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DECISION MAKING FOR SMALL AND MEDIUM-SIZED ENTERPRISES

Conference Proceedings

May 13th - 14th 2021

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Dear reader,

this is proceedings from the 3rd edition of the international scientific conference DEcision Making for Small and Medium-sized Enterprises 2021 (DEMSME 2021, go.slu.cz/demsme) that should have taken place in Congress & Wellness Hotel Olšanka in Prague. Unfortunately, due to pandemic and government restrictions we had to shift the programme of the conference to the virtual form in MS Teams environment. This 2-day conference is organized by Department of Business Economics and Management and Department of Informatics and Mathematics of Silesian University in Opava, School of Business Administration in Karvina. DEMSME 2021 is a regular meeting of experts from universities and businesses interested in the theory and application of decision-making in research using the methods from business economics, management, marketing, artificial intelligence and mathematics disciplines in the current practice of small and medium-sized enterprises (SMEs). This year's edition reflected particularly on lessons learnt from Covid-19 pandemic in 2020-21 period.

We are very pleased that we have obtained 110 submissions and we have selected a total amount of 84 original contributions after rigorous double-blind review process and evaluation. The authors gathered from 14 countries, namely the Czechia, Slovakia, Moldova, Romania, Hungary, Spain, Croatia, Greece, India, Tunisia, Latvia, Iran, France, and Poland. From the 84 papers are 73 papers included in our conference proceedings, the best papers will be selected for the publication in our 11 partner journals (e.g., Journal of East-West Business, European Journal of International Management, Scientific Annals of Economics and Business, Organizacija, Central European Business Review, etc). Total number of papers from before-mentioned areas indicates that these fields are interesting from a scientific point of view and in general, there is a plethora of issues that require a specific scientific approach to solving them and strengthening the competitive advantages of SMEs.

The papers link scientific activities with up-to-date practice dedicated to SMEs and beyond. The emphasis in this edition of DEMSME was given, e.g., to the theory of acceptance and use of technology, e-commerce, buyers' preferences and management strategies during pandemic, creating sustainable competitive advantage, shaping and improving the human resource management, behavioral aspects of decision making in SMEs, innovation and knowledge sharing, brand support and online marketing, ICT tools and their use in Industry 4.0, process mining, robotic process automation, mathematical models, business intelligence, exchange rates, consumers' behaviour and business performance measurements. Most of the papers brought up-and-coming case studies, which could be implemented immediately into SMEs practice. The conference was enriched by 2 keynote speeches delivered by Václav Švec and Jana Švecová (Czech University of Life Sciences Prague, Czechia, with the topic „Team Academy implementation in the Czech Higher Education context“), and Tomáš Gavlas (TietoEVRY, Czechia, with the topic „Predictive Analytics: Unified solution for real-time application and business process performance visibility and insights using machine learning“).

Great thanks to the scientific committee of the conference, its organizers and, last but not least, its partners and sponsors, alongside the Silesian University in Opava, School of Business Administration in Karvina, also European Structural and Investment Funds (Operational Programme Research, Development and Education), Ministry of Education, Youth and Sports

of the Czech Republic, Veolia company, IT Cluster of Moravian-Silesian Region (Czechia), Czech Society for System Integration and European Council for Small Business and Entrepreneurship (ECSB). We believe that the 3rd edition of the DEMSME conference was once again successful and we look forward to its repetition in two-year cycles next to other traditional scientific conferences organized at the Silesian University in Opava, School of Business Administration in Karvina, Czechia.

Roman Šperka, Petr Suchánek
Executive Co-Chairs, DEMSME 2021

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EFFECTS OF THE CORONAVIRUS CRISIS ON BUSINESS MODELS

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Abstract

This paper analyses the impact of COVID-19 on the identification of changes in the firm's behaviour through adaptability and adjustment of the business model. The logic of the focus lies in the adaptability of business in response interconnection of pandemic triggering events in the connection of the reaction of managerial decisions. The paper aims to define the level of impact of changes of businesses in elements of the Canvas Business Model. Subsequently, we examine how businesses can do to respond quickly to the stimuli, and the formation of subsequent specific measures and innovative strategies of businesses. Methodologically, the paper combines a search of available resources and the subsequent impacts of changes in the business models of firms based on a search within the ongoing changes. Next, an exploratory quantitative research design based on interviews with key informants of family/non-family businesses in Czechia is accomplished. The period before and during the pandemic (2019 – 2020) is monitored. Data are processed using the econometric software EViews. The Mann-Whitney U test is used in the statistics. The proposal and discussion formulate business model shifts for resilient and flexible approaches to capturing business value.

Keywords: business model, business model elements, COVID-19, crisis, family business

JEL codes: D22, M21, O33

1. Introduction

Europe is still under pandemic pressure. The outbreak of the COVID-19 pandemic has forced many businesses to change, as there has been an unreasonable disruption of economic activity in most sectors. New, more contagious variants of coronavirus are currently being developed around the world, which is exacerbating the epidemiological situation and leading to a re-blocking of social contacts and company activities. Overall, not all areas are affected in the same way and companies' hope is placed in a vaccination strategy that seems to allow for a gradual easing of economic activity, where it is necessary to stimulate demand and revive the outlook for the global economy (European Commission, 2021).

Currently, we see that many businesses, whether family or private, face many short-term challenges where they have to deal with health and safety, the workforce, cash flow, supply chains, consumer demand, and sales (Donthu and Gustafsson, 2020). Changing global markets are shrinking and managers/owners are looking for ways and means to sustain production through new processes, technology, materials (Cohen, 2020), there is potential in business model shifts to capture new values, which can be delivered by new distribution channels to more stable or flexible segments. However, successful orientation in these challenges does not guarantee a promising future, so our study aims to define the level of impact of changes in the behaviour of companies in elements of the Business Model

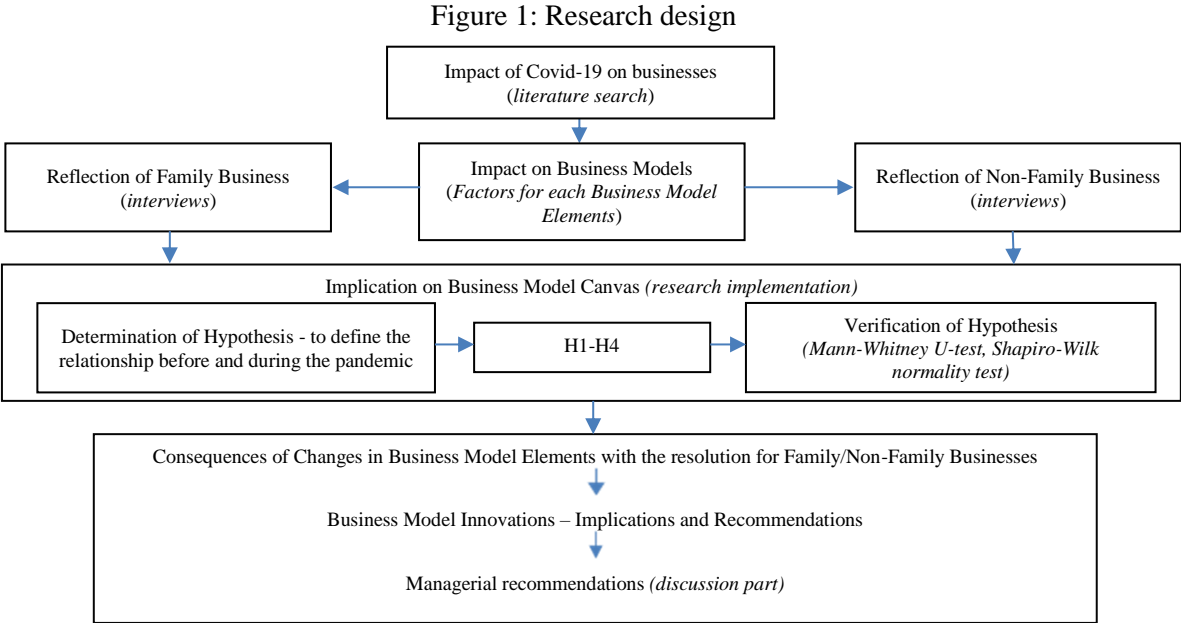
Canvas (BMC), where different approaches and management bring different solutions to adapt to new market conditions.

The limited studies that exist suggest that the major historical pandemics of the last millennium have usually been associated with a subsequent generation of return on assets (Jorda et al., 2020). In the post-pandemic period, we tend to be less interested in investing and more interested in saving our capital, which results in reduced economic growth (Donthu and Gustafsson, 2020). In this context, these approaches are more typical of family businesses (FB) than large private corporations. We see the potential for capturing changes in the innovation of business models and generalized recommendations that can help a faster response to build a sustainable and resilient business model. We follow up on Seetharaman (2020), which points out the need to focus on business model shifts and also what agility and dynamic capabilities can help companies use their potential for change caused by the COVID-19 crisis. The novelty of the study is that a similar study was not performed on a sample of Czech businesses. Foreign studies already exist, examining impacts in the form of case studies, but our study is based on the methodology of business models and its elements, where such research, including current market conditions, has not yet been conducted.

The study is structured as follows. First, we present reviews in articles COVID-19 on business which allows businesses to share knowledge, insights, and decisions to change business models. Next, to understand the current situation, we revised the actual papers resulting from the pandemic crisis in connection with the impact on business, especially in Czechia. Then, the article extends this connection to include comparisons between family/non-family businesses. Furthermore, the dependencies between individual elements of business models were investigated, where research design and methodology define the logic of research. Thereafter, a discussion part is presented, we intend to preserve the mutual impact of the pandemic on businesses, which subsequently results in the prioritization of changes in business models.

2. Research design and methodology

The methodology applied in the study is structured around mapping the available literature related to the impact of the pandemic on businesses. For these purposes, a research design (Figure 1) was created, which operationalizes the logic of the whole study. Further, to add empirical evidence, we examine the impact of COVID-19 on businesses. The elements of Business Model Canvas (BMC) by Osterwalder and Pigneur (2010) were incorporated.



Source: own processing

BMC was taken as the basis for this study, as it allows monitoring changes in the nine elements of this model (customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partners, and cost structure) and also describe value creation for key stakeholders and shareholders (Osterwalder and Pigneur 2010). We believe that it is the use of BMC that is appropriate, because the crisis can often give rise to new business models that include new capabilities, new value propositions, and new innovations in business model elements, and address new customer needs (Ritter and Pedersen, 2020). Next, hypotheses (H1-H4) were determined that reflect the mutual relationship before and during the pandemic on businesses.

We collected data during the period from 07/2019, to 12/2020, through a snowball sampling technique (Bo Liu et al., 2014). A total number of 100 businesses from Czechia participated in the survey and provided their perspective. The research tool of the survey is a structured questionnaire lasting about 15 minutes. According to Sudman (1976), the research sample in the survey consists of a total of 100 businesses is sufficient. A descriptive analysis approach was employed for data analysis (Shafi et al., 2020). The research results are a source for concessions in changing individual business models with the resolution for family/non-family businesses.

3. Literature review - COVID-19 impact on businesses

The literature review is mainly focused on the general impact of COVID-19 on business, because it is necessary to identify the main consequences, which can then be linked in more detail to the individual elements of the business model in our research. To define the importance of the business model, Ritter and Lettl (2018), argue that there are five meta-theoretical perspectives on business models: business-model activities; business-model logics; business-model archetypes; business-model elements; and business-model alignment. Therefore, it makes sense for us to grab the way of alignment of business model, which includes interdependence from the customer segment, through the creation of value propositions to the definition of costs.

This part is structured as follows. Firstly, it defines the basic impact of the pandemic on the European Union in terms of key indicators. Next, it defines the role of FB, which are a major part of almost 90 percent of annual global GDP (De Massis et al., 2018). The mapping of the current impact on FB is also specified for the conditions of Czechia, where subsequent empirical research is currently focused on them. On the other hand, we are convinced that the rise of large (private) corporations in industrialized countries (which Czechia is one of) is significant and can be considered accelerators of overcoming poverty and strengthening economic power (Jenkins, 2007). Therefore, large (private) corporations differ in their structure, capital adequacy, and background of resources, which can be "more easily" corrected compared to FB. These sources can be a more diverse pleiad for discovering and structuring changes, where it has been confirmed, e.g. family businesses exploit significantly fewer opportunities than non-family businesses (De Massis, Eddleston and Rovelli, 2020).

The consequences of COVID-19 are worldwide, not just in the economic field; affected society as a whole, leading to dramatic changes in business and consumer behaviour (Donthu and Gustafsson, 2020). The European Union has been hit by one of the biggest economic shocks of decades. The consequent effects are therefore also unparalleled. The government measures in place since the outbreak of the COVID-19 pandemic have almost halted the successful operation of companies, which has been hampered by restrictions. It is possible to identify the main impacts in the area of, for example, differences in recovery, which will vary across the EU (due to differences in economies, national policies, and health care). Another impact is to define the impact of individual government measures (fiscal support and liquidity assistance) to avoid layoffs and protect businesses (European Commission, 2020).

FAMILY BUSINESSES DURING A PANDEMIC

The importance and role of family businesses are underestimated, even though they are considered the basis of the global economy (KPMG, 2020; Xi et al., 2015). FB make up two-thirds or more of businesses worldwide, representing 70 to 90 percent of annual global GDP and 50 to 80 percent of employment (De Massis et al., 2018). Due to their ubiquity in the business environment, the role of FB in the economy as employers, wealth creators, and innovators are significant

(Filser et al., 2016). A common feature is that FB usually have a long-term horizon (Miller and Le Breton-Miller, 2005) and intend to pass on a sustainable firm to future generations (Bauweraerts, 2013). Therefore, family members tend to be willing to sacrifice short-term financial gains for the long-term survival of their family's heritage (Lins et al., 2013; Minichilli et al., 2016). Family businesses are also characterized by the use of their liquidity, low levels of debt costs (Aronoff and Ward, 1995), and also build on their "patient" capital, which are funds that can be invested without the threat of liquidation (Dobrzynski, 1993). As a result, in times such as the economic downturn or the financial crisis, FB can better mobilize their resources to keep their businesses more resilient (Amann and Jausaud, 2012) and tend to outperform non-family businesses (van Essen et al., 2015; Minichilli et al., 2016). These features will also be the subject of research from the point of view of resources as one of the elements of the business model. It is a comparison between family and non-family businesses that points out the differences.

Furthermore, pandemic situations come along with unexpected challenges that usually require quick and prompt decision-making (Heath, 1995; Ritchie, 2004). This is the prerogative of family businesses that are very good at quick and creative responses (Ward, 1997) in the current situation. They are based on centralized decision-making and state of ownership (De Massis et al., 2013), where individual processes are direct and less complicated with emphasis on the position and powers of management in the interests of the company and the family (Tagiuri and Davis, 1996; Carney, 2005). Currently, many FB have responded decisively and quickly to the ongoing pandemic, for example in the form of disease mitigation measures, cost reductions, generating modified logistics routes, and overall correcting future activities to the best extent possible (Kraus et al., 2020). Therefore, each of these FB faces a unique set of challenges. One of the most difficult is what happens to a business if the original representative leaves the company. This was one of the burning issues for the subsequent aging baby boomer generation of business owners and with the impact of COVID-19, it became even more pressing. The pandemic is certainly another test of the competitiveness of FB. The general pressure is on building natural resilience and accessibility to rapid innovative change and resilience.

We argue that the pandemic and its social and economic repercussions trigger particularly significant challenges for FB. In this context, we can agree with the five assumptions that Covid-19 has on family businesses, where according to De Massis et al. (2020) needs to be addressed. First, FB scholars assume leadership succession as a process within the family (Cabrera-Suárez et al., 2001), therefore it is necessary to focus in research on the issue of how the goals and motivations of FB change during and after Covid-19. There we see the connection and focus of our research that can reveal these connections. Second, the family's presence in the company is expected to ensure stable and trustworthy long-term relationships with external and internal actors that will receive significant social capital (Arregle et al., 2007). Therefore, research on relationships and dependencies with customer segments, as sources of income and relation with actors, plays an important role here and is also represented in our research. Third, research hypothesized that non-economic family goals and preservation of socio-emotional wealth are drivers for FB decision-making (Gómez-Mejía et al., 2007). Therefore, to identify internal motives, our research was directly focused on business owners, when in this context, key resources and key activities for which management is responsible were examined. Fourth, there is an assumption that FBs are promising and growth-oriented for generations (Miroshnychenko et al., 2020). Therefore, our research is focused on identifying differences and dependencies in the business model element in realizing the importance of key resources and key activities that can generate another element in the form of added value. When the positive effect of added value is assumed, then it increases sales and is the basis for sustainability establishing and growth for future FB generations.

CZECHIA BUSINESS COVID-19 IMPACT

Economic growth in Czechia reversed sharply in 2020 as the pandemic brought significant disruptions, particularly to the country's large export-oriented manufacturing industry. The real GDP declined by 5.6% in 2020 and the recovery is expected to take hold in spring 2021 and GDP is forecast to reach its pre-crisis level by the end of this year (European Commission, 2021). Czechia has been severely hit by the second wave of the pandemic. Restrictions introduced in October 2020 likely impacted domestic demand and investment, but due to strong foreign demand, economic activity is estimated to have increased in 2020-Q4 by 0.3% compared to the previous quarter. Private consumption is likely to be the

main driver of the economic recovery, reflecting a stable situation on the labor market, pent-up demand, and a decline in the high household saving rate (European Commission, 2021).

To capture the impacts and changes that must precede the corrections of the business model, we use the results of the IPSOS research, which took place in Czechia in 2020 among members of the association of family businesses. The research showed that 90% of FB had to respond to the crisis by introducing measures to increase revenue or reduce costs. 60% of companies had to accept traffic restrictions. One-third of companies used state programs. An additional two-thirds used family savings to overcome the crisis. In the coming period, 80% of company representatives plan to invest in the company's development - most often in the purchase of new machines and in employees. Most companies expect a recovery within one year. This research also confirmed the hypothesis that the current situation in FB leads to closure and handing over the company to successors remains the main theme and goal of most companies (IPSOS, 2020). The research confirmed that changes are needed, which can be the basis for operationalization and correction of the business model. FB have trouble grasping the changes and translating them into a clear strategy to help them innovate business models by defining and allocating key areas that need to change and adjust. As the researchers pointed out, companies had to adjust their costs in the area of using their savings (54%), reduce the number of employees (32%), implement new work procedures (31%), negotiate deferred payments or reduce liabilities to banks (27%), change of orientation to other products or services (17%), the introduction of new technologies (11%) (IPSOS, 2020).

All these contexts are the basis for subsequent research, which confronts the main parts of the business model before and during the ongoing pandemic. The findings are a valuable source for the correction and formulation of new innovative business models, which are also easier to apply in the practice of FB. To determine the interrelationships between the individual elements of the business model in the comparison of the period before and during the pandemic, the following research is designed to capture the changes and challenges of not only FB in the areas of adaptation to the current situation where the basis for comparison is just used BMC.

4. A descriptive analysis approach

The analysis of the dependencies of selected elements in Table 2 is examined using statistical methods. Specifically, the Shapiro-Wilk normality test and the Mann-Whitney U test are used (Allbright, 2013). Methods of analysis and synthesis, abstraction, comparison, and deductive-inductive approaches been applied in the study. Authors have used the Shapiro-Wilk normality test to verify elements of Business Model Canvas (BMC). A simple random sample was removed from Table 2 and was checked in Table 1. The Shapiro-Wilk normality test verifies the provided sample sizes $N > 20$. The statistic factors in Table 2 were calculated according to the Mann-Whitney U test so that it would be possible to understand the elements of BMC of the key factors of family and non-family businesses. The Mann-Whitney U test is a non-parametric statistical test that can be used in place of an unpaired t-test. It is used to test the null hypothesis that two samples come from the same population (i.e. have the same median) or, alternatively, whether observations in one sample tend to be larger than observations in the other. Although it is a non-parametric test it does assume that the two distributions are similar in shape.

Though the dependent variable is conditional on many other variables, some only in combination with other factors, these compounds have been carefully selected, which would well describe the BMC and the phenomenon of the period before and during the Covid-19 pandemic. Data acquisition has been quite challenging, owing to the reluctance of the business owners to share data, as part of their privacy policy. The problems in continuing with business activities and the adverse market environment, due to the restrictions imposed by the government, have made the owners/managers less cooperative towards surveys. Many companies are still not geared up to turn around in the current situation. Some has changed their outlook towards their business and priorities. The situation of the COVID-19 pandemic, which has hit the business sector hard, sets a whole new direction for a business (European Commission, 2021).

All the nine individual elements of BMC have not been covered in the study and those, that are mentioned, have insufficiently explained the dynamics between BMC factors in the Covid-19 period. The study does not define the functional and non-functional elements of BMC (Pavlovski and Zou, 2007) in its entirety. Functional elements are the building blocks that is the basis for any company's business model.

Non-functional elements are those that are included in the business model but may not be directly beneficial to the business model in the current conditions, for example digitisation is also integral in this period for any kind of business. The study does not define all these building blocks of a business model, which should be adopted and incorporated in the current scenario to the interest of business viability. The study gives an idea of the preferable functioning of the analysed elements of the business model.

To identify the impacts before and during the pandemic, a framework of nine elements of BMC was used, where we are currently interested in the context of changes in segments, how companies generate revenue, and what changes can be seen in approaches to human resources. These areas were selected as the important ones and the subsequent hypotheses concretize the given relationship and connection between BMC and hypotheses.

The mentioned hypotheses H1-H4 are alternative hypotheses H_1 to hypotheses H_0 :

- *H1: Customer segmentation is well known during the Covid-19 pandemic.* The level of development of family and non-family businesses is influenced by customer segments. Businesses cannot survive in a long-term perspective without customer segmentation. Also, channels of BMC, play an important role in approaches and communication with targeted customer segments.
- *H2: Businesses generate growing revenue during the Covid-19 pandemic.* Government restrictions have affected the revenues of companies that generate it from their customers. The segmentation of customers and their repurchases is integral. It can be assumed that purchases generate income and only with subsequent repurchases, high margins are generated.
- *H3: Financial resources are generated by growing customer segments during the Covid-19 pandemic.* Financial resources ensure a more advantageous market position. The availability of financial resources provides a competitive edge.
- *H4: Human resources help in the expansion of customer segments during the Covid-19 pandemic.* Employees are among the most important and valuable assets of the firm. They contribute to the realization of the expected goals, they are motivated and qualified to perform the agreed work. In general, they are one of the most important drivers of long-term growth.

4.1 Research results

Given the common results of the questionnaire surveys, it is possible to determine the basic common factors of the elements of BMC in Table 2. The study is based on the research of empirical literature, as well as generally known characteristics and relationships of the factors that are valid in the real conditions. The choice of elements of BMC in Table 2 is based on the common factors business model according to the study by Viceli and Tolfo (2017) or Kim and Im (2012). The factors examined are indicators that have a clear explanatory power, are in line with the firm's terms, follow up on the firm's strategic objectives, and are focused on innovations Business Model Canvas (Viceli and Tolfo, 2017). Based on the data obtained from the questionnaire survey, significant elements of BMC were mapped, which are evaluated by using Microsoft Office Excel and econometric software EViews (more e.g. Allbright, 2013; Bin Othman and Heng, 2014). The normal distribution was verified using the Shapiro-Wilk normality test in Table 1.

Table 1: Shapiro-Wilk normality test

Businesses	Family	Non-family
Shapiro-Wilk test	0.003257-0.04721	0.01562-0.04564

Source: own processing

The performed Shapiro-Wilk normality test does not assume the normality of the data (Table 1). There is an explanation that the nature and scope of business models are distributed normally, but immediate government restrictions on business activities during the period under review have shifted the distribution toward non-normal distribution. Although the assumption of normality, Table 1, confirmed by the Moivre – Laplace Theorem (Allbright, 2013), the authors of the article used

a nonparametric Mann-Whitney U test (Bin Othman and Heng, 2014). Based upon the collected data, we received the following statistics as shown in Table 2.

Table 2: Selected elements of the Canvas Business Model

Business Model Element	Researched Factor	Family b.	Non-family b.
		p-value	p-value
Customer Segments	We performed segmentation according to sales and turnover	0.039	0.099
	Significant customer segments are business to business (B2B)	0.047	0.072
	Significant customer segments are business to consumer (B2C)	0.029	0.075
	We are aware of the needs of each segment	0.028	0.027
	We know the motivators of each segment	0.030	0.030
Offered Value	We provide solutions to a real problem in the market	0.096	0.071
	Our offered values (products/services including their properties, appearance, design) are well aligned with the needs of customers	0.015	0.022
	Our offered quantitative values (price, speed of service, etc.) are aligned with the needs of customers	0.016	0.025
	Our offered qualitative values (design, quality, functional use, usability, etc.) are aligned with the needs of customers	0.009	0.017
	Our channels (communication, distribution) facilitate the co-creation of customers	0.064	0.010
Channels	Customer segments in B2B can take advantage of our offer through various channels	0.039	0.099
	Customer segments in B2C can take advantage of our offer through various channels	0.037	0.075
	Channels are efficient and effective	0.022	0.029
	Customers can easily see our channels	0.030	0.053
	The channels are well adapted to customer segments	0.058	0.088
Customer Relations	We have strong relationships with our customers	0.022	0.014
	Our brand is strong	0.040	0.046
	Our services are tailored to customers	0.019	0.075
	Our customer relationships meet customer expectations	0.007	0.028
	We are aware of the financial costs of establishing and maintaining customer relationships	0.049	0.050
Sources of Income	We are convinced of our pricing strategy	0.003	0.010
	Our revenues are predictable	0.000	0.000
	Our incomes are diverse	0.019	0.052
	Our incomes are sustainable	0.000	0.001
	We know which customer segments generate the most revenue	0.002	0.008
	We know which value offer generates the largest sales	0.003	0.008
Key Resources	We have a high turnover	0.000	0.002
	Key resources are used efficiently	0.001	0.006
	Key physical resources (property, machinery, real estate, etc.) are used efficiently	0.001	0.006
	Key human resources are used efficiently	0.000	0.001
Key Activities	Key financial resources are used efficiently	0.002	0.013
	Key activities are carried out efficiently	0.000	0.009
	Key activities are carried out effectively	0.001	0.011
	The activities needed to provide services/products are clear to employees	0.011	0.034
Key Partnerships	Activities are aimed at the company's strategic goals	0.001	0.040
	If necessary, we are focused and cooperative with the partners	0.023	0.035
	The relationship between key partners and channels is clear	0.014	0.007
	The relationship between key partners and customer relationships is clear	0.007	0.011
Cost Structure	We store key knowledge in our firm	0.061	0.039
	Our activities are cost-effective	0.000	0.000
	Our cost structure is properly aligned with our business model	0.000	0.004
	We know which key activities are the most expensive	0.012	0.027
	We know which key resources are the most expensive	0.006	0.025

Source: own processing according to EViews 10, indicates the significance level of 5%

4.2 Hypothesis verification

To evaluate the data and verify the hypothesis, it is then processed on individual elements of the Canvas business model in Table 2.

H1: Customer segmentation is well known during the Covid-19 pandemic. For customer segments, the beneficial value lies in the value offer. This leads to the need for businesses to think about competitive advantage. For all firms, the choice of products or services responds significantly to the needs of the customer segment (elements: customer segment and value offer). Segmentation according to B2B and B2C customer requirements is significant only for family businesses (elements: customer segment and value offer). Businesses are subjectively afraid of problems: existential, organizational, and performance, even though they have enough employees. This is an objectively sufficient understanding of customers and employees of non-family businesses (elements: customer segments and key resources). Even without significant customer segmentation, non-family businesses achieve sustainable growth in sales and turnover (element: sources of revenue).

Based on questions and interviews, it was found that family and non-family businesses use digital technology on the IT platform as communication channels. The reason for the rapid growth of the digital environment and digitization is the strong and rapid disruption of the Czech market environment by government restrictions (European Commission, 2021; Government of the Czech Republic, 2021). Therefore, the only communication channels which can reap benefit to any business is through digital environment. To raise the quality and services of products or services during the COVID-19 pandemic, information technology has been a great support towards the continuous development of firms. With the COVID-19 pandemic, the relationship between automation and digitization is getting deeper. During the pandemic, information technology has become a necessity to every household for their essential and luxury needs. It is an immediate requirement for all businesses to survive, catering to different segments of customers. Although owing to the situation created by COVID-19, companies have partially accelerated the digitization, it was reflected only in family businesses (element: customer segment). They have strengthened the connection between the software and the entire IT system and are better prepared for the home office. It's probably the family firms who used the IT facilities, even before the COVID-19 pandemic. The reason is also the use of home or family facilities for business activities. Generally, the channels are leveraged, only as a communication and sales tool. Due to the cooperation of third parties, distribution channels cannot be evaluated for firms. Information technologies are used mainly for digital media and are significantly prevalent in family businesses (element: channels). *The hypothesis is confirmed for family businesses.*

H2: Firms generate growing revenue during the Covid-19 pandemic. The arterial sources of income of the family businesses are value offers, which are generated based on the needs of the customer segments (elements: customer segments, value offer and sources of income). Firms that did not have a sufficient investment cushion before the COVID-19 pandemic is at risk. The current instability and suspension of innovation without investment will lead to the demise of the firms. It can be assumed that the stagnation of innovation influenced by high wages or the lack of capable employees may lead to the unsuccessful development of enterprises, it is not confirmed in any of the firms. Businesses with a proper management principle, attract investors through various forms of partnership. Conscious managers are aware of the importance of key employees, without whom they cannot function effectively. The offered value, possibly even at a lower price, satisfies the needs of customer segments, especially of family businesses (elements: customer segments and value offer). Although, there is a risk for the firms which do not have the required cash flow in operating, investing, and financing. They certainly do not prefer larger investments, when they have to borrow from foreign sources, which may not be secured and may not ensure the desired returns in time. The subject of the study is not the analysis of financing - own and foreign, through subsidies or other available financial resources in the situation of COVID-19. *The hypothesis is confirmed for family and non-family businesses.*

H3: Financial resources are generated by growing the customer segments during the Covid-19 pandemic. The key source for the operation of the firms are the information technologies themselves on various digital platforms. This requires human resources that take care not only of customers but also of the development and operation of information technology. Current government restrictions force the use of digital technologies. This significantly affects customer segments using information technology through various digital media. This achieves higher sources of income and a higher return on investment

or cost optimization, including an increase in the quality of employees. Confirmed for family and non-family businesses. The readiness of firms for unexpected changes and the requirements of the business environment forces companies to be prepared for changes associated not only with the field of human resources and information technology but also to be prepared for opportunities that support the competitiveness of the firm. However, it may require support through financial resources. In particular, the negative development of the situation around COVID-19 may slow down both the financing of innovation, product research and development, and its development for some firms. It is not possible to accurately identify the financing of firms, but it can be assumed that key financial resources are used efficiently. Confirmed by the sustainability of growing incomes for family and non-family businesses, Table 2. Sustained growth in sales and turnover are indicators for the business investment. Of course, there are several firms that are more or less affected by the COVID-19 situation. It is not a reason for firms to be inactive and waiting for what will happen. *The hypothesis is confirmed for family and non-family businesses.*

H4: Human resources help in the expansion of customer segments during the Covid-19 pandemic. The competencies and motivation of employees determine the results of the business and management of firms. Targeted human resource management, significantly affects the performance of family and non-family businesses (elements: key resources and key activities). Human resources thus play an important role in knowledge and creativity. They participate significantly in achieving higher revenues and returns on business investment or cost optimization. Confirmed for family and non-family businesses (elements: sources of income, key resources, and key activities). Hence, the current economy will not come to a halt completely. It is crucial to increase the technological sophistication of companies in connection with increasing the added value and productivity of employees (elements: key resources and key activities). Human resources also play an important role at the level of communication, stakeholder relationship, including immediate barriers put into existing business systems and practices. *The hypothesis is confirmed for family and non-family businesses.*

5. Discussion – Post-COVID-19 business models changes and innovations

Currently, every business is facing the same question: *What's going to happen when the pandemic is over?* Changing customer behaviour, unforeseen state interventions, global demand constraints, etc. evoke the question: *Will that growth sustain?* Neither family businesses nor large private corporations are spared (except when companies have found their market potential). An interesting finding is that businesses are still able to generate some growth even if it is limited. This causes that when the pandemic is over, many companies will find that their business model has been disrupted in fundamental ways. Therefore, it is desirable to make rapid changes in the elements of the business model, to create space for its innovative potential, so that it can withstand current changes and help operationalize business for business owners.

Business owners need to ask themselves the question: *How does your business really make money?* This is the basis for the logic and modification of existing BMCs. As research has shown, segmentation, finding the value offered and proper communication with customers is essential. Concentration must therefore go to the element of value offered and customer segments, where a strategy for realizing changes in a customer behaviour look like after the pandemic can be. For business owners/managers, this is a moment when it's critical to adopt a mindset of learning and discovery.

The fact is that the business models of a company that are questioned in times of crisis, such as COVID-19, are at different levels according to the industry. Some family owners considered it more appropriate to adapt to the same business model; while for others it seemed inevitable to think of new ones. Generally, businesses have to ask the basic *questions of value creation, to whom it is offered, how it can be delivered to the right segments* in the current conditions (possibly, visionary when the pandemic ends). Family businesses are closer to this approach than large corporations because are stronger in family governance (Deloitte, 2019) react more quickly (make decisions) to ongoing changes, use their "patient" capital so as not to reduce their liquidity.

Based on the findings, we recommend to the corporate sector a strict orientation to digitization, especially in the part of channels, where it is necessary to adequately communicate and bring product and services closer to customers. It is about strengthening the approach to the customer, very intensive relationship, this seems to be fundamental and if companies develop these mechanisms, they are able

to generate revenue. Emphasis on adaptation for example in the area of reducing operating costs, creating direct communication with customers, strengthening the human resource are key factors for market survival. For the above reason, there will be a demand for new and innovative business models. Therefore, it is desirable to develop a shift in the business model, which are changes in the factors and logic of specific elements of the business model. A viable business model is a basis for the long-term survival of businesses (Magretta, 2002).

Which businesses are innovative, more flexible, and faster to respond to ongoing changes? Based on the results of an empirical survey, the authors identified that FB in particular are more innovative and adapt to customer needs through various communication channels. Businesses are moving from convective approaches to digital ones (Paiola and Gebauer 2020, Naglič et al., 2020). The finding is consistent with the results of the study Pourhejazy (2020) claims that the online environment has brought about new possibilities for innovation and radically changed the business activities of companies. Therefore, channel-focused elements such as digital media through information technology have gained importance. Then empirical investigation revealed that the barriers to innovation in non-family businesses are customer segments and channels in BMC. We confirmed that these elements are insufficient elements of BMC in non-family businesses, which could not secure sufficient income. Their income is also limited due to the lack of adequate support and funds for implementing information technology, dearth of government support or the quality and development of human resources. The impact of economic conditions and cooperation among business partners, which can be described as insufficient elements of national firms (Indrawati et al., 2020).

Despite knowledge of the national environment and the domestic customer, the placement of a product or services in the market could not be achieved to its full potential, due to lack of proper implementation of information technology. Therefore, it did not add value to the products or services offered by non-family businesses, to build sustainable and strong customer relationships with a detailed focus on key resources. These findings are underlined by the IPSOS (2020) research results, which states that 47 percent of Czech family businesses are planning investments in new technologies.

What potential do businesses see in human resources during a pandemic crisis? Systematic development of human resources and readiness of companies increases the potential of firms to adapt to continuous changes in the market conditions and requirements in the business environment. Agility towards changes with the help of information technology, combined with the ability and motivation of customer segments through digital media, provide the company with the necessary competitiveness in the form of innovation with the support of human resources. IPSOS research (2020) confirmed this, when investments in human resources are in second place in investing plans, specifically in 39 percent of family businesses. The solution to current challenges and problems of the market environment is, innovation, continuous generation of active customer segments and manpower optimisation. The results of the empirical survey suggest, the effective development of BMC and the creation of suitable conditions for family and non-family businesses, based on the already available web application Strategyzer (2020). It is confirmed that business strategies, structure, policies, practices, and processes of a company harmonized together, are the basis of business model, which triggers innovation and prepare the company for a longer phase of multi-dimensional business. Among other things, the development of specific needs of companies for example: technology and application, should be linked to the business goals of the company, presents a foundation for new ideas and is a smart investment to gain a competitive advantage in the market (Osterwalder and Pigneur, 2010).

Generally speaking, entrepreneurial activities in the market environment are actively developed mainly by family businesses such as the ability to: communicate with customers and employees, the ability to solve unexpected problems arising in connection with the COVID-19 pandemic, acquire new knowledge of the market environment or information technology or the ability to apply innovation that confirms their readiness, development, and growth in a market environment. However, innovation takes many forms and its perception in the business model is different.

6. Conclusion

To conclude, the differences between family businesses and large corporations, based on the results of the research, it follows that the approach at FB in the field of customer segmentation is well known during the Covid-19 pandemic. Both groups are then able to generate revenue even in times

of pandemic, although this requires changes in the structure of business models and ways of generating income. Next, was confirmed that financial resources are generated by the growth of customer segments in the number of customers in given segments during the Covid-19 pandemic, which testifies to the adaptability of businesses and the willingness for change but with different motivations for both FB and large corporations. Finally, the assumption was confirmed that companies are turning their concentration to human resources, which they consider to be the main source for overcoming the crisis and the consequent competitive advantage.

The contribution of the study can be divided into several areas, the first, is the benefit for companies that participated in this study, when this study served as a stimulus for change, to realize what entrepreneurs did and what they could improve in elements of the business model. The second benefit is the transfer of findings for subsequent research, which identified differences between family and non-family businesses. Specifically, it is a cooperation with the Czech Association of Family Business, where this research methodology can be used for wider involvement. The third benefit is a scientific approach that examines current approaches and changes in the behavior of businesses, which can be linked to these procedures in a broader, for example, international research framework. Businesses cannot ignore the interests of stakeholders in the new ecosystem; on the contrary, it is necessary to involve in interconnection and creating, to structure the fundamental values and mechanisms for an agile response to survival in the situation after a pandemic (Silva and Hirschheim, 2007). The practical contribution of the paper is in the feedback for the businesses involved in this study, when already during the research, and especially after it, some subjects showed interest in the results of the research. Many companies have used the framework of a business model to realize how they actually generate value and deliver it to customers, as well as for the necessary changes that managers/owners must make both during and after the pandemic. It is essential to realize how the businesses operates, what it has changed and what else it can change. This forms the framework for subsequent managerial decision-making. The general recommendations resulting from the findings are directed to the use of the media to clearly and effectively communicate values and maintain connections with customers, the community, and the ecosystem. The post-COVID period opens up a new challenge for sustainable business transformation (Cohen, 2020) and strengthens a more resilient supply chain and production and trading system (Sarkis et al., 2020). Furthermore, it is necessary to unify the activities with their purpose and values, gaining support and consensus among internal resources. Use digital knowledge and solutions to stay ahead and rethink investment strategy in terms of capital generation and liquidity levels.

The study provides empirical evidence that results in questions that each business needs to clarify and determine its business model and its linkage to ecosystems. The limitation of the research lies in the limited number of participating businesses, which is caused by the reluctance to participate in the research due to the pandemic and also the limited resources of the research authors. Subsequent research, which can be carried in cooperation with other associations of businesses will have a higher added value. We contribute to the debate on the possibilities of using business modeling to simplify and operationalize business activities so that businesses can quickly adapt and adjust to new conditions in response to the ongoing pandemic. These conclusions are generalized due to the broader implementation level of businesses, stakeholders, and owners. Finally, we would like to encourage researchers to carry out further studies defining the impact of a pandemic on elements of business modeling that reflect the impacts of all business entities.

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MULTI-CRITERIA CLASSIFICATION OF SPARE PARTS - CASE STUDY

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Abstract

Classification of spare parts plays an important role in the effective control of the warehouse management systems. The traditional method of inventory classification is ABC. It may not be an accurate method for classifying spare parts inventory since it only considers the monetary value of annual consumption. Other criteria such as lead time, price, consumption rate, cost of missing, degree of sensitivity, etc. should be involved in spare parts classification. In our research, we have tried to use multi-criteria in the classification of spare parts in a Medium-sized enterprise. Analytic Hierarchy Process is applied to classify gas turbine spare parts in the company. Then, cost-benefit analysis is performed for inventory management. Finally, the results of the multi-criteria classification are compared with the results of the ABC single-criterion method. While some parts are prioritized as critical and sensitive parts in the multi-criteria method, they are considered trivial parts in the single-criterion approach. The novelty of this study is not only applying multi-criteria for spare parts' classification but also the application of a well-known managerial decision-making method for the detailed quite specific industrial area.

Keywords: Analytic Hierarchy Process, Classification, Multi-Criteria decision making, Sensitivity, Spare Parts.

JEL codes: C44, D61, D79

1. Introduction

Accessibility and reliability are the key aspects of manufacturing organizations. Minimizing the time of failure of machines in a manufacturing plant is an effective step to increase efficiency. The availability of spare parts at the time of machines' failure reduces the time of failure. Also, maintaining a certain number of spare parts inventory is required to successfully carry out the maintenance process. While a lack of spare parts leads to production stoppages; increasing inventory levels also increases storage costs. Therefore, determining the optimal inventory level, which spare parts should be stocked and which ones should not, is one of the main challenges for inventory control administrators in organizations (Stoll et al., 2015).

Different inventory control actions are required for the two basic types of maintenance, preventive or scheduled maintenance, and unscheduled repairs. For preventive maintenance, spare parts demand is predictable, and parts may be ordered to be delivered on time. There is no need to stock spare parts. However, in unplanned repairs, the lack of required spare parts causes maintenance delays. Classifying inventory items is essential to manage and control the inventory of spare parts (Shahin and Gholami, 2014).

The traditional method of inventory classification is ABC, which is based on the monetary value of the annual consumption of spare parts. Since this method is single-dimensional and classifies the parts only

based on the monetary value of annual consumption, it may not be an accurate method for classifying spare parts inventory. To categorize spare parts, other criteria such as lead time, price, consumption rate, cost of lacking a part, degree of sensitivity, etc. are important (Roda et al., 2012).

Considering different criteria to categorize spare parts, applying Multi-Criteria Decision Making (MCDM) would be a proper solution (Molenaers et al., 2012). Analytical Hierarchy Process (AHP) is one of the multi-criteria decision-making methods proposed by Saaty in the 1970s. This method enables decision-makers to simultaneously determine the interplay of many complex and uncertain situations. This process helps decision-makers to make reasonable priorities based on their goals, knowledge, and experience (Momeni, 2010).

The main aim of this paper is to apply an analytical hierarchy process in the criticality classification of gas turbine spare parts in a petrochemical company. The secondary aim of this paper would be 1- Determination of safety, environmental, and manufacturing implications in the absence of gas turbine spare parts in the petrochemical company. 2- Determining and executing inventory control strategies for each group of gas turbine spare parts in the company. 3- Calculating the amount of income or cost for the company after classifying spare parts and executing inventory strategies. 4- Displaying the advantage of multi-criteria classification in comparison to the single-criterion classification.

A review of past literature has shown that there are extensive studies on the classification of spare parts, some of which are theoretical, some practical, and case studies. In Iran, this topic has not been seriously considered, either in theory or practice. The only study is the research carried out by Shahin and Gholami (2014). They took into account criteria such as cost, sensitivity, lead time, consumption rate, and Risk Priority Number (RPN). They consider environmental and safety criteria for decision-making in the classification of spare parts by applying the TOPSIS method. One of the simple and primary methods of classifying inventory items is the ABC method, which is based on only one criterion, the monetary value of the annual consumption of spare parts. Reid (1987) used the traditional ABC method to classify several items in a hospital. He found that a small percentage of items had a high monetary value which should be more controlled.

Since the ABC method uses a single criterion to classify inventory items, its application is simple and easy. But it may not be a good and accurate model for the classification of some kinds of inventory items like spare parts. There might be some other important criteria when one wants to classify inventory items. In addition to the monetary value of the annual consumption, there are some other criteria such as certainty about item's supply, failure rate, sensitivity, and shortages of items that might be considered while one is classifying inventory items. Due to the importance of applying multi-criteria in the classification of inventory items, researchers have been looking for other classification methods to categorize inventory items based on multi-criteria. (Partovi and Burton, 1993).

Duchessi et al. (1988) presented a two-criteria model to classifying spare parts. The classification model is a matrix method based on two criteria, inventory cost and sensitivity of inventory items. These criteria included some sub-criteria such as the cost of the stoppage due to missing parts, lead time, and the number of failures in a period.

Partovi and Burton (1993) classify inventory items using the AHP method. They categorized inventory items by considering both quantitative and qualitative criteria. Based on each priority, the items were classified into A, B, and C categories. To illustrate the applicability of this model, they presented a case study using real-time data from a pharmaceutical company's maintenance department.

Partovi and Anandarajan (2002) presented a model using artificial neural networks (ANN) to classify spare parts in a pharmaceutical company. The method consisted of a backpropagation algorithm (BP) and a genetic algorithm (GA). The classification criteria included: unit price, ordering cost, demand rate, and lead time.

A new multi-criteria approach was introduced by Braglia, et al. (2004) to define the best spare parts inventory management strategy. A Multi-Attribute Spare Tree Analysis (MASTA) was developed to categorize spare parts based on two steps: In the first step, a decision diagram was used to classify spare parts in terms of sensitivity. The AHP was applied to categorize spare parts. Secondly, for diverse groups of spare parts, different spare part management strategies were determined by using an Inventory

Management Policy matrix (IMP). Based on this matrix, the following four policies were adopted: A. No need for storage, B. Single piece storage, C. Ordering the piece only when needed, D. Multi-item storage.

There are uncertainty factors while analyzing the sensitivity of spare parts. Also, tangible and intangible factors in multiple criteria should be considered in a sensitivity analysis. Prioritizing these factors can be a great challenge and a complex task (Duran, 2015). Therefore, some researchers have employed the fuzzy AHP which is based on fuzzy theory (Duran, 2015; Cakir and Canbolat, 2008; Zeng et al, 2012).

Ramanathan (2006) developed a balanced linear optimization model for multi-criteria ABC classification. This model is an objective model for multi-attribute inventory ABC classification. But Rezaei and Esmailzadeh (2007) believed this model may cause a high-value item in a low importance criterion being inappropriately placed in category A which does not show the actual position of the item.

Liu (2006) categorized items by applying data envelopment analysis. Zhou and Fan (2007) developed the Ramanathan model. They provided a balanced linear optimization model. Ng (2007) proposed a linear programming model to classify M inventory items based on N criteria. The items were categorized based on descending score into three groups A, B, and C.

Some of the researchers like Rezaei (2007), Chu et al. (2008) applied fuzzy models for multi-criteria inventory classification.

Hadi Vinci (2010) provided an integrated approach of (Ng, 2007) and (Zhou and Fan, 2007) models for multi-criteria ABC classification. In the integrated model, functions are the same as the Zhou and Fan model, but the limitations are the same as the Ng model.

Bacchetti and Sacconi (2012) investigated several studies on the categorization and prediction of spare parts demand. They have surveyed various criteria and classification methods. Table 1 represents the results of the survey.

Table 1. Classification Indicators Applied to Articles

Criteria	The number of papers used the criteria
Price/Cost of Part	15
Sensitivity of Part	15
Volume of Demand (Consumption) / Demand Value (Consumption)	13
Part's supply specifications	12
Variety of demand	8
Part's Life Cycle	3
Part's Properties	2
Part's reparability	1
Part's reliability	1

Source: Reviewed by Bachetti and Sakani (2011)

Antosz and Ratnayake (2016) provided a simple math function to classify spare parts. Maintenance and logistics were the two main criteria considered in their study. Spare parts were classified into three categories A, B, and C (sensitive (too important), ordinary (important), and low importance). Then, different inventory strategies were determined.

Teixeira et al. (2017) presented research to develop a multi-criteria classification for spare parts by the definition of a stock management policy. Firstly, classification was done to know the requirement and importance of spare parts for maintenance by applying the designation VED which divides the spare parts into three criticality categories (Vital: Failure parts have a great impact on production processes; Essential: Failure parts have a middle impact on production processes; Desirable: Failure parts pose no risk to the production processes). Lead time and price were also considered as the other criteria. To define the spare parts category, a multi-criteria classification was used. Finally, an appropriate stock management policy was provided.

A multi-criteria decision structure for management of maintenance spare parts in biodiesel refinery was presented by Ferreira et al. (2018). The criticality of equipment, demand forecast, logistic characteristics

(unit value, lead time, number of potential suppliers) were considered as the main indicators. To calculate weights of criteria, sub-criteria, and classes, fuzzy-AHP was applied.

Spare parts critically evaluated and prioritized for increasing manufacturing systems' availability and reliability were presented by Antosz and Ratnayake (2019). To elaborate and introduce the experimental spare parts classification model, firstly, the authors identified spare part's critical appraisal criteria based on logistic and maintenance requirements. After assigning critical levels (Low, Medium, and High) to spare parts, the AHP technique was applied to classify spare parts. Finally, by applying Expert Choice software, a sensitivity analysis was done to increase transparency in the categorization process. Table 2 represents the advantages and disadvantages of previous studies.

Table 2. Previous studies- the pros and cons

Model	Author(s)	Advantage(s)	Disadvantage(s)
ABC analysis(Single criterion)	(Reid, 1987)	Simplicity in understanding and executing	Classification is based on one criterion
Two criteria attitude	(Duchessi et al., 1993).	Introducing more than 2 criteria	High Computational Complexity - Hard Implementation
Balanced Linear Optimization Method	(Ramanathan, 2006), (Zhou, Fan, 2007)	Applying a multi-criteria classification method with different criteria weights	Research can be longer if there are too many items
Ng model	(Ng, 2007)	Simplicity in implementation	If there are too many criteria in the model, ranking them is not easy for the decision-maker
Ng revised model	(Aga Shahi and Hadi Vinci, 2010)	Introducing a nonlinear programming model to specify the weights of criteria	Only applicable to metrics with continuous values.
Analytical Hierarchy Process (AHP)	(Partovi and Anandarajan, 2002), (Braglia et al., 2004) (Molnar and Horvath, 2017) , (Antosz & Ratnayake,2019)	Different kind of criteria can be considered	It requires individual judgment. Additive independence has to be valid for the attributes.
Fuzzy AHP	(Rezaei, 2007) (Cakir and Canbolat, 2008)(Zeng et al, 2012)	Try to overcome problems with subjective judgments in the AHP method by introducing Triangular Fuzzy Numbers - suitable for action under uncertainty	It is difficult to apply in practice.
TOPSIS	(Shahin and Gholami, 2014)	Considering Risk Priority Number (RPN) as a classification criteria	To extend the results to other spare parts, caution should be exercised.
Artificial Neural Networks (ANN)	(Partovi and Anandarajan, 2002)	Introducing a supportive analytical method for decision making	The number of variables that can be entered into this model is limited, some qualitative variables may not be included in the model.
Innovative methods	(Antosz and Ratnayake, 2016)	Data collection is time-consuming.	It is simple and easy to implement.

Source: Authors' literature review

By studying and analyzing the above issues, one can determine the research method and some of its parameters. It might be said that the classification of spare parts is a decision-making process. Since spare parts classification should be done based on different criteria, a multi-criteria decision-making method must

be applied. By reviewing the research literature, it is concluded that using the AHP method is appropriate for this study. Since expert opinions are involved in the decision-making process, Group AHP (GAHP) method should be applied.

In all of the articles reviewed in the research background, a limited number of spare parts have been selected to be classified. The authors stated the classification of all spare parts in the warehouse would be a time-consuming and difficult task. They believed that firstly some spare parts should be classified based on their models, then the procedure would be extended for classifying other spare parts. So in this study, we only choose gas turbine spare parts.

2. Material and Methods

This is applied research in terms of purpose and a descriptive case study in terms of method. Experts' opinion is involved in this study and multi-criteria decision-making is applied to classify spare parts. The method of data collection in this research is a combination of library and field research methods. A library method is chosen for studying the literature and theories. The field research method was used to collect data through meetings with experts. To determine different criteria and identify the value of alternatives based on each criterion, an interview with experts in the maintenance, engineering, and planning, production, trade, and finance departments is done. This study is done in a petrochemical company in Iran. Figure 1 shows the method of data analysis in this research.

Figure 1. Method of data analysis



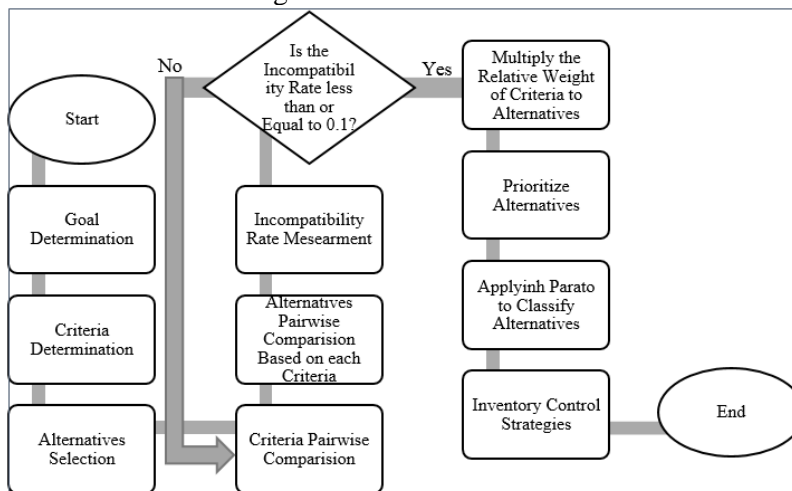
Source: Authors' drawing

The data relating to 56 spare parts of the gas turbine, which are the company's strategic spare parts, are collected by interviewing and meeting with 8 experts. Then the data are analyzed by the AHP method. Finally, the alternatives are classified.

Only 8 experts who were involved in the spare parts management cycle are selected as decision-makers. They are working in different departments with different specializations. So they could provide detailed technical and made expert opinions regarding the spare parts.

The flowchart of the research method is illustrated in Figure 2.

Figure 2. Research method



Source: Authors' drawing

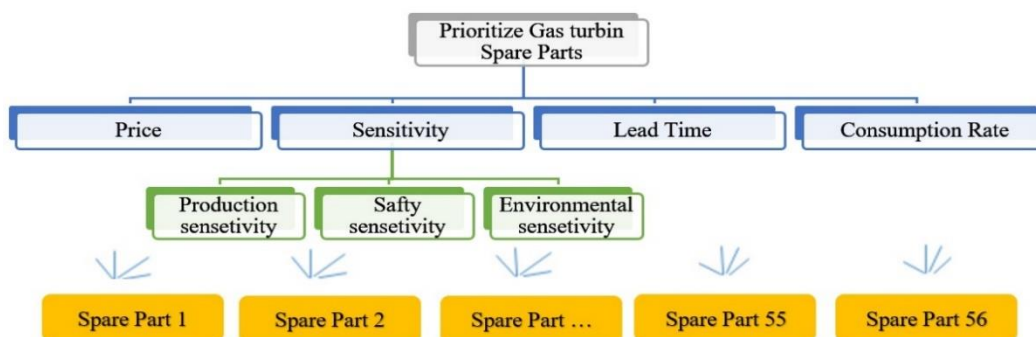
The main purpose of this study is to classify the gas turbine spare parts in an Iranian petrochemical company. Since the spare parts are not equal in terms of importance, there is no need that all of them should be kept in the company warehouse. It is possible to distinguish the low-importance spare parts from the important ones by categorizing and applying different strategies.

After meeting with the experts involved in the research, all members reached an agreement regarding the criteria. Four criteria are selected as the main criteria (the price of spare parts, sensitivity, consumption rate, and lead time). The reason that experts selected the criteria was not only the frequent use of the criteria in previous research but also the information about all of the criteria that were available in the company.

In the petrochemical industry, safety is very important. Lack of safety may cause accidents such as explosions and fires. People believe injuring individuals at the cost of business is unacceptable; as a result, every effort must be done to minimize the likelihood of any safety or environmental incident. So the experts decided to consider production sensitivity, safety sensitivity, and environmental sensitivity as the sub-criteria in the sensitivity criterion.

By defining the goal, the criteria, and the alternatives, the hierarchical structure of the problem is plotted in Figure 3.

Figure 3. The hierarchical structure of the problem



Source: Authors' drawing

The relative weights of each pair of criteria are individually assessed by eight experts giving a score, denoted S , to the most important of the two criteria on a 1 to 9 Saaty scale. An assessment of 1 indicates

that the criteria are of the same importance. An assessment of 9 indicates that the more important criterion is of extremely greater importance. The criterion of lesser importance is ascribed a score of 1/S.

AHP is applied in our study since it is a technique that helps decision-makers to set priorities based on their goals, knowledge, and experience.

Four criteria are considered in the current study. Price, consumption rate, and lead time which are quantitative criteria, and sensitivity which is a qualitative one. Based on decision makers' opinion, the sensitivity criterion was converted to a quantitative one by defining some quantitative scale (Table 3).

Table 3. Scoring alternatives for Sensitivity criteria

Alternatives' score in production sensitivity criterion		Sensitivity	Score
Lack of spare parts cause a complete stop in production		High	3
Lack of spare parts cause a partial stop in production		Medium	2
Lack of spare parts does not affect production		Low	1
Alternatives' score in safety sensitivity criterion		Sensitivity	Score
Lack of spare parts causes an accident leading to death or injury		High	3
Lack of spare parts does not cause any accident		Low	1
Alternatives' score in environmental sensitivity criterion		Sensitivity	Score
Lack of spare parts causes environmental pollution or violates its laws and regulations		High	3
Lack of spare parts does not cause environmental pollution or violate its laws and regulations		Low	1

Source: Authors' work based on expert opinion

After prioritizing alternatives, considering the Pareto principle, the spare parts are classified into three groups: A, B, and C. 20% of the spare parts with the highest score placed in the A category, the next 40% placed in the B category, and the remaining 40% with the lowest score classified in C category. Then, based on Antosz and Ratnayake (2016) and experts' opinions, an inventory control strategy is determined for each category. The strategies are outlined in Table 4.

Table 4. Inventory control strategies

Category	Strategy
A	I. (Spare parts stock is mandatory. Maximum control and precision over warehouse inventory - a high priority in purchasing the spare part - 5 times average consumption over lead time must be available in warehouse)
B	II. (Spare parts stock is recommended - Second priority in purchasing - 3 times average consumption over lead time must be available in the warehouse)
C	III. (Revise in spare parts stock- Preferably purchase spare parts when they are needed - If lack of spare parts causes production, safety, and environmental implications, 2 times average consumption over lead time must be available in the warehouse). Otherwise, it is not essential to keep the spare parts in the warehouse.

Source: Antosz and Ratnayake (2016) and experts' opinion

3. Results

Effective inventory management of spare parts is necessary for most organizations. Spare parts are maintained to protect equipment against damage and to support maintenance operations. Some companies, on one hand, face this challenge to maintain a large volume of spare parts inventory and on the other hand a lack of essential parts (Porrás and Dekker, 2008). Minimizing this challenge requires an optimal system for managing spare parts. Spare parts classification is one of the key steps in this process. Given the different factors involved in this classification, employing multi-criteria decision-making techniques is recommended.

To evaluate alternatives considering each criterion, the values related to price, lead times, and annual consumption rates are directly extracted from the company warehouse management software (Table 5). The

values for the sensitivity criterion, which include the sub-criteria of production, safety, and environmental, are selected by the experts based on table 3.

Table 5. Alternative values based on each criterion

Spare part No.	Price (USD)	Lead Time (Working day)	Consumption Rate(year)	Production Sensitivity	Safety Sensitivity	Environmental Sensitivity
1	5938 \$	30	0	2	3	1
2	5375 \$	100	0	3	3	1
3	2656.25 \$	30	0	1	3	1
4	2350 \$	30	0	1	1	1
5	2312.50 \$	100	0	3	1	1
6	1921.88 \$	45	0	1	1	1
7	1891.25 \$	45	0	1	1	1
8	1854.69 \$	7	1	3	1	3
9	1406.25 \$	30	0	1	1	1
10	1341.25 \$	30	2	3	1	3
11	953.13 \$	30	3	3	3	1
12	945.63 \$	30	0	1	1	1
13	903.13 \$	45	2	3	3	1
14	781.25 \$	100	1	3	1	1
15	375.00 \$	100	1	1	1	1
16	343.75 \$	50	3	2	1	1
17	321.88 \$	100	1	2	1	1
18	281.25 \$	20	1	3	1	3
19	240.63 \$	40	2	2	3	3
20	234.38 \$	40	2	3	3	3
21	231.25 \$	30	5	2	1	3
22	225 \$	100	3	3	1	1
23	206.25 \$	30	1	3	3	1
24	175 \$	2	12	2	1	1
25	156.25 \$	2	8	2	1	1
26	125 \$	100	1	2	1	1
27	121.88 \$	30	8	2	1	1
28	112.50 \$	25	24	2	1	1
29	103.13 \$	20	8	2	1	1
30	81.25 \$	7	8	2	1	3
31	71.88 \$	30	2	3	3	1
32	71.88 \$	100	1	3	3	1
33	43.75 \$	50	3	1	1	1
34	37.50 \$	10	4	2	3	1
35	29.69 \$	50	2	1	1	1
36	25 \$	12	2	1	1	1
37	17.81 \$	25	4	2	1	1
38	15.63 \$	3	60	1	1	1
39	15 \$	45	6	2	1	1
40	12.50 \$	5	25	1	1	3
41	7.81 \$	2	20	2	1	1
42	7.81 \$	7	15	1	1	1
43	6.88 \$	5	50	1	1	1
44	6.25 \$	5	22	2	3	1
45	4.53 \$	12	50	2	3	1
46	3.44 \$	5	28	1	3	1
47	2.81 \$	15	22	1	1	1

48	2.50 \$	20	4	2	1	1
49	2.19 \$	7	5	3	3	1
50	2.19 \$	15	45	2	1	1
51	1.88 \$	10	35	2	1	1
52	1.56 \$	3	30	3	3	1
53	1.25 \$	3	35	3	1	3
54	1.09 \$	15	60	2	1	1
55	0.47 \$	2	10	3	1	1
56	0.03 \$	4	45	3	1	3

Source: Data provided by the firm being studied

It should be noted that due to the negative desirability of price, its inverse is calculated.

To make pairwise comparisons among criteria, experts were asked to fill the pairwise comparison matrix based on 1 to 9 Saaty pairwise comparison scale. The weights of each criterion are calculated by Expert Choice software.

To determine sub-criteria weights, instead of making pairwise comparisons between the sub-criteria, experts decided to leave the decision to the company's top manager. Management decided to consider 0.4 as the weight of safety, 0.35 for environmental, and 0.25 for production sensitivity.

Due to the different experts' opinions, we used the group AHP (GAHP) model. The unit pairwise comparison matrix is calculated by applying a geometric mean. In the current study, the geometric mean is applied because it is not significantly affected by extreme values and its value is a precise figure. The geometric mean also keeps the reciprocal properties of the aggregated pairwise comparison matrices in case of aggregation of judgments (Mikhailov, 2004). Table 6 represents the pairwise comparison unit matrix.

Table 6. Pairwise comparisons unit matrix (group)

Group	Price	Lead Time	Consumption Rate	Sensitivity
Price	1	2.632	1.272	0.318
Lead Time	0.380	1	1.225	0.212
Consumption Rate	0.786	0.816	1	0.340
Sensitivity	3.138	4.724	2.942	1

Source: Authors' calculations using Expert Choice

To specify the relative criteria weight and measure inconsistency rate, Expert Choice software is applied. Results are represented in figure 4.

Figure 4. Criteria relative weights and inconsistency rate



Source: Expert choice calculation based on authors' data

After entering all data in Expert Choice software, the priority and the score of each alternative are determined.

Since only the relative value of the priority scores are important, the scores of alternatives are scaled so that their sum is equal to one.

Considering the Pareto principle, the spare parts are classified into three groups: A, B, and C. According to Pareto, 20% of the highest score spare parts are categorized in the A category, the next 40% in the B category, and 40% with the lowest score classified in the C category. The final classification of

spare parts is shown in Table 7. To compare the results of the multi-criteria classification method with the single-criterion, each spare part is also grouped with ABC single-criterion method in the last column.

Table 7. Ranking and categorizing alternatives

1. Spare Part No.	2. Score	3. Classify in ABC multi-criteria	4. Inventory and storage control strategy	5. Price(USD)	6. Number of current inventory	7. Minimum Required parts to be kept in warehouse +1	8. Buy or sell the parts to adjust inventory levels	9. Amount of expense or income due to adjusting inventory level (USD)	10. Classify in ABC single-criterion
56	0.037	A	I	0.03	191	3	+188	5.875	C
20	0.029	A	I	234.38	1	2	-1	-234.375	B
19	0.028	A	I	240.63	2	2	0	0	B
2	0.026	A	I	5375	1	1	0	0	C
32	0.026	A	I	71.88	2	2	0	0	C
45	0.025	A	I	4.53	2	9	-7	-31.719	B
52	0.024	A	I	1.56	9	2	+7	10.938	C
53	0.024	A	I	1.25	2	2	0	0	C
13	0.023	A	I	903.13	2	2	0	0	A
10	0.022	A	I	1341.25	1	2	-1	-1341.250	A
11	0.022	A	I	953.13	2	2	0	0	A
23	0.022	A	I	206.25	1	1	0	0	B
31	0.022	B	II	71.88	1	1	0	0	B
18	0.021	B	II	281.25	7	1	+6	1687.5	B
21	0.021	B	II	231.25	2	2	0	0	A
44	0.021	B	II	6.25	1	2	-1	-6.250	B
49	0.021	B	II	2.19	1	1	0	0	C
1	0.020	B	II	5937.50	1	1	0	0	C
8	0.020	B	II	1854.69	1	1	0	0	A
30	0.020	B	II	81.25	1	1	0	0	B
40	0.020	B	II	12.50	1	2	-1	-12.5	B
46	0.020	B	II	3.44	5	2	+3	10.313	B
54	0.020	B	II	1.09	32	8	+24	26.250	C
5	0.019	B	II	2312.50	2	1	+1	2312.5	C
14	0.019	B	II	781.25	1	2	-1	-781.25	B
22	0.019	B	II	225.00	2	3	-1	-225	B
34	0.019	B	II	37.50	4	1	+3	112.5	B
3	0.018	B	II	2656.25	1	1	0	0	C
50	0.018	B	II	2.19	8	7	+1	2.188	B
17	0.017	B	II	321.88	5	2	+3	965.625	B
26	0.017	B	II	125.00	14	2	+12	1500	B
38	0.016	B	II	15.63	6	2	+4	62.52	A
51	0.016	B	II	1.88	114	4	+110	206.25	C
15	0.015	B	II	375.00	3	2	+1	375	B
28	0.015	C	III	112.50	1	4	-3	-337.5	A
39	0.015	C	III	15.00	2	2	0	0	B
43	0.015	C	III	6.88	20	0	+20	137.50	B
55	0.015	C	III	0.47	3	1	+2	0.938	C
16	0.014	C	III	343.75	2	2	0	0	A
27	0.014	C	III	121.88	1	2	-1	-121.875	A
41	0.014	C	III	7.81	3	1	+2	15.625	B
24	0.013	C	III	175.00	1	1	0	0	A
37	0.013	C	III	17.81	1	2	-1	-17.813	C

48	0.013	C	III	2.50	2	1	+1	2.5	C
25	0.012	C	III	156.25	2	1	+1	156.25	A
29	0.012	C	III	103.13	2	2	0	0	A
33	0.012	C	III	43.75	8	0	+8	350	B
35	0.012	C	III	29.69	24	0	+24	712.5	C
47	0.012	C	III	2.81	16	0	+16	45	C
4	0.011	C	III	2350.00	1	0	+1	2350	C
6	0.011	C	III	1921.88	1	0	+1	1921.875	C
7	0.011	C	III	1891.25	1	0	+1	1891.25	C
9	0.011	C	III	1406.25	1	0	+1	1406.25	C
12	0.011	C	III	945.63	2	0	+2	1891.25	C
42	0.011	C	III	7.81	16	0	+16	125	B
36	0.010	C	III	25.00	4	0	+4	100	C

Source: Authors' calculation

The values in the seventh column (the minimum number needed to be kept in stock+1) are consistent with the specified strategies in each group of spare parts. For example, for spare part 56, which is categorized into group A, the strategy "I" should be used. It should be kept at the warehouse 5 times the average consumption, during the lead time. The lead time for this spare part is 4 working days. The annual consumption of this spare part is 45. The average number consumed during the lead time is 2.4. Therefore, the minimum number of spare parts 56 that must be kept in the warehouse is $2.47+1=3.4 \approx 3$.

In addition to the minimum numbers of spare parts (in the A and B category and some of the spare parts in the C category) that should be kept in the warehouse, one extra spare part is considered as safety stock.

The values in column eight (the number needed to be bought/sold to adjust inventory levels) are obtained from the difference between the values of the sixth column and the seventh column. For example, for spare part 56, the current inventory is 191. According to the strategy, at least 3 parts must be kept in the warehouse and the remaining 188 could be sold. In column eight, those numbers with a positive (+) mark represent that the number of spare parts which could be sold, and the numbers with a negative (-) mark show the number of spare parts that must be bought.

The values in the ninth column (the amount of income or expenses to adjust inventory) are obtained by multiplying the number of spare parts that must be bought or could be sold by the price of the spare part.

Results in Table 7 displayed that 12 spare parts are categorized in group A, 22 spare parts classified in group B, and 22 spare parts in group C.

In Group A, after strategy implementation, the inventory of 3 spare parts increased, 2 spare parts decreased, and 7 spare parts remained without any changes.

In Group B, after strategy implementation, the inventory of 4 spare parts increased, 11 spare parts decreased, and 7 spare parts remained without any changes.

In Group C, after strategy implementation, the inventory of 3 spare parts increased, 15 spare parts decreased, and 4 spare parts remained without any change.

So, the inventory of 10 spare parts increased, 28 spare parts decreased, and 18 spare parts remained without any changes.

In Group A, increasing the inventory level costs the company 1607.340 \$, and decreasing the inventory level could make 16.81 \$ income.

In Group B, increasing the inventory level costs the company 1025 \$, and decreasing the inventory level could make 6295 \$ income.

In Group C, increasing the inventory level costs the company 477.18 \$, and decreasing the inventory level could make 11105.93 \$ income.

Increasing the inventory level costs the company 3109.53 \$, and decreasing the inventory level could make 17417.74 \$ income for the company.

Generally, classifying the gas turbine spare parts besides inventory control strategies could make 15267.59 \$ income for the Iranian petrochemical company.

The final results of the research are compared with the results of the ABC single-criterion classification. Accordingly, only 27 of the spare parts in the ABC-multi criteria method placed in the same category in the ABC-single criterion method. It is illustrated that spare parts 56, 2, 32, 52, and 53 in the ABC-multi criteria method are classified in A group while in ABC- single criterion method they are categorized in the C group. Also, spare parts 29, 16, 27, 24, 25, and 28 in the multi criteria method placed in the C group but the single criterion method is categorized in A group. These differences between ABC-single criterion and ABC-multi criteria method in spare parts classification are because the traditional ABC (ABC- single criterion) method only considers the monetary value of annual consumption but the ABC-multi criteria method takes into account different criteria.

4. Conclusion and Limitations

After classifying the gas turbine spare parts in the petrochemical company, based on the main objective and sub-objectives of the research, the main question and secondary questions of research are answered.

Applying AHP in the classification of 56 gas turbine spare parts, the spare parts are categorized as follows: 12 spare parts in group A, 22 spare parts in group B, and 22 spare parts in group C. The results of this classification are presented in Table 7.

The safety, environmental, and manufacturing implications of the lack of gas turbine spare parts in the company are determined. Lack of spare parts with a high sensitivity score causes effective implications in the company's performance while a lack of spare parts with a low sensitivity score does not have a significant implication in the company's performance.

While conducting research, inventory control strategies for the gas turbine spare parts are determined based on Antosz and Ratnayake (2016) and experts' opinion, the strategies are described in Table 3. Executing the strategies, in group A, the inventory of 3 spare parts increased, 2 of them decreased, and 7 spare parts remained without any changes. In group B, the inventory of 4 spare parts must be increased, 11 spare parts decreased, and the inventory of 7 pieces remain the same. For group C, the stock of 3 parts increased, 15 parts should be decreased, and 4 remain without any changes.

After implementing strategies, it is found that some of the spare parts have surplus inventories and some of them are deficient.

To increase the level of the inventories that a company has a shortage of, some spare parts must be bought. Besides, some other spare parts could be sold to decrease the level of the surplus inventories. Increasing the inventory level of required spare parts costs the company 3109.53 \$. The company may make an income of 17417.74 \$ by selling surplus spare parts.

The multiple-criteria approach treats many of the "sensitive" parts as a high priority, which protects the company against adverse effects. On the other hand, since the single-criterion approach does not take the possible consequences of a lack of spare parts into consideration, it places a low priority on parts when lacking can lead to serious consequences.

The limitation of this study is as follows. It was time-consuming to categorize all the spare parts in the company's warehouse, so only gas turbine spare parts were classified. If one wants to generalize the results to another company's spare parts, he/she should be cautious.

Based on the results, it is recommended that this study will be done for all the parts in the company's warehouse within a specified time. Also, classify alternatives based on other criteria such as reliability, reparability, cost of missing, number of suppliers, etc. is strongly recommended. The revised AHP or fuzzy AHP or other techniques like SAW, TOPSIS, ELECTRE could be applied to prioritize alternatives. Research can be done by one or all of the above methods and the best results can be achieved by the integration of all methods.

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DECISION-MAKING IN STATE-OWNED EXPORT CREDIT AGENCIES (ECAs): WHAT CAN BE EXPECTED FROM HUNGARIAN ECA'S ORGANIZATIONAL STRUCTURE?

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Abstract

State-owned export credit agencies (ECAs) are established to support exporters against the risks that may cause the non-payment by the buyers. Studying effective decision-making in ECAs is a challenging concept according to its nature. State-owned ECAs are sensitive to their mission that is to support exporters. However, to work more productive and be able to give the customers more services, these organizations may need to consider both their effectiveness and ability to meet exporter's needs regarding credits at the same time in their decision-making approach. They should also consider some critical limitations in the way of decision-making. This study used the ECA in Hungary (EXIM) as an example for state-owned ECAs. By investigating the reports, organizational structure, and company's profile provided in the EXIM website, it is tried to debate its management and decision-making structure. The goal of this paper is to study decision-making in state-owned ECAs by reviewing previous researches and using the Hungarian ECA as a case study.

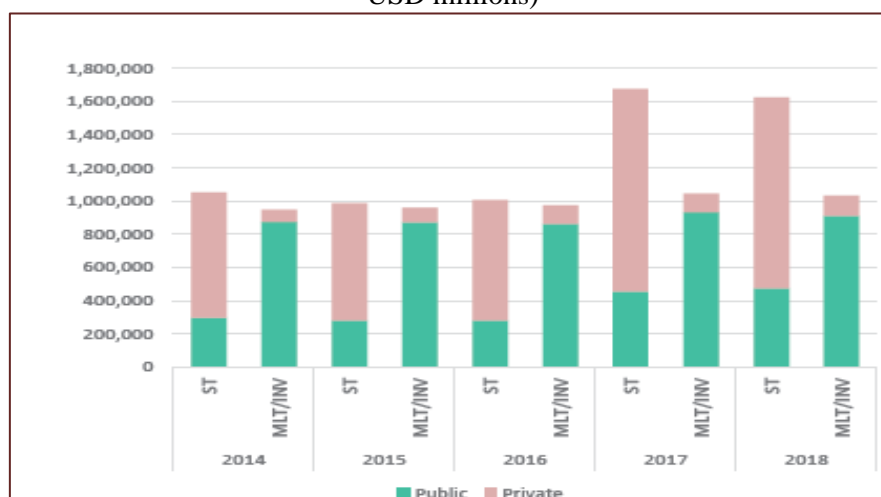
Keywords: decision-making, ECAs, Hungary, management.

JEL codes: M10, G22, G23, M12.

1. Introduction

Export credit agencies (ECAs) are founded to support exporters against the economic, political, and commercial risks that can result in non-payment by foreign buyers, especially in non-marketable areas. Their mission is to support exporters to improve the economic situation in their country. In most countries in the case of the existence of private export credit companies, the state-owned one covers the cases which are not possible for the private one to take the risks. These risks usually belong to the export contract with the big amount of money involved which are mostly for Medium and long-term (MLT), and investment insurance policies, and/or the export cases that the imported area is non-marketable. Figure 1 shows public and private share of total exposure among export credit companies in Berne Union from 2014 to 2018. As it is shown in figure 1, the share of public insurance is much higher than private companies in the number of exposures in MLT and investment insurances, but in short-term insurances which are less risky than the others, they let private companies cover more. For instance, in 2018, ECAs covered about 80 percent of MLT and investment exposures; however, they only covered around 13 percent of short-term exposures. Another issue that is sometimes the subject of ECAs' services is to cover export credits to the non-marketable import areas. The word non-marketable lends itself to criticism. It is against effectiveness in general, because it means risk analysts compute that exporting to these places may lead to loss with considerable probability. However, usually because of the political interests and country's economic and trade benefits on these areas or businesses, ECAs support them which usually is with the government's financial support. To be more specific, ECAs are the instrument of government for their aim in developing international trade which is probably aiming to lead the economic growth of the country. According to the U.S. EXIM bank (2019, p. 12), "many foreign governments reported that export finance and promotion programs are a policy priority based on the effectiveness and profitability of these programs".

Figure1: Public and private share of total exposure among export credit companies in Berne Union (in USD millions)



Source: Berne Union Statistics (2018) YE (Charts)

In contrast with some people's thinking, ECAs are not competitors of or substitutes for private or other state-owned export credit finance companies (Gianturco, 2001). In the case of credit insurances or other kinds of credits, they provide contracts in the cases that those companies refuse to finance or insure. For guarantees, they provide only "second-story" as Gianturco (2001, p. 11) said, which they guarantee exporters to banks to give them loans or credits. Also, both exporters and finance companies can take technical assistance from ECAs due to the credit professionals and their relations to international markets and sometimes even politicians.

In decision-making in any kind of organization, the first level is to understand completely the aim of the organization's entity. Especially in public or state-owned organizations, it is vital to know their mission first than anything else. But what makes them an efficient organization is to be specialized and skilled. In managerial decision-making of course this subject should be more considered. Professional decision-makers are aware that for continuous success they should perform efficiently despite any purpose or mission the organization has. More importantly, they should make balance on management and making decisions effectively and their missions. Therefore, they need to follow professional management techniques and analyses to make an efficient decision.

According to the nature of state-owned ECAs, the decision-makers need to focus double times rather than the private ones. The mission of these companies is to support local exporters against credit risks especially in non-marketable areas. The mix of considering this mission and efficient decision-making may be found hard to be implemented. Considering the issue that to achieve the missions and also be self-financed is a big reason for decision-makers to act effectively. These companies because of very unstable local and international economic, political, and trade circumstances, find it so hard to have this balance. Therefore, there is a clear need for research to identify methods to facilitate effective decision-making processes in the state-owned ECAs.

According to the best of my knowledge, there are not many studies in management decision-making of ECAs. The goal of the paper is to debate on the issue with the available literature and then use the available data in the Hungarian ECA (EXIM)'s website to analyze its organizational structure to find its probable decision-making approach for further research. In the second part of the study, literature is discussed. In the third part of the study, the case study is described, and in parts 4 and 5, the discussion and conclusion of the study can be found, respectively.

2. Literature

2.1. History of ECAs

According to Gianturco (2001), in 1919, the first official export credit programs were established in the UK to help unemployment and exporters to start again after World War I. It's good to know that the first export credit insurance program which was privately owned was established by the Federal of Switzerland in 1906. Their provision was that "income should be sufficient to meet possible losses" (Gianturco, 2001, p. 41). However, during the 1980s, lots of ECAs experienced big losses because of low-interest rates and not so good financial planning for increasing income and get the money back for losses happened. Then they changed their strategies to also be profitable, so in the 1990s most ECAs were profitable (Gianturco, 2001).

"In recent years, ECAs are estimated to have supported between US \$50 - \$70 billion annually in what is called 'medium and long-term transactions', a great portion of which are large industrial and infrastructure projects in developing countries" which most of these projects had vital impacts on environment and society (What are ECAs? n.d.).

2.2. Decision-making in state-owned ECAs

As Simon (1948), considered decision-making as the key concept of managerial science, the effectiveness of decision-making should be studied very deeply in any organization. Effective decisions result from "a systematic process with clearly defined elements and in a distinct sequence of steps" (Drucker, 1967). The process of decision-making would be effective only if it could achieve business objectives. According to the CIMA (2007), effective decision-making can be the positive key differentiator and link in the value chain of an organization. However, in the real world, there will be some limitations to effective decision-making. CIMA (2007) refers to human errors as the decision-making process limitation. They say that decision-makers have different personalities, prejudices, self-interest bias, attitudes, and risk appetites. Decisions are taken by people, so the potential impact of these factors in the organizational culture and people's attitudes and behavior cannot be underestimated. Simon (1974) stated that people are limited by information shortage, the cognitive limitation of their minds, and time limitation for rational decision-making. In addition to these human errors in effective decision-making, in organizations especially public organizations, they are some critical limitations and challenges in the way of decision-makers such as resource limitations, unstable environments, political and economic issues, governmental laws, administrative bureaucracy, and so on.

In the decision-making process, managers should have a look at the strategies, missions, and values of the company and see what the precious purpose of the company is. Usually, decision-makers in ECAs have a 'mission-minded approach' in decision-making. Accordingly, we should know what the main missions of ECAs are. Generally, the aims of establishing ECAs are (1) to increase exports by reducing exporters' risks and make it easier to use the bank financing with guarantees providing by the ECA; (2) Accordingly, production will increase which cause domestic economic development, and (3) "to help small- and medium-sized firms that lack access to the capital markets" (Gianturco, 2001, p. 89). However, Saghir (2020, p.10) pointed out that "although it is a governmental department, it, however, acts as a commercial entity and aims to be governed in a business-minded way to ensure shareholders' rights are protected and stakeholders' interests are looked after".

Another factor that should be noticed in effective decision-making in ECAs is good corporate governance. According to Saghir (2020), good corporate governance is a very important issue in state-backed export credit agencies' decision-making process. Shareholders and stakeholders are affected directly and indirectly by every decision made by decision-makers in the company and as these companies like other state-backed agencies have access to tax-prayers funds, this issue becomes more important. Corporate governance means to consider noticeably the shareholders' and stakeholders' values and interests in their decision and management process (Saghir, 2020).

According to Gianturco (2001), decision-making bodies in ECAs are credit committee, board of directors, and government. Based on the exact word of him, "Determination of acceptable costs versus potential benefits is a policy decision that the government must make" (Gianturco, 2001, p. 91)". As a result, the government's role and intervention in the decision-making process are becoming so clear

when there will be special political benefits on covering the export finance. It should be considered that exporters' needs and political priority in each country are different and have their own characteristics. In order to understand the effective organizational decision-making of the ECAs, we should consider various environments economic, social and physical facing aspects of the ECA and to consider the complexity of these agencies as a public business institute. In summary, we need to consider deeply two main elements: 1.Purposes, 2.Limitations.

ECAs as official credit export agencies share some characteristics and constraints with any other public organizations. Some important limitations of decision-making they may face are (Rainey 2003):

1. *The degree of authority of managers:* People to pursue goals and participate in DM need power and authority (Rainey 2003). However, this authority may cause some corruption, especially in the public organization. The question is how we can decrease the probability of corruption. In my opinion, keeping the balance can be the solution to this issue. By balance, I mean to give authority to the managers but with some limitations.
2. *External power and politics:* He mentioned that over the years, according to scholars and observers, this external power and politics have weakened the power and authority of internal managers in public organizations.
3. *The public bureaucracy:* It makes the decision-making process so slow especially in urgent cases makes the process inefficient.
4. *The strong role of adjudication units:* The existence of these units is vital to prevent corruption but it should not decrease the authority of internal managers too much. Again they should keep the balance.
5. *Dependency on governmental financial source:* To be completely dependent on governmental budget makes the ECAs so inefficient. They should be able to pay all their expenses and probable losses to the insured exporters by their own income. The governmental financial sources only should be for the compensation of irregular cases covered by the direct command of government bodies.
6. *Dependency on other institutes for information and other services:* It also makes the process so slow and increases the risk of information distortion. However, in most cases, it is not preventable. By making good relations and building linkages between their systems probably they can improve this process.
7. *Values and the preferences of employees:* This factor mostly comes in the implementation of the decisions phase. How much they are committed to the values of the ECA. How much they feel free and valued to give their opinions about decisions and the pros and cons of the way of implementations.

Because of all these reasons and also human errors mentioned before, being rational in DM is harder for public organizations than private firms. According to Rainey (2003), in some cases in which goal agreements and technical knowledge are high, managers can be rational in decision-making but when the case is involved with too much uncertainty; they need to apply more complex decision-making approaches. Here we reach the contingency theory which is telling that there is no best way to handle a process including decision-making.

2.2.1. ECA's organizational structure and authority of Decision-making

According to Daft (2008), there are five organizational structures:

1. **Functional structure:** This is a strong vertical structure that the departments are grouped based on related abilities, qualifications, skills, and usage of resources. The top of the organization gives the command. In a functional structure, Managers who are higher in the hierarchy make decisions and give orders to employees in the departments and the employees only should implement the decisions. The functional hierarchy of authority runs vertically which takes too long and delay in decision-making.
2. **Divisional structure:** In this structure departments are grouped based on similar organizational outputs. In divisional structure the chain of command comes from lower in the hierarchy in comparison to Functional structures and the differences of opinions

would be resolved at the divisional level rather than by the president. Here, top managers are mostly responsible for strategic planning and decision-making is done by other managers in the hierarchy and the authority runs horizontally.

3. **Matrix approach:** In Matrix structure both functional and divisional chains of command in the same part of the organization at the same time. The matrix structure supports a formal chain of command for both functional (vertical) and divisional (horizontal) relationships with equal emphasis based on authority. The employees must confront senior managers and reach joint decisions and then report to both of them. The matrix boss is the product or functional boss. He/she is responsible for one side of the matrix. The top leader is responsible for the entire matrix and to maintain a power balance between the two sides of the matrix.
4. **Team Approach:** Based on Daft (2008), in recent years, probably the more common structure has been the implementation of the team concept. In an organization with a team approach, the responsibility and is shared among managers to lower levels way more than previous approaches and lower managers have authority to make decisions.
5. **The Virtual Network Approach:** The organizations with a Virtual Network structure outsource their major functions such as accounting, design, manufacturing, and distribution to separate companies that are connected electronically to the central office. This system enables the organization to focus more on what they are good at and devote other activities to other companies that are specialists in the area.

Interestingly, Gianturco (2001) categorized the ECAs structure based on the size of the company. He mentioned that “a typical organizational structure for a small, full-service ECA reflects just three main departments headed by directors and seven divisions there under headed by managers” and “the organization of a large, full-service ECA in an industrial country shows certain similarities, but also many differences reflecting additional programs, operational complexities, branch offices, and a staff of about 400”. In both cases, ECA’s are governed by the board of directors who has the authority of policy-making, considering that in many state-owned ECAs, the government ministry act as a “guardian authority”. The boards of directors or guardian authority generally choose the senior managers, define the policies, general procedures, and the budget; review performance, the annual report of the organization, management’s commitments of loans, guarantees, insurance, and claims; and approve the larger individual transactions and so on (Gianturco, 2001).

To compare the small and large ECAs structure, based on the Daft (2008) categorization on organizational structures, both ECAs’ organizational structures mostly tend to be more vertical, and probably they are “Functional”. In the functional structures, who is higher in the management structure, make the decisions, and others should implement them. Accordingly, it is assumed that decision-making authority in ECAs runs vertically. As mentioned before, small and large ECAs share so many similarities especially about the authority in the organization. The difference among them is mostly about the number of sectors and staff in the organizations, programs, the branch offices. However, these differences may have a positive effect on the more efficiency of large ECAs in comparison with small ECA. Gianturco (2001, p. 112) argues that the larger ECAs are more capable to “handle the functions such as program evaluation and development, strategic planning, management information services, communications, and separate divisions for different types of finance” by establishing more specialized sectors and more branch offices.

3. Case Study

The case study for this research is Hungarian ECA. Hungary’s export credit agency’s name is EXIM based in Budapest, Hungary which is the integrated company of Hungarian Export-Import Bank Plc. (Eximbank) and the Hungarian Export Credit Insurance Plc. (MEHIB). In this study, I used the secondary data available on the EXIM official website and also some information from reliable articles for a qualitative analysis.

The owner of both companies is the Hungarian State with 100% ownership. Both companies share same management structure. They “managed by the Ministry of Foreign Affairs, perform export-

credit agency tasks in Hungary, regulated by OECD and EU frameworks, with the basic objective of promoting the sale of Hungarian goods and services on foreign markets” (EXIM about us, n.d.).

The company’s vision is “having the clear financial solutions for the export activity of enterprises” (EXIM Stratégia, 2017-2021), and its mission is “to support Hungarian exporting enterprises in facilitating the retention of jobs, growth in employment and an expansion of Hungary’s export capacities” (EXIM about us, n.d.). EXIM is an instrument for economic-policy purposes (EXIM about us, n.d.).

EXIM’s goal is to cover the full range of export activity from production to sales support, by assessing and channeling the demands of exporters, with coherent credit, guarantee, and insurance products. And with its new products, the institutional system can also serve to finance and secure supplier processes, chains before export activities. Additionally, Eximbank and MEHIB have the task of promoting the expansion of investments for export purposes. Thus, businesses can be interested in partnering to enhance existing production capacities, expand their product range, and target additional export markets.

The services EXIM provide for their customers are (Exim products, n.d.):

1. Cross-border Financing and Insurance: included Buyer credit and discounting facilities, Export credit insurance, and Foreign investment insurance
2. Domestic Financing: included Working capital financing, Capital investment loan, Domestic investment loan, leasing, and Other financing products
3. Guarantees: included Loan guarantees and Commercial guarantees
4. Equity and Venture Capital Funds: included international funds and domestic funds

3.1. EXM Management and organizational structures

Bankwatch Network (2017) mentioned in 2015 the number of employees of EXIM was 192, also in the EXIM (2019), the average number of employees in 2019 was reported 192.

According to Bankwatch Network (2017, p. 89), “decision-making structures within EXIM acting as officially-supported export credit agency and EXIM’s main corporate bodies of are:

- The “Founder”: The Minister in charge of foreign economic affairs.
- The Board of Directors as governing body of Eximbank and MEHIB.
- The Supervisory Board, performing oversight of the management and administration of Eximbank and MEHIB.
- The functional units of Eximbank and MEHIB are headed by the Chief Executive Officer, whose duties and powers are determined by the Board of Directors. Apart from the CEO, the Executive Board consists of the Deputy CEO, Executive Director for IT and the Executive Director for Risk Management”.

To explain the management structure of EXIM, by looking at its website (EXIM Management, n.d.) and the organizational structure that is shown in figure 2, management of EXIM contains:

1. Deputy Chief Executive Officers:
 - Chairman of the Board, CEO
 - Deputy CEO, Business Operations
 - Managing director, Risk management
 - Financial deputy CEO
 - Managing director, Operation
2. Board of Directors: One chairman and five members
3. Supervisory board: One chairman and five members
4. Directors: Twenty-one directors and three head offices (head of Nur-sultan office, head of Beograd office, and head of Istanbul office)

According to EXIM organizational structure (n.d.), the following departments are under the direct control of the CEO:

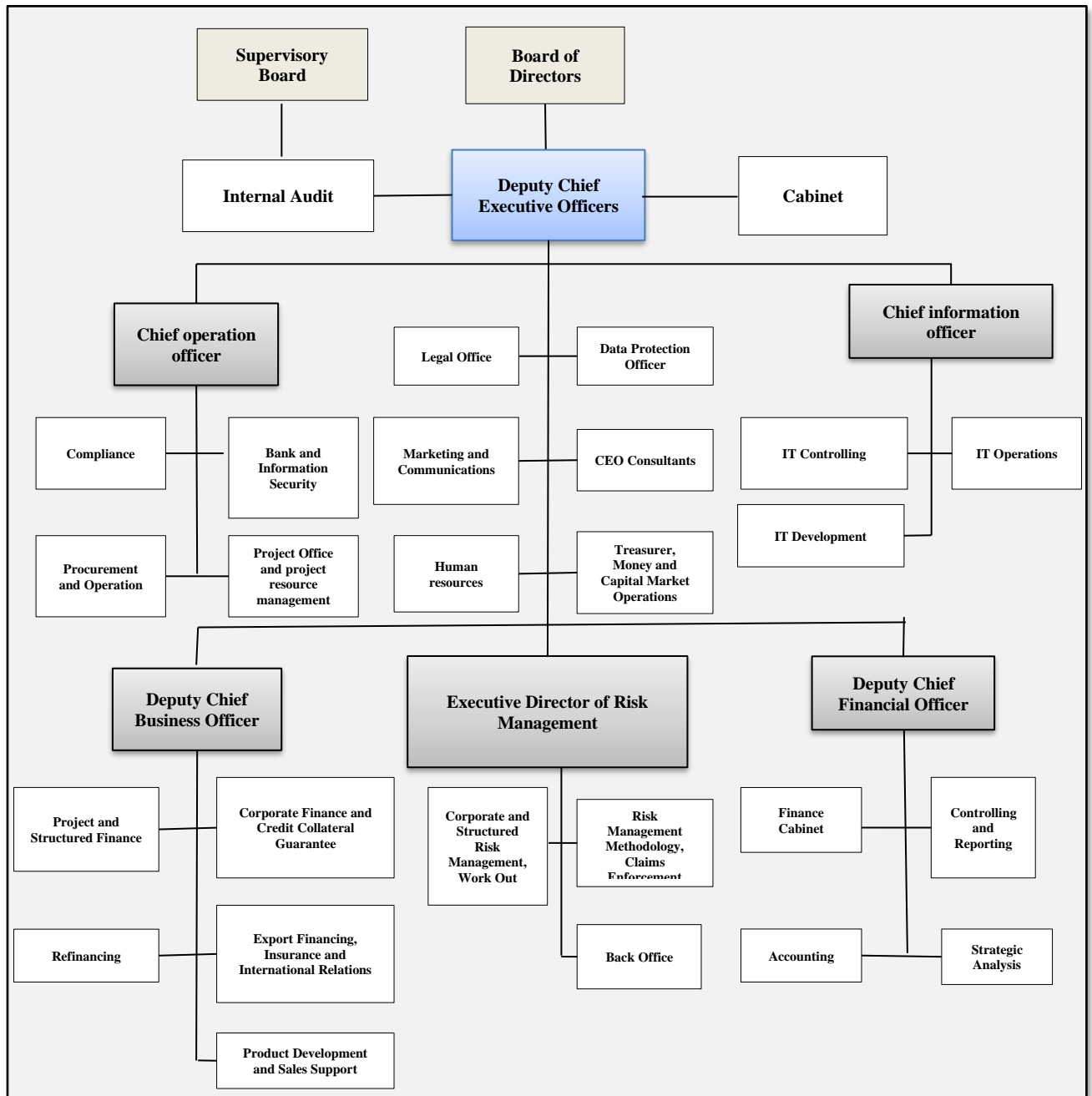
- Cabinet
- Internal Audit
- Treasurer, Money and Capital Market Operations
- Legal Office

- Marketing and Communications
- Human Resources
- Data Protection Officer
- CEO Consultants

The CEO is the chairman of the board and also has control of the Deputy Chief Executive Officers cabinet.

The organizational structure of EXIM is shown in figure 2. As the original chart and some data provided above are originally in Hungarian Language, I translated words inside the chart provided in EXIM organizational structure (n.d.) based on matching with the management structure of the English version of the site.

Figure 2: EXIM Organizational Structure



Source: Author's translation from <https://exim.hu/en/exim-en/public-data/general-disclosure-list/organisational-data/organisational-structure>

4. Discussion

By looking at the organizational structure of an organization, the relationship between departments, management levels, and management style can be discussed. From the analysis of EXIM organizational structure and its profile, the author's understanding is that EXIM may follow the traditional way of Decision-making and management structure of ECAs mentioned in prior parts by Gianturco (2001).

Based on Figure 2 that shows the company's organizational structure, the organization seems to follow a more "Vertical Functional" approach in its structure based on the Daft (2008) categorization on organizational structure. As mentioned before, in a functional structure, decision-making is done by the top managers who are higher in the hierarchy. However, to put the cabinet and the CEO consultants departments in the official organizational structure shows the importance of consulting, brainstorming, and probably group decision-making in its decision-making processes. It is mentioned in EXIM organizational structure (n.d.) that CEO consultants should actively participate in the decision-making process at the request of the CEO.

Like most of the officially-supported export credit agencies, the strong existence of government in the upper layer of EXIM's corporate bodies can show the considerable role of government authority in decision making.

According to the Gianturco (2001)'s ECAs' categorization to small or large organizations, Although the number of employees in EXIM is 192 and Gianturco (2001) mentioned that big ECA has about 400 employees, EXIM tends to be a large ECA based on the departments, divisions, branch offices, and its programs.

By analyzing the vision, mission, and main goals of EXIM, it seems the EXIM's decision-makers are more mission-minded than business-minded by focusing more on supporting exporters as it is emphasized in its main goals and missions the activities to support exporters more effectively. However, as Saghir (2020) mentioned ECAs should consider business mindset in their decision-making to be able to protect the shareholders and stakeholders interests. To be able to make a balance in these two mindsets they should try to find the point that both mission and business goals can be meet with the consideration of the limitations in their way of effective decision-making. The role of regulations and policy of the company and government may be a strong limitation here.

5. Conclusion

Export credit agencies (ECAs) are public agencies that support exporters against the non-payment of foreign buyers by export credit insurances and guarantees. In this study by considering ECAs as public and a business organization, and also the special characteristics of each aspect, I tried to first, investigate the effective decision-making in ECAs by considering the limitations managers face in decision- making process, and then I tried to have a qualitative analysis on Hungarian ECA's managerial structure as a case study to find out more about its managerial decision-making approach. From its organizational structure, it is expected that EXIM tends to be a big ECA with more of a hierarchal decision-making approach with a strong footprint of government bodies in its structure and corporate decision-making. However, by having some departments like CEO consultants and the Cabinet, it is assumed that brainstorming and group decision-making are valued in its decision-making approach.

Managers in ECAs face many limitations including human cognitive errors, time, lack of information, resource limitations, unstable environments, political and economic interests in some cases, governmental laws, administrative bureaucracy, lack of authority, external power and authority, and so on. Besides, as a public organization whose aim is to support exporters and trade growth, the managers in ECAs should have a mission-minded approach. It means that their priority in decision-making should be the organization's mission and purpose. However, this study mentions that to be able to keep the financial stability and meet the shareholders' and stakeholders' interests, they should grow their business mindset as well to find a balance between these two mindsets that can be considered for EXIM as well. Therefore, by this balance, they can increase the efficiency of decision-making to the possible highest level with consideration of its limitations.

For further research, it is planned to investigate the subject with primary data and focus more on the details.

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AGILITY AND RESILIENCE IN HRM PRACTICES FROM CENTRAL AND EASTERN-EUROPEAN COUNTRIES – EVIDENCE FROM LITERATURE REVIEW

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Abstract

SMEs are being described in the literature as organizations having a rather short life and are highly volatile at the external change. In this context, as opposed to the abundance of literature on HRM practices in large or multinational companies, studies on HRM practices in SMEs, are less present within the research in the field. This situation is even more evident for research in Central and Eastern European countries. The aim of the paper is to offer a systematic analysis on the literature capturing cross-country studies on HRM practices in SMEs from Central and Eastern European countries, focusing on identifying similarities areas and identifying key challenges linked to each SMEs growth stage. Data used consists of published papers identified in most common databases between 1990 and 2020, using keywords HRM/ SME/ country name. The frequency of specific HRM issues, country HRM specificity and last on HRM agility and resilience proven during time were the characteristics considered within the analysis. Results are focusing on identifying HRM practices trends, relevant for each SMEs growth stage and on offering some future research insights.

Keywords: Central and Eastern European countries, cross-country study, HRM practices for SMEs, literature review

JEL codes: M51, O15

1. Introduction

SMEs are being described in the literature as organizations having a rather short life and are highly volatile at the external change. Therefore, developing and implementing strategic instruments could not be created in a friendly context, decision-making processes being highly influenced by seizing opportunities and adapting to socio-economic environment. Despite this uncertainty and challenges, SMEs are employing high numbers of employees and contribute to each country's GDP, sometimes, more than expected.

1.1 HRM in SMEs

HRM related literature within SMEs is one of the focus of this paper as it seems that compared to HRM in large companies, especially multinational (MNCs) ones, it is rather scarce and is focusing more on identifying HRM practices implemented, without capturing the essence of its specificity. This is more obvious for studies conducted on Central and Eastern- European countries.

The formal – informal debate is one of the subjects that is also considered by researchers, studies being oriented to new attributes that organization lately focus on, like agile and resilience. So far, there is a growing literature on organization agility, workforce agility, HRM being part of this transitioning process as a support in implementation. HRM system's agility and resilience however was not yet clearly defined. This paper stands for filling in these white spots trying to present some opportunities for future research.

1.2 Brief methodology

The aim of the paper is to offer a systematic analysis on the literature capturing cross-country studies on HRM practices in SMEs from Central and Eastern European countries, focusing on identifying similarities areas and identifying key challenges linked to each SMEs growth stage.

Data used consists of published papers identified in most common databases between 1990 and 2020, using the following keywords: HRM/ SME/ HR activity / HR main research item / country name. Two search engines relevant for scientific research were used considering the publication attainability for researchers, especially those among Central and East European countries: one of the data bases is more restrictive – WOS – and the other one is more inclusive – Google Scholar. The analysis was conducted for 1990-2020 period, staging articles using three ranges of 10 years. The stages resulted are corresponding, for the majority of the countries considered, with: (1) transition/ post-communism; (2) orientation to EU accession and integration; (3) strengthening position and development.

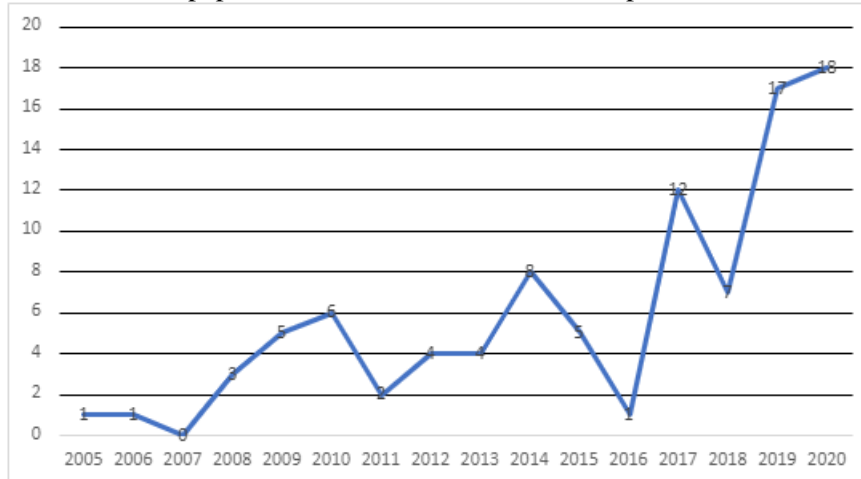
Identifying the countries that are part of Central and Eastern European region might be quite challenging, as the number can differ, depending on the aim of the analyses or main dimensions taken into consideration – political, geographical, historical. For the present study, considering the necessity of the coherence of comparative analyses The French National Institute of Statistics and Economic Studies (2020) approach, was chosen. The approach encompasses 11 countries for Central and Est European region, namely: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia. Particular terminology was adopted for refining the initial search (conducted using keywords like HRM/SME/CEE) after analysing the direction in which the most relevant articles were captured.

The frequency of specific HRM issues, country HRM specificity and last on HRM agility and resilience proven during time were the characteristics considered within the analysis.

2. Bibliometric evidence

Although studies on HRM are primarily focused on the practices of multinationals, there is a growing interest in SME-specific analyzes. Thus, in the WOS database, searching for the keywords "HRM / SME", the results show a growing interest of researchers for this topic; if until 2005 there was no work on such a topic, starting 2005, 94 articles are registered, and significant increases can be observed in the period 2008 - 2010, year 2017 and 2019-2020 interval (figure 1).

Figure 1: Number of papers from WOS on HRM / SME topic from 1990-2020 period



Source: webofknowledge.com

Searches for keywords specific to the SME sector in the field of HRM and for the countries included in the analysis show a differentiated concern of researchers for different aspects (table 1).

The most frequently addressed categories of HR processes in SMEs were related to Occupational health and safety, Performance management and Training and development, while Equal employment opportunity and Compensation and benefits were addressed in a single publication. Considering the keywords associated with HRM research in SMEs, innovation, internationalization, diversity, and monitoring appear most frequently, but also more specific terms such as agility, ambidexterity, resilience, and well-being have a high frequency. However, these keywords address to organization, not to HRM.

Table 1: Frequency of aspects related to SME / HR activities / specific terms / countries from WOS papers

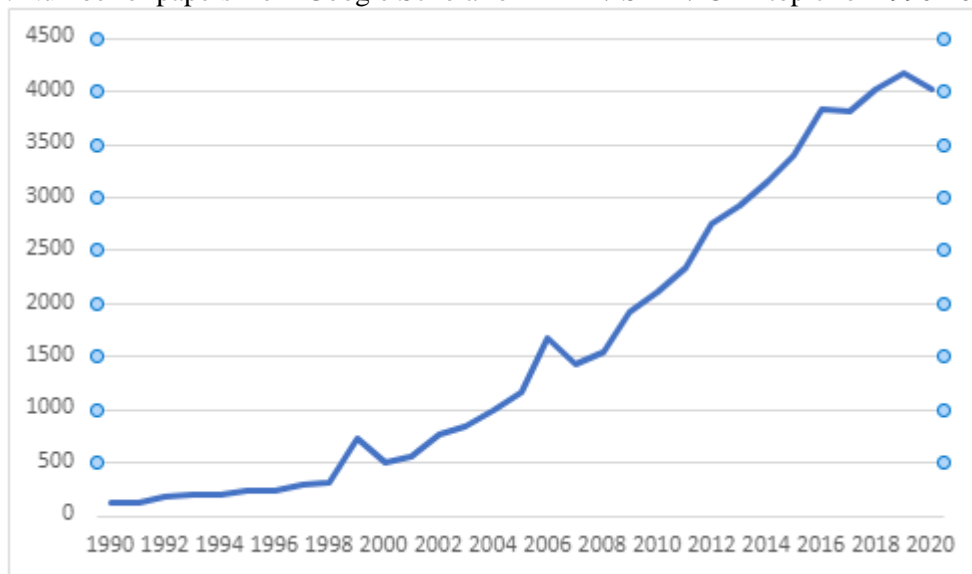
SME / HR activities		SME / specific HR concept		SME / country name	
<i>Category</i>	<i>number</i>	<i>Concept</i>	<i>number</i>	<i>country</i>	<i>number</i>
HR planning	5	Agility	61	Bulgaria	2
HR acquisition	3	Ambidexterity	66	Croatia	0
Performance management	43	Diversity	139	Czech Republic	2
Motivation	6	Formalization	40	Estonia	0
Training and development	17	Innovation	960	Hungary	0
Compensation and benefits	1	Internationalization	168	Latvia	0
Occupational health and safety	45	Migration	72	Lithuania	0
Organizational development	10	Monitoring	130	Poland	1
Encouraging participation in management	3	Resilience	77	Romania	2
Equal employment opportunity	1	Talent	63	Slovenia	0
HR integration	6	Well-being	66	Slovakia	0

Source: webofknowledge.com; author's selections

Research focusing specifically on CEE countries is few, 3 countries (Bulgaria, Czech Republic and Romania appearing in 2 publications each, and Poland in one article). In total there are 5 papers that analyze the HRM practices in the SMEs of these countries, 2 articles being common (Poland and Czech Republic, Romania and Bulgaria). The studies are presenting HRM practices like monitoring and

success (Lobos, 2020), innovation and internationalization (Rekova, 2015), well-being (Galabova and McKie, 2013), formalization of HRM practices (Psychogios et al., 2016), effectiveness and quality management system (Gal, 2019).

Figure 2: Number of papers from Google Scholar on HRM / SME / CEE topic for 1990-2020 period



Source: scholar.google.com

The number of works in the database covered by the Google scholar search engine is much higher, for this reason the searches were strictly oriented towards the HRM practices of SMEs in Central and Eastern European countries. The search for the keywords "HRM / SME / Central Eastern Europe" reveals an exponential growth after 1999 of researchers' interest in this topic, after a relatively slow growth during the '90s (figure 2).

A detailed analysis, by searching for keywords specific to the SME sector in the field of HRM and for the CEE countries is presented in table 2.

Table 2: Frequency of the aspects related to SME / HR activities / specific terms / countries of papers from Google Scholar

SME / CEE/ HR activities		SME / CEE / specific HR concept		SME / HRM / country name	
<i>Category</i>	<i>number</i>	<i>Concept</i>	<i>number</i>	<i>country</i>	<i>Number</i>
HR planning	17,000	Agility	4,960	Bulgaria	1,190
HR acquisition	16,700	Ambidexterity	1,520	Croatia	2,860
Performance management	17,100	Diversity	16,500	Czech Republic	5,310
Motivation	17,000	Formalization	8,300	Estonia	3,010
Training and development	17,000	Innovation	20,900	Hungary	5,720
Compensation and benefits	17,000	Internationalization	6,380	Latvia	2,230
Occupational health and safety	16,500	Migration	16,100	Lithuania	3,190
Organizational development	17,300	Monitoring	16,900	Poland	7,850
Encouraging participation in management	16,900	Resilience	10,800	Romania	2,330
Equal employment opportunity	16,900	Talent	17,200	Slovenia	4,860
HR integration	16,600	Well-being	15,000	Slovakia	2,940

Source: scholar.google.com; author's selections

HR-specific activities are roughly equally represented in publications, around 17,000, with better representation of organizational development and performance management topics, and poorer representation for occupational health and safety and HR integration. The specific keywords frequently addressed are innovation in HRM techniques and talent management. The niche keywords have seen a high development - for agility the number raised 4 times in the last decade compared to the previous one and 20 times compared to the '90s; the resilience increase has been over 4 times in the last decade compared to the previous one and over 40 times compared to the '90s. Considering the research by country, on first positions are those from Poland, Hungary, and Czech Republic, while on the last places are Bulgaria, Latvia and Romania.

3. HRM in SMEs

The literature abounds in HRM studies, most of them being relevant for large companies. There is a growing interest for HRM in SMEs, however fewer research is conducted on SMEs from Central and Eastern European countries. After analysing the literature in the field few debating directions emerged: considering the role of HRM within SMEs there is *'bleak-house' vs. 'small and beautiful'/'bright prospects'* debate; *formal vs. informal HRM practices* debate; *HRM convergence or divergence* related to, on one hand, classical HRM models, and related to HRM in MNCs, on the other hand. However, most of the studies are focusing on identifying HRM practices implemented within SMEs, emphasizing on the importance of the SMEs context that may determine the HRM development.

3.1 *'Bleak-house' vs. 'small and/is beautiful'/'bright prospects'*

During '90s when literature on SMEs started to appear, a lot of focus was on employment relations and the way in which these relations were taking place. Studies described work in SMEs being done in a more management-control environment (Bacon et al., 1996), control being exercised directly by the owner-manager, without proper condition of work and safety (Rainnie, 1985; Wilkinson, 1999), rather low salaries and no training activities (Black et al., 1999). All these characteristics design the image of HRM as being the *'bleak-house'* (Sisson, 1993). On the opposite side, there were authors that suggested an extreme scenario, HRM in SMEs being characterised by close and harmonious employment relations which develops a more *'family'* culture, better communication, and lower level of conflict (Bird, 1989; Wilkinson, 1999). This second scenario was named *'small and/is beautiful'*.

Later studies suggested that this dichotomic approach does not capture the entire picture of so diverse experiences of HRM in SMEs (Kotey and Sheridan, 2004), was labelled as exaggeratedly simplistic (Marlow, 2002) and HRM in SMEs should be understood as *'complex'* (Harney and Dundon 2006), HRM practices development and implementation being influenced by a highly diverse context.

3.2 *Formal vs. informal HRM practices*

Another concern that remains on the literature *'table'* on the field is underlined by the formality of HRM in SMEs. Evidence show that formality comes from legal requirements to which the enterprise is embedded in, being related more to contract relations, while informal practices translate to flexibility and ad-hoc practices that are implemented as a result of cultural needs. It is considered that SMEs are described by informal practices (Kotey and Slade 2005, Behrends, 2007), as this approach is more suitable for the changing and uncertain environment in which they exist (Hill and Stewart 2000), although previous research condemn this approach as being a result of lack of foresight are resources (Golhar and Deshpande, 1997). A study on post-communist countries underlines that factors that may influence adopting formal HRM practices are: degree of internationalisation of SMEs, sector of SMEs and size of the organization (Psychogios et al., 2016).

There were also studies that focused on the way in which HRM practices are moving from an informal to a formal approach along with the firm growth. The results show that once the size of the organization grows, the HRM practices tend to change: the organization becomes more hierarchical, documentation and administrative processes increases as number of employees increases as well (Kotey and Sheridan, 2004). Despite this change, however HRM still remains informal at its core (Kotey and Sheridan, 2004).

Another subject on this topic is whether the purpose of implementation subordinates strategic organizational objectives and aim at having an integrative approach or they are just reactions to legal requirements and ad-hoc decisions (Weisner and Innes, 2010). Results on this topic are yet to be investigated.

3.3 HRM convergence or divergence

Furthermore, considering *convergence – divergence debate* HRM in SMEs fell into two approaches: the comparative HR studies topics, as they address also cultural issues and into best practice - best fit topic. The dominant question was if SMEs' HRM practices are rather converging to those used by MNCs and this way, imitating them 'best practices' or they are trying to differentiate and implement more tailored HRM practices. Studies show that even though MNCs may influence the local business practices (Bogićević Milikić *et al.*, 2008) there are small businesses that choose to approach them own style, design in relation to their needs, expertise, and resources (Prouska and Kapsali, 2011) depending also on the heterogeneity of the SMEs (Torres and Julien, 2005). However, there are authors that sustain that SMEs should be more courageous in implementing their own innovative practices as they can bring higher results (Heilman *et al.*, 2018).

3.4 Other relevant insight from the literature

Regarding research on *SMEs characteristics* that influence best the adoption, development, or implementation of HRM practices, most of the studies focus on specificity of SMEs generated by internationalisation level, organizational culture – 'family' type, management style, technological factors, and type of industry (Bogićević Milikić *et al.*, 2008; Psychogyos *et al.*, 2016). However, a more comprehensive and complete overview of SMEs characteristics was made by De Winne and Sels (2013) analysing research that was focused on HRM-performance link within SMEs. They included in them framework both SMEs specificity characteristics (such as external factors – legislation, lack of legitimacy, difficult access to financial resources, etc. - and internal factors related to ownership, decision-making process and control, hierarchy, etc.) and SMEs heterogeneity characteristics, such as economic climate, competition, industry (external factors), firm history, firm age, life cycle stage, product portfolio, to mention just a few (De Winne and Sels, 2013). For example, the type of industry, competition and type of products and services developed will have great impact on HRM practices adopted as they are conducted by the type of employees required: low-skilled or. high-skilled employees. This will impact the investment decision in HRM practices, whether they will be preoccupied with retaining and development talents or not (Psychogyos *et al.*, 2016). Other studies are focusing on the impact of non-refundable funds on SMEs orientation to sustainability objectives, this way, giving up short-term objectives that usually characterise them activity (Manolescu *et al.*, 2016).

4. Defining agility and resilience concepts

Agile could be defined as “a discipline that copes adaptively with rapid change through feedback learning loops that iteratively create and incrementally deliver value” (Moran, 2015).

Another researcher defines agility as being „the ability to move quickly and gracefully while at the same time being resourceful and adaptable” (Rose, 2015). Agile is more of a journey than a process, and there is no agile completed box at the end to be ticked (Rose, 2015). Similarly, Haneberg (2011) when defining agility, emphasised on the efficiency with which organizations respond to continuous change by consistently adapting.

Shafer *et al.* (2000) defined four workforce agile attributes that could be developed by agility oriented HRM strategy, and these are:

- dedicated - every employee would be totally committed to organizational success.
- accountable- all employees would hold themselves personally accountable for taking the actions necessary to pursue desired organizational results, as well as for achieving those results; in contrast with traditional approach in which employees were expecting the guidance from the supervisors.

- generative - the tendency for employees to proactively apply new knowledge and skills to search for new solutions.
- resilient - employees embrace change, are comfortable with taking calculated risks, and bounce back quickly and easily when confronted with unanticipated events or result.

The question we put ourselves is *How could these attributes be transferred to HRM system?* Pretty often agility attribute was associated to organization as a whole, to different sectors of management system, as infrastructure, operations, supply, or to workforce. However, truly little was written about HRM agility (Dank and Hellstrom, 2020). Lately the HR department started to be seen as a potential leader in the implementation of agile (Moreira, 2017), a department that can work agile (Dank & Hellstrom, 2020), or merely a department whose procedures and policies hinder the agile processes (Boehm & Turner, 2005) (Winter, 2015). However, the most frequent agile HRM practices found in Finnish SMEs were related to flexible working hours, organizing work, organizational cooperation, work wellbeing, leadership, development, interaction, workplace, work-family balance, recruitment, and work equipment, all designed based on the organization cultural needs (Heilman et al., 2018).

Theoretically, HR from SMEs may become agile easier, as they are dominated by informal HR practices while larger organizations may have difficulties as the HR department and procedure do not empower people to approach non-traditional approaches, as the last ones require the organization to revise the procedure. (Boehm and Turner, 2005)

Even though it is expected for the SMEs to be able to easy implement an agile management system, HRM being one of the functions that is required to act accordingly, many organizations seem to adopt rather passive role or just react to change around them (Heilman et al., 2018). On the other hand, SMEs might be trapped between trying to do their way and imitating what large companies are doing, as on the labour market both types of organizations are in direct competition. However, there are researchers that support the fact that as long as the context in which SMEs are operating is distinctive in terms of HRM practices implementation (Klaas et al., 2012), SMEs should work on having their own practices and unique business models (Heilman et al., 2018).

Some of the agile actions that HRM in SMEs should do, which will bring benefits on long term are: “looking forward, observing silent signals, being motivated to learn, adopting solution-based learning and competence management, and nurturing resilience.” (Heilman et al., 2018)

Resilience concept is often related to agility, as it deals with anticipation of different trends and constantly adaptation to change, as well as the capability to recover rapidly from crises. (Heilman et al., 2018). Within the organizational research, as in the case of agile concept, resilience was usually approached as a capability of the organization or as workforce characteristic, while HRM was the instrument that will help organization or its employees to become resilient.

One of the success factors in becoming agile is accentuating the agile principles over the agile practices. (Dikert et al. 2006) and future research should focus on this variable more, not only on innovative, agile HRM practices.

5. Conclusion

European SMEs is an important sector for any country development and this trend is confirmed by data showing that over the period 2008-2019, gross value added generated by EU-28 SMEs increased by 14.3% and SMEs employment grew by 2.5%. According to the REPORT, SME contributed to the European economic growth, by accounting for 47% of value added generated by the non-financial business sector and for 52% of the cumulative increase employment in the sector. The projections for this year remain positive, EU-28 SMEs are expected to grow by 1.3%, but this trend could be affected by numerous risks, such as the development of the Brexit or pandemic affect.

Even though debates related to HRM in SMEs are crucial for developing this sector, research articles published in renown journals are rather scarce – 94 articles in WOS starting year 2005, an increased growth being registered in the last years. Studies on the same topic conducted in CEE countries are even fewer - there are only 5 papers that analyze the HRM practices in the SMEs of these countries (Bulgaria, Czech Republic, Poland, and Romania).

The bibliometric analysis on HRM in SMEs in CEE topics conducted using Google Scholar data base emphasis a sharp growth on the matter, from a yearly average of 100 articles during ‘90s to over 1100 starting 2005 and over 4000 articles in 2018. Even though most of the topics cover subjects like

talent management and innovation in HRM techniques, agility and resilience key words are registering remarkably interest among the researchers – over four times in the last decade compared with the previous one.

Agility of HRM practices for SME is designed for saving time, boost performance and support business goals. From small or large traditional companies, organizations need to be fast, flexible, and digitally empowered to develop their affaires. Agile HRM in CEE countries is an essential tool for dealing with constraints and managing a turbulent time. The resilience development framework for HRM in SME is a challenge to survive under uncertain times. In this context, human beings should be the source for refreshing during change and discovering new solutions for ahead.

The article highlights the research orientation to agility and resilience in HRM, evaluates continuous improvement strategies for SMEs business approaches. The paper's findings revealed that most of the studies focused more on HRM influence in helping organizations and implicitly workforce to become agile or resilient and less on the way in which HRM itself may acquire these characteristics. The context in which HRM takes place in SMEs may be favorable for developing such topics as flexibility, innovation and informal HR practices are just some of the attributes that characterize the framework. The current paper focus more on bibliometric analysis. However a systematic literature review on the topic using recent frameworks (e.g. Harney and Alkhalaf, 2021) will reveal more on the main focus of HRM in SMEs research from CEE countries. Further research could also take in considerations theoretical fundaments of agility and resilience in correlation with high performance work systems of SMEs.

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ENTREPRENEURS' PERSONALITY AND THE SMES DECISION MAKING PROCESS: THE MODERATING ROLE OF INSTITUTIONAL ENVIRONMENT

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Abstract

The aim of the present study is to investigate the overall effects of specific personality characteristics of entrepreneurs (i.e. their goal-orientation and risk propensity) on their decision-making process regarding the growth and development of their new ventures. Besides, it examines the mediating role of risk propensity in the relationship between personality characteristics of entrepreneurs and their decision process, as well as the moderating effects of institutional environment on the association between risk propensity and decision process of SMEs. Data has been collected through a single cross sectional survey with a structured questionnaire administrated to 182 Indian entrepreneurs. The overall results of the study reveal that entrepreneurs' personality traits have a great influence on their decision-making process regarding their new ventures. Furthermore, findings support the moderating effects of the institutional environment.

Keywords: Decision-making process, Entrepreneurs, Goal-orientation, Institutional environment, Locus of control

JEL codes: F64, L26, M12

1. Introduction

Entrepreneurship development has attracted the attention of researchers, academicians, and practitioners for several decades. More specifically, during the last couple of years, governments of several countries have laid special emphasis on entrepreneurs' growth and their contribution to the economic development of nations. Several attempts, from several fields, such as strategy, economics, and personality psychology, have been dedicated to the relationship between specific entrepreneurial characteristics and their decision-making processes regarding their new ventures (Mitchell et al. 2007). The economic theory focused on the outcome-based approach for understanding the phenomenon of new venture creation. Although this approach is useful in "identifying what entrepreneurship is and when it occurs, it does not address the fundamental questions of how and why of entrepreneurship" (Mitchell et al. 2007) and whether "there are any set of unique characteristics to all entrepreneurs that distinguish them from non-entrepreneurs?".

Therefore, researchers have turned to the trait-based approach. Both researchers and practitioners have made attempts for the past five decades into this direction. However, researchers were unable to establish a set of psychological characteristics that are unique for all entrepreneurs (Antoncic et al. 2015; Mitchell et al. 2000). Moreover, by exploring psychological characteristics like (1) goal orientation, (2) innovativeness, (3) locus of control, (4) risk-taking propensity, (5) proactiveness; and (6) self-efficacy on 134 Indian entrepreneurs, Jain and Ali (2012) found that personality characteristics of entrepreneurs are weakly associated with their overall success, while risk-taking propensity was found to have no significant effects on their entrepreneurial behavior.

On the basis of the above observations, certain studies have concluded that the personality-trait approach is not a useful predictor of entrepreneurial behaviour (Brockhaus and Horwitz, 1986). Some

researchers have even advocated abandoning this research (Chell, 1985). However, as Stewart and Roth (2001) stated: “though there is considerable controversy in the field of psychology concerning the ability of personality traits to explain behaviour, it is accepted by many scholars that such traits do exist, that they are stable over time” (Herron and Robinson 1993). That is why, in spite of such criticism, the personality-trait approach remains attractive for researchers (e.g. Bakotic and Kruzic 2010; Chye Koh, 1996).

Among a multitude of entrepreneurial psychological attributes, only goal-orientation (McClelland, 1987) and locus of control originally from (Rotter, 1966) were considered as impactful across several studies (Arkorful and Hilton 2021; Tentama, and Abdussalam, 2020). Goal-orientation refers to the capability of doing something better and faster than others do. It additionally underlines how an individual’s existing frame of mind is positioned towards achieving desire goals (McClelland, 1987; Taormina and Lao 2007; Remeikiene, Dumciuviene, Startiene, 2013).

Locus of control refers to the individual’s belief that events are the result of their actions (Rotter, 1966; Zhao, et. al, 2010). According to Di Zhang and Bruning (2011), creating and running a venture in a competitive environment is a challenging adventure which requires that the entrepreneur believes that the success/or failure of his new venture is the result of his/her own actions.

It appears then that the two personality characteristics stated above play an important role in predicting the business decision process regarding the new venture creation (Hansemark, 2003). However, Shepherd and Krueger (2002) demonstrated that, in addition to these personality traits, some other specific factors, such as perception, attitude, and intention, might explain the entrepreneurial decision-making processes.

Moreover, it is important to consider the mediating and moderating effects of many contextual factors (Simon and Houghton, 2002) and findings may be inconclusive towards the relationship between personality traits and start-up process. It is then relatively not feasible to include all the mediators and moderators simultaneously (Krueger 1993). That is why, the present study considers only one mediator (risk propensity) and one moderating factor (institutional environment) in order to systematically explore and test their effects on decision-making processes regarding new ventures. In this perspective, it has been perceived that risk-taking is an important business proposition (Mullins et al. 2002). It is pursued as a multifaceted personality trait that has a significant effect on new venture decision processes

Therefore, persons who tend to take risks are more predisposed to initiate their businesses (Kannadhasan et al., 2014; Shaver and Scott, 1991). The extant literature underlined that risky decisions are affected by individual’s predisposition towards risks (Bromiley and Curley, 1992), rather than by circumstances alone. There is a significant relationship between an individual’s attitude towards risk-taking and strategic choices (Josien, 2012).

Entrepreneurs are endowed with certain characteristics or traits that differentiate them from others (e.g. Mahboobi, and Sharifzadeh, 2013; Sheikhan, 2011; Shane 2000; Westhead and Wright, 1998). An entrepreneur with higher motivation tends to take risks moderately. This study attempts to understand the role of risk propensity as a mediator on the relationship between specific traits of entrepreneurs (i.e. goal-orientation and locus of control) and decision-making processes. Studies have attempted to conceptualize entrepreneurship. However, mixed views cannot freeze consensus that explained entrepreneurship.

Most studies tried to understand the entrepreneurial process from various perceptual lenses. For instance, it was documented that the institutional environment or the conducive work environment policy alone does not yield more new venture creation and development (Kannadhasan et al., 2014). This might explain why most studies carried out their investigation in isolation and did not included environmental factors through an integrative framework (Baum et al., 2001) that explore their effects on start-up processes.

In 2017, India was ranked 37th out of 125 countries into the global start-up ecosystem (Ecosystem, 2018). It was argued then that rising the number of entrepreneurs, incubators and multinational corporations might lead to rapid economic growth. The number of start-ups in India is expected to nearly quadruple from 3100 in 2014 to over 11,500 by 2020. In spite of good start-up growth figure, Indian start-ups have their own set of environmental challenges; for example, start-ups are generally funded only after they have a working product and a proven business model, with revenue. However, the institutional environment for the start-ups in the USA is more conducive that translates into opportunities. For example, firms can prove their value proposition and test products extensively

before releasing them into the market (Yadav 2016). The important question in this regard is how environmental factors interact with personal factors to determine start-up process.

The interaction between entrepreneurs and their institutional environment is required, as the environment has to fulfill the needs of entrepreneurs and induce or reinforce their desire to go into business, thereby facilitating the process of new venture creation (Korunka et al., 2003; Naffziger et al., 1994). The major challenge for startups is to have a supportive environment, where the entrepreneur decides to operate the business. The outcome of entrepreneurship, i.e. success/failure in start-up process, is determined by the interaction between entrepreneurs and their environment (Gnyawali and Fogel, 1994). Therefore, this study attempts to understand the interaction of personality characteristics and environment on Indian start-ups.

The contribution of the present study is as follows: (a) it responds to the controversy about the overall significant influence of specific entrepreneurial characteristics; (b) it elucidates the relationship between personal characteristics and decision-making processes; and (c) it further reveals the significance of interaction effect of institutional environment on the personality characteristics and the decision-making processes.

2. Theoretical Framework and Hypotheses development

Although entrepreneurial personality is often supported by the characteristics and trait approach, theoretical progress in this area remains limited. Most studies applied the trait approach that did not sufficiently take into account the dynamics of the start-up process and interactions between personal and situational determinants, consequently reducing the complexity of start-up process inappropriately. However, contemporarily, studies based on entrepreneurs added a new point of view to explain the entrepreneurial intent, thus, viewed trait theory from an interactionist perspective that explains behaviour as a result of configured interaction of personal and situational/ environmental factors (Korunka et al. 2003). Therefore, personal features alone do not sufficiently determine start-up process. Rather it is the interaction effects of institutional environment with personal characteristics that explains the strength of associations. Therefore, institutional environment is included as a moderator to examine the interaction effects with risk propensity.

2.1 Goal-oriented entrepreneurs and their propensity to take risks

Goal-orientation (GR) refers to the unconscious motive dispositions (Langan-Fox and Roth, 1995). It has been considered as one of the most promising approaches into the psychology of entrepreneurship as it helps identifying and distinguishing an entrepreneur from others (Shane and Venkataraman, 2000). Goal-orientation has also largely served for identifying an entrepreneur as it is culturally acquired and might be cited as a key psychological attribute of entrepreneurs. Typically, entrepreneurs are distinctively different from managers regarding task orientation. They place greater emphasis on the stated role requirements rather than single motive (Miner et al. 1989). Previous studies indicate that successful entrepreneurs have a strong need for achievements (Hansemark 2003; Lau and Busenitz 2001; Olson and Currie 1992; Rauch and Frese 2007; Wu et al. 2007).

Similarly, entrepreneurs differ from non-entrepreneurs regarding risk propensity (RP) (Begley 1995), because the way they perceive the risks of their actions is different from the perception of non-entrepreneurs. Typically, an individual who has a higher need for achievement tends to take higher risk than an individual who has a lower need for achievement. This line of thoughts was confirmed by Sagie and Elizur (1999) and Stewart and Roth (2001). They have opined that risk-bearing is an essential quality of entrepreneurs. Entrepreneurship demands to cope with a less structured, more uncertain outcomes of every decision and bearing the ultimate responsibility for the decision. Accordingly, individuals who have a higher propensity to bear risk can exploit the opportunities better than others (Sarasvathy et al. 1998). In simple words, an entrepreneur who has higher needs for achievement tends to have higher risk propensity, even if the situations are full of uncertainty. Therefore, it is expected that:

H1: Goal-oriented entrepreneurs are more predisposed to take risks.

2.2 The correlation between entrepreneurs' locus of control and their risk propensity

The concept of locus of control (internal and external) is a structure that was raised by Rotter (1966). This scholar believed that individuals try to control the important aspects of their life, assimilating the meaning of control to the sense of 'a generalized expectation' of victory and reward achievement. However, hardiness control is located on a vector between two internal and external extremes. Individuals, who believe that positive outcomes can be achieved via their hard work, have the tendency to manage well their destiny. They are internally guided and they might be responsible of the overall life events (Kadivar, 2011; Schultz and Schultz, 2005, quoted by Seyed Mohammadi, 2013). By the way, many practitioners and researchers have underlined that hardiness and locus of control can be raised via Taekwondo because the mental, moral and physical culture may contribute to the the growth and development of a healthy character focused on accepting responsibility, hardiness, modesty and the overall ability to control situations (Mohiman et al, 2005).

On the other hand, locus/hardiness of control is considered as a sustainable personality structure (Rauch and Frese, 2007)). It consists of three main parameters related to commitment, control and challenge (Kobasa, et al, 1998; Wieb, 1991). Diligent people feel more committed to the responsibility they have in hands and feel that they can manage the different situations they encounter and sustain required efforts to reach their objectives by considering life changes as opportunities rather than threats used to progress and evolve. Self-confidence increases then independence and improves performance as it creates opportunities in the course of life tensions to face it effectively and to grow personally. As a result, it leads to better intellectual, emotional, coherent and stable behavioral functions (Besharat et al, 2008; Bartone, 2006; Maddi, 2004 and 2006). In this perspective, it seems that some concepts have been stated as similar to hardiness, such as locus of control, sense of coherence (Antonosky, 1987), self-efficacy (Bandura, 1997), optimism (Scheier and Carver, 1988) and resilience (Connor and Davidson, 2003, quoted by Alizadeh, 2013).

H2: Entrepreneurs' locus of control influences positively their risk propensity.

2.3 The correlation between entrepreneurs' risk propensity and their decision-making process regarding their new ventures

The extant literature suggests that risk propensity is the most discussed trait among all. An individual who tends to take risks is more likely to form a new venture than someone who is averse to doing so (Kannadhasan and Nandagopal, 2010). As discussed above, persons who have higher risk-taking propensity are more likely to exploit the opportunities than others are. However, the risk-taking propensity is a double-edged sword. If it goes on either the higher side or the lower side, it may lead to disaster. For instance, "an individual who does not have high-risk propensity might unknowingly involve in risky ventures if s/he perceives less risk than others do" (Simon et al., 2000).

Similarly, Begley and Boyd (1987) have already stated that an increased level of risk propensity would decrease the venture performance. In the same perspective, another study undertaken by Baum and Locke (2004) confirmed that entrepreneurs' risk propensity might lead to a disaster if those risks are taken within an irrational process.

Conversely, there is a positive relationship between mean annual growth in sales and lower risk-taking propensity (Miner et al., 1989). Forlani and Mullins (2000) opined that entrepreneurs preferred positive outcomes achieved with low variable venture risks rather than those that might engender high risks. Therefore, the following hypothesis can be proposed as follows:

H3: Entrepreneurs' risk propensity is negatively related to their decision-making process.

2.4 The moderating effect of institutional environment on the relationship between entrepreneurs' Risk Propensity and their decision-making process

Entrepreneurs do not work in isolation. Their behavior is yet derived from and in response to the various environmental forces. For instance, competitive strategy of any business is a response to the actions of competitors (Porter and Teisberg, 2006). Similarly, the start-up process is contingent upon the environment where they operate the business (Audretsch, 1991).

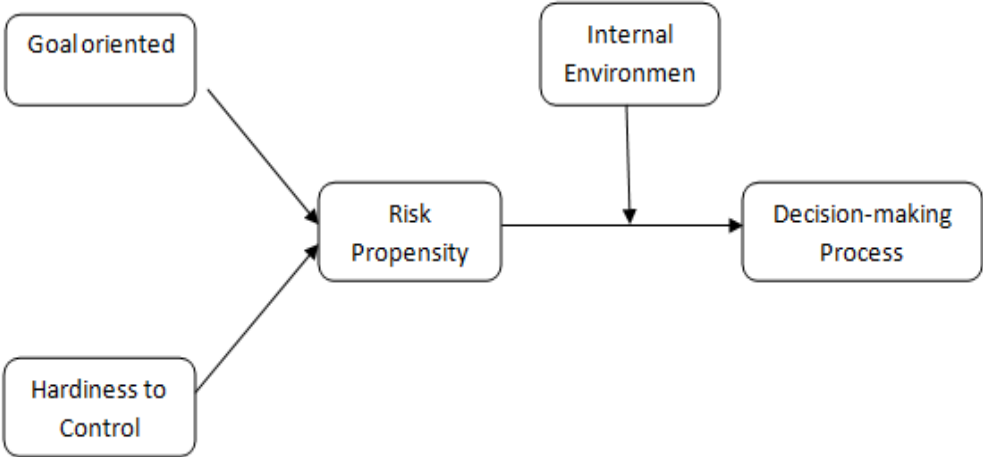
The institutional environment consists of a set of guidelines, procedures, rules, and values that facilitates an individual to do or constraint in his life (North 1991). The institutional framework has a great influence on the survival and growth of start-up of business. In addition, it has a major impact on the rate and nature of entrepreneurial activity (Chiles et al., 2007). The institutional framework facilitates and motivates the entrepreneurial activity with conducive policies to pursue a new venture.

Government of India has laid strong emphasis on encouraging and developing initiatives that support entrepreneurs with several business-friendly policies related to their businesses. For example, India has jumped 30 positions and became the top ranked 100th country in terms of ease of doing business (The World Bank Group Flagship Report, 2018). Those motivating policies may enhance the number of entrepreneurial activities and the likelihood of creating new ventures (Peng and Zhou, 2005). Dubini (1989) opined that “highly munificence environment is characterized by a strong presence of family businesses and business models, rich infrastructure, and availability of skilled resources, a solid financial community, and governmental incentives to start a new business”. This definition is consistent with those of Gnyawali and Fogel (1994) as well as Korunka et al. (2003). Entrepreneurs may get moral assistance from the experienced and serial ones; whereas financial assistance comes from the other external stakeholders. This assistance is required not only for start-ups, but also for other newgrowth and expansion (Gnyawali and Fogel, 1994). The relationship between risk propensity and the process of decision is contingent upon the environment in which the business is going to exist. If the environment provides the required financial assistance and other supports to entrepreneurs, the entrepreneurial process is relatively easy and one can expect better performance regardless of the level of strategy (Tang and Tang, 2007). A higher level of institutional environment has many advantages such as enhanced performance owing to utilization of abundant resources, availability of experts and skilled workers, etc. On the contrary, the lack of financial availability or unavailability of experts and workforce would occur in an environment with a low institutional support. Based upon the above discussion, the current study proposes the following hypothesis:

H4: Institutional environment moderates the relationship between entrepreneurs’ risk propensity and their decision-making process.

Considering all the observations above, the model presented above depicts the main variables of the present research as well as the formulated hypotheses that were proposed in order to test the relationships between them.

Figure 1: Theoretical model



Source: own research

3. Research method

The present research is carried out in a rich cultural context which implies that samples have been drawn from the registered manufactures of handicrafts and in different time periods. It was also replicated on numerous samples means the diverse industry, incorporating few new constructs/associations like risk propensity. The population of the study was composed of Small and Medium-sized Enterprises' (SMEs)' manufacturers living in India. The details about enterprises have been collected from the District Industries' Center (DIC), which involves three districts of West Bengal (located in India). The responses have been collected through a self-administered structured questionnaire. 200 questionnaires have been distributed to the selected manufactured enterprises' managers. However, during the screening process, eighteen questionnaires were incomplete and therefore not considered for the study. We have finally worked upon 182 received questionnaires, with a response rate of 91%. Such replications and extensions are needed to establish the external validity of past findings and to build the confidence of researchers and practitioners in past evidence (Tsang and Kwan 1999). Based on the above discussion, the study has conceptualized the research model. The same is given in figure 1. The proposed relationships were examined using partial least square-path modelling (PLS-PM). PLS-PM is a well-established, accepted and widely used method in business and applied social sciences (Henseler et al., 2016, Bag, et. al., 2020). This technique is suitable for prediction oriented objectives. It does not require normal data distribution and accommodates even small sample sizes (Chin and Newsted, 1999). Furthermore, multiple variables can be considered simultaneously in a single analysis.

4. Results' presentation and analysis

4.1 Measurement of reliability and validity for the Outer Model

The measures of convergent validity, i.e., reliability and validity of the constructs have been used to predict the outer model (Chin, 2010). The Cronbach's alpha (λ) and Composite Reliability (CR) have been calculated to assess the reliability for the constructs. Their corresponding values were greater than the threshold of 0.7 (Nunnally and Bernstein, 1994) for all cases. The results of construct correlations, Cronbach's alpha, CR and AVEs were presented in Table 1. Besides, every item has an individual reliability above the threshold values (i.e., square of outer loading > 0.4) (Hulland 1999). The construct correlations were indicating the correlations/association to each other (Bag and Omrane, 2020). In connection with the AVE, the results show that all the values were more than 0.5, indicating a valuable convergent validity (Cohen, 2001; Hair et al., 2012). Thus, the measurement model of the study is satisfactory with the evidence of adequate reliability and validity of constructs.

Table 1: Quality review of constructs

Constructs	No of items	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Goal orientation	5	0.739	0.789	0.561
Locus of control	5	0.869	0.898	0.721
Decision Making	6	0.914	0.945	0.701
Risk Propensity	5	0.818	0.846	0.658
INEN	5	0.878	0.903	0.735

Source: own research

In order to assess the discriminant validity, two testing steps were performed: (1) 'Heterotrait-Monotrait Ratio (HTMT)' and (2) 'Fornell-Larcker Criterion'. The Heterotrait-Monotrait (HTMT) ratio should be significantly lower than the threshold level of 0.85 for establishing the discrimination between two factors (Henseler et al., 2016). Table-2 depicts that Heterotrait-Monotrait (HTMT) ratio for all correlation values was significantly lower than the conservative level (except for the values between experiential quality and tackling of crowd, and experiential satisfaction and experiential quality). Those values indicate that the discriminant validity might be established. For this purpose, the test of Fornell-Larcker criterion was applied.

Table 2: Discriminant Validity (2) Heterotrait–Monotrait (HTMT) ratio

Construct	Goal orientation	Locus of Control	Decision Making process	Risk Propensity	INE N
Goal oriented					
Hardiness to Control	0.564				
Decision Making	0.457	0.399			
Risk Propensity	0.557	0.334	0.256		
INEN	0.436	0.407	0.571	0.430	

Source: own research

According to the Fornell-Larcker criterion, the square root of AVE of each latent construct should be higher than the construct's maximum correlation with any other construct (Fornell and Larcker, 1981). Table-3 showed that all correlations' values were lower than the square root of AVE. Hence, the discriminant validity was determined for all the constructs of the present study.

Table 3: Discriminant Validity (2) Fornell-Larcker Criterion

Constructs	Goal orientation	Locus of Control	Decision Making	Risk Propensity	INEN
Goal orientation	0.561				
Locus of Control	0.214	0.720			
Decision-making	0.143	0.129	0.701		
Risk Propensity	0.208	0.641	0.056	0.658	
INEN	0.121	0.127	0.263	0.142	0.735

Source: own research

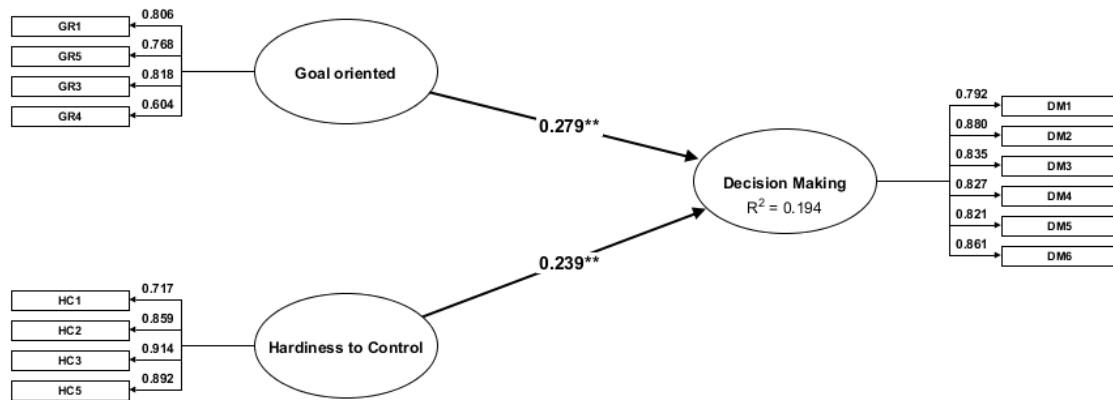
The measurement model was considered as satisfactory with the evidence of adequate reliability and validity of all the constructs.

4.2 Results' presentation and analysis

Following the evaluation of the outer model, the inner model was examined in order to assess the explanatory power and the predictive relevance of the proposed model. Moreover, the strength of path coefficients and the significance of the hypothesized relationships were estimated. The main criterion for evaluating the structural model in PLS is the variance explained i.e., R². The R² values of 0.67, 0.33, or 0.19 implies substantial, moderate, or weak for endogenous latent variables in the inner path model (Chin, 1998).

The present study used simultaneous measurement of mediator effects (Iacobucci and Duhachek 2003; Kannadhasan, et al., 2018) because it gives the robust results over the other methods (Helm et al., 2010). The measurement model without mediator and moderator variables has been presented in figure 2 and results were depicted in Table-4. It has revealed that goal orientation and hardiness to control are positively related to the decision process of entrepreneurs. After introducing risk propensity, there are slightly changes of the path coefficients but all are statistically significant. The paths of goal oriented and hardiness to control and risk propensity to decision process are also significant. Thus, results indicate that risk propensity play an important role as a mediator in the relationship between goal orientation and hardiness to control with decision process of entrepreneurship (refer figure-3 and table-5).

Figure 2: Measurement model without mediator and moderating variables



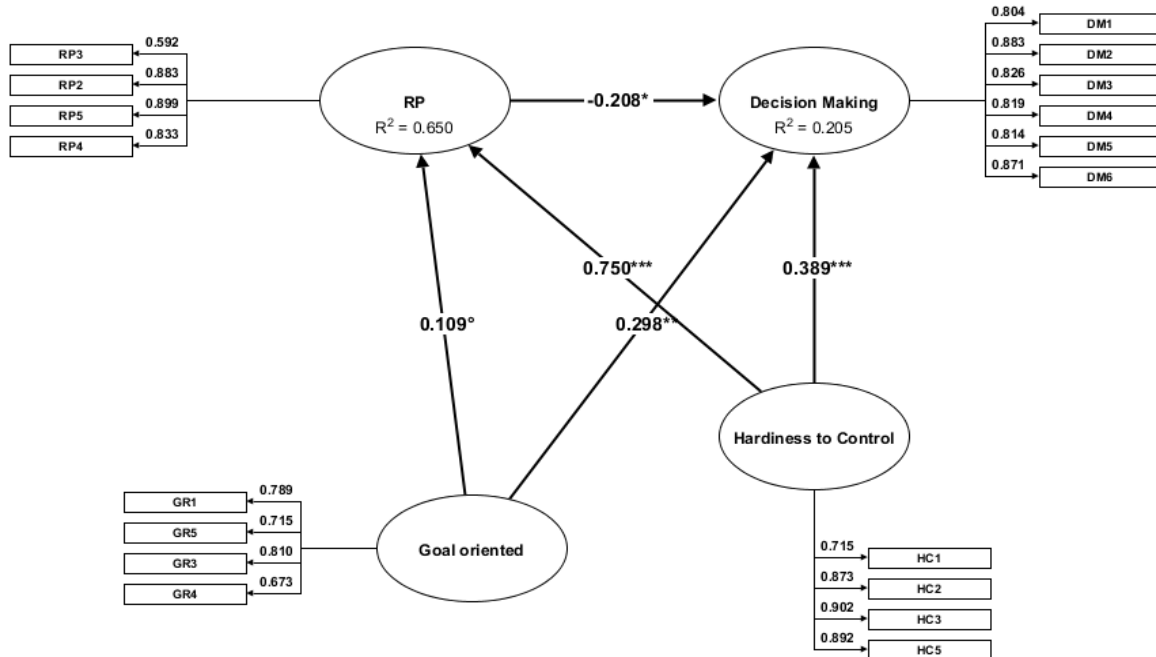
Source: own research

Table 4: Results of the measurement model without mediator and moderator variables

Paths	Coefficients	SE	t statistics
Goal oriented → Decision-making process	0.279	0.088	3.161**
Hardiness to control → Decision-making process	0.239	0.086	2.773**

Source: own research, **Significant at 1% level

Figure 3: Measurement model with mediator and without moderator variable



Source: own research

Table 5: Results of measurement model with mediator and without moderator variables

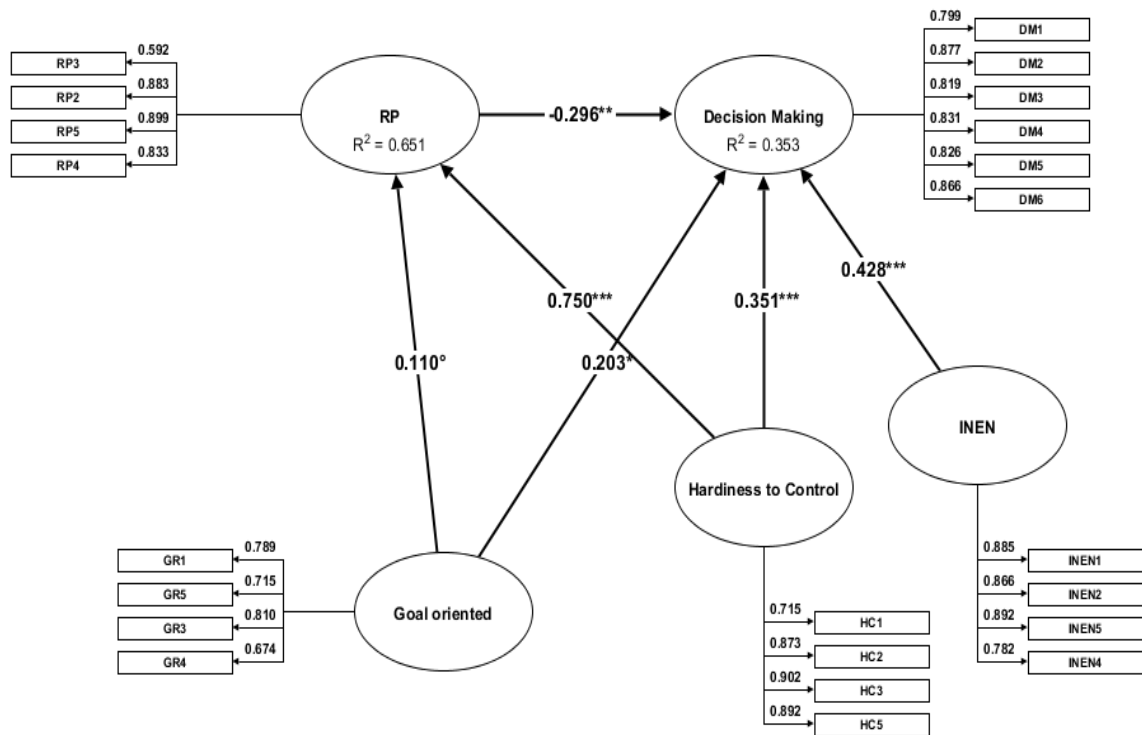
Paths	Coefficients	SE	t statistics
Goal oriented → Decision-making process	0.298	0.081	2.4809**
Goal oriented → Risk propensity	0.109	0.060	1.7992*
Hardiness to control → Decision-making process	0.389	0.094	3.7124**
Hardiness to control → Risk propensity	0.750	0.051	14.4510**
Risk propensity → Decision-making process	-0.208	0.090	-3.2716**

Source: own research, **Significant at 1% level; *Significant at 5% level

5. Interaction effects

This study applied PLS-PM of product indicator approach (Chin et al. 2003) to test the moderation effect. Institutional environment (four items) and risk propensity (four items) are multiplied to create a new construct, called moderation effect construct (sixteen items) (Chin et al. 2003; Fassott et al. 2016). It is expected that the relationship between independent, dependent and moderating variables are to be significant. Institutional environment has been introduced as a moderating variable into the model. The results reveal that institutional environment has a significant effect on decision process of entrepreneurs which has been measured by the value of R^2 . After introduction of institutional environment R^2 value has increased and the path coefficient is also significant at 1% level of significance (refer figure-4 and table- 6). To test the interaction effect, moderating effect construct was created by multiplying institutional environment and Risk Propensity and tested. It is also statistically significant (refer figure 5 and table-7).

Figure 4: Measurement model with mediator and moderator, but without interaction effect



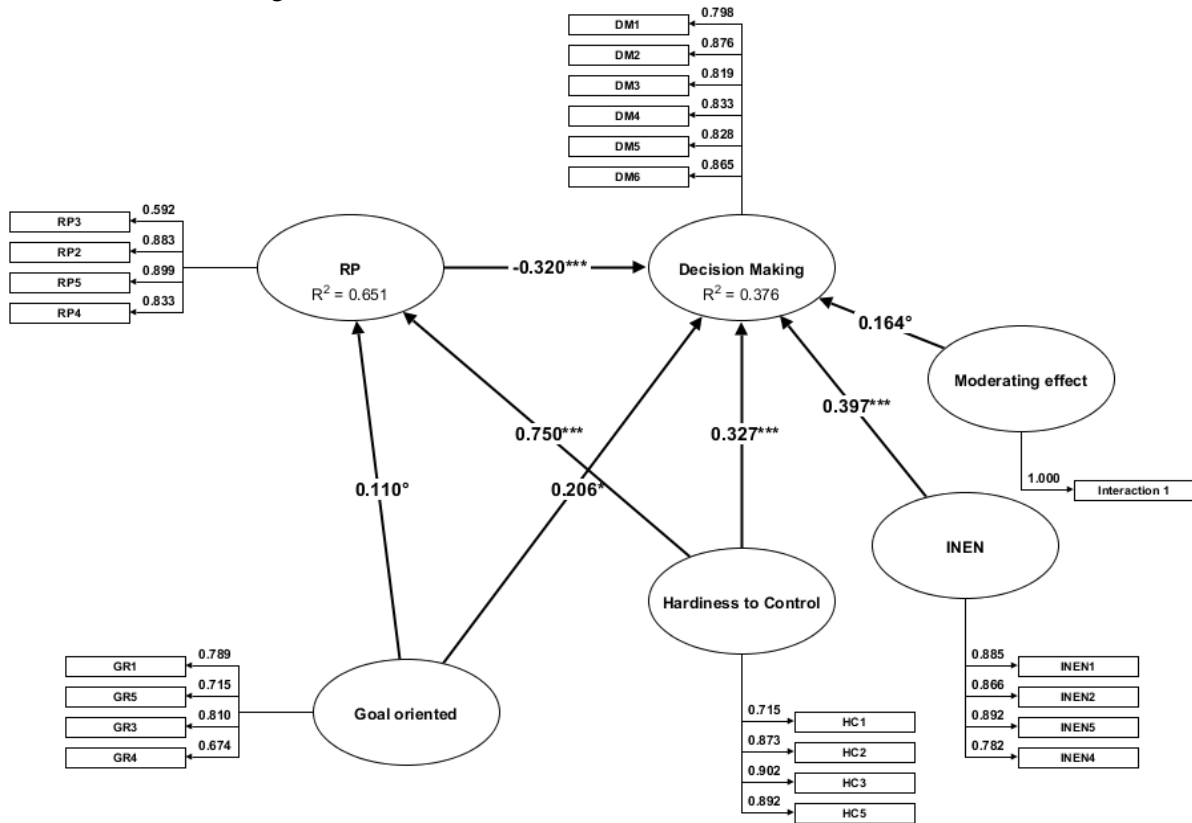
Source: own research

Table 6: Results of measurement model with mediator and moderator, but without interaction effect

Paths	Coefficients	SE	t statistics
Goal oriented → Decision-making process	0.203	0.085	2.408**
Goal oriented → Risk propensity	0.110	0.060	1.799*
Hardiness to control → Decision-making process	0.351	0.092	3.530**
Hardiness to control → Risk propensity	0.750	0.051	14.449**
Risk propensity → Decision-making process	-0.296	0.085	-3.728**
Internal Environment → Decision-making process	0.428	0.091	4.339**

Source: own research, **Significant at 1% level; *Significant at 5% level

Figure 6: Measurement model with mediation and interaction effects



Source: own research

Table 7: results of Measurement model with mediation and interaction effect

Paths	Coefficients	SE	t statistics
Goal oriented → Decision-making process	0.206	0.0855	2.408**
Goal oriented → Risk propensity	0.110	0.0609	1.799*
Internal Environment → Decision-making process	0.397	0.0915	4.339**
Moderating effect → Decision-making process	0.164	0.0931	1.760*
Hardiness to control → Decision-making process	0.327	0.0927	3.530**
Hardiness to control → Risk propensity	0.750	0.0519	14.449**
Risk propensity → Decision-making process	-0.320	0.0858	-3.728**

Source: own research, **Significant at 1% level; *Significant at 5% level

6. Conclusion

The objective of the present study is to assess the relationship between personality characteristics of entrepreneurs (goal orientation and locus/hardiness of control, risk propensity) and their process of decision making regarding their new ventures. In addition, this research investigates whether the institutional environment moderates the relationship between entrepreneurs' risk propensity and their decision-making process.

Results indicated that all paths linking goal orientation, locus of control, risk propensity and decision process of entrepreneurs are statistically significant at 5 per cent level. Corroborating past findings (Hansemark, 2003), goal-orientation and hardiness of control are found to be the important personality characteristics that reinforce the intention for new venture creation. More importantly, the present research indicated that the institutional environmental moderates the association between personality characteristics of entrepreneurs and their venture creation process. This finding reveals that entrepreneurs do respond to the environment and do not operate in vacuums (Bouchikhi 1993; Gartner 1985).

On the other hand, the findings supported a direct relationship between goal orientation and the process of decision. This result is similar to those of Collins et al. (2004). It also stressed that risk propensity plays a key role in the entrepreneurial decision making process (Tang and Tang 2007). There is then a negative relationship between risk propensity and decision process. Such findings are in contrast with earlier ones (Brockhaus and Horwitz, 1986) which concluded that risk propensity do not have any influence on entrepreneurial decision processes. Corroborating earlier findings (Baum et al. 2001; Bouchikhi 1993; Tang and Tang 2007), personality of entrepreneurs and their institutional environment interact with one another to determine the new venture creation process.

6.1 Main implications of the study

The present research explores the relationship between personal characteristics of SMEs' entrepreneurs and their decision making process. It also emphasizes the moderating effect of the internal environment; inducing policymakers to provide a supportive environment/ecosystem to existing and potential entrepreneurs. The current research aims therefore at enabling the SMEs' owners to establish and expand their businesses. Moreover, it offers some guidelines to young graduates and novice entrepreneurs, appealing them to grow up new sustainable ventures, rather than looking for employment.

6.2 Limitations and future avenues of research

The present study presents certain limitations, which open up the way for new future research orientations. Indeed, this research considered two main personality characteristics, i.e. goal orientation and locus of control and do not take other personality features such as risk taking, extraversion, or self-esteem. In this regard, future studies might also explore other characteristics, like self-efficacy, tolerance for ambiguity and innovativeness. Other environmental factors might be addressed, by considering the relationship between psychological characteristics of SMEs' entrepreneurs and their new ventures' development/success, which can be mediated or moderated by other variables (like SMEs' age, sector ...). Moreover, further writings can focus on the role of entrepreneurs' cultural differences or their networking abilities on their intentions to undertake successful ventures' processes.

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A NOTE ON HOMOGENEOUS LINEAR PROGRAMMING

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Abstract

We consider the homogeneous variant of linear programming problems in the setting of a module over a linearly ordered commutative associative ring. We formulate the optimality condition for the primal and for the dual problem; by combining the aforementioned results, we obtain the Strong Duality Theorem for the homogeneous linear programming problems. Albeit the results are based on a general discrete variant of Farkas' Lemma, which has been published recently, further restrictive assumptions are necessary to prove the results. We also propose a simple application of the results – an extension of the FMEA (Failure Mode and Effects Analysis) method – in business decision making of small and medium-sized enterprises.

Keywords: failure mode and effects analysis, homogeneous linear programming, strong duality theorem
JEL codes: C60, C61

1. Introduction

Given a matrix $\mathbf{A} \in \mathbb{R}^{m \times n}$, a column vector $\mathbf{b} \in \mathbb{R}^m$, and a row vector $\mathbf{c}^T \in \mathbb{R}^{1 \times n}$, recall the classical pair of the primal and dual problem of linear programming:

$$\begin{array}{ll} \text{(P}_c\text{)} & \text{maximize} & \mathbf{c}^T \mathbf{x} \\ & \text{subject to} & \mathbf{A} \mathbf{x} \leq \mathbf{b} \end{array} \qquad \begin{array}{ll} \text{(D}_c\text{)} & \text{minimize} & \mathbf{u}^T \mathbf{b} \\ & \text{subject to} & \mathbf{u}^T \mathbf{A} = \mathbf{c}^T \\ & & \mathbf{u}^T \geq \mathbf{0}^T \end{array}$$

where $\mathbf{x} \in \mathbb{R}^n$ and $\mathbf{u}^T \in \mathbb{R}^{1 \times m}$ are variables. The *Weak Duality Theorem* holds true: if $\mathbf{x} \in \mathbb{R}^n$ and $\mathbf{u}^T \in \mathbb{R}^{1 \times m}$ is a feasible solution to the primal and dual problem, respectively, then $\mathbf{c}^T \mathbf{x} \leq \mathbf{u}^T \mathbf{b}$. It is well known (see, e.g., Franklin, 2002) that the *Strong Duality Theorem* also holds true: problem (P_c) has an optimal solution if and only if problem (D_c) has an optimal solution; if $\mathbf{x}^* \in \mathbb{R}^n$ and $\mathbf{u}^{*T} \in \mathbb{R}^{1 \times m}$ is an optimal solution to the primal and dual problem, respectively, then $\mathbf{c}^T \mathbf{x}^* = \mathbf{u}^{*T} \mathbf{b}$.

Let $\mathbf{x}^* \in \mathbb{R}^n$ and $\mathbf{u}^{*T} \in \mathbb{R}^{1 \times m}$ be any feasible solution to the primal and dual problem, respectively. It is easy to see that $\mathbf{c}^T \mathbf{x}^* = \mathbf{u}^{*T} \mathbf{A} \mathbf{x}^* \leq \mathbf{u}^{*T} \mathbf{b}$, hence $\mathbf{u}^{*T} (\mathbf{A} \mathbf{x}^* - \mathbf{b}) \leq 0$. Notice that it holds $\mathbf{c}^T \mathbf{x}^* = \mathbf{u}^{*T} \mathbf{b}$ if and only if $\mathbf{u}^{*T} (\mathbf{A} \mathbf{x}^* - \mathbf{b}) = 0$. The latter equation is the *complementarity condition*, whose meaning is as follows. Let $\mathbf{a}_1, \dots, \mathbf{a}_m \in \mathbb{R}^{1 \times n}$ be the rows of the matrix \mathbf{A} , let $b_1, \dots, b_m \in \mathbb{R}$ be the components of the vector \mathbf{b} , let $c_1, \dots, c_n \in \mathbb{R}$ be the components of the row vector \mathbf{c}^T , and let $u_1^*, \dots, u_m^* \in \mathbb{R}$ be the components of the solution \mathbf{u}^{*T} . Then the complementarity condition $\mathbf{u}^{*T} (\mathbf{A} \mathbf{x}^* - \mathbf{b}) = 0$ holds true if and only if the following pairs of equivalent implications hold true: $u_i^* > 0 \Rightarrow \mathbf{a}_i \mathbf{x}^* = b_i$ and $\mathbf{a}_i \mathbf{x}^* < b_i \Rightarrow u_i^* = 0$ for each $i = 1, \dots, m$. Consequently, the following optimality conditions can be obtained:

Let $\mathbf{x}^* \in \mathbb{R}^n$ be any feasible solution to the primal problem and let $I = \{i \in \{1, \dots, m\} : \mathbf{a}_i \mathbf{x}^* = b_i\}$ be the set of the indices of the active primal constraints. Then \mathbf{x}^* is an optimal solution to the primal problem if and only if there exist non-negative $u_i^* \in \mathbb{R}$, for $i \in I$, such that $\mathbf{c}^T = \sum_{i \in I} u_i^* \mathbf{a}_i$.

Let $\mathbf{u}^{*T} \in \mathbb{R}^{1 \times m}$ be any feasible solution to the dual problem and let $I = \{i \in \{1, \dots, m\} : u_i^* > 0\}$ be the set of the indices of the active dual variables. Then \mathbf{u}^{*T} is an optimal solution to the dual problem if and only if there exists a solution $\mathbf{x}^* \in \mathbb{R}^n$ such that $\mathbf{A} \mathbf{x}^* \leq \mathbf{b}$ and $\mathbf{a}_i \mathbf{x}^* = b_i$ for $i \in I$.

Our purpose is to introduce a pair of the primal and dual problem of homogeneous linear programming (in the setting of a module over a linearly ordered commutative associative ring) and to study possible generalizations of the above results for the pair of the problems.

2. Concepts and notation

Let R be a non-trivial linearly ordered commutative associative ring. (The ring R need not be unital; that is, it need not possess the unit element, neutral with respect to multiplication.) Additionally, let V be a linearly ordered module over the linearly ordered ring R . The relation of the linear ordering of the ring R and module V will be denoted by the symbol \leq and \preceq , respectively. Finally, let W be a module over the ring R .

For a non-negative natural number m , let $\alpha_1, \dots, \alpha_m: W \rightarrow R$ be linear forms, which make up the linear mapping $A: W \rightarrow R^m$. (Notice that the mapping $A: W \rightarrow R^m$ generalizes the concept of the matrix $\mathbf{A} \in \mathbb{R}^{m \times n}$ and the linear forms $\alpha_1, \dots, \alpha_m$, which the mapping A consists of, correspond to the rows $\mathbf{a}_1, \dots, \mathbf{a}_m$ of the matrix \mathbf{A} , which we could see in the Introduction.) For any vectors $\boldsymbol{\lambda}, \mathbf{b} \in R^m$, we always stipulate that they consist of the components $\lambda_1, \dots, \lambda_m$ and b_1, \dots, b_m , respectively, and we define their scalar product by $\boldsymbol{\lambda}^T \mathbf{b} = \sum_{i=1}^m \lambda_i b_i$. Accordingly, the linear form $\boldsymbol{\lambda}^T A: W \rightarrow R$ is defined by $\boldsymbol{\lambda}^T A x = \sum_{i=1}^m \lambda_i (\alpha_i x)$ for every $x \in W$, where $\alpha_i x$ is the value of α_i at x . For a $\mathbf{u} \in V^m$, we always stipulate that it consists of the components u_1, \dots, u_m and we define the linear mapping $\mathbf{u}^T: R^m \rightarrow V$ by $\mathbf{u}^T: \boldsymbol{\lambda} \mapsto \sum_{i=1}^m \lambda_i u_i$ for every $\boldsymbol{\lambda} \in R^m$. We then have $\mathbf{u}^T \mathbf{b} = \sum_{i=1}^m b_i u_i$ and $\mathbf{u}^T A: W \rightarrow V$ is the composition of both mappings $A: W \rightarrow R^m$ and $\mathbf{u}^T: R^m \rightarrow V$, so that $\mathbf{u}^T A x = \sum_{i=1}^m (\alpha_i x) u_i$ for every $x \in W$.

The symbol $\mathbf{0}$ denotes the column vector consisting of m zeros of the ring R and the inequalities $Ax \leq \mathbf{0}$ and $\boldsymbol{\lambda} \geq \mathbf{0}$ are understood componentwise, that is $\alpha_i x \leq 0$ and $\lambda_i \geq 0$, respectively, for every $i = 1, \dots, m$, for every $x \in W$, and for every $\boldsymbol{\lambda} \in R^m$. Given a column vector $\mathbf{b} \in R^m$ and a positive scalar $t \in R$, that is $t > 0$, then $\mathbf{b}t$ is the column vector consisting of the components $b_1 t, \dots, b_m t$, where b_1, \dots, b_m are the components of the vector \mathbf{b} . Subsequently, the inequality $Ax \leq \mathbf{b}t$ is also understood componentwise, that is $\alpha_i x \leq b_i t$ for every $i = 1, \dots, m$ and for every $x \in W$. The symbol $\mathbf{0}^T$ denotes the row vector consisting of m zeros of the module V and the inequality $\mathbf{u}^T \preceq \mathbf{0}^T$ is understood componentwise, that is $u_i \preceq 0$ for every $i = 1, \dots, m$.

The symbol o denotes the zero linear form $o: W \rightarrow R$. The symbol 0 denotes either the zero of the ring R or the zero of the module V . The meaning of the symbol 0 will be clear from the context.

Finally, let $\gamma: W \rightarrow V$ be another linear mapping. Given a constant $r \in R$, then $r\gamma$ denotes the r -multiple of γ . That is, we have $r\gamma x = r(\gamma x)$, where γx is the value of γ at x , for every $x \in W$.

3. Basic results

The following key result – a discrete variant of Farkas' Lemma – has been published recently (Bartl, 2020):

Lemma 1. (Farkas' Lemma). *Let R be a non-trivial linearly ordered commutative ring (which need not be associative), let W be a module over the ring R such that $(\lambda\mu)x = \lambda(\mu x)$ for all $\lambda, \mu \in R$ and for all $x \in W$, let V be a linearly ordered module over the linearly ordered ring R , and let $A: W \rightarrow R^m$ with $\gamma: W \rightarrow V$ be linear mappings. It then holds: if*

$$\forall x \in W: Ax \leq \mathbf{0} \Rightarrow \gamma x \preceq 0,$$

then

$$\exists r \in R, r > 0, \exists \mathbf{u} \in V^m, \mathbf{u}^T \preceq \mathbf{0}^T: \mathbf{u}^T A = r\gamma.$$

By using Farkas' Lemma 1, another key result – a discrete variant of Gale's Theorem of the alternative (Fan, 1956; Gale, 1960; Bartl, 2007) – can be established instantly:

Theorem 2. (Gale's Theorem of the alternative). *Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , let $A: W \rightarrow R^m$ be a linear mapping, and let $\mathbf{b} \in R^m$ be a vector. It then holds: if*

$$\nexists x \in W \nexists t \in R, t > 0: Ax \leq \mathbf{b}t,$$

then

$$\exists \boldsymbol{\lambda} \in R^m, \boldsymbol{\lambda} \geq \mathbf{0}: \boldsymbol{\lambda}^T A = \mathbf{0} \wedge \boldsymbol{\lambda}^T \mathbf{b} < 0.$$

Proof. There is no $x \in W$ and no positive $t \in R$ to solve $Ax \leq \mathbf{b}t$ if and only if $Ax \leq \mathbf{b}t$ implies $t \leq 0$, that is

$$\forall \begin{pmatrix} x \\ t \end{pmatrix} \in W \times R: (A \quad -\mathbf{b}) \begin{pmatrix} x \\ t \end{pmatrix} \leq \mathbf{0} \implies \begin{pmatrix} \mathbf{0} & 1 \end{pmatrix} \begin{pmatrix} x \\ t \end{pmatrix} \leq \mathbf{0}.$$

By considering the ring R as the module V , that is $V = R$, and by using Farkas' Lemma 1, there exist a non-negative $\boldsymbol{\lambda} \in R^m$ and a positive $r \in R$ such that $\boldsymbol{\lambda}^T A = \mathbf{0}$ and $-\boldsymbol{\lambda}^T \mathbf{b} = r1$. By treating the latter equality, we obtain $\boldsymbol{\lambda}^T \mathbf{b} = -r < 0$, which concludes the proof. ■

Remark. Due to the arbitrary choice of the vector $\mathbf{b} \in R^m$, we need to assume additionally that the ring R is associative in the proof of Theorem 2 in order that the mapping $R \ni t \mapsto \mathbf{b}t \in R^m$ is linear.

4. Homogeneous linear programming

Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , and let V be a linearly ordered module over the linearly ordered ring R . Consider the set $\mathcal{V} = \{u/t : u \in V, t \in R, t > 0\}$ of "fractions" with positive denominator. We define a quasi-ordering of the set \mathcal{V} as follows. For vectors $u_1, u_2 \in V$ and for scalars $t_1, t_2 \in R$ such that $t_1, t_2 > 0$, we define that $u_1/t_1 \succcurlyeq u_2/t_2$ if and only if $t_2 u_1 \succcurlyeq t_1 u_2$. Moreover, we define that $u_1/t_1 \approx u_2/t_2$ if and only if $t_2 u_1 = t_1 u_2$.

Let a linear mapping $A: W \rightarrow R^m$, a vector $\mathbf{b} \in R^m$, and a linear mapping $\gamma: W \rightarrow V$ be given. We consider the following pair of the primal and dual problem of *homogeneous linear programming*:

$$\begin{array}{ll} \text{(P)} & \text{maximize} & \gamma x/t \\ & \text{subject to} & Ax \leq \mathbf{b}t \\ & & t > 0 \end{array} \qquad \begin{array}{ll} \text{(D)} & \text{minimize} & \mathbf{u}^T \mathbf{b}/r \\ & \text{subject to} & \mathbf{u}^T A = r\boldsymbol{\gamma} \\ & & \mathbf{u}^T \geq \mathbf{0}^T \\ & & r > 0 \end{array}$$

where the pairs $(x, t) \in W \times R$ and $(\mathbf{u}, r) \in V^m \times R$ are variables. The values of the objective functions lie in the set \mathcal{V} , whose quasi-ordering has been defined above. We are now going to formulate and prove the respective generalizations of the main results presented in the Introduction.

Theorem 3. (Weak Duality Theorem). *Let $(x, t) \in W \times R$ and $(\mathbf{u}, r) \in V^m \times R$ be a feasible solution to problem (P) and (D), respectively. Then*

$$\gamma x/t \preccurlyeq \mathbf{u}^T \mathbf{b}/r.$$

Proof. Since the solutions are feasible, we have $r\gamma x = \mathbf{u}^T Ax \preccurlyeq \mathbf{u}^T (\mathbf{b}t) = t\mathbf{u}^T \mathbf{b}$. By the definition of the quasi-ordering of the set \mathcal{V} , we obtain $\gamma x/t \preccurlyeq \mathbf{u}^T \mathbf{b}/r$, which concludes the proof.

Corollary 4. *Let $(x^*, t^*) \in W \times R$ and $(\mathbf{u}^*, r^*) \in V^m \times R$ be a feasible solution to (P) and (D), respectively. If $\gamma x^*/t^* \approx \mathbf{u}^{*T} \mathbf{b}/r^*$, then (x^*, t^*) and (\mathbf{u}^*, r^*) is an optimal solution to (P) and (D), respectively.*

Remark. Let $(x^*, t^*) \in W \times R$ and $(\mathbf{u}^*, r^*) \in V^m \times R$ be a feasible solution to (P) and (D), respectively. Observe that $\gamma x^*/t^* \approx \mathbf{u}^{*T} \mathbf{b}/r^*$, that is $r^* \gamma x^* = t^* \mathbf{u}^{*T} \mathbf{b}$, if and only if $\mathbf{u}^{*T} (Ax^* - \mathbf{b}t^*) = 0$, which is the *complementarity condition* now.

Our main goal is to study whether the Strong Duality Theorem holds for problems (P) and (D). We shall follow the outline used in Bartl (2007).

Recall that an element $a \in R$ is a *zero divisor* if and only if $a \neq 0$ and there exists a non-zero $b \in R$, that is $b \neq 0$, such that $ab = 0$. The linearly ordered ring R is *weakly Archimedean* if and only if, for every $a, b \in R$ such that $0 < a < b$, there exists a $\lambda \in R$ such that $b \leq \lambda a$. The module V is *R -torsion free* if and only if, for every $r \in R$ and for every $u \in V$, we have $ru \neq 0$ if both $r \neq 0$ and $u \neq 0$ and r is not a zero divisor.

We shall need the following additional hypotheses about the ring R and module V .

Hypothesis: The non-trivial linearly ordered commutative associative ring R and the linearly ordered module V over the linearly ordered ring R are such that:

- (H1) There exists at least one element $K \in R$ such that $K > 0$ and K is not a zero divisor.
- (H2) The ring R is weakly Archimedean.
- (H3) The module V is R -torsion free.

We also introduce further notation as follows. Let $I \subseteq \{1, \dots, m\}$ be a set of indices and choose a $\mathbf{u} \in V^m$. We then put $\mathbf{u}_I^T A_I = \sum_{i \in I} u_i \alpha_i$ and also $\mathbf{u}_I^T A_I x = \sum_{i \in I} (\alpha_i x) u_i$ for $x \in W$. For $x \in W$ and for $t \in R$, the inequality $A_I x \leq \mathbf{b}_I t$ means that $\alpha_i x \leq b_i t$ for every $i \in I$. Likewise, the inequality $\mathbf{u}_I^T \geq \mathbf{0}_I^T$ and $\mathbf{b}_I t - A_I x > \mathbf{0}_I$ means that $u_i \geq 0$ and $b_i t - \alpha_i x > 0$, respectively, for every $i \in I$.

Lemma 5. (Optimality condition for the primal problem). *Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , and let V be a linearly ordered module over the linearly ordered ring R . Additionally, assume that hypotheses (H1)–(H3) hold true.*

Let $(x^, t^*) \in W \times R$ be any feasible solution to problem (P). Let $I = \{i \in \{1, \dots, m\} : \alpha_i x^* = b_i t^*\}$ be the set of the indices of the active primal constraints. Then (x^*, t^*) is an optimal solution to problem (P) if and only if*

$$\exists r^* \in R, r^* > 0, \exists \mathbf{u}_I^* \in V^I, \mathbf{u}_I^{*T} \geq \mathbf{0}_I^T: \mathbf{u}_I^{*T} A_I = r^* \gamma.$$

Proof. Let $J = \{1, \dots, m\} \setminus I$ denote the complement of the index set I .

The “if” part is easy. Put $u_i^* := 0$ for every $i \in J$. We then have a $\mathbf{u}^* \in V^m$ such that $\mathbf{u}^{*T} \geq \mathbf{0}^T$ and $r^* \gamma = \mathbf{u}_I^{*T} A_I = \mathbf{u}_I^{*T} A_I + \mathbf{u}_J^{*T} A_J = \mathbf{u}^{*T} A$. It follows that (\mathbf{u}^*, r^*) is a feasible solution to problem (D). Moreover, we have $r^* \gamma x^* = \mathbf{u}_I^{*T} A_I x^* = \mathbf{u}_I^{*T} (\mathbf{b}_I t^*) = \mathbf{u}_I^{*T} (\mathbf{b}_I t^*) + \mathbf{u}_J^{*T} (\mathbf{b}_J t^*) = \mathbf{u}^{*T} (\mathbf{b} t^*) = t^* \mathbf{u}^{*T} \mathbf{b}$, which means that $\gamma x^* / t^* \approx \mathbf{u}^{*T} \mathbf{b} / r^*$. By Corollary 4, it follows that (x^*, t^*) is an optimal solution to problem (P).

We prove the “only if” part now. It is our purpose to show that $A_I x \leq \mathbf{b}_I t$ implies $t^* \gamma x \leq t \gamma x^*$ for every $x \in W$ and for every $t \in R$. By using Farkas’ Lemma 1 (with the module W replaced by the module $W \times R$), we then obtain that $\mathbf{u}_I^{*T} A_I = r t^* \gamma$ and $\mathbf{u}_I^{*T} \mathbf{b}_I = r \gamma x^*$ for some non-negative $\mathbf{u}_I^{*T} \in V^I$ and for some positive $r \in R$. By putting $r^* := r t^*$, we shall be done.

Let $x \in W$ and $t \in R$ be such that $A_I x \leq \mathbf{b}_I t$. (Notice that $t \in R$ is not restricted in sign.) Distinguish two cases: either (A) it holds $t^* + t > 0$, or (B) it holds $t^* + t < 0$. In case (A), put $(x^{**}, t^{**}) := (x^*, t^*)$. In case (B), there exists a $\lambda^* \in R$ such that $0 < -t < -t - t \leq \lambda^* t^*$ because the ring R is weakly Archimedean by (H2). It is obvious that $\lambda^* > 0$, and we may assume wlog that λ^* is not a zero divisor. (By (H1), there exists a $K > 0$ which is not a zero divisor. It is easy to see that if $\lambda^* > 0$ is a zero divisor, then $0 < \lambda^* < K$. Since $t^* > 0$, it holds $\lambda^* t^* \leq K t^*$, so it is enough to put $\lambda^* := K$.) In case (B), put $(x^{**}, t^{**}) := (\lambda^* x^*, \lambda^* t^*)$ and notice that the solution (x^{**}, t^{**}) is also feasible to (P) and $\gamma x^{**} / t^{**} = \gamma (\lambda^* x^*) / (\lambda^* t^*) \approx \gamma x^* / t^*$, that is $t^* \lambda^* \gamma x^* = \lambda^* t^* \gamma x^*$, which means that the solution is also optimal. We conclude in either of the cases that (x^{**}, t^{**}) is an optimal solution to (P) and it holds $t^{**} + t > 0$.

Consider now the solution $(x^{**} + x, t^{**} + t)$. Let us split the constraints $A(x^{**} + x) \leq \mathbf{b}(t^{**} + t)$ into two systems $A_I(x^{**} + x) \leq \mathbf{b}_I(t^{**} + t)$ and $A_J(x^{**} + x) \leq \mathbf{b}_J(t^{**} + t)$. Note that $A_I x^{**} = \mathbf{b}_I t^{**}$ in either of the cases (A) or (B) by the definition of the set I . Since $x \in W$ and $t \in R$ are

such that $A_J x \leq \mathbf{b}_J t$, it follows that the first system $A_I(x^{**} + x) \leq \mathbf{b}_I(t^{**} + t)$ is satisfied. We consider two cases: either $A_J(x^{**} + x) \leq \mathbf{b}_J(t^{**} + t)$, or $A_J(x^{**} + x) \not\leq \mathbf{b}_J(t^{**} + t)$.

Assume that $A_J(x^{**} + x) \leq \mathbf{b}_J(t^{**} + t)$. Then the solution $(x^{**} + x, t^{**} + t)$ is feasible to (P) and, since (x^{**}, t^{**}) is optimal to (P), it follows that $\gamma(x^{**} + x)/(t^{**} + t) \leq \gamma x^{**}/t^{**}$, that is $t^{**}\gamma(x^{**} + x) \leq (t^{**} + t)\gamma x^{**}$, hence $t^{**}\gamma x \leq t\gamma x^{**}$.

Assume now that $A_J(x^{**} + x) \not\leq \mathbf{b}_J(t^{**} + t)$, which means that $\alpha_i x - b_i t > b_i t^{**} - \alpha_i x^{**}$ for some $i \in J$. Let $J^> = \{i \in J : \alpha_i x - b_i t > b_i t^{**} - \alpha_i x^{**}\}$. Since $b_i t^{**} - \alpha_i x^{**} > 0$ and since the ring R is weakly Archimedean by (H2), there exists a $\lambda_i \in R$ such that $\alpha_i x - b_i t \leq \lambda_i(b_i t^{**} - \alpha_i x^{**})$ for every $i \in J^>$. Let $\lambda := \max_{i \in J^>} \lambda_i$. It is obvious that $\lambda > 0$, and we may assume wlog that λ is not a zero divisor. (By (H1), there exists a $K > 0$ which is not a zero divisor. It is easy to see that if $\lambda > 0$ is a zero divisor, then $0 < \lambda < K$. Since $(b_i t^{**} - \alpha_i x^{**}) > 0$, it then holds $\lambda(b_i t^{**} - \alpha_i x^{**}) \leq K(b_i t^{**} - \alpha_i x^{**})$ for every $i \in J^>$. So we let $\lambda := K$.)

Considering this $\lambda > 0$, which is not a zero divisor, we have $A_J x - \mathbf{b}_J t \leq (\mathbf{b}_J t^{**} - A_J x^{**})\lambda$. Since $A_J x \leq \mathbf{b}_J t$, it follows that $A_J x - \mathbf{b}_J t \leq \mathbf{0}_J = (\mathbf{b}_J t^{**} - A_J x^{**})\lambda$. Rewriting the inequalities, we obtain $A_J(\lambda x^{**} + x) \leq \mathbf{b}_J(\lambda t^{**} + t)$ with $A_J(\lambda x^{**} + x) \leq \mathbf{b}_J(\lambda t^{**} + t)$, and we conclude that the solution $(\lambda x^{**} + x, \lambda t^{**} + t)$ is feasible to (P). Since the solution (x^{**}, t^{**}) is optimal, it is easy to see that the solution $(\lambda x^{**}, \lambda t^{**})$ is optimal too. It follows hence $\gamma(\lambda x^{**} + x)/(\lambda t^{**} + t) \leq \gamma(\lambda x^{**})/(\lambda t^{**})$, or $\lambda t^{**}\gamma(\lambda x^{**} + x) \leq (\lambda t^{**} + t)\gamma(\lambda x^{**})$, therefore $\lambda t^{**}\gamma x \leq \lambda t\gamma x^{**}$. Since $\lambda > 0$ is not a zero divisor and the module V is R -torsion free by (H3), it follows that $t^{**}\gamma x \leq t\gamma x^{**}$.

In both cases ($A_J(x^{**} + x) \leq \mathbf{b}_J(t^{**} + t)$ or $A_J(x^{**} + x) \not\leq \mathbf{b}_J(t^{**} + t)$), we have concluded that $t^{**}\gamma x \leq t\gamma x^{**}$. In case (A), we directly have that $t^*\gamma x \leq t\gamma x^*$. In case (B), we have that $\lambda^* t^{**}\gamma x \leq \lambda^* t\gamma x^*$. Since $\lambda^* > 0$ is not a zero divisor and the module V is R -torsion free by (H3), it follows that $t^{**}\gamma x \leq t\gamma x^*$. Having shown that $A_J x \leq \mathbf{b}_J t$ implies $t^*\gamma x \leq t\gamma x^*$ for every $x \in W$ and for every $t \in R$, it follows by Farkas' Lemma 1 that $\mathbf{u}_J^{*\top} A_J = r t^* \gamma$ and $\mathbf{u}_J^{*\top} \mathbf{b}_J = r \gamma x^*$ for some non-negative $\mathbf{u}_J^{*\top} \in V^J$ and for some positive $r \in R$. By putting $r^* := r t^*$, we are done.

We shall also need the following additional hypothesis about the ring R and module V .

Hypothesis: The non-trivial linearly ordered commutative associative ring R and the linearly ordered module V over the linearly ordered ring R are such that:

(H4) For every positive $u \in V$, that is $u > 0$, and for every positive $\lambda \in R$, that is $\lambda > 0$, there exists a positive $\varepsilon \in V$, that is $\varepsilon > 0$, such that $\lambda \varepsilon \leq u$.

Lemma 6. (Optimality condition for the dual problem). *Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , and let V be a linearly ordered module over the linearly ordered ring R . Additionally, assume that the module V is non-trivial and that hypotheses (H1)–(H4) hold true.*

Let $(\mathbf{u}^, r^*) \in V^m \times R$ be any feasible solution to problem (D). Let $I = \{i \in \{1, \dots, m\} : u_i^* > 0\}$ be the set of the indices of the active dual variables. Then (\mathbf{u}^*, r^*) is an optimal solution to problem (D) if and only if*

$$\exists t^* \in R, t^* > 0, \exists x^* \in W, Ax^* \leq \mathbf{b}t^*: A_I x^* = \mathbf{b}_I t^*.$$

Proof. Let $J = \{1, \dots, m\} \setminus I$ denote the complement of the index set I .

We prove the “if” part. Notice that (x^*, t^*) is a feasible solution to problem (P). By using that $\mathbf{u}_J^{*\top} = \mathbf{0}_J^\top$, we obtain that $r^* \gamma x^* = \mathbf{u}^{*\top} A x^* = \mathbf{u}_I^{*\top} A_I x^* + \mathbf{u}_J^{*\top} A_J x^* = \mathbf{u}_I^{*\top} (\mathbf{b}_I t^*) + \mathbf{u}_J^{*\top} (\mathbf{b}_J t^*) = \mathbf{u}^{*\top} (\mathbf{b}t^*) = t^* \mathbf{u}^{*\top} \mathbf{b}$, which means that $\gamma x^*/t^* \approx \mathbf{u}^{*\top} \mathbf{b}/r^*$. By Corollary 4, it follows that (\mathbf{u}^*, r^*) is an optimal solution to problem (D).

It remains to prove the “only if” part. We prove it indirectly. Assume that there is no positive $t^* \in R$ and no $x^* \in W$ such that $Ax^* \leq \mathbf{b}t^*$ and $A_I x^* = \mathbf{b}_I t^*$. Equivalently, there is no $x^* \in W$ and no positive $t^* \in R$ to solve $A_I x^* \leq \mathbf{b}_I t^*$ and $-A_I x^* \leq -\mathbf{b}_I t^*$ and also $A_J x^* \leq \mathbf{b}_J t^*$. By Gale's Theorem 2, there exist non-negative $\lambda_I^+, \lambda_I^- \in V^I$ and a non-negative $\lambda_J \in V^J$ such that it holds

$\lambda_i^{+T}A_i - \lambda_i^{-T}A_i + \lambda_j^T A_j = o$ and $\lambda_i^{+T}\mathbf{b}_i - \lambda_i^{-T}\mathbf{b}_i + \lambda_j^T \mathbf{b}_j < 0$. Put $\lambda_i := \lambda_i^+ - \lambda_i^-$. We then have $\lambda_i^T A_i + \lambda_j^T A_j = o$ and $\lambda_i^T \mathbf{b}_i + \lambda_j^T \mathbf{b}_j < 0$.

We may assume wlog that $\lambda_i^T \mathbf{b}_i + \lambda_j^T \mathbf{b}_j = \lambda^T \mathbf{b}$ is not a zero divisor. (By (H1), there exists a $K > 0$ which is not a zero divisor. If $\lambda^T \mathbf{b}$ is a zero divisor, then we have $0 < -\lambda^T \mathbf{b} < K$. Since the ring is weakly Archimedean by (H2), there exists a $t \in R$ such that $0 < K \leq -t\lambda^T \mathbf{b}$, whence $t\lambda^T \mathbf{b}$ is not a zero divisor. Put $\lambda := \lambda t$.)

Considering the given solution (\mathbf{u}^*, r^*) , distinguish two cases: either (A) it holds that r^* is not a zero divisor, or (B) it holds that r^* is a zero divisor. In case (A), put $(\mathbf{u}^{**}, r^{**}) := (\mathbf{u}^*, r^*)$. In case (B), there exists a $K > 0$ which is not a zero divisor by (H1), therefore it holds $0 < r^* < K$. Since the ring R is weakly Archimedean by (H2), there exists a $\lambda^* \in R$ such that $0 < K \leq \lambda^* r^*$, whence $\lambda^* r^*$ is not a zero divisor. We may assume wlog that λ^* is not a zero divisor. (We have $0 < \lambda^* < K$ otherwise, hence $\lambda^* r^* \leq K r^*$, so it is enough to let $\lambda^* := K$.) Since the module V is R -torsion free by (H3), we have $u_i^* > 0$ if and only if $\lambda^* u_i^* > 0$ for $i = 1, \dots, m$. In case (B), put $(\mathbf{u}^{**}, r^{**}) := ((\lambda^* \mathbf{u}^{*T})^T, \lambda^* r^*)$ and observe that the solution $(\mathbf{u}^{**}, r^{**})$ is feasible to (D) and also $\mathbf{u}^{**T} \mathbf{b} / r^{**} = \iota(\lambda^* \mathbf{u}^{*T}) \mathbf{b} / (\lambda^* r^*) \approx \mathbf{u}^{*T} \mathbf{b} / r^*$, that is $r^* \lambda^* \mathbf{u}^{*T} \mathbf{b} = \lambda^* r^* \mathbf{u}^{*T} \mathbf{b}$. We conclude in either of the cases that the solution (\mathbf{u}^*, r^*) is optimal if and only if the solution $(\mathbf{u}^{**}, r^{**})$ is optimal, moreover it holds $I = \{i \in \{1, \dots, m\} : u_i^{**} > 0\}$ and r^{**} is not a zero divisor.

Now, it is our purpose to find a positive $\varepsilon \in V$, that is $\varepsilon > 0$, such that $u_i^{**} + \lambda_i \varepsilon \geq 0$ for every $i = 1, \dots, m$. Let $I^< = \{i \in I : \lambda_i < 0\}$. We distinguish two cases: either $I^< = \emptyset$, or $I^< \neq \emptyset$.

Assume first that $I^< = \emptyset$. As the module V is non-trivial by assumption, there exists a positive $\varepsilon \in V$. Since $\mathbf{u}^{**T} \geq \mathbf{0}^T$ and $\lambda \geq \mathbf{0}$, it is easy to see that $u_i^{**} + \lambda_i \varepsilon \geq 0$ for every $i = 1, \dots, m$.

Assume now that $I^< \neq \emptyset$. By (H4), there exists a positive $\varepsilon_i \in V$ such that $-\lambda_i \varepsilon_i \leq u_i^{**}$ for $i \in I^<$. Let $\varepsilon := \min_{i \in I^<} \varepsilon_i$. Observe that $0 \leq -\lambda_i \varepsilon \leq u_i^{**}$, hence $0 \leq u_i^{**} + \lambda_i \varepsilon$ for $i \in I^<$. Since we have $\lambda_i \geq 0$ for $i \in \{1, \dots, m\} \setminus I^<$, put together, we obtain that $0 \leq u_i^{**} + \lambda_i \varepsilon$ for every $i = 1, \dots, m$.

We thus have $\mathbf{u}^{**T} + (\lambda \varepsilon)^T \geq \mathbf{0}^T$. Recall that $\lambda^T A = o$ and $\lambda^T \mathbf{b} < 0$. Since $\lambda^T \mathbf{b}$ is not a zero divisor and the module V is R -torsion free by (H3), we have $\lambda^T \mathbf{b} \varepsilon < 0$. Consider $\mathbf{u} := \mathbf{u}^{**} + \lambda \varepsilon$. Since $\mathbf{u}^T A = \mathbf{u}^{**T} A + \iota(\lambda \varepsilon)^T A = \mathbf{u}^{**T} A + \iota \varepsilon \lambda^T A = r^{**} \gamma + o = r^{**} \gamma$ and $\mathbf{u}^T \geq \mathbf{0}^T$, it follows that (\mathbf{u}, r^{**}) is a feasible solution to problem (D). It also holds $\mathbf{u}^T \mathbf{b} = \mathbf{u}^{**T} \mathbf{b} + \iota(\lambda \varepsilon)^T \mathbf{b} = \mathbf{u}^{**T} \mathbf{b} + \lambda^T \mathbf{b} \varepsilon < \mathbf{u}^{**T} \mathbf{b}$. Since r^{**} is not a zero divisor and the module V is R -torsion free by (H3), it follows that $r^{**} \mathbf{u}^T \mathbf{b} < r^{**} \mathbf{u}^{**T} \mathbf{b}$, that is $\mathbf{u}^T \mathbf{b} / r^{**} < \mathbf{u}^{**T} \mathbf{b} / r^{**}$, which means that $(\mathbf{u}^{**}, r^{**})$ is not an optimal solution problem (D), equivalently (\mathbf{u}^*, r^*) not an optimal solution to problem (D) either. The proof is finished thus.

By combining Lemma 5 and Lemma 6, our main result, that is the following Strong Duality Theorem for problems (P) and (D), is obtained easily.

Theorem 7. (Strong Duality Theorem). *Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , let V be a linearly ordered module over the linearly ordered ring R , and let hypotheses (H1)–(H3) hold true. It then holds:*

- (I) *If $(x^*, t^*) \in W \times R$ is an optimal solution to problem (P), then there exists an optimal solution $(\mathbf{u}^*, r^*) \in V^m \times R$ to problem (D) and it holds $\gamma x^* / t^* \approx \mathbf{u}^{*T} \mathbf{b} / r^*$.*
- (II) *If $(\mathbf{u}^*, r^*) \in V^m \times R$ is an optimal solution to problem (D), the module V is non-trivial, and hypothesis (H4) also holds true, then there exists an optimal solution $(x^*, t^*) \in W \times R$ to problem (P) and it holds $\gamma x^* / t^* \approx \mathbf{u}^{*T} \mathbf{b} / r^*$.*

Proof. (I) Let $(x^*, t^*) \in W \times R$ be an optimal solution to problem (P) and let $I = \{i \in \{1, \dots, m\} : a_i x^* = b_i t^*\}$. Let $J = \{1, \dots, m\} \setminus I$ be the complement of the index set I . By Lemma 5, there exist a positive $r^* \in R$ and a non-negative $\mathbf{u}_i^* \in V^m$ such that $r^* \gamma = \mathbf{u}_i^{*T} A_i$. Put $u_i^* := 0$ for every $i \in J$. We have a $\mathbf{u}^* \in V^m$ such that $\mathbf{u}^{*T} \geq \mathbf{0}^T$ and $r^* \gamma = \mathbf{u}_i^{*T} A_i = \mathbf{u}_i^{*T} A_i + \mathbf{u}_j^{*T} A_j = \mathbf{u}^{*T} A$, which means that (\mathbf{u}^*, r^*) is a feasible solution to problem (D). Moreover, we have $r^* \gamma x^* = \mathbf{u}_i^{*T} A_i x^* = \mathbf{u}_i^{*T} (b_i t^*) =$

$= \mathbf{u}_I^{*\top}(\mathbf{b}_I t^*) + \mathbf{u}_J^{*\top}(\mathbf{b}_J t^*) = \mathbf{u}^{*\top}(\mathbf{b} t^*) = t^* \mathbf{u}^{*\top} \mathbf{b}$, which means that $\gamma x^*/t^* \approx \mathbf{u}^{*\top} \mathbf{b}/r^*$. By Corollary 4, the solution (\mathbf{u}^*, r^*) is optimal.

(II) Let $(\mathbf{u}^*, r^*) \in V^m \times R$ be an optimal solution to problem (D) and let $I = \{i \in \{1, \dots, m\} : u_i^* > 0\}$. Let $J = \{1, \dots, m\} \setminus I$ be the complement of the index set I . By Lemma 6, there exist a positive $t^* \in R$ and an $x^* \in W$ such that $A_I x^* = \mathbf{b}_I t^*$ and $A_J x^* \leq \mathbf{b}_J t^*$. It follows that (x^*, t^*) is a feasible solution to problem (P). Additionally, it holds $r^* \gamma x^* = \mathbf{u}^{*\top} A x^* = \mathbf{u}_I^{*\top} A_I x^* + \mathbf{u}_J^{*\top} A_J x^* = \mathbf{u}_I^{*\top}(\mathbf{b}_I t^*) + \mathbf{u}_J^{*\top}(\mathbf{b}_J t^*) = \mathbf{u}^{*\top}(\mathbf{b} t^*) = t^* \mathbf{u}^{*\top} \mathbf{b}$, which means that $\gamma x^*/t^* \approx \mathbf{u}^{*\top} \mathbf{b}/r^*$. By Corollary 4, the solution (x^*, t^*) is optimal.

5. An application in business decision making

Following Bartl (2019), we propose a simple application of homogeneous linear programming in the context of SMEs. In Subsection 5.1, we introduce a special linearly ordered commutative associative ring R , which we shall use. In Subsection 5.2, we describe a simple decision making problem (an extension of the FMEA method) and a mathematical model of the decision making problem in terms of homogeneous linear programming. In Subsection 5.3, we briefly discuss other special linearly ordered commutative rings.

5.1. A special linearly ordered commutative ring

We construct the special linearly ordered commutative associative ring in two steps. First, consider the ring S consisting of all rational numbers of the form $m \times 10^n$ for all integer m and n . In words, the auxiliary ring S consists of all numbers that can be written by using a finite number of (decimal) digits, such as 5, 12.345, -3.14 , but not $1/3 = 0.333 \dots$. This ring S is a subring of the field of the real numbers \mathbb{R} , therefore the arithmetical operations (addition, subtraction, and multiplication) as well as its linear ordering are defined in the usual way. Second, let the special linearly ordered commutative associative ring R consist of all the formal power series of the form $\sum_{n=-\infty}^{+\infty} a_n x^n$, that is

$$\dots + a_3 x^3 + a_2 x^2 + a_1 x^1 + a_0 x^0 + a_{-1} x^{-1} + a_{-2} x^{-2} + a_{-3} x^{-3} + \dots$$

where “ x ” is a formal variable and the coefficients $a_n \in S$ for all $n \in \mathbb{Z}$ where only finitely many of a_n ’s are non-zero. (Here S is the above constructed ring. Alternatively, we can consider $S = \mathbb{R}$ or $S = \mathbb{Q}$, or any other suitable ring.)

The addition and subtraction are defined in the usual way. That is, for $\sum_{n=-\infty}^{+\infty} a_n x^n \in R$ and for $\sum_{n=-\infty}^{+\infty} b_n x^n \in R$, we have $\sum_{n=-\infty}^{+\infty} a_n x^n + \sum_{n=-\infty}^{+\infty} b_n x^n = \sum_{n=-\infty}^{+\infty} (a_n + b_n) x^n$ and also $\sum_{n=-\infty}^{+\infty} a_n x^n - \sum_{n=-\infty}^{+\infty} b_n x^n = \sum_{n=-\infty}^{+\infty} (a_n - b_n) x^n$. We note that the element $0 = \sum_{n=-\infty}^{+\infty} a_n x^n$, where $a_n = 0$ for all $n \in \mathbb{Z}$, is neutral with respect to addition.

The multiplication is defined by using the rule that $x^m \times x^n = x^{m+n}$. That is, for $\sum_{n=-\infty}^{+\infty} a_n x^n \in R$ and for $\sum_{n=-\infty}^{+\infty} b_n x^n \in R$, we have that $\sum_{n=-\infty}^{+\infty} a_n x^n \times \sum_{n=-\infty}^{+\infty} b_n x^n = \sum_{n=-\infty}^{+\infty} (\sum_{m=-\infty}^{+\infty} a_{n-m} \times b_m) x^n$. We note that the element $1 = x^0 = \sum_{n=-\infty}^{+\infty} a_n x^n$, where $a_0 = 1$ and $a_n = 0$ for all $n \in \mathbb{Z} \setminus \{0\}$, is neutral with respect to multiplication.

The ring is ordered lexicographically by using the rule that $x^m \ll x^n$ if and only if $m < n$. That is, for $\sum_{n=-\infty}^{+\infty} a_n x^n \in R$ and for $\sum_{n=-\infty}^{+\infty} b_n x^n \in R$, we have $\sum_{n=-\infty}^{+\infty} a_n x^n < \sum_{n=-\infty}^{+\infty} b_n x^n$ if and only if there exists an $n_0 \in \mathbb{Z}$ such that $a_{n_0} < b_{n_0}$ and $a_n = b_n$ for all $n \in \mathbb{Z}$ such that $n > n_0$.

Both rings S and R are commutative, associative, unital, and do not contain zero divisors. The motivation behind the use of the ring S is that, when an expert (decision maker) writes down some number with a practical meaning, such as some score or probability of an event, then the number will consist of a finite number of digits. In other words, the expert cannot write down more than finitely many digits in practice. The motivation behind the use of the ring R is that it provides a finer resolution than the usual numerical scale. To illustrate this idea, consider the sample space $\Omega = \{1, 2\}$ with the probability mass function defined as $p_1 = 0.5 + 10x^{-1}$ and $p_2 = 0.5 - 10x^{-1}$. Then both elementary events $\{1\}$ and $\{2\}$ are (about) equally probable, but the event $\{1\}$ is “slightly more” probable than $\{2\}$.

5.2 A simple decision making problem: an extension of the FMEA method

The FMEA (Failure Mode and Effects Analysis) method (Stamatis, 2003) is a tool to identify serious risks; it can also be used in Six Sigma. Let $\Omega = \{\omega_1, \omega_2, \dots, \omega_n\}$ be the set of the risks under consideration; we assume for simplicity that the number of the risks is finite. Each risk ω receives three scores: probability P_ω is the likelihood of the occurrence of the risk, severity S_ω is the score of the worst impact of the risk, and detection D_ω is the likelihood that the risk will *not* be detected until its severe impact shows up. It is usual to take the scores from the scale $\{1, 2, \dots, 10\}$, where 1 and 10 represent the mildest and the most serious, respectively, value. The RPN (Risk Priority Number) of the risk ω is a number ranging from 1 (risk of little account) to 1000 (serious hazard); it is the product of the three scores, that is $RPN_\omega = P_\omega S_\omega D_\omega$.

In the FMEA method, it also makes sense to use the ring R introduced in the previous subsection. We then choose the scores $P_\omega, S_\omega, D_\omega$ from the scale $\mathcal{S} = \{r \in R : 0 < r \leq 10\}$. Recall that 0 is the element $0 = \sum_{n=-\infty}^{+\infty} a_n x^n$ with $a_n = 0$ for all $n \in \mathbb{Z}$, and 10 is the element $10x^0 = \sum_{n=-\infty}^{+\infty} b_n x^n$ with $b_0 = 10$ and $b_n = 0$ for all $n \in \mathbb{Z} \setminus \{0\}$.

Assume that, for each risk $\omega \in \Omega$, its probability score $P_\omega \in \mathcal{S}$ and its severity score $S_\omega \in \mathcal{S}$ are given and fixed, but its detection score $D_\omega \in \mathcal{S}$ can be decreased to $D'_\omega \in \mathcal{S}$ if full attention is paid to the risk ω . Full attention means attention of unit intensity. We assume, however, that attention of intensity of no more than $I_\omega \in R$ can be paid to the risk ω . We assume that $\sum_{\omega \in \Omega} I_\omega > 1$ and $0 < I_\omega < 1$ for $\omega \in \Omega$, where 1 is the element $1x^0 = \sum_{n=-\infty}^{+\infty} a_n x^n$ with $a_0 = 1$ and $a_n = 0$ for all $n \in \mathbb{Z} \setminus \{0\}$. If attention of intensity $x_\omega \in R$, such that $0 \leq x_\omega \leq I_\omega$, is paid to the risk ω , then its detection score is decreased proportionally to $D_\omega - (D_\omega - D'_\omega)x_\omega$, so that its RPN is mitigated to $RPN'_\omega = P_\omega S_\omega D_\omega - P_\omega S_\omega (D_\omega - D'_\omega)x_\omega$. The task is to divide the available unit attention among the risks so that the maximum of the mitigated RPN's is minimized.

This simple decision making problem can be expressed in terms of homogeneous linear programming as follows:

$$\begin{aligned} &\text{minimize} && y/t && && (1) \\ &\text{subject to} && P_\omega S_\omega D_\omega t - P_\omega S_\omega (D_\omega - D'_\omega)x_\omega \leq y && \text{for } \omega \in \Omega \\ & && \sum_{\omega \in \Omega} x_\omega \leq 1t \\ & && 0 \leq x_\omega \leq I_\omega t && \text{for } \omega \in \Omega \\ & && t > 0 \end{aligned}$$

where $y \in R$ and $x_\omega \in R$ for $\omega \in \Omega$ and also $t \in R$ are variables. The value of the variable x_ω is the intensity of the attention paid to the risk ω , and $t > 0$ is the homogenizing variable; its value can be seen as the total intensity of the attention. The variable y is auxiliary and it is used to find the maximum of the mitigated RPN's. We can rewrite problem (1) into the form of primal problem (P) as follows:

$$\begin{aligned} &\text{maximize} && -y/t && && (2) \\ &\text{subject to} && -y - P_\omega S_\omega (D_\omega - D'_\omega)x_\omega \leq -P_\omega S_\omega D_\omega t && \text{for } \omega \in \Omega \\ & && \sum_{\omega \in \Omega} x_\omega \leq 1t \\ & && x_\omega \leq I_\omega t && \text{for } \omega \in \Omega \\ & && -x_\omega \leq 0t && \text{for } \omega \in \Omega \\ & && t > 0 \end{aligned}$$

Notice that, in this primal problem (2), the primal variable module is $W = R \times R^\Omega$ and the module V of the objective values is identified with the ring itself, that is $V = R$. The dual problem then takes the form:

$$\begin{aligned} &\text{minimize} && (\sum_{\omega \in \Omega} -P_\omega S_\omega D_\omega u_\omega + 1w + \sum_{\omega \in \Omega} I_\omega v_\omega + \sum_{\omega \in \Omega} 0z_\omega)/r && (3) \\ &\text{subject to} && \sum_{\omega \in \Omega} -u_\omega = -1r \\ & && -P_\omega S_\omega (D_\omega - D'_\omega)u_\omega + 1w + 1v_\omega - 1z_\omega = 0r && \text{for } \omega \in \Omega \\ & && w, u_\omega, v_\omega, z_\omega \geq 0 && \text{for } \omega \in \Omega \\ & && r > 0 \end{aligned}$$

where $z \in R$ and $u_\omega, v_\omega, w_\omega \in R$ for $\omega \in \Omega$ and also $r \in R$ are variables. Here $r > 0$ is the homogenizing variable. We can simplify problem (3) to:

$$\begin{aligned}
& \text{maximize} && (\sum_{\omega \in \Omega} P_\omega S_\omega D_\omega u_\omega - \sum_{\omega \in \Omega} I_\omega v_\omega - w)/r && (4) \\
& \text{subject to} && \sum_{\omega \in \Omega} u_\omega = 1r \\
& && P_\omega S_\omega (D_\omega - D'_\omega) u_\omega - v_\omega - w \leq 0r && \text{for } \omega \in \Omega \\
& && u_\omega, v_\omega, w \geq 0 && \text{for } \omega \in \Omega \\
& && r > 0
\end{aligned}$$

Recall that R is a non-trivial linearly ordered commutative associative ring and notice that the additional hypotheses (H1)–(H4) are also satisfied. It follows hence that Strong Duality Theorem 7 holds for problems (2) and (3). Since problem (2) and (3) is equivalent with problem (1) and (4), respectively, it follows that the Strong Duality Theorem holds for problems (1) and (4) as well.

5.3 Other special linearly ordered commutative rings

The motivation behind the use of the rings S and R was explained at the end of Subsection 5.1. Notice, however, that we used another special linearly ordered commutative ring in the applications described in Bartl (2019), see Bartl (2017, Example 1); this ring is associative, contains zero divisors, but does not satisfy (H2), which is the reason why we have not used it here. More examples of linearly ordered commutative rings can be found in Bartl (2017, Examples 2–4), see also Bartl (2020, Examples 4.1, 5.1, 5.2, and 7.1). We do not go into the details due to the lack of space.

6. Remarks

Let R be a non-trivial linearly ordered commutative associative ring, let W be a module over the ring R , and let V be a linearly ordered module over the linearly ordered ring R .

Let $a, K \in R$ be positive elements such that a is a zero divisor and K is not a zero divisor. Observe that $0 < a < K$.

It is then easy to see that, if the ring R satisfies (H1) and (H2), then there are no zero divisors in the ring. (Assume for the sake of a contradiction that $a \in R$ is a positive zero divisor; that is, there exists a positive $b \in R$ such that $ab = 0$. Let $K \in R$ be a positive element, provided by (H1), which is not a zero divisor and. Since $0 < a < K$ and the ring R is weakly Archimedean by (H2), there exists a $\lambda \in R$ such that $0 < K \leq \lambda a$. Since $b > 0$ and the ring is linearly ordered, it holds $0 \leq Kb \leq (\lambda a)b$. By the associativity, we have $(\lambda a)b = \lambda(ab) = \lambda 0 = 0$, whence $Kb = 0$, which is a contradiction because K is not a zero divisor. We conclude that there are no zero divisors in the ring.)

7. Conclusion

The classical variant of Farkas' Lemma (Farkas, 1902) says in symbols that $(\forall x \in \mathbb{R}^n: Ax \leq 0 \Rightarrow c^T x \leq 0) \Leftrightarrow (\exists u^T \in \mathbb{R}^{1 \times m}, u^T \geq 0^T: u^T A = c^T)$, where $A \in \mathbb{R}^{m \times n}$ is a matrix and $c^T \in \mathbb{R}^{1 \times n}$ is a row vector. Like latter statement of Farkas' Lemma with the equation $(u^T A = c^T)$ yields the constraints of the dual problem (D_c), the consequent of the discrete variant of Farkas' Lemma (Lemma 1) with the equation $(u^T A = r\gamma)$ led us naturally to formulate the constraints of the dual problem (D), cf. Lemma 5. The constraints of the primal problem (P_c) are given by the system of linear inequalities $(Ax \leq b)$ considered in the classical variant of Gale's Theorem of the alternative (Fan, 1956; Gale, 1960). Likewise, the system of linear inequalities $(Ax \leq bt)$ considered in Gale's Theorem 2 yields the constraints of the primal problem (P), cf. Lemma 6. The objective functions of both problems (P) and (D) are made up easily then.

Given the new variant of Farkas' Lemma (Lemma 1), it was our purpose to investigate whether the Strong Duality Theorem can also be proved for problems (P) and (D). Albeit the hypothesis of the associativity of the ring R is unnecessary in the new variant of Farkas' Lemma (it is relaxed to the hypothesis that $(\lambda\mu)x = \lambda(\mu x)$ for all $\lambda, \mu \in R$ and for all $x \in W$ in Lemma 1), we used it several times when proving our results (Lemma 5 and Lemma 6 in particular). Moreover, we also used additional

hypotheses (H1)–(H3) and (H4) to prove our results. We showed in Section 6, however, that there are no zero divisors in the ring R under these hypotheses. Then, the ring R being commutative, associative and without any zero divisors, it can naturally be extended into the corresponding field F of fractions. Consequently, Strong Duality Theorem 7 also follows from the already known results for the continuous case (Bartl, 2007), see Bartl and Dubey (2017, Remark 8), which is a disappointing finding. In other words, Strong Duality Theorem 7 cannot be seen as a new result due to the strong additional hypotheses, which we used to prove Lemma 5 and Lemma 6.

We thus ask whether the Strong Duality Theorem for problems (P) and (D) holds even if the hypothesis of the associativity of the ring R and/or additional hypotheses (H1)–(H3) and (H4) are relaxed, or if it holds in the special case of some of the rings discussed in Subsection 5.3.

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PLATFORM-BASED HORIZONTAL COLLABORATION IN LAST MILE DELIVERY

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Abstract

Urban, downtown logistics is the biggest challenge for the parcel delivery industry to date. E-commerce is showing an increasing trend, with concomitant traffic in the city centre, a decrease in the number of parking spaces and, to curb all this, environmental protection is increasingly demanding a reduction in pollution. In addition, in order to reduce the rising transport costs, the introduction of parcel delivery alternatives is no longer enough, the application of a new business model would be the appropriate solution. One possible solution is to rethink horizontal cooperation, even with the involvement of players of the SME sector, in the spirit of the sharing economy. The sharing economy, which has existed for a few years, has made it possible to realize unprecedented collaborations between ordinary people who undertake to share their resources with strangers to reduce their costs. This paper examines the conditions under which a platform-based collaboration between last mile delivery providers with a horizontal relationship could be established. What decision do business leaders face if, while maintaining competition, a business model built on a new foundation (platform) supports them use their resources more efficiently, reduce their costs, and maintain customer satisfaction. The research examines the possibility of collaboration between four- and two-wheeled, horizontal service providers in the downtown area, who organize deliveries through a common platform to share their resources as well as provides examples of the collaborations.

Keywords: horizontal collaboration, last mile logistics, sharing economy, trust, urban city collaborations

JEL codes: L81, P48, R10

1. Introduction

E-commerce is on an upward trend and the Covid-19 situation in 2020 predicts even more intense growth for the coming years, and the consumers' expectations have become more demanding along with. Excess transport demand and changed customer expectations pose increasingly serious challenges for logistics providers as well as city residents. Urban and city logistics have an important role in economic development of cities. The concept of "urban logistics" refers to logistics delivery services in the city area. Urban logistics offers unique, personalized solutions for the transport of goods in cities by consolidating and streamlining existing logistics platforms and using innovative information and communication technologies to create innovative solutions for the future.

The last leg of last mile delivery in the inner-city area represents a significant challenge for the logistics service providers. The increasing level of urbanization worldwide leads to higher levels of transport activity related to cargo distribution and service provision (Paddeu et al., 2016). This

phenomenon generates social, environmental, and economic impacts, mainly related to traffic congestion and noise, pollutants, and greenhouse gas emissions, as well as a greater risk of traffic accidents (Oliveira et al., 2017). According to experts the consequence of this problem can be examined in the last mile distribution of goods. In order to mitigate these effects, cities need to advance their transformation and allow the innovative exploration of urban freight operations, especially in relation to the development of new technologies. In addition to these challenges, Olsson et al. (2019) argue that last mile delivery consumes the largest share of the logistics cost; therefore, suppliers and stakeholders are encouraged to minimize their transport cost while attempting to reduce the social, environmental, and economic impact of their operations. Last mile delivery are the cause of increased traffic, congestion, and pollution, the studies and findings of the present article are limited to parcel delivery.

Due to the growing competitive situation, environmental pressure and customer expectations, service providers have been forced to enter into special collaborations. The collaboration strategies among logistics service providers have been discussed by scholars for several years. Collaboration is a co-operative strategy that logistics providers engage with each other to reduce costs, increase revenue, and serve customers more efficiently. However, new types of challenges have emerged in the last few years which are increasingly demanding the establishment of even new type of collaborations, therefore, the revision and alternative use of previously known cooperative models can result in the expected solution. As Lindawati et al. (2014) state, different alternatives to collaborations do not necessarily lead to success, and many of them do not even go through the pilot phase, thus it is important to examine what strategy can lead and what motivations can drive to successful collaboration.

Collaborations need to be put on a new footing; business models different from those known so far and the previous failures need to be found so that increasing competition does not require sacrifices but sustainability. The sharing economy initiative has had a huge impact on passenger transport (Uber), tourism (Airbnb), hospitality (Wolt) over the last few years. The innovative solutions developed can also provide ideas to the logistics industry to be able to provide a platform-based service while reducing costs and maintaining customer satisfaction.

To address these questions, the article focuses on a comprehensive literature review on the existing collaborative approaches, their advantages and challenges as well as provides a conclusion of the findings and concludes what motivation or coercive factors are required for last mile delivery service providers to make collaborations in order to gain benefit and remain competitive in the changed environment. The paper is organized as follows: Section 2 provides a literature review on different last mile delivery collaborations including urban logistics solutions. Section 3 presents a discussion about the developed and proposed alternative model. Section 4 concludes the findings and provides directions for future research.

2. Literature review

Last mile delivery has undergone a dramatic change and is undergoing these days. The participants of the courier express and parcel (CEP) market are called “all-to-everywhere” industry where the players work in the same areas using their own operation resources (e.g., vehicles, human resources, etc.) as well as serving similar consumers. Last mile providers are typically players in the CEP market. The CEP players also work in the inner-city area called “city logistics”. McLeod et al. (2020) state that city logistics becomes challenging due to street closures, restrictions, parking costs, the traffic and long distances from the parking van to the consumer’s doorstep. In addition to that Cleophas et al. (2018) also argue that the increasing urban logistics, i.e., city logistics, faces a huge challenge in terms of congestions, high emissions and also having a negative impact on the quality of life.

The last mile logistics literature develops various initiatives and concepts to address the challenges. In the field of urban logistics, methodological solutions are being sought that will not only increase efficiency. The existing literature provides different solutions, and as Olsson et al. (2019) initiate that have been addressed in the last mile logistics research as follows: 1) evolving technologies and trends; 2) operational optimization; 3) logistics structures including urban city models; 4) policy and regulations.

Evolving technologies and trends articles focus on innovative solutions including sustainable vehicles (Oliveira et al., 2017) as well as emerging business models such as freight traffic controller as trusted third party (Allen et al., 2017) and different perspectives on collaborations such as multi-

agent-auction-based approach (Dai and Chen, 2011) and carrier's carrier operating model (McLeod et al., 2020).

Operational optimization literatures refer to articles focused on planning, modelling and optimizing last mile operations including distribution of parcels in order to avoid revenue erosion and increasing cost pressure (Limoubpratum et al., 2015). These articles most often describe problems and possible solutions using different mathematical models (Dahl and Derigs, 2011, Park et al., 2016, Allen et al., 2017).

Logistics structures including urban city models' literatures are the most reviewed and discussed themes where the articles focus on transforming supply chain structures. In the field of urban logistics, there are case study-based approaches that illustrate structural changes and their effects on the supply chain through implemented or planned examples (Serrano-Hernandez et al., 2018). Urban logistics often deals with the creation of urban city centers (UCC) and explores their potential for service providers to provide distribution space and shared vehicles and resources (Park et al., 2016).

Policy and regulations type of articles refer to identifying the existing and missing regulations of the last mile logistics. Almost all of the articles belonging to the former categories contain, at some level, views and evaluations related to regulations, since the models proposed by the authors are only theoretical in the absence of regulations (Park et al., 2016).

Participating in either solution requires some kind of collaboration between the parties involved (Lindawati et al., 2014). Cooperation is not unknown in the logistics industry. Basically, two forms are known: vertical and horizontal types of cooperation. The collaboration is vertical when the actors are subordinate to each other and they all supply a certain segment of the business. Vertical collaborations typically emerge in the supply chain process. Gonzalez-Feliu et al. (2018) state that vertical collaboration takes part among complementary stakeholders of the transport and mobility service value chain. Horizontal cooperation, according to Crujssen et al. (2007) refers to a practice among companies operating at the same level in the supply chain, where the companies either compete with each other or they are independent. In horizontal cooperation, participants "identify and exploit win-win situations" (p. 23) that can be categorized in the following manner: 1) integration level, 2) centralization and decentralization, and 3) dimension and strength. The main characteristic of such cooperation is that joint operation is excluded, on the other hand, relationships are adjusted by resource and risk sharing and mutual trust for the purpose of gaining a competitive advantage. Horizontal cooperation is typical of maritime transport, but traditional road shipping actors lack this form. Logistics experts suggest that despite this type of collaboration being not widespread in parcel logistics, companies still need to work together to achieve their specific goals. Gonzalez-Feliu et al. (2018) demonstrated that horizontal collaboration takes part among stakeholders of same type and level, as for example users, transport providers or shippers. A special form of horizontal collaboration is an alliance, which takes the form of strategic cooperation between at least two companies to achieve a commonly defined goal (Bengtsson et al., 2000). Many organizations perceive it as a promising direction, but they do not understand how to guide their collaboration and how to build a trustful relationship. The field of last mile logistics examined in this article is horizontal in terms of cooperation, where the parties provide services on the same level of the market and many times to the same consumers.

A company alone cannot grow to some extent or spread a market segment without entering into alliances with other partners. In order to increase business results, a company must cooperate with external parties, suppliers, competitors and complementors. Bengtsson and Kock (1999) argue that a special form of horizontal cooperation is co-opetition, which defines a business situation where independent actors cooperate and compete with each other at the same time. The authors supplement that such business relationships are based on trust and mutuality. According to Limoubpratum et al. (2015) trust and dependence are essential in cooperation between companies where there are three main driver forces to promote co-opetition: trust and risk sharing ability; management commitment; and communication. As McLeod et al. (2020) argue, there are obstacles in the different type of collaborations, e.g., brand identity, IT system compatibility, liability issues and different measures of city authorities, which might be considered while adopting a new operating model. Moreover, Cleophas et al. (2018) also contend that there have been such collaborations for years within the logistics service sector but not many have survived their trial phase. On the other hand, many authors state that there is innovation in the collaboration where start-up companies explore new business models related

to the sharing economy, such as crowdsourcing (involvement of the regular citizens in delivery), Uber-like delivery models and takeaways (Alnaggar et al., 2021).

The sharing economy is not a new phenomenon, but it is still a much researched topic in the scientific literature. Research on the topic is completely understandable, as previously almost unimaginable things have come true under the auspices of the sharing economy. Frenken and Schor (2017) aptly state that people shared things with each other centuries ago, yet this behavior is fairly new to the society of the century. Also, these authors find that there is something new with the current sharing. Trust, which is the basis of all existence and action, is placed on a new foundation by the sharing economy, as unknown people share their property with each other with complete confidence. The potential of the platform for exchanging information in the sharing economy has also attracted the interest of the logistics industry. Qin et al. (2020) studied the impact of it through the operation of the Amazon-operated warehouse base and its associated delivery service platform.

This study examines the basis for cooperation between CEP market providers. The study is limited to the last step of the parcel delivery process, which is called last mile delivery. In recent years, a number of solutions, even supported by mathematical calculations, have been developed in the scientific literature to increase the efficiency of last mile delivery based on collaboration. Solutions included innovative vehicle or alternative delivery methods, innovative operations or optimization strategies. Despite all this, the number of successful collaborations is negligible, therefore it is assumed that the factor necessary to achieve success is missing from the analyzes. Cooperation requires proper motivation and trust. The present study further examines what motivational factors are needed to initiate a platform-based collaboration, and whether trust facilitates or hinders the development of collaboration.

3. Discussion

CEP market players' activity is characterized by their own operation, which includes their own parcel processing (distribution), their own defined distribution network and their own resources (trucks and human resources). Their day-to-day operations are determined by the struggle for customers. Rising customer expectations (time-window deliveries) and strong price competition have posed serious challenges to service providers. In addition to the existing challenges, especially in cities, environmental standards that enable people to have a better quality of life pose additional challenges for service providers. The biggest problem for last mile delivery providers is delivery to downtown areas, as these areas are partially closed in a significant number of cities, but at least have limited access. The number of parking spaces is also limited, there are no designated parking zones for trucks, so delivering a parcel to the customer is a serious problem. In the absence of cooperation, there are several service providers operating in the same downtown area on a daily basis, which puts a heavy burden on the population, traffic and air quality alike.

3.1 Competition with cooperation – case studies

The challenges listed encourage service providers to work together. However, cooperation does not take place, at least in very rare cases (e.g., carrier's carrier model implemented in Berlin and another one in north of Scotland presented by McLeod et al., 2020). Competitive cooperation is based on rivalry. An action-reaction type interaction characterizes their relationship. The movement of one party is followed by the movement further developed by the other party, thus maintaining competition. The essence of the competition is to win the largest possible number of parcels and market share in the case of the CEP market. Is there competition combined with cooperation?

As a unique example in the Hungarian CEP market, two market players have collaborated to optimally cover downtown deliveries. One player is the market-leading courier service and the other is the market-leading bicycle courier service. The motivation for the cooperation was on the one hand the environmental commitment of the courier service, on the other hand economic interests, cost-based considerations. The motivation for the bicycle courier service was purely economic. The cooperation resulted in a win-win situation, both sides as well as the downtown area also won the new cooperation. This cooperation is characterized by the complementary type. One provider is teaming up with another provider to take advantage of its potential. Although the two companies operate in the same market, their customers are often the same, they are not explicitly in competition with each other due to the

different nature of the vehicles on which the delivery is based. In terms of cooperation, a complementary horizontal cooperation has been established, where the motivating factor was the lack of a competence on the one hand and economy on the other.

A collaborative urban consolidation center (UCC) can only be established if there is horizontal cooperation between the participants. Although it is established on the basis of horizontal cooperation, in addition to service providers at the same level, a third party enters into the cooperation. The third party is often the management of the city, but the actor may also be an independent third party. One such initiative is the UCC in Bristol, presented by Paddeu et al. (2018). Bristol is the largest coastal city in the South West of England, making it the most congested city by 2016 due to daily car and truck traffic. The city administration has been determined to transform Bristol into a sustainable city and build a city consolidation center. The city has introduced various regulations that have resulted in non-food last mile deliveries being delivered through UCC, where collaboration is based on the use of shared resources and deliveries. As a result of the initiative, emissions have been significantly reduced while maintaining customer satisfaction. According to the authors more than 200 similar experiments have been conducted in Europe, but only 15 UCCs are operational 5 years after their establishment. The basic motivation of the Bristol example is to reduce environmental damage and make the city more livable, which has been supported by regulations of the city leadership. For last mile providers, joining UCC and collaborating has become the only way to deliver future deliveries. In addition to creating the regulatory background, the city management made joining the UCC attractive, so the motivation for service providers to comply with the rules was also to reduce their costs. The authors pointed out that although the establishment of UCC resulted in cost reductions, in most cases, initial capital and willingness have been required to establish them. The lack of ongoing financial support does not make the operation of UCCs sustainable.

3.2 Role of trust

Cooperation between competitors can only take place in order to achieve some common goal, in which the basic motivating factor is to achieve a win-win situation. In addition to the examples presented, growth can be a demand that stimulates collaboration. The projected growth rate of e-commerce is such that last mile delivery providers can meet demand to the detriment of the current operation. Sufficient motivation may arise to share resources and services to meet increased needs. Significant growth cannot be achieved by a company alone, only through an alliance or some form of collaboration as this is the easiest way to access the resources needed for growth. Horizontal cooperation develops at a certain stage of the development and maturity life cycle of companies. The initial phase of a company is characterized by self-operation and the use of its own resources. At one point in the lifecycle, an additional service provider can either develop its own additional service in-house or collaborate with another company. The next step in development is to achieve significant growth, which is accomplished either through significant capital investment or cooperation. Achieving growth or service expansion and its form of implementation is based on a decision. The company makes a decision on how to move to the next stage of its development life cycle.

In addition to motivational factors, cooperation is based on trust. Trust is the foundation of long-term business relationships and a critical factor in successful logistics collaborations. Trust is needed to share information and resources, without which successful collaboration would not work. However, companies are reluctant to share information outside the company. During horizontal cooperation, the cooperating partners share their resources, in case of last mile delivery, the parcels are delivered to the customer in vehicles operated jointly by the partners. To use the shared resource, information must be shared with the partner so that delivery is accomplished in optimal way. Sharing information requires trust from partners. Oláh et al. (2017) defined trust as “a type of expectation that alleviates the fear that one’s exchange partner will act opportunistically” i.e., the trusted partner acts predictably, in concert for the benefit of the relationship and not against it. The authors also argue that there is a strong relationship between corporate culture and the level of trust that can also determine the willingness to cooperate and the trust that influences it. Trust has been moved to a different level in the last few years. In the context of the sharing economy, people have built unprecedented levels of trust with unknown people (shared cars), and the concept of digital trust has been developed.

3.3 Factors that affect collaboration

The classic form of collaboration is cooperation between companies (e.g., an alliance). However, there is a form of collaboration that needs to be interpreted more broadly, as a third party appears in the cooperation. UCC-based collaboration always involves third party entry. The third party may be the city management, an independent third party, or a joint venture jointly designated by the parties. In such special collaborations, one actor (UCC operator) plays a different role from the other partners. Service providers that have joined UCC perform the same activity in the market, but the third party plays a completely different role from them. Its role is to moderate and provide service to the joined providers.

The hitherto known form of collaborations (vertical and horizontal) has been changed with the involvement of a third party (UCC, trusted third party), so the characteristics of the categories discussed in the examination of collaborations do not necessarily apply to new models. The new models combine the previously known forms and create a hybrid model where not only horizontal but also vertical and new types of relationships, even temporary ones, emerge, which is even more true for the platform-based operating models preferred by the sharing economy.

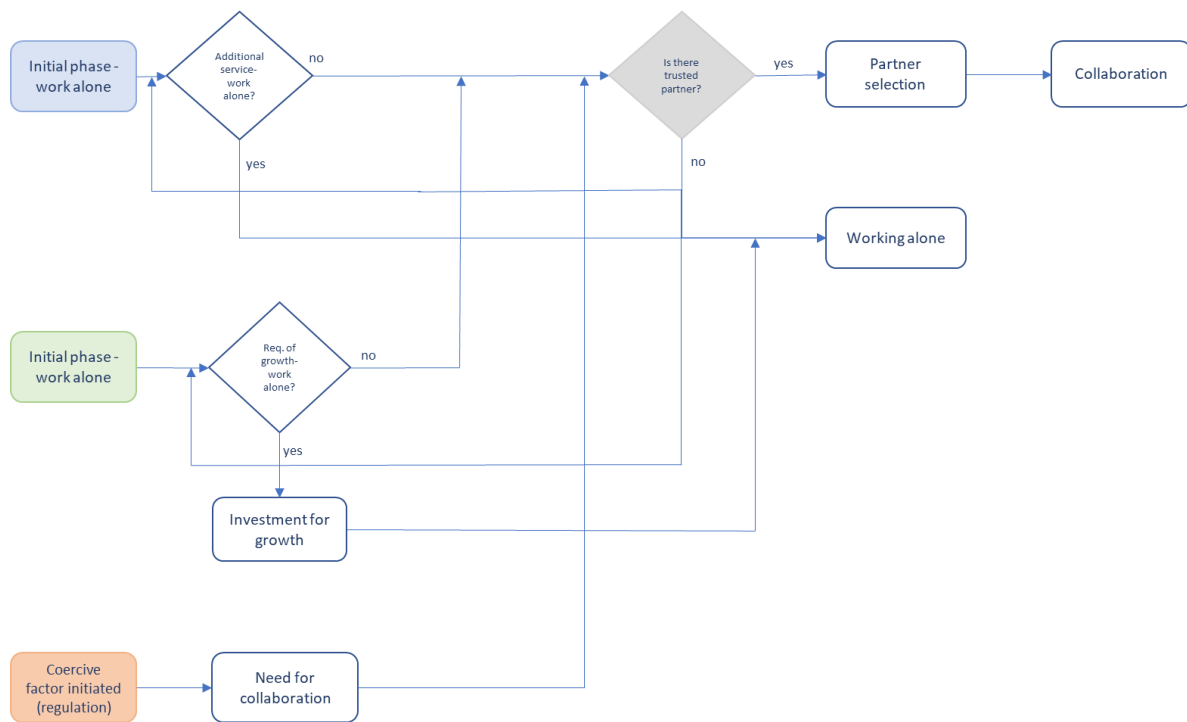
The aim of this article is to investigate what factors (conditions) force logistics last mile service providers to cooperate and what role the issue of trust can play in the establishment of collaborations. Based on the examples mentioned earlier and existing in the logistics industry, it appears that there are basically three factors influencing the entry into cooperation

Regulations: it is the responsibility of city management to make cities more livable. Environmental regulations are increasingly opposed to increased vehicle traffic and emissions. These regulations only become city management regulations in certain cases. The development of rules already has a coercive effect on service providers and they should continue to work together on the basis of a new business model once the rules are introduced. Thus, city management has a major role to play in reducing pollution, however, short-term regulations (closures, parking restrictions, introduction of separate time windows) tend to increase costs or place a greater burden on surrounding locations where regulations do not exist (Dario et al., 2017). Regulation can in some cases be an incentive to achieve goals, but at the same time it is a disincentive if it is not designed with the interests of the stakeholders involved. Regulation becomes feasible for the parties if the city government acts as a partner and not just as a regulator. In each of the successful examples, city management has played a significant role not only in its role as a regulator, but also as an active participant in the solution, planning to implement the new business model for the city's sustainability through incentives, seed capital, or even third-party involvement.

Economic interest: economic interest can have two origins. In one case the aim is to achieve a significant cost reduction, in the other case the service provider is no longer able to satisfy the increased needs on its own, so it enters into an alliance with another service provider to achieve the growth or both at the same time. The driving force behind both cases is economic interest. Significant cost reductions can occur after a complete redesign of the logistics operation. Under the new model, cooperating service providers will share their resources to minimize costs and achieve higher profits. One form of economic interest is the acquisition of the missing competence by joining the alliance, in which case one service provider cooperates with another complementary service provider. The model can be created based on an alliance of two service providers, or even in the case of a third-party involvement. A third-party could be the city management (UCC) or even a trusted third party. It should be noted that the introduction of regulation may be a precondition for the establishment of UCCs. However, UCCs also serve some economic interest in addition to regulation. Regulation and economic interest meet when the parties involved work together and clearly strive for a win-win situation.

Trust: Trust is an additional factor that complements basic motivations. If there is an advantage that promotes cooperation, trust will be considered as an additional factor between the parties. In the absence of trust, any economic interest remains at the plan level. Economic interest, or the existence of a coercive force, but in the absence of trust, cooperation is not established. Nevertheless, the existence of trust is an essential element of cooperation motivated by a purely economic interest. Once cooperation is motivated by an external force, the importance of trust is overridden by the new situation created by regulation, though trust remains existing. Figure 1 shows the development of the process and the role of trust in the case of three initiatives that require cooperation.

Figure 1: Development of the collaboration process and the role of trust



Source: author's own figure

In a world of sharing economy and platforms, trust has transformed and appreciated. Trust is also needed when, in the digital world, service providers trade through a common platform. Service providers need to trust each other, the success of the digital platform, and possibly the third-party service provider operating the platform. In the case of the sharing economy, the trust factor multiplies, as participants have to believe and trust not only in each other, but also in other factors in order to succeed. The platform-based service is a new phenomenon that involves not only IT challenges but also psychological and sociological ones. This document also classifies the concept of risk as a category of trust. In addition to trust, the willingness to take risks also plays an important role as a precondition for establishing collaborations. Trust in the new partner, in the new service provider, in the new IT service also means at the level of risk-taking. However, low risk-taking, at the same time a high confidence index already hinders cooperation and on the contrary, high risk-taking and a low confidence index also hinder the development of cooperation.

3.4 The other side of the coin - barriers

In addition to the factors that launch cooperation, those that limit cooperation also should be examined. The literature reviewed also defines barriers in some cases. The most basic limitation to cooperation is that there is no coercive force. There is no motivation that promotes collaboration and there is no condition that would facilitate the cooperative behavior. The next stage already has coercive force or facilitator factor, but the loss of competitiveness fear factor is intensifying. In the event of cooperation, the parties trust that the other party will not take advantage of them, and a lack of trust will prevent cooperation. Creating an alliance and cooperation is not necessarily a guarantee of success. The parties take the risk of cooperating. During cooperation, control over the operation is partially lost, at least transformed, which the parties feel risky. Shared resource use is risky even with a well-designed business plan, so low risk-taking ability is a barrier to collaboration.

4. Conclusion

Urban areas continue to become more and more crowded, innovative ideas for transporting freight are becoming increasingly important for keeping cities attractive and livable. In addition, e-

commerce sector is still increasing and the consumers' expectations have changed significantly. The last mile delivery in urban areas faces significant challenge for the logistics service providers due to traffic, restricted roads and increased environmental expectations. Moreover, last mile delivery is quite inefficient in urban areas due to empty trips and low load factors.

Despite the challenges, collaboration level among last mile service providers is insignificant, though it is an existing concept used in certain areas of logistics. There are innovative business models for collaboration in the area of urban logistics. Horizontal, vertical and carrier's carrier collaboration have been identified by scientists for many years. These types of collaborations have been successfully used in the traditional line-haul transportation. Resource sharing models have been appeared in the recent years, where human and non-human type of resources of participants have been shared for executing the logistics service.

The last mile logistics industry faces increasing challenges due to increased e-commerce, changed customer demands, and expectations that drive cities to become sustainable. Changed customer behavior and increased parcel numbers are strengthening competition between service providers, while increasing their costs, especially in downtown areas. Changing circumstances are increasingly encouraging service providers to work together. The purpose of this article has been to examine what motivational factors are needed to develop collaboration among last mile logistics providers. The article has reviewed horizontal last mile logistics solutions, including emerging trends and technologies, operations optimization solutions, urban logistics structures, and regulations.

It has been found that three factors are needed for collaboration: economic interest, regulation and trust. It can be stated that without economic interest and / or coercion, there is no cooperation between last mile providers. In the presence of coercive factors, trust is the next factor needed to build cooperation. However, trust is an additional factor that works in conjunction with the other two factors. The present study has defined regulation as a coercive factor. The coercive factor has both positive and negative meanings. A negative coercion, if it only benefits the coercive, is positive if it is win-win based. The task of city governments is to improve the living conditions of the population, decrease traffic and, at the same time, reduce negative environmental impacts. The tool of city governments is regulation, with the help of which they are able to change the process. However, regulations can have a negative impact on industry, including last mile providers. The development of regulation is expediently a multi-stakeholder process, where the city governments, in cooperation with the relevant stakeholders, makes a decision on sustainability. Instead of forced rules, making cooperation attractive is the proposed solution.

In the absence of regulations, economic interest is the only factor that facilitates the creation of a collaboration. Last mile providers cooperate when there is an economic interest that allows them to make significant cost reductions, expansions, or acquire a complementary competence. Trust is an essential basis for cooperation. However, the study also finds that trust is of great importance in cooperation motivated by economic interest, but less or negligible in the presence of coercive force. Examining the vertical and horizontal collaborations known in the logistics industry, it can be concluded that the new models (UCC and trusted third party involvement) created based on horizontal collaborations form a kind of hybrid model, where the actors differ in their task and timing from the previously used models. The new hybrid model is created by an economic interest and/or by a potential negative/positive coercive factor. The present study has found that the platform-based collaboration proposed by the sharing economy is only a tool for supporting the operation. The basis of it is also a hybrid collaboration model. In conclusion, in the present study a new model of cooperation has been introduced due to the involvement of new actors and the factors influencing and hindering the establishment of collaborations have been systematized. The role of trust and risk-taking in the different phases of establishing collaborations have been interpreted. As for future development it is proposed to further examine the newly defined hybrid collaboration model and its additional characteristics which might influence its establishments.

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DESIGN OF THE DECISION-MAKING MODEL IN THE FIELD OF PROCESS MANAGEMENT OF IT SERVICES

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Abstract

Process management in the area of IT services and the use of sophisticated methods are gaining importance due to increasing requirements for the quality of Information Technology service provision. Constant increase in requirements for Information Technology services raises the need to use a standardized methodology for process management in the field of Information Technology services. The article focuses on comparison of the methodologies used in the process management of IT. The design of the model is focused on identifying specific criteria for a process that is utilized to select the optimal alternative of the methodology. The company mentioned in the practical part of the article focuses on the implementation of process management and offers a software support for the measurement of the performance as well as the implementation of strategic management in the Information Technology. A proposal of the criteria plays a critical role to meet the objectives of every clients' request. Once a specific decision-making methodology is selected, suitable methods are designed to meet requirements of the client. For illustration, the proposed criteria were evaluated by the pairwise comparison method and the utility evaluation method was selected as the appropriate methodology.

Keywords: Information technology, methodology, process management, services
JEL codes: M15, O32

1. Introduction

Decision-making is one of the basic managers activities. It is the process of few crucial steps, which are necessary to do. Some of the problems are crucial and cannot be solved without the thorough qualitative analysis based upon managerial experiences and quantitative analysis based upon mathematical tools. Decision-making theory and methods were applied in many fields. There were some applications in the ICT services provided, but only a few applications in the field of comparison of methodologies are in the field of IT services. IT company is faced with the decision of which methodology to recommend to the customer and to start implementing for him. This application study strives to compare two main methodologies of the IT services – ITIL and COBIT. This paper presents the decision-making process for the specific company, what kind of methodology she implements. For the company is important what methodology is chosen. A proposal of the criteria depends on many factors - the preferences, strategy, structure, habits of the company, etc. Therefore, it is first necessary to identify the criteria for evaluating methodologies, describe individual alternatives (methodologies) and evaluate them. Criteria will be evaluated using the method of pairwise comparison and alternatives will be evaluated by maximize utility evaluation. The methodology that best meets the given criteria will be recommended and offered as the most suitable for the given customer. IT services are services,

which are focused directly on the customer (Bucksteeg et al., 2012). When the company wants to ensure a faster response to customer needs, then ICT is one of the key tools for achieving this goal, as state Voříšek et al. (2015). ICT services are provided to the external and internal customers. It combines technology, processes, and personnel. Service is a mean of providing value to the customer through the outputs that the customer wants to achieve without owning specific costs and risks. Service Management is a set of specific organizational competencies needed to provide value to the customer in the form of services. A service is the result of a process that is represented by a structured set of activities designed to achieve a specific goal. The process has one or more defined inputs and converts them into defined outputs. The process can include any roles, responsibilities, tools, and management controls required for reliable output delivery. The process can define policies, norms / standards, guidelines, activities, and work instructions as needed. Baliga et al. (2021) found out that to address service failure issues becomes critical in B2B markets, as they deal with high impact on corporate customers. Baliga et al. (2021) presented in their article the strongest challenges to effective service recovery (SR), as they were least dependent on other barriers and exerted strong influence over the operational barriers to executing service recovery management. Dayal, et al. (2020) created a cognitive model by using ITIL methodology, which manages to minimize the issues of the Information Technology Infrastructure by incorporation of service management practices.

One of the most useful features of automation services is that the process will run the same way every time. Therefore, the automation is the best way to improve the efficiency of the service provider and the next steps of the process. Rubio and Arcilla (2020) pointed out that one of the main points when implementing the Information Technology Infrastructure Library (ITIL) is which order processes must be implemented. Thus, once it is shown that there is no methodology/algorithm providing a sequence of ITIL processes specifically adapted for each company, an algorithm to solve this problem is presented: The algorithm has a deep mathematical basis and returns a sequence of ITIL processes to optimize the efforts during implementation, so the company implementing the ITIL gets the closest to the competitors. The optimization is made considering parameters such as staff, age of the company, size, industry, etc., and it is specific for each company. If ICT services are aimed at external customers, the business economy needs to be adapted to them. In the case of ICT services of public institutions, then these IT services affect the efficiency of the entire economy in a given country, as state Sanchez, et al. (2021). Hepola et al. (2020) pointed out that it is all about consumer engagement. They explained in their article that the consumer plays in the quality of IT services a key role. They compared the explanatory power of consumer engagement (CE) regarding service continuance intention with the variables of attitude (utilitarian and hedonic) and satisfaction.

2. Decision-making model

Multi-criteria decision methods (MCDM) require information about the criteria importance. Importance is expressed using criteria weights according to the relationship:

$$w = (w_1, w_2, \dots, w_k), \sum_{i=1}^k w_i = 1, w_i \geq 0 \quad (1)$$

The pairwise criteria comparison method compares the criteria with each other. Number of comparisons are expressed as (Fiala et al., 1994):

$$N = \binom{n}{2} = \frac{n(n-1)}{2} \quad (2)$$

The pairwise comparison method is often expressed using a Fuller's triangle. There is the weight of the criteria calculated as:

$$w_j = \frac{f_j}{\frac{n(n-1)}{2}} \quad (3)$$

where f_j means the number of preferences for the criteria and v_j means the weight of the criteria. When equals the number of preferences zero, is necessary to adjust it.

The utility function assigns a utility to each alternative. The overall utility of each alternative is determined based on knowledge of the weights of the criteria. The one with the highest utility is then selected as the best option. The value of utility is then expressed as:

$$v(a_i) = \sum_{j=1}^k w_j \times u_j [f_j(a_i)] \quad (4)$$

3. Data

The solution to this complex decision-making problem is based on the collection of information on given methodologies and the selection of criteria for their evaluation. The principles of the methodologies are described in this section.

ITIL methodology is based according ITIL® Foundation. (2019) on some general principles ITIL:

- The application prefers the usefulness of the chosen certain IT service
- Performance of the service
- availability
- capacity
- continuity
- information security

The application of ITIL prefers the usefulness of the chosen certain IT service. Within ITIL, these services are organized according to their life cycle into 5 phases. These are gradually Service Strategy, Service Design, Service Transition, Service Operation and Continuous Service Improvement. Each phase contains processes that provide IT services for a given stage of the life cycle;

Performance of the IT services provides a function used by an IT service provider to perform the day-to-day activities required to manage IT services and support IT infrastructure. IT performance management includes IT Operations Management, Facility Management Application Management. IT Operation management is responsible for monitoring IT services and IT infrastructure. Facility Management is a function responsible for managing the physical environment in which the IT infrastructure is located. Equipment management includes all aspects of physical environment management (eg, power supply, building access management, etc.). Application Management is responsible for managing applications throughout their lifecycle. An application is a software that provides the functionality required by an IT service.

Availability of a service represents the ability to perform the assigned function in the event of its demand. The determination of its value is usually based on the agreed objectives of the service and its downtime;

Capacity corresponds to the amount of current and future resources of IT and IT services, which will be in accordance with the defined goals of service level so that the service is available economically and on time. From the perspective of IT service management, capacity management is an activity that must understand the future business requirements for a given IT service to incorporate them into a capacity plan;

Continuity is the management of risks regarding unforeseen events and disasters that may have serious repercussions on a given service. Based on the reduction of risk to an acceptable level, the user is assured IT service supplier's ability to deliver the agreed minimum level of delivered IT services and then develop measures to restore the service.

Information security is represented in ITIL by the Information Security Management (ISM) process, which is part of the Service Design. It is a new process designed to ensure the confidentiality, integrity, and availability of an organization's IT assets, information, data, and services. Its goal is to link information security with the overall security of the organization to protect the interests of all those who depend on information and information systems. Information Security Management does not provide a detailed proposal for information security management (very briefly including referring to ISO 27001). He works intensively on risk management, including security risks. It is through risk management that security is reflected in the entire life cycle of an IT service.

The application of this methodology is suitable for medium and large companies, where it focuses on the effective provision of IT services and the effective management of IT development and operation. The management of IT services is then implemented mainly within the IT departments in the organization.

COBIT5 methodology supports the optimal value for stakeholders, which represents benefits to companies with optimal level of risk and use of IT resources (Bernard, 2012). COBIT is a comprehensive methodological framework that helps to stakeholders achieve their goals through governing and management. It supports the creation of optimal values for stakeholders, which represents benefits to companies with optimal level of risk and use of IT resources. It is based on the following 5 complementary principles:

Meeting stakeholder needs Stakeholders can be inside or outside of the company and each stakeholder has its interests and needs. Sometimes they are identical, sometimes contradictory. These interests and needs then have their value to the stakeholder. The value arises from the benefits gained. To maximize the value, the resources and means should be used as optimal (Moravec et al, 2017). This, of course, carries certain risks. These risks should be proportionate to the value obtained. This is addressed through "cascading", where the needs of stakeholders are translated into corporate goals;

Covering the enterprise from end-to-end when IT services are provided within the company by IT staff using IT processes and support tools. Very often, the IT department begins to look like a company within a company. Therefore, it is necessary to define the rules of the game (company routing), which will apply to both the IT department and the rest of the company. This company routing must be defined together. Very often, the IT department begins to look like a company within a company. Therefore, it is necessary to define the rules of the game (company governing), which will apply to both the IT department and the rest of the company. This direction of the company must be defined together, when it is necessary to define resources and scope, and further determine accountability. As part of the definition of responsibility, it is necessary to realize that everything starts again with the stakeholders, especially the owners. They specify their requirements and delegate responsibility for establishing routing to the company's governing body. This, of course, does not relieve them of accountability. The top management of the company sets the governing rules and thus defines how the middle management of the company should instruct the executive components (operation and execution). These executives must then report the results of their work to the management, which is monitored by the top management;

Applying a single, integrated framework. There are many recommendations, standards, and different frameworks for IT. Each was created by a different organization, using different terminology and a different approach. Some of them complement each other and some overlap. Because everyone chooses a different approach, it is difficult to use single framework. As a result, each had a different structure and used different terminology. The unification of COBIT5 and later version COBIT2019 according ISACA (2019) eliminated these shortcomings. COBIT5 defines the goals and reasons for individual processes, the related frameworks and standards then determine the way of their implementation;

Enabling a holistic approach that represents seven pillars:

1. principles, policies, and frameworks which define the rules of the game for everyday work;
2. processes which define the activities how to achieve the desired results and the individual interfaces;
3. organizational structure, which defines the way people are organized into individual teams;
4. culture, ethics and behavior, which defines the way of expected behavior and communication in the organization;
5. information which defines what information is created, where it is needed, and how it is provided;
6. services, infrastructure, and applications which define the technical means needed to provide information and how to logically connect them;
7. people, skills, and competencies which defines what people we need for all this and what they need to know to be able to meet the set goals.

For each of these pillars, it defines four dimensions and how they are measured, which are stakeholders, goals, lifecycle, and good practices. We can look at the measurement of individual

dimensions in two ways. First of all, we can ask to what extent we achieve the set goals. Secondly, we can ask how successful we are in implementing the individual recommendations.

Separating governance from management when it is therefore necessary to distinguish between the governing of the organization and day-to-day management. This distinction was reflected in the COBIT5 process model, where a total of 37 processes are defined, which are divided into five domains. One domain is reserved only for processes designed to govern the organization and the rest four process domains are intended for day-to-day management.

Application of these principles is the same in large companies as well as in medium and small companies. COBIT5 and later version COBIT2019 according ISACA (2019) are focused primarily on IT governance and its aim is to define the strategic goals of IT services in accordance with the needs and interests of the entire organization.

4. Results

There was an input analysis with the customer by the Attn Consulting company provided. There were 20 global aspects selected that are important for the choice of the methodology. From this input analysis were chosen 6 main aspects as criteria (see Table 1): complexity of methodology, service management concept, coverage of processes, stakeholder participation, and possibility of certification. They all have a growing tendency and we try to maximize them.

Table 1: Key criteria evaluations and their tendency

		Tendency (increasing/decreasing)	Aim (maximize/minimize)
C1	Complexity of methodology	increasing	maximize
C2	Service management concept	increasing	maximize
C3	Coverage of processes	increasing	maximize
C4	Coverage of services	increasing	maximize
C5	Stakeholder participation	increasing	maximize
C6	Possibility of certification	increasing	maximize

Source: own processing

According to the pairwise comparison method, each criterion was compared with each other (see Table 2). This evaluation was provided according to the preferences of the customer who was interviewed by the company manager. The number of preferences was calculated as a sum of the ones in a row. Then is necessary to adjust the number of preferences because of the zero at the criteria C5. Therefore, one must be added at each preference and number of pairwise comparisons (N=21). Then have been calculated the adjusted weights of the criteria *C1*, *C2*, etc.:

$$w(C1) = \frac{4}{21} = 0,19, w(C2) = \frac{2}{21} = 0,095, \dots \quad (5)$$

There have been calculated adjusted weights for all six criteria in Table 2. The highest adjusted weight was achieved by the criteria C4 is for customer the least important, the coverage of services is the most important (see Table 2). The customer considers to certificate the methodology. It justifies this because of the growing number of customers.

Table 2: Pairwise comparison of the criteria

	C1	C2	C3	C4	C5	C6	Number of preferences	Order of criteria	Adjusted weight
C1		1	1	0	1	0	3	3.	0.190
C2	0		0	0	1	0	1	5.	0.095
C3	0	1		0	1	0	2	4,	0.143
C4	1	1	1		1	1	5	1.	0.286
C5	0	0	0	0		0	0	6.	0.048
C6	1	1	1	0	1		4	2.	0.238

Source: own processing

The methodologies ITIL and COBIT were evaluated according to the criteria importance. Methodology evaluation has been provided by a process engineer from the IT company, who will implement the ITIL or COBIT methodology in the specific company. There are described results from this discussion about the methodology in Table 3.

Table 3: Methodology evaluation according to the criteria

Criteria	ITIL meets	COBIT meets
C1	slightly meet	fully meet
C2	fully meet	slightly meet
C3	fully meet	fully meet
C4	fully meet	slightly meet
C5	slightly meet	fully meet
C6	fully meet	didn't meet

Source: own processing

Then it is needed to convert the words to numbers. It is displayed in Table 4. If the methodology fully meets the criteria, it is rated by 100%. When the methodology meets the criteria slightly, it is rated by 50%. If the criteria did not meet the methodology, it is rated by 0% (see Table 4).

Table 4: Alternatives and their weights

Criteria	Weight $w(j)$	Alternative 1 (A1)	Alternative 2 (A2)
C1	0.190	50	100
C2	0.095	100	50
C3	0.143	100	100
C4	0.286	100	50
C5	0.048	50	100
C6	0.238	100	0

Source: own processing

The utility evaluation was calculated according to (2) that means the weight of the criteria multiplies the alternative evaluation.

Table 5: Utility evaluation of alternatives

Criteria	$w(j)$	$v(A1)$	$v(A2)$
C1	0.190	9.52	19.05
C2	0.095	9.52	4.76
C3	0.143	14.29	14.29
C4	0.286	28.57	14.29
C5	0.048	2.38	4.76
C6	0.238	23.81	0.00
Total utility		88.10	57.14

Source: own processing

4. Conclusion

As a state, Voříšek et al. (2015), according to the success of the IT services, it is possible to measure by using various indicators.

This paper contributed to the inclusion of various indicators (criteria) according to which the suitability of the implementation of the ITIL and COBIT methodologies is assessed. One of the basic methods of multicriteria evaluation method was used, namely, pairwise comparison of criteria and utility evaluation of variants. The results from the utility evaluation were displayed in Table 5. The most important methodology is the ITIL, the second place has the methodology COBIT (see Table 5). The ITIL methodology had in our case the higher utility (88.10) than the COBIT methodology (57.14) (see Table 5). The IT company recommended the customer to realize the ITIL methodology. ITIL methodology appears to be a better methodology for this specific company, because it is focused on the management of IT services in the organization. The ITIL methodology meets the set of criteria in 4 cases. The process manager preferred the certification of the company for purpose business activities. This criteria played a key role for him. The evaluation of the criteria by pairwise comparison method showed that the certification is of the second highest importance for the customer.

This case of using MCDM shows that the choice of the methodology should respect the requirements and preferences of the specific user. On the other hand, evaluation according to such set criteria is also valuable for other companies that decide to implement one of the mentioned methodologies. For the next research, it is valuable to use another decision-making method such as Electre, TOPSIS, or Saaty's method.

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USE OF STEREOTYPES AS A COMMUNICATION TOOL TO SUPPORT THE BRAND - CASE STUDY OF THE POLISH AND CZECH BRAND OF BEER

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Abstract

The article deals with the research of advertising slogans as a special form of discourse, on selected beer brands of Czech and Polish origin. The aim of the research is to find out the presence of stereotypes, to describe them in Czech and Polish advertising focused on the promotion of Czech and Polish beer brands and to identify their similarities and differences. In the introduction of the article, the topic of research is included in the broader framework of the issue of discourse, in which the overlap of the concept of discourse within some scientific disciplines is pointed out. This is followed by an overview of selected literature on the issue of advertising discourse and a terminological understanding of the terms stereotype and stereotyping. The research of advertising slogans included in beer brand spots in Poland and the Czech Republic was narrowed down to the period from 2015 to 2018. It was an analysis and synthesis of the latest possible material. The material, especially audiovisual, was collected from the official websites of the individual brewing companies or their official promotional channels published directly on the website www.youtube.com. Research into advertising spots has clearly demonstrated the presence of cultural stereotypes and the differences in the creation of a linguistic image of the world about Czech and Polish culture. The performed analysis of advertising spots recorded their presence in both verbal and audiovisual messages.

Keywords: advertising discourse, linguistic view of the world, stereotype.

JEL codes: Z13

1. Introduction

The issue of discourse research is one of the prevalent topics addressed by current researchers. This is mainly since discourse is part of many scientific disciplines such as political science (Nonnhof 2004), philosophy (Habermas 1987), sociology (Schwab-Trapp 2001, Weiner 2014), linguistics (Patráš 2005, Bartmiński 1998, 2009, 2010, Czachur 2005, 2016, 2017, 2018a, 2018b, 2020), communication and media (Musil 2010), etc. In our paper, we will focus on the advertising spot as a special form of discourse, namely the discourse of advertising as a specific form of communication.

We begin the paper a little more boldly by saying that "advertising is a branch of superlatives" (Luttermann, 2020, 23). Or even bolder, the statement in the preface to the Werbung-grenzenlos publication, with which we fully agree that advertising as a lifestyle "art of everyday life" is not

nowadays an easily transparent area of communication science and linguistics research and which can hardly be examined, as Luttermann argues (2020, 23).

2. The subject of research

In our paper, we will focus on the advertising discourse in terms of creating cultural stereotypes against the background of advertising spots of Czech and Polish beer brands. The aim of the research is to find out the presence of stereotypes, to describe them in Czech and Polish advertising focused on the promotion of Czech and Polish beer brands and to identify their similarities and differences.

In today's world, ways of creating advertising texts and their subsequent reception by potential customers cannot do without a multimodal strategic approach. The indicated multimodality of advertising discourse can be understood on three levels in accord with Stöckl (2016):

1. as text multimodality (image, text),
2. as a multimodality manifested by the internal structure of the advertising text (e.g. lexicon, grammar)
3. as a field multimodality (in the approach to advertising discourse from the point of view of individual scientific disciplines).

In our paper, we will limit ourselves to the multimodality mediated through the image and text.

The research of advertising slogans included in beer brand spots in Poland and the Czech Republic was narrowed down to the period from 2015 to 2018, as the subsequent period showed saturation in research. It was an analysis and synthesis of the latest possible material. The material, especially audiovisual, was collected from the official websites of individual breweries or from their official promotional channels published directly on the website www.youtube.com. The collected sample covers a total of 60 advertising slogans of Polish and Czech beer brands, specifically, 37 examples in the Polish environment and 23 examples in the Czech environment were analyzed. From each advertising spot collected, the most important frameworks were selected for demonstration purposes, which contain key slogans.

We chose the advertising brands of Czech and Polish beers because we wanted to find out the presence of stereotypes and similarities, or differences in the approach to their creation. Another reason was the extensive Polish literature on the topic of stereotypes and the linguistic image of the world with its multimodal dimension. When choosing brands, we limited ourselves to the most famous Czech and Polish brands. The following brands were analyzed during the research:

- Czech beer brands (Kozel, Gambrinus, Pilsner Urquell, Staropramen, Radegast, Starobrno),
- Polish beer brands (Żubr, Leszek, Warka, Żywiec, Okocim, Kasztelan, Harnaś).

In the research survey, we set the following questions:

1. Are stereotypes present in advertising spots?
2. Which stereotypes do Czech and Polish advertising spots operate with?

3. Professional literature on the issue and terminology

Extensions of the term discourse have been noted in many fields, political science, philosophy, sociology, linguistics, and media communication. For this reason, the concept of discourse is approached in different ways. As mentioned by Czachur (2016, 16), discourse linguistics is a relatively new branch of research, revealing new research paths and new methodologies.

In linguistics, advertising research is focused on expanding the multimodal concept of communication that can also be used in advertising texts. In particular, Polish linguists address this issue with an emphasis on the linguistic image of the world and its multimodal dimension. In this context, we can mention, for example, Czachur (2020), who in his monograph emphasizes the importance of discourse in the contemporary world and demonstrates and using examples of Polish and German linguistics he supports it with evidence, how discourse becomes a stimulating subject of research. Consistent with Czachur (2020) and Bartmiński (2009), we see the importance of discourse in its linguistic value in the context of social communication research and the processes of creating meanings and creating the so-called linguistic image of the world within cognitive ethnolinguistics. In the Czech environment, for example, Vaňková (2000, 2005) deals with the linguistic image of the world.

Also in world literature the above mentioned issue is dealt with by Lakoff (1990), Lyons (1995) and Putnam (1975).

The stereotypes play a significant role in creating the image of the world. The genesis of the word *stereotype* comes from Greek. It consists of two parts: *stereos*, which in Greek means solid, hard, and *typos*, in translation it means imprint, pattern. According to the Sociological Dictionary (Olechnicki, Załęcki, 2002), the stereotype is defined as a mental construction based on a schematic and simplified perception of reality, coloured in an evaluative way, often based on prejudices and incomplete knowledge.

The functioning of a stereotype is based on the fact that a person takes a certain simplified and evaluative explicit or implicit view of phenomena in the world in advance, without thinking deeply about its legitimacy, which is determined by other common views existing in the given environment. Based on certain cognitive patterns, he then forms his own view of the rules operating in the world, including the image of people hierarchized on the basis of some real or perceived common feature (Walas, 1995, p. 25).

Bartmiński (1998, 11), referring to Lippmann's concept of a stereotype understood as an "image in the head", emphasizes that under the influence of sociologists stereotypes are commonly combined with ideas of people of different nationalities (German, Jew, Ukrainian), profession (official, peasant), origin (from Warsaw) and so two features of these images come to the fore:

- the emotional colouring of the image
- the tendency to be a false generalization.

Another term is the *linguistic image of the world*. This linguistic image of the world can be understood as "a language-entrenched interpretation of reality, which can be expressed in the form of judgment about the world, people things, events. It is an interpretation, not a reflection, it is a portrait without claims to fidelity, not a photograph of the real object. The interpretation is a result of subjective perception and conceptualization of reality performed by the speakers of a given language, this is a clearly subjective, social" (Bartmiński 2009, 23).

The process of creating the relevant stereotype is called the term *stereotyping*. This process is conditioned by historical and cultural context. In our paper, we will proceed from the concept of stereotype as a solid image created by historical processes, the accumulation of experiences and their processing within the community. As Bartmiński (1998, 12) points out, this processing includes, among other things, stereotyping, i.e. selection of characteristics, hierarchization of characters, elimination of dominant and, of course, hiding unpleasant "embarrassing" characters.

In connection with the research of advertising spots for beer brands in the Czech Republic and Poland, we are also interested in images of a typical Czech and a typical Pole, especially in the sense of the so-called autostereotype, i.e. circulating, axiologically marked images of one's own community. As Bartmiński (1998, 12) emphasizes, stereotyping should not be associated with the mere grouping and evaluation of people on the basis of alleged commonalities. This applies, among other things, to animals and all other phenomena, grouped and valued to gain cognitive comfort on the basis of the belief that we understand the world well, that it is transparent to us.

Stereotypes are relatively persistent in that their changes are usually slow, resulting from the transformation of socio-political and cultural conditions. Today, one of the key tools for creating stereotypes is the so-called new media, whose main feature is interactivity. Reports that include a struggle for the attention of potential recipients must be based on proven methods of persuasive-manipulative communication and must represent a relatively simplified representation of the world. To reach the recipient, senders often use stereotypes and create, among other things, the images with which the consumer most identifies.

One of the striking phenomena of such behaviour is the creation of stereotypes and heterostereotypes, which allow the creation of easily recognizable differences between "own" and "foreign" because they are the basis of a sense of cognitive and existential security. We should point out that in the case of the autostereotype it is the image of "ours", i.e. the image of the community with which we identify, while in the second case it is the image of the community from which we distance ourselves. The driving force behind the advertising message is the need to identify with an image of one's own community that is positive and gains universal consent among "people". The self-stereotype used and created by advertising is to some extent idealized, which may not correspond to historical reality.

4. Research results of stereotypes in advertising spots of beer brands in the Czech Republic

The following section presents the results of a survey that provide a set of stereotypes presented in individual advertising spots. The purpose of the comparison will be to summarize the key common and different content of stereotypes used in advertising spots of beer brands in the Czech Republic and Poland.

The Czech beer brand **Kozel**, first of all, shows the classic stereotype of beer drinking culture in the Czech Republic. We see a Czech inn, a frothy mug of beer, regulars sitting in their place in the inn, in the advertising spot there is a picture of a typical Czech inn with a wooden counter, bar, glass mugs with a capacity of 0.5 litres and sausage as the most suitable snack for beer. The stereotypical image completes the ritual of drinking beer. It shows how guests drink a glass with another guest sitting at the same table. This creates a stereotypical, idealized to idyllic image of a Czech village and chapel as a refuge for tradition.

The spot of the brand **Gambrinus** also emphasizes the stereotype of a glass full of foam, a wooden counter, a bartender, and an inn as a place not only for social contact but also, for example, for reading newspapers or other social gatherings.

Pilsner Urquell beer synchronously and diachronically emphasizes the stereotype of the strength of a Czech man on the example of a strong man (e.g., firefighter, coach, etc.), the stereotype of wisdom on the example of an educated scientist, the stereotype of the family on the example of the father of the family, the stereotype of Christmas. There is also a stereotype showing the perseverance of the nation and the strength of the Czechs in a retrospective view of the history of a nation that was exposed to various dangers (e.g., during the Austro-Hungarian period, during fascism or the Soviet occupation), but which never gave up its own tradition and culture.

The beer brand **Staropramen** shows a stereotype of the unity and cohesion of the Czech nation, which is characterized by strength, solidarity, determination to resist the occupiers and never gives up.

Radegast beer builds on the metaphorical slogan "*Life is bitter. Thank God*", which proposes strength and perseverance and determination to win every fight and overcome the most difficult obstacles in life. Attention is focused on a strong man, such as a hockey player or an ordinary man. The slogan is based on the game between the image of the "bitterness" of an ordinary person and someone who excels above average. They both heroically struggle with the challenges of everyday life, and what unites them in the community and allows them to overcome social barriers is the bitter taste of beer.

Starobrno beer supports the stereotype of beer drinking culture based on the freedom of spontaneous action of an individual, joint entertainment, informal meetings, social events, etc.

5. Results of research on stereotypes contained in advertising spots of beer brands in Poland

Below we state what stereotypes are used to support beer brand selection in Polish advertising.

Advertisements of beer **Żubr** promote the fundamental moral values that symbolically and metaphorically symbolize a creature of the same name. Żubr is associated with the imaginary values of a good Pole, such as strength, willingness to help the weak, care for others, love for a clean and healthy natural environment. The stereotype used and promoted also has a second dimension, including fun, relaxation, willingness to spend time with loved ones, friends, get-togethers, and integration. At this point, there is an explicit reference to the idealized model of the Polish family.

Advertisements of beer **Leszek** promotes the stereotype of a determined, energetic, courageous, creative and entrepreneurial Pole, who combines valuable character traits along with the ability to communicate with different social groups in different countries and cultures. Besides, Leszek is to be associated with the ideas of democracy, freedom, and entrepreneurship. The image, combined with beer, refers to the belief that a Pole can rule anytime, anywhere, has a natural talent for business, and will eventually succeed.

Another beer brand **Warka** in the Biało-Czerwoni advertising spots creates the stereotype of a patriot, a devoted fan of the national football team, and at the same time emphasizes belonging to the Polish nation, national pride and faith in the Polish football team's victory at the upcoming football championships.

On the other hand, the "Planet Warka" advertising spots create a black-and-white escape vision of reality, where the consumption of the brand's beer allows an "escape" to a new planet, where life revolves around men. They are the ones who control an idealized world created exclusively for them (e.g. there are no problems, no imperfections, etc. on the planet). Advertising uses the game of ideas about male domination because women "submit" to male power and play a secondary role.

Żywiec beer shows a stereotype of success understood in terms of material abundance if thanks to winning (large accumulation of financial resources) you can taste life in abundance, including everything related to it, such as freedom of action, travel, etc.

Advertising spots of **Okocim** beer refer to an idealized image of entertainment where there is the joy of life, parties and games. All this is related to the vision of national pride, based on what is meant by typically Polish traditions and rules.

Advertisements of **Kasztelan** beer promote a stereotype based on an idealized image of the Polish countryside. Dominant here are references to the ideal of original Polish values based on working together, high ethical and customary standards, living in harmony with nature.

Advertisements of **Harnaś** beer combine the stereotype of drinking beer with the support of the Polish team and football fans and victory. The images used here integrate the most important values, such as national pride (eagle pride) and Polish honour, which symbolically extend from the Tatras to the outermost Polish cities.

We present research results in the following clear table:

Table 1: Predominant stereotypes in Czech and Polish cultures

Stereotype	Czech culture	Polish culture
1. gender role	Man - sociable, traditional, persistent, supports Czech values and tradition, supports the national ice hockey team, never gives up	Man - active, successful, free, adventurous, on the move, fighting for freedom and victory, great entrepreneur, patriot, supports the national football team
2. pub	Tradition, ritual, agora for social and public life, based on egalitarianism	Fun, entertainment, modern, freedom of action, movement, fun, hedonism, interaction with friends
3. countryside	Idealized, egalitarianism, equal relations, high moral principles, work ethos, tradition, solidarity	Idealized, harmony, mutual cooperation and support, great interpersonal relations, solidarity
4. family	Unity supported by Christmas, tradition, common values shared in Czech society	Tradition, idealized family model based on universal values shared in Polish society

Source: results of the research conducted by the authors

6. Discussion

The researched advertising spots provide recipients with a way of perceiving reality, and for this reason, in agreement with Orlová (2018, 199) we can state that this image of the world reflects the cognitive cultural and national peculiarities of individual national communities. We fully agree with the view that advertising should address cognitive schemas by Schönbach (2009, 77). We also agree with his statement on simplicity, as stated by "Keep it simple and stupid" by Schönbach (2009, 78). The simplicity of the discourse and its simple interpretation give room for simple stereotyping. This approach to the advertising message meets the requirements imposed on it.

In the case of both Czech and Polish advertising spots, we have seen a very simple, abbreviated staging of stereotypes, and therefore we can agree with Jäckel (2016, 2007) in the opinion that the mentioned simple and quick understanding of the advertising message is therefore worthwhile in advertising. At the same time, we agree with Olechnicki and Załęcki (2002) in the statement that creating a stereotype imposes a pattern of perception of the reality of a certain social group. Through this very simple way of perception, the basis for manipulating and influencing people is laid.

In the case of the Czech cultural environment, advertising spots include references to an idealized, stereotypical image of a Czech inn as a place of social gathering, which is conceived as a ritual, repeated after everyday work. Great emphasis is placed on the culture of drinking beer, always

associated with rich foam and the tradition of spending time together in the circle of acquaintances. To this image of the world is added an idyllic to an idealized image of the Czech countryside, in which peace, harmony and order reign.

The mentioned advertisements work with the wishes and desires of a typical Czech - a patriot, whose patriotism is already reflected in the preference of Czech beer brands. Czech beer brands present the image of a typical Czech, strong, solidary, determined, never giving up despite various life situations or difficult historical periods of one's own nation, always willing to fight and defend Czech values. This image is intensified by the emphasis on patriotism and eccentricity of the Czech nature and the inclination towards games, parties, and informal social gatherings.

In the Polish cultural environment, an image of a Pole appears, who drinks beer after working hours while standing and drinking it directly from a bottle. We are dealing here with a man who is free-spirited, helps, protects the weaker, determined, does business, and loves to travel. With his creativity, he can handle all socio-political periods in all conditions, as he is determined to fight for freedom and democracy. His patriotism is manifested, for example, by supporting Polish football teams (but not hockey teams) and by believing in their victory and success. He is a great businessman. He knows a lot about business. He is the embodiment of male domination in social, professional, political, and private life. The images used in the advertisements indicate what happiness is about in the life of a Pole. It relates to victory, i.e., with the accumulation of financial resources, which will bring him freedom of action, freedom of his own decisions and joy of life.

The advertisements also contain an idealized image of the Polish countryside, which is characterized by idyllic beauty, tranquility, and closeness to nature. Its inhabitants are characterized by untouched nature, they are in solidarity, eager to cooperate and develop perfect interpersonal relationships, they are characterized by a high standard of living, because it is in accordance with nature and the ethical principles that follow from it.

The image of a Czech or a Pole is presented by positive qualities such as strength (physical and mental), courage, determination, and fearlessness to pursue your goal, adventurous nature, and success in life.

If we consider the area of lifestyle, we can notice a relative agreement between the visions created in Polish and Czech beer advertising. In both cases, the potential beer consumer is offered the image of an active, spirited man who likes to spend his free time in a group, having fun and enjoying life. In both cultural environments, only men play this role, because women are visible only in the background, nevertheless, it should be added that more often in Polish advertisements. For this reason, it should be mentioned that advertisements operating in both cultural environments support the not very happy traditional division of social roles.

7. Conclusion

Stereotypes become an integral part of the culture, are preserved, and passed on in every community. Their essence is used by advertising for its purposes. It is based on the desire of the human community to be interested in images of people. This includes the need for people to know how they are perceived by others. Language with lexical and grammatical means becomes an inseparable helper in mediating awareness of a given national culture and its bearers.

Research into advertising spots has clearly demonstrated the presence of cultural stereotypes and the differences in the creation of a linguistic image of the world about Czech and Polish culture. The performed analysis of advertising spots recorded the presence of a stereotype in both verbal messages and audiovisual messages.

At the end of the article, we summarize the following conclusions:

1. Stereotypes of Czech and Polish advertising spots for different brands of beer have common and different features.
2. The agreement is reflected in the presented and idealized image of the patriot in the Polish and Czech cultural environment.
3. The compatibility between Czech and Polish beer advertisements also applies to the pious, idealized image of the countryside, which refers to domestic traditions in the cultivation of grain, hops, fruits and vegetables, the production of traditional crafts, etc.
4. The personality traits of Poles and Czechs are equally presented.

5. We also see the compatibility of both cultures in people's habits and their moral and ethical values such as solidarity, cooperation, collegiality, equality, good neighbourly and interpersonal relations, a sense of national dignity, etc.

Returning to the above-cited concept of a multiculturally competitive marketing product (Bendel, Held, 2008, 2), we can state that:

1. For Czech and Polish beer brands, we managed to find the name of the product, which is legible and pronounced in all languages (for which advertising is expected). For Polish products, the applicability of the brand on the Polish market is calculated a priori.

2. For the Czech and Polish beer brands, the communications managed to build the brand's image so that it was positively connoted in various cultural contexts, as the stylization of the brands positively reflects the social status and social environment.

3. In the case of Czech and Polish beer brands, the linguistic and culturally specific message of image and textual material has been designed to be worthy of a company name and to appeal primarily to the national audience.

4. For Czech and Polish beer brands, it is necessary to create concepts of advertising brands in such a way as to enable transnational application, as national stereotypes are strong in them, which work mainly in the national cultural context.

Stereotypes will continue to be an interesting topic of research not only for linguists but also for sociologists, psychologists, and marketing researchers, as they may offer to explore their cognitive component present in the stereotype so that based on the findings the linguistic formulation of advertising communications could be achieved and applied across a diverse range of cultures. Cognitive, linguistic categorization of the world in this way can offer interesting insights into the implementation of advertising discourses.

Last but not least, the research of stereotypes in this article has been limited to a small section of the view of this issue from the perspective of the linguistic image of the world. It is up to marketing professionals to determine whether stereotypes affect the success of advertising and guide social behavior. Only a multimodal approach to the issue (see above) makes it possible to reveal the deeper context of this phenomenon from the point of view of partial scientific disciplines, which is their result.

We see the impact of our research on experts mainly in the fact that stereotypes reflect social development, therefore they have the ability to address a potential customer and attract his/her attention. For this reason, they represent a potential for marketing communication.

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POST-COVID ENTREPRENEURIAL TRENDS

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Abstract

Entrepreneurship shapes the image of people who intend to start their own business. Given that the COVID-19 pandemic took most entrepreneurs by surprise by disrupting their normal activities, there is a growing interest in impact studies examining post-COVID entrepreneurship. Therefore, the purpose of this study is to find out young people's perceptions regarding the future trends of entrepreneurship in Romania. How prepared are young people to deal with a post-COVID crisis? This article aims to answer this question. The changes caused by the COVID-19 pandemic and the effects on the entrepreneurial field have changed young people's perceptions. The results show that young people perceive the trends of the post-COVID period differently, based primarily on their experience. Also, young people believe that there are opportunities to develop their own business online, young people's perception being correlated with the skills developed to operate in the online environment.

Keywords: COVID-19, entrepreneurship, post-COVID, trends

JEL codes: M19, H12, L26

1. Introduction

The rapid spread of the SARS-CoV2 virus made governments, businesses, and even families to react quickly to disruptions in the local and global economies. The measures to mitigate the COVID-19 pandemic were the closure of shops, malls, restaurants, the suspension of production of non-essential goods, etc. (Naudé, 2020). Consequently, the economic disturbances have been major. They were generated by the low demand for products and services, which led to an increased risk of closing certain businesses, and implicitly to the loss of jobs (OECD, 2020). In addition, some companies completely ceased their activity for a period, determined by international trade relationships, which influenced future directions of activity.

The COVID-19 crisis has led companies to identify new post-COVID business opportunities, with the aim of economic and financial recovery. Cepel et al. (2020) showed the necessity to segment the entrepreneurial needs in response to the impact of the COVID-19 crisis in order to discover sensitive small and medium-sized enterprise (SME) segments to build post-COVID support scenarios. According to Jinjara et al. (2020), the economic impact has been very heterogeneous, affecting individuals and companies differently. Travel, accommodation services, tourism sales experienced a significant decline, but the food, pharmaceutical and IT industries had a positive impact in the period of the COVID-19 pandemic, experiencing significant increases in sales of products and/or services (Cepel et al., 2020).

Consequently, the purpose of this paper is to contribute to the understanding of young people's entrepreneurial trends in the post-COVID-19 period. Studying the literature dedicated to post-COVID-19 entrepreneurship, this article aims to open the way in addressing entrepreneurial trends in the post-COVID period in Romania. The content of the paper is made to highlight the important conceptual aspects of the literature. First, we analyzed the existing literature, and we presented key aspects of the effect of the COVID-19 pandemic on young people's entrepreneurial trends, after which we presented and discussed the results of the study. At the end of the paper, we added the main conclusions and implications regarding young people's intentions as future entrepreneurs, as well as the measures taken by the authorities to boost business development in the post-COVID period.

This article is organised in the following sections: introduction, analysis of the literature, and development of research hypotheses, research methodology, results, discussions and conclusions.

The results show that the *perception of digital skills* had a statistically significant positive effect on the perception of post-COVID business opportunities, meaning that a young person that has skills in the digital space (programming, digital marketing, etc.) will feel that there are more opportunities to start a business. The results also show that the perception of the current economic and financial situation does not have a significant effect on the perception of opportunities. Therefore, this shows that young people are entrepreneurial, and given the proper tools and education, they are likely to have the intention to start a business no matter the economic circumstances.

2. Literature review

2.1 Perception of the current economic and financial situation

Most entrepreneurs had a negative perception of the onset of the COVID-19 pandemic, and a small proportion reported positive effects of the pandemic.

As mentioned before, demand and supply experienced substantial negative effects, generated mainly by the decrease in the number of customers (Ewing Marion Kauffman Foundation, 2020). The pandemic caused shocks both in terms of demand for retail activities by interrupting the supply chain and lowering the demand for final and intermediate goods, and of supply, which had negative influences by ceasing production activities and workers' inactivity (Borgioli et al., 2020). The negative influence on the production process was exerted as shown by the results of the study conducted by Bodnár et al. (2020), pressure on costs and on consumer price inflation. Moreover, according to the study conducted by Giones et al. (2020), narrow vision and risk-taking can be a disadvantage for entrepreneurs in times of economic uncertainty, especially because they are not open to exploiting new opportunities. Planning of entrepreneurial activities and financial support measures can reduce difficulties by generating new business opportunities through the establishment and development of appropriate activities.

Therefore, this study proposes to test the following hypothesis **H1**: *The perception of post-COVID business opportunities will be influenced by the current economic and financial situation.*

2.2 Perception of economic recovery

Entrepreneurs identify opportunities to start a business with social impact and financial growth. Current innovations are uncertain in the long run, which is why dilemmas may arise regarding a viable long-term business (Schroeder, 2020).

During the crisis caused by the spread of the SARS-CoV2 virus, loans were granted to create new business opportunities (OECD, 2020). Thus, the COVID-19 pandemic led tax systems to adopt new approaches to fiscal challenges. Taxes and duties did not undergo changes aimed at recovering post-COVID economies. Also, this period created an opportunity to address fiscal weaknesses and revive taxes to support desirable changes. The governments intended to be a form of recovery based on consistent contributions from companies with stable economic results, which went well through the COVID-19 crisis period, these contributions being used to stabilize the vulnerable companies. Inclusiveness, based on issues of equality, intergenerational equity, opportunity, and equal treatment of people in similar circumstances are the principles that build the post-COVID perspective of governments (De Mooij et al., 2020).

Therefore, this study proposes to test the following hypothesis **H2**: *The perception of post-COVID business opportunities will be influenced by the perception of economic recovery.*

2.3 Perception of a potential economic crisis

According to the study conducted by Sułkowski (2020), phases of a recession were expected in the economies affected by the COVID-19 pandemic, determined by nationalisation and increasing digitalisation throughout society. The current recession is unique, caused by government-imposed lockdowns. The immediate effect materialised in supply disruptions, periodic suspension of activities, and travel limits. These situations have led to declining revenues and demand, through reduced exports and imports, reduced travel and tourism, falling prices, and budget deficits (Jomo and Chowdhury, 2020). In addition, the high number of victims affected by the SARS-CoV2 virus led to increased promotion of measures to prevent infection with the SARS-CoV2 virus by closing schools, and to decreases in certain areas, such as tourism or education (Sułkowski, 2020).

The recession caused by the COVID-19 pandemic will be considered the most severe global economic crisis since World War II. There are signs of hope in controlling the pandemic through vaccination. According to the study conducted by Doerr and Hofmann (2020), there is a negative relationship between countries: the higher the ratio of deaths, the deeper the recession.

At the same time, young people around the world are severely affected by the COVID-19 recession, especially young people who intend to enter the labour market early in their careers. The risk specific for this period is that young people could earn less money over a long period of time, with negative effects on a personal level (Schwandt and von Wachter, 2020).

Therefore, this study proposes to test the following hypothesis **H3**: *The perception of post-COVID business opportunities will be influenced by the perception of a potential economic crisis.*

2.4 Perception of digital skills

The pandemic outlined the importance of digital technologies, and digital skills are beginning to be considered the main driver of competitiveness for the private sector. Digital skills are based on five pillars of the digital economy: the digital entrepreneur, digital platforms, digital skills, digital infrastructure, and digital financial services. Digital skills can thus contribute to the transformation of states and national and individual economies (Melhem et al., 2020). The COVID-19 pandemic has changed the way society operates globally, with limitations within existing systems, reconfiguring the role of information technology and digitalisation for economic growth. Technology is a critical component for all areas of specialisation, which is why individuals had to improve their digital skills (Doroba, 2020).

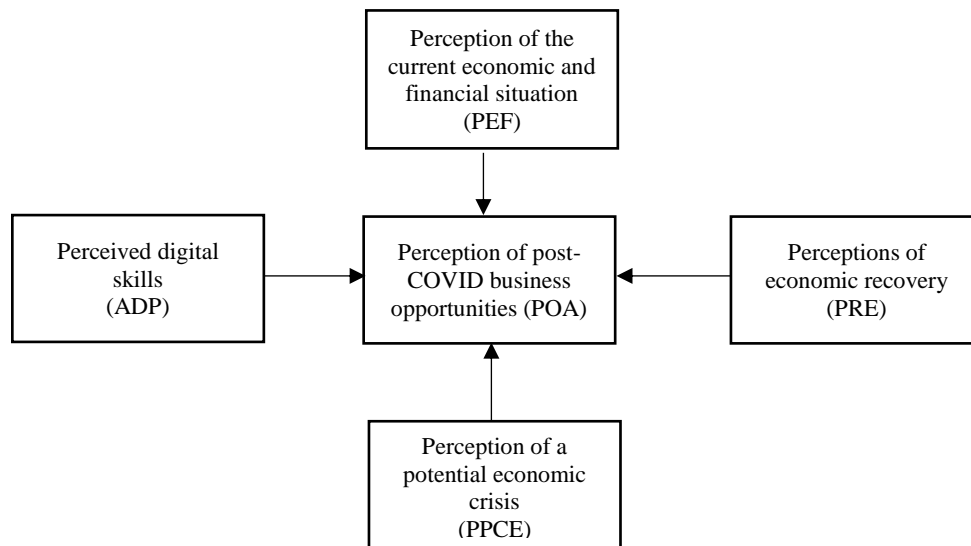
Thus, currently, digital technologies support the acceleration of development. Some activities were transferred to the online environment, allowing the maintenance and functioning in optimal conditions of the

educational and economic systems, through work from home (UNESCO, 2020). In addition, the global market showed trends towards the construction of new technologies by changing the ways of employment, and the most important aspect was the training of workers and leaders (Oxford Economics, 2020).

Therefore, this study proposes to test the following hypothesis **H4**: *The perception of post-COVID business opportunities will be influenced by the perception of digital skills.*

The perception of opportunities is due to many different factors. Some of the factors are studied in this article, as presented in figure 1.

Figure 1: The research model



Source: authors' research

3. Research methodology

3.1 Description of the research method

This study had a questionnaire-based survey as a data collection tool, in which 784 pupils and students participated: 575 females (74.34%), and 209 males (26.66%). The students were from Alexandru Ioan Cuza University of Iași (Romania), and the pupils were from Virgil Madgearu Economic-Technological High School of Iași (Romania). The average age of the participants in this study was 20.30 years old. Recruitment of participants was done by e-mails sent to all students enrolled in the specializations Commerce Economics, Tourism, and Services, 1st, 2nd, and 3rd years of the undergraduate program, Geography of Tourism, 1st, 2nd, and 3rd years of the undergraduate program, and Tourism and Hotel Management, 1st and 2nd years of the postgraduate (master) program, and high school students with economic profile, grades 9, 10, 11 and 12. Beneficiaries of educational programs were instructed to take into account the general knowledge about entrepreneurship gained during their studies, also the business opportunities they perceived when answering the questions. The questions asked contained five-point Likert-scale items and the responses were collected between 1st and 31st of October, 2020.

3.2 Selection and description of variables

3.2.1 Dependent variable

In this study, *the perception of post-COVID business opportunities* is used as the dependent variable. The variable represents the respondents who perceive business opportunities in the post-COVID

period, and it was measured by assigning values from 1 to 5 (1 – with no business opportunities, 5 - with high business opportunities).

Table 1: Description of variables

Variable	Description	Type	Scale
Perception of post-COVID business opportunities (POA)	A Likert scale type variable measured by the answers to the question: <i>Going back now to the business conditions in the country, in general - do you think that there will be business opportunities in your area in the next 12 months?</i> (1-no business opportunities, 5-high business opportunities);	<i>Likert</i>	<i>1-5</i>
Perception of the current economic and financial situation (PEF)	A Likert scale type variable measured by the answers to the question: <i>Would you say that you and your family are better or worse financially than you were a year ago?</i> (1 - low financial situation, 5 - high financial situation);	<i>Likert</i>	<i>1-5</i>
Perceptions of economic recovery (PRE)	A Likert scale type variable measured by the answers to the question: <i>Based on the current situation - do you think that in a year you and your family will be better financially, worse, or similar to the present situation?</i> (1 - low economic recovery, 5 - high economic recovery);	<i>Likert</i>	<i>1-5</i>
Perception of a potential economic crisis (PPCE)	A Likert scale type variable measured by the answers to the question: <i>Do you think a recession is expected in your area in the coming period?</i> (1 - the perception of a high probability of an economic crisis, 5 - the perception of a small probability of economic crisis);	<i>Likert</i>	<i>1-5</i>
Perceived digital skills (ADP)	A Likert scale type variable measured by the answers to the statement: <i>I have solid digital skills</i> (1 - without digital skills, 5 - with very good digital skills);	<i>Likert</i>	<i>1-5</i>
Age	Age of respondents;	<i>Numerical</i>	<i>14-99</i>
Gender	A binary variable which takes the value 0 when the respondent's gender is male, and the value 1 when the respondent's gender is female;	<i>Binary</i>	<i>0-1</i>
Current level of education (high school or university)	A binary variable that measures the level of education takes the value 0 for high school studies, and the value 1 for university studies;	<i>Binary</i>	<i>0-1</i>

Source: authors' own calculations using the statistical analysis

3.2.2 Independent variables

Predictive variables:

- a) *Perception of the current economic and financial situation* is used as an independent variable, which was measured by assigning values from 1 to 5 (1 - low economic and financial situation, 5 - high economic and financial situation);
- b) *Perception of economic recovery* - is an independent variable which was measured by assigning values from 1 to 5 (1 - low economic recovery, 5 - high economic recovery);
- c) *Perception of a potential economic crisis* - was used as an independent variable. This variable was measured by assigning values from 1 to 5 (1 - the perception of a high probability of an economic crisis, 5 - the perception of a small probability of economic crisis);
- d) *Perception of digital skills* - is a variable that was measured by assigning values from 1 to 5 (1 - no digital skills, 5 - with very good digital skills).

3.2.3 Control variables

The control variables used in this study are:

- a) *age* - it is a numerical value representing the respondent's age;
- b) *gender* - it is a variable that takes the value 0 when the respondent's gender is male, and the value 1 when the respondent's gender is female;
- c) *level of education* – it is a categorical variable that represents the respondents' real level of education, and it has 2 possible values: 0 - high school and 1 - university.

Table 1 shows the description of variables for this study.

3.3 Assumptions of logistic regression

Ordinal logistic regression was chosen as the regression type because ordinal logistic regression is used to predict an ordinal dependent variable, such as a variable measured on a Likert scale. Logistic regression does not make many of the assumptions of linear regression. First, logistic regression does not require a linear relationship between the dependent and independent variables. Second, the error terms do not need to be normally distributed. Third, logistic regression requires there to be little or no multicollinearity among the independent variables, a condition that was tested and the results were encouraging.

4. Results

Table 2 presents the descriptive statistics. Using the Stata statistical analysis software, we calculated descriptive statistics first. The current study included 784 participants: 575 females (74.34%), and 209 males (26.66%). The average age of the participants was 20.30 years old, with 70.16% of the respondents between 18 and 25 years old, 23.47% between 14 and 18 years old, and the rest of the respondents being over 25 years old. Regarding the classification according to the level of education, 248 (31.63%) are high school students, 405 (51.66%) are undergraduate students, and 131 (16.71%) are postgraduate (master) students.

Table 2: Descriptive statistics

		Number	Percentage (%)	
Gender	Male	209	26.66	
	Female	575	74.34	
Age	14-18	184	23.47	
	18-25	550	70.16	
	over 25	50	6.37	
Education	High school	9 th grade	40	5.10
		10 th grade	89	11.35
		11 th grade	63	8.04
		12 th grade	56	7.14
	Undergraduate students	1 st year	65	8.29
		2 nd year	247	31.51
		3 rd year	93	11.86
	Postgraduate students (master)	1 st year	56	7.14
2 nd year		75	9.57	

Source: authors' calculations using the Stata statistical analysis program

Table 3 shows the parallel correlations (bivariate correlations) between the variables, which are generally weak, without a correlation above 0.326. Even if there are some significantly correlated variables (e.g., PRE and POA), we can estimate that there are no factors to prevent consistent results.

Table 4 shows the results of the ordinal logistic regression for the dependent variable *perception of post-COVID business opportunities*. The results indicate that the dependent variable is positively and statistically significant influenced by the independent variable *perceptions of economic recovery* (PRE),

with a $\beta = 0.725$, $p = 0.000$, which shows that the future financial situation has a very important role in identifying business opportunities. However, *the current financial situation* (PEF) does not show a statistically significant effect on the independent variable, because the value obtained for $\beta = 0.103$ and $p = 0.229$. The independent variable *perception of a potential economic crisis* (PPCE) had a statistically significant effect, with the following values: $\beta = 0.626$ and $p = 0.000$. *Perceived digital skills* (ADP) had a statistically significant positive role on the perception of post-COVID business opportunities, with $\beta = 0.278$ and $p = 0.000$, which proves the importance of digital skills in a business environment influenced by the COVID-19 pandemic.

Table 3: Testing and validation of variables (bivariate correlations)

	POA	PEF	PRE	PPCE	ADP	Age	Gender	Education
POA	1.000							
PEF	0.075*	1.000						
PRE	0.326*	-0.009	1.000					
PPCE	0.281*	0.067	0.049	1.000				
ADP	-0.002	0.029	-0.095*	0.059	1.000			
Age	0.125*	0.147*	0.056	0.158*	0.081*	1.000		
Gender	-0.003	0.056	0.028	0.050	0.066	0.145*	1.000	
Education	0.153*	0.170*	0.029	0.221*	0.110*	0.701*	0.207*	1.000

Note: *, **, *** indicate that $p < 0.10$; $p < 0.05$; $p < 0.01$

Source: authors' calculations using the Stata statistical analysis program

Regarding the control variables, they proved to be statistically insignificant. Age, gender, and level of education currently had a statistically not significant effect on the dependent variable *perception of post-COVID business opportunities* (POA) ($p > 0.05$).

Table 4: Logistic regression results

Variable	β coef. (sig.)	Std. error
PEF	0.103 (0.229)	0.861
PRE	0.725* (0.000)	0.778
PPCE	0.626* (0.000)	0.889
ADP	0.278* (0.000)	0.087
Age	0.006 (0.802)	0.025
Gender	-0.234 (0.143)	0.159
Education	0.230 (0.128)	0.151
<i>Cut1</i>	0.520	0.798
<i>Cut2</i>	2.277	0.701
<i>Cut3</i>	5.802	0.710
<i>Cut4</i>	8.025	0.738

Note: * indicates that $p < 0.05$. Dependent variable: POA

Source: authors' calculations using the Stata statistical analysis program

Table 5 shows the goodness-of-fit statistics for the regression model: omnibus test, LR χ^2 , pseudo R^2 . Omnibus tests of the model coefficients are significant ($p < 0.05$), confirming the causal relationship of the proposed models and the acceptance of the hypothesis according to which β coefficients are different from zero. The χ^2 probability ratio is 177.88 for the dependent variable, with a value $p = 0.000$, which shows that the general model is significantly better than a model without predictors. The value of log-likelihood is -816. The value of log-likelihood can be from $-\infty$ to $+\infty$. The higher the value of log-likelihood, the more appropriate the model. However, in the present situation, having no other models for comparison, it is not possible to say exactly how appropriate it is. Therefore, the goodness-of-fit statistics show that the model has a good fit.

Table 5: The goodness of fit statistics

Omnibus test (significance level)	0.000
LR chi ²	177.88
Prob. > chi ²	0.000
Pseudo R ²	0.0982
Log-likelihood	-816

Source: authors' calculations using the Stata statistical analysis program

5. Discussions of the results

In this study we proposed the following hypotheses:

- **H1:** *The perception of post-COVID business opportunities will be influenced by the current economic and financial situation.* The results showed that respondents' current financial situation did not have a statistically significant effect on their perceptions of business opportunities. Possible causes could be that they expected a better financial situation in the future, which would allow them to implement a potential business plan. Therefore, hypothesis H1 was not confirmed.
- **H2:** *The perception of post-COVID business opportunities will be influenced by the perception of economic recovery.* The results of the study showed that the perception of economic recovery had a statistically significant positive effect on the dependent variable ($\beta = 0.725$, $p = 0.000$). Therefore, hypothesis H2 was confirmed.
- **H3:** *The perception of post-COVID business opportunities will be influenced by the perception of a potential economic crisis.* The results of the study showed that the perception of a possible recession had a statistically significant positive effect on the dependent variable. Therefore, hypothesis H3 was confirmed.
- **H4:** *The perception of post-COVID business opportunities will be influenced by the perception of digital skills.* The results of the study showed that the perception of digital skills had a statistically significant positive effect on the dependent variable. Therefore, hypothesis H4 was confirmed.

Table 6 summarizes the results of the hypotheses proposed.

Table 6: Results of the hypotheses

No.	Hypothesis	Coefficient	Is the hypothesis supported?
H1	POA → PEF	0.103 (0.229)	NO
H2	POA → PRE	0.725* (0.000)	YES
H3	POA → PPCE	0.626* (0.000)	YES
H4	POA → ADP	0.278* (0.000)	YES

Note: * indicates that $p < 0.05$;

Source: our own calculations using Stata statistical analysis software

6. Conclusions

The COVID-19 crisis has led to multiple global losses materialised in health risks, income cuts, and job losses. Governments took actions to protect vulnerable groups and alleviate poverty through fiscal policies, the main goal of interventions being an inclusive recovery (De Mooij et al., 2020). Thus, the companies had to identify new business opportunities adapted to the effects of the COVID-19 pandemic.

The COVID-19 pandemic was a global shock and involved the simultaneous supply and demand disruptions. Supply was reduced due to low productivity, job cuts, and lockdowns, which led to business closure and supply disruptions (Chudik et al., 2020). According to Jorda et al. (2020), pandemic periods are followed by periods when people's tendency to save money is higher, being less interested in investments or in the possibility of starting new businesses. There is a possibility of a long-term impact

of the COVID-19 crisis on the world economy, especially on entrepreneurship and innovation, which is still largely unknown. Consequently, a very important role will be played by the authorities who can support the start-up of potential businesses through legislation and grants, as well as through an education system encouraging young people.

7. Limits and future research directions

The first limitation of the study is that it only considered respondents from one university and one high school. Therefore, it is difficult to generalize the results beyond this target population or to a broader population. The sample consists of young Romanians, which raises the question of whether the results are sustainable; however, this limitation is relative because the perceptions of young Romanians are not necessarily different from other young people. However, future research in other countries on this topic will be helpful. These limitations open up future research opportunities to fill the study gaps and to complete its results.

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INFORMATION-MATHEMATICAL MODELLING OF THE DECISION MAKING PROCESS IN THE LOGISTICS SYSTEM

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Abstract

The paper highlights the problem of modelling the decision making process in the logistics system consisting of parallel chains of supplies. The structure of the system is introduced and the change of the state of the order matrix as well as the change of the state of decisions is emphasized. The way how to calculate either real costs or costs of delays is shown. The method of evaluating the state of the decision making process is proposed and sample guidelines for the possible combination of decisions followed by the possible logistics routes are given. Finally, the method of making the final decision about initiating the manufacturing process is introduced. Additionally, recommendations for the development of the system for calculating costs of the reverse flow of the decision-making process are proposed.

Keywords: decision making, logistics chain, modelling, sequence of actions, simulation system
JEL codes: C150, C630

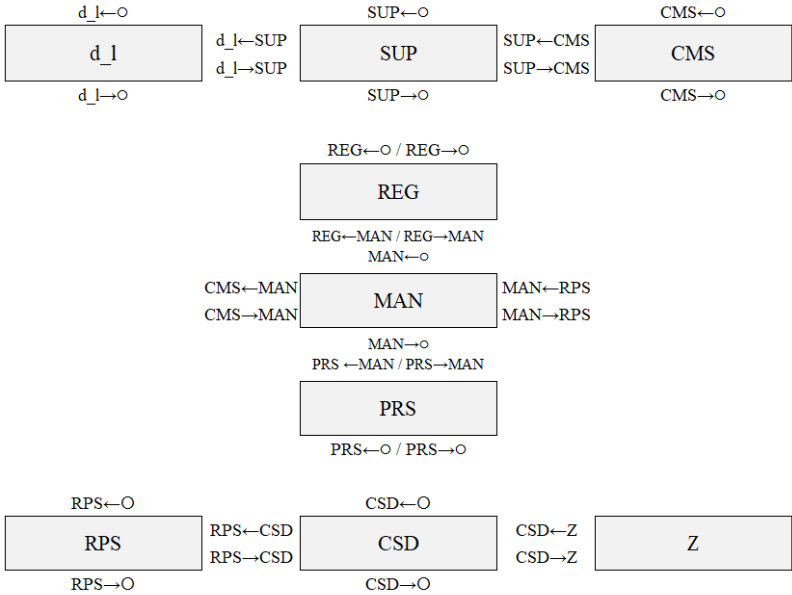
1. Introduction

Logistics is a key area in all manufacturing and trading companies. Setting its optimal management is the primary prerequisite for achieving the adequate efficiency of individual companies (Bielecki and Galinska, 2017). The goal of logistics managers is to ensure the smooth running of logistics operations in all segments of logistics. Generally, management consists of solving complex decision-making problems (Zimon and Malindzak, 2017). While in solving simple decision-making problems the manager usually uses intuition, their experience and practice in the field in order to make more complex decisions. Intuition is not sufficient and it is necessary to perform certain calculations manually or using computer technology. Specific logistics systems require solving decision-making problems quickly, which is possible with the use of mathematical models and software tools currently offered by computer science and operations research methods (Delaram and Valilai, 2018). The overall assessment of the logistics system in terms of the speed of making decisions has a significant impact on the potential choice of the logistics chain included in the system best prepared to perform manufacturing operations (Jaradat et al., 2017). The isolated implementation of logistics solutions has only limited effectiveness. When implementing logistics principles in the logistics chain, it is necessary to achieve overall optimization, coordination and synchronization of all activities which leads to the integration of logistics chains (Zhang and Xing, 2020). Elaboration of a detailed process map of the entire system and its adequate parameterization is an important basis for the successful optimization of logistics chains (Alcnauer and Bucki, 2011). Currently, it is a common standard to use simulation systems that are based on mathematical models to optimize (Straka et al., 2020).

The main goal of the paper is to propose an idea how to illustrate and implement a possible solution to the problem of modelling the decision making process in the sample logistics chain. The model presented in the article is a continuation of the solutions proposed in (Suchánek and Bucki, 2020) regarding modelling of time delays which occur during handling client inquiries. The article focuses on the method of accelerating the decision-making process in individual units of the logistics chain. Decision making in logistics systems is an important issue widely discussed in contemporary publications (Golomazov et al., 2019), (Skerlic, 2020) and others.

To illustrate the problem of decision making, the paper presents a sample logistics system consisting of parallelly arranged logistics chains. The sample logistics chain consisting of units is presented in Fig. 1. Customers' orders are placed in the order matrix from which they are passed to a certain logistics chain according to the operator's decision. It is assumed that a decision about each customer's order is passed to each unit of the chosen logistics chain beginning with the customer service department (CSD) from where it is passed to the ready product storage (RPS). This unit is connected with the manufacturing unit (MAN) and its role in the chain is to make a decision before passing the information to the regeneration unit (REG) as well as the production support unit (PRS) and the charge material storage (CMS). The last mentioned unit is directly connected with the supply centre (SUP) which makes a decision influencing the set of suppliers (D). It is assumed that a positive decision made by the unit D can begin the required manufacturing process (Suchánek and Bucki, 2017).

Figure 1: Sequential flow of a customer inquiry



Source: own work on the basis of (Suchánek and Bucki, 2020)

This kind of logistics chain is characteristic for numerous manufacturing systems. There is always a need to look for the “bottleneck” in the system and one of them can be found in the decision making process. A decision which is not made in time in one unit of the logistics chain does not allow the operator to make another decision in the subsequent unit and causes costly delays.

It is assumed that a decision can be either positive or negative. If the decision is positive, only then the subsequent unit can start the decision making process. Should the decision be negative, the decision making process is;

- i) stopped i.e. the order being its subject cannot be made in the system;
- ii) brought to a standstill in order to be reconsidered;
- iii) subject to the escalation procedure.

Additionally, there is a need to assume that available logistics chains are identical and they are arranged parallelly.

Further, it is assumed that orders can be made in;

- i) the logistics chain set chosen manually,
- ii) a logistics chain available from the set of logistics chains chosen at random.

2. Specification

It is assumed that there are Γ parallel logistics chains in the system. Further, it is assumed that each γ -th logistics chain, $\gamma = 1, \dots, \Gamma$ is equipped with a certain number of units. Let β_γ be the β -th unit in the γ -th logistics chain, $\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma$. The order inquiry matrix takes the following form (1):

$$Z^0 = [z_{(m,n)/\gamma}^0], \gamma = 1, \dots, \Gamma, m = 1, \dots, M, n = 1, \dots, N \quad (1)$$

where: $z_{(m,n)/\gamma}^0$ - the inquiry of the n -th order of the m -th customer to be made in the γ -th logistics chain expressed in contract unit numbers at the initial state.

When the decision for the n -th order of the m -th customer in the γ -th logistics chain is made, the decision process for this order is then passed subsequently beginning with the customer service department (CSD) to the set of suppliers (D). Making the decision in the set of suppliers means that this order inquiry process is completed.

Let us introduce the structure matrix of the logistics system (2):

$$E = [e_{\beta(\phi),\gamma}], \beta(\phi) = 1, \dots, B(\phi), \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma \quad (2)$$

where: $e_{\beta(\phi=0),\gamma}$ - the main β -th unit in the γ -th logistics chain of supplies,

$e_{\beta(\phi \geq 1),\gamma}$ - the ϕ -th secondary unit associated with the β -th unit in the γ -th logistics chain of supplies.

At the same time $e_{\beta(\phi),\gamma} = 1$ if the $\beta(\phi)$ -th unit in the γ -th logistics chain exists and is ready to operate. Otherwise, $e_{\beta(\phi),\gamma} = 0$.

The state of the order inquiry matrix changes as follows:

$$Z^0 \rightarrow Z^1 \rightarrow \dots \rightarrow Z^k \rightarrow \dots \rightarrow Z^K$$

where: $z_{m,n}^0 \rightarrow z_{m,n}^1 \rightarrow \dots \rightarrow z_{m,n}^k \rightarrow \dots \rightarrow z_{m,n}^K$

At the same time, $z_{m,n}^k = z_{m,n}^{k-1}$ if the state of the decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer does not change at the k -th stage, otherwise $z_{m,n}^k \neq z_{m,n}^{k-1}$.

The vector of suppliers takes the following form (3):

$$D = [d_l], l = 1, \dots, L \quad (3)$$

where: d_l - the l -th supplier for the manufacturing system.

Let us introduce the matrix of all possible decisions in the units of the logistics chains of supply (4):

$$G^k = g_{[\beta(\phi),\gamma]/(m,n)}^k \quad (4)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, k = 0, 1, \dots, K, m = 1, \dots, M, n = 1, \dots, N$$

where: $g_{[\beta(\phi),\gamma]/(m,n)}^k$ - the possible decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage.

Let us introduce the matrix of state of decisions in the units of the logistics chains of supply (5):

$$S^k = s_{[\beta(\phi),\gamma]/(m,n)}^k \quad (5)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, k = 0, 1, \dots, K, m = 1, \dots, M, n = 1, \dots, N$$

where: $s_{[\beta(\phi), \gamma]/(m, n)}^k$ - the state of the decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage.

At the same time, $s_{[\beta(\phi), \gamma]/(m, n)}^k = 1$ if the decision has already been made in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage. Otherwise, $s_{[\beta(\phi), \gamma]/(m, n)}^k = 0$. Moreover, $s_{[\beta(\phi), \gamma]/(m, n)}^k = -1$ in case there is no need to implement any decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage.

The state of the decision matrix changes if there is any alternation in any β -th unit of any γ -th logistics chain i.e. (6):

$$S^0 \rightarrow S^1 \rightarrow \dots \rightarrow S^k \rightarrow \dots \rightarrow S^K \quad (6)$$

where: $s_{[\beta(\phi), \gamma]/(m, n)}^0 \rightarrow s_{[\beta(\phi), \gamma]/(m, n)}^1 \rightarrow \dots \rightarrow s_{[\beta(\phi), \gamma]/(m, n)}^k \rightarrow \dots \rightarrow s_{[\beta(\phi), \gamma]/(m, n)}^K$

At the same time, $s_{[\beta(\phi), \gamma]/(m, n)}^k = s_{[\beta(\phi), \gamma]/(m, n)}^{k-1}$ if the state of the decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer does not change at the k -th stage, otherwise $s_{[\beta(\phi), \gamma]/(m, n)}^k \neq s_{[\beta(\phi), \gamma]/(m, n)}^{k-1}$.

Let us introduce the matrix of remaining decisions to be made (7):

$$P^k = p_{[\beta(\phi), \gamma]/(m, n)}^k \quad (7)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, k = 0, 1, \dots, K, m = 1, \dots, M, n = 1, \dots, N$$

where: $p_{[\beta(\phi), \gamma]/(m, n)}^k$ - the state of the remaining decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage.

At the same time, $p_{[\beta(\phi), \gamma]/(m, n)}^k = 0$ if the decision has not been made yet in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage. Otherwise, $p_{[\beta(\phi), \gamma]/(m, n)}^k = 1$. Moreover, $p_{[\beta(\phi), \gamma]/(m, n)}^k = -1$ in case there is no need to implement any decision in the β -th unit of the γ -th logistics chain for the n -th order inquiry of the m -th customer at the k -th stage.

It is assumed that the unit cost is the price incurred by a company to make an adequate decision in a given time period. It is further assumed that unit costs include all fixed costs and all variable costs involved in making a decision.

Let us introduce the matrix of the unit costs of making decisions (8):

$$C^{unit} = [c_{\beta(\phi), \gamma}^{unit}], \beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma \quad (8)$$

where: $c_{\beta(\phi), \gamma}^{unit}$ - the unit cost of making a decision in the β -th unit of the γ -th logistics chain.

It is assumed that the unit costs of making a decision in the β -th unit in the γ -th logistics chain may differ for each n -th order inquiry of each m -th customer, however, then it is necessary to take this difference into account while creating a mathematical model.

Let us introduce the matrix of the predicted unit times of making decisions (9):

$$T^{pred} = [t_{[\beta(\phi), \gamma]/(m, n)}^{pred}]$$

$$\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma, \phi = 0, 1, \dots, \Phi, m = 1, \dots, M, n = 1, \dots, N$$

where: $\tau_{[\beta(\phi),\gamma]/(m,n)}^{pred}$ – the predicted unit time of making the decision for the n -th order inquiry of the m -th customer in the β -th unit in the γ -th logistics chain.

Let us introduce the matrix of predicted unit costs of making decisions (10):

$$C^{unit} = \left[c_{[\beta(\phi),\gamma]}^{unit} * \tau_{[\beta(\phi),\gamma]/(m,n)}^{pred} \right] \quad (10)$$

$$\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma, \phi = 0, 1, \dots, \Phi, m = 1, \dots, M, n = 1, \dots, N$$

The matrix of the modified predicted times of making decisions is introduced (11):

$$T^{mod} = \left[\tau_{[\beta(\phi),\gamma]/(m,n)}^{mod} \right] \quad (11)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, m = 1, \dots, M, n = 1, \dots, N$$

where: $\tau_{[\beta(\phi),\gamma]/(m,n)}^{mod}$ - the modified unit time of making the decision for the all n -th order of the m -th customer in the β -th unit in the γ -th logistics chain.

$$\text{At the same time, } \tau_{[\beta(\phi),\gamma]/(m,n)}^{mod} = \zeta \cdot \tau_{[\beta(\phi),\gamma]/(m,n)}^{unit} + \frac{z_{m,n}^0}{\xi}$$

where: ζ - the base amount coefficient; ξ - the minimizing denominator.

In fact, it is assumed that the time needed to make a decision for one product in a certain unit of the logistics chain is lower than the time needed to make a decision for more products of the same type. However, it is almost never known how much time is required to make a decision in case of more products to be made in a certain logistics chain so certain preliminary estimations are to be proposed.

Let us introduce the matrix of the stabilized times of making decisions (12):

$$T^{st} = \left[\tau_{[\beta(\phi),\gamma]/(m,n)}^{st} \right] \quad (12)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, m = 1, \dots, M, n = 1, \dots, N$$

where: $\tau_{[\beta(\phi),\gamma]/(m,n)}^{st}$ - the stabilized predicted time of making the decision for the all n -th order of the m -th customer in the β -th unit in the γ -th logistics chain (stabilized times mean times close to real times).

There is a need for minimising the amount coefficient of orders inquiries in case it exceeds the set value as follows (13):

$$\text{if } \frac{z_{m,n}^0}{\xi} > \theta \text{ then } \tau_{[\beta(\phi),\gamma]/(m,n)}^{st} = \zeta \cdot \tau_{[\beta(\phi),\gamma]/(m,n)}^{unit} + \theta,$$

$$\text{otherwise } \tau_{[\beta(\phi),\gamma]/(m,n)}^{st} = \zeta \cdot \tau_{[\beta(\phi),\gamma]/(m,n)}^{unit} + \frac{z_{m,n}^0}{\xi} \quad (13)$$

where: θ - the stabilized coefficient

Let us introduce the matrix of periods of delays influencing the times of making decisions (14):

$$T^{del} = \left[\tau_{[\beta(\phi),\gamma]/(m,n)}^{del} \right] \quad (14)$$

$$\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma, \phi = 0, 1, \dots, \Phi, m = 1, \dots, M, n = 1, \dots, N$$

where: $\tau_{[\beta(\phi),\gamma]/(m,n)}^{del}$ - the delay time of making the decision for the n -th order inquiry of the m -th customer in the β -th unit in the γ -th logistics chain.

It is assumed that making a decision in a certain logistics unit cannot take less time than is given in T^{del} i.e. $\Lambda_{1 \leq \beta \leq B} \Lambda_{0 \leq \phi \leq \Phi} \Lambda_{1 \leq \gamma \leq \Gamma} \Lambda_{1 \leq m \leq M} \Lambda_{1 \leq n \leq N} \tau_{[\beta(\phi),\gamma]/(m,n)}^{del} \geq 0$

Let us introduce the matrix of the unit costs of delayed decisions:

$$C_{del}^{unit} = [c_{del_[\beta(\phi),\gamma]}^{unit}] \quad (15)$$

$$\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma, \phi = 0, 1, \dots, \Phi, \lambda = 1, \dots, \Lambda$$

where: $c_{del_[\beta(\phi),\gamma]}^{unit}$ - the unit cost of making the delayed decision in the β -th unit of the γ -th logistics chain.

The matrix of the real times of making decisions (16):

$$T^{real} = \left[\tau_{\frac{[\beta(\phi),\gamma]}{m,n}}^{real} \right] \quad (16)$$

$$\beta = 1, \dots, B, \gamma = 1, \dots, \Gamma, \phi = 0, 1, \dots, \Phi, m = 1, \dots, M, n = 1, \dots, N$$

where: $\tau_{[\beta(\phi),\gamma]/(m,n)}^{real}$ - the real time of making the decision for the n -th order inquiry of the m -th customer in the β -th unit of the γ -th logistics chain. At the same time, $\tau_{[\beta(\phi),\gamma]/(m,n)}^{real} = \tau_{[\beta(\phi),\gamma]/(m,n)}^{st} + \tau_{[\beta(\phi),\gamma]/(m,n)}^{del}$

The matrix of the real costs of making decisions takes the following form (17):

$$C^{real} = \left[c_{\frac{[\beta(\phi),\gamma]}{m,n}}^{real} \right] \quad (17)$$

$$\beta = 1, \dots, B, \phi = 0, 1, \dots, \Phi, \gamma = 1, \dots, \Gamma, m = 1, \dots, M, n = 1, \dots, N$$

where: $c_{[\beta(\phi),\gamma]/(m,n)}^{real}$ - the real cost of making decisions for the n -th order of the m -th customer in the β -th unit of the γ -th logistics chain. At the same time, $c_{[\beta(\phi),\gamma]/(m,n)}^{real} = c_{\beta(\phi),\gamma}^{unit} * \tau_{[\beta(\phi),\gamma]/(m,n)}^{st} + c_{del_[\beta(\phi),\gamma]}^{unit} * \tau_{[\beta(\phi),\gamma]/(m,n)}^{del}$.

Let us assume the following (18):

$$s_{[\beta(\phi),\gamma]/(m,n)}^k = 1 \Rightarrow s_{[\beta(\phi),\gamma]/(m,n)}^k = s(1)_{[\beta(\phi),\gamma]/(m,n)}^k \quad (18)$$

Then it is possible to sum up the number of already made decisions according to the sample guidelines included in Table 1.

Table 1: Sample guidelines for the possible combination of decisions

Calculated parameter in the logistics system	Formula no.										
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)	(xi)
	$G_{\beta,\gamma,m,n}$	G_{β}	G_{γ}	G_m	G_n	$G_{\beta,\gamma}$	$G_{\beta,m}$	$G_{\beta,n}$	$G_{m,n}$	$G_{\gamma,m}$	$G_{\gamma,n}$
	$S_{\beta,\gamma,m,n}$	S_{β}	S_{γ}	S_m	S_n	$S_{\beta,\gamma}$	$S_{\beta,m}$	$S_{\beta,n}$	$S_{m,n}$	$S_{\gamma,m}$	$S_{\gamma,n}$
	$P_{\beta,\gamma,m,n}$	P_{β}	P_{γ}	P_m	P_n	$P_{\beta,\gamma}$	$P_{\beta,m}$	$P_{\beta,n}$	$P_{m,n}$	$P_{\gamma,m}$	$P_{\gamma,n}$
β	x		x	x	x				x	x	x
ϕ	x		x	x	x				x	x	x
γ	x	x		x	x		x	x	x		
m	x	x	x		x	x		x			x
n	x	x	x	x		x	x			x	

Source: own work

The number of all possible decisions can be calculated at the k -th stage:

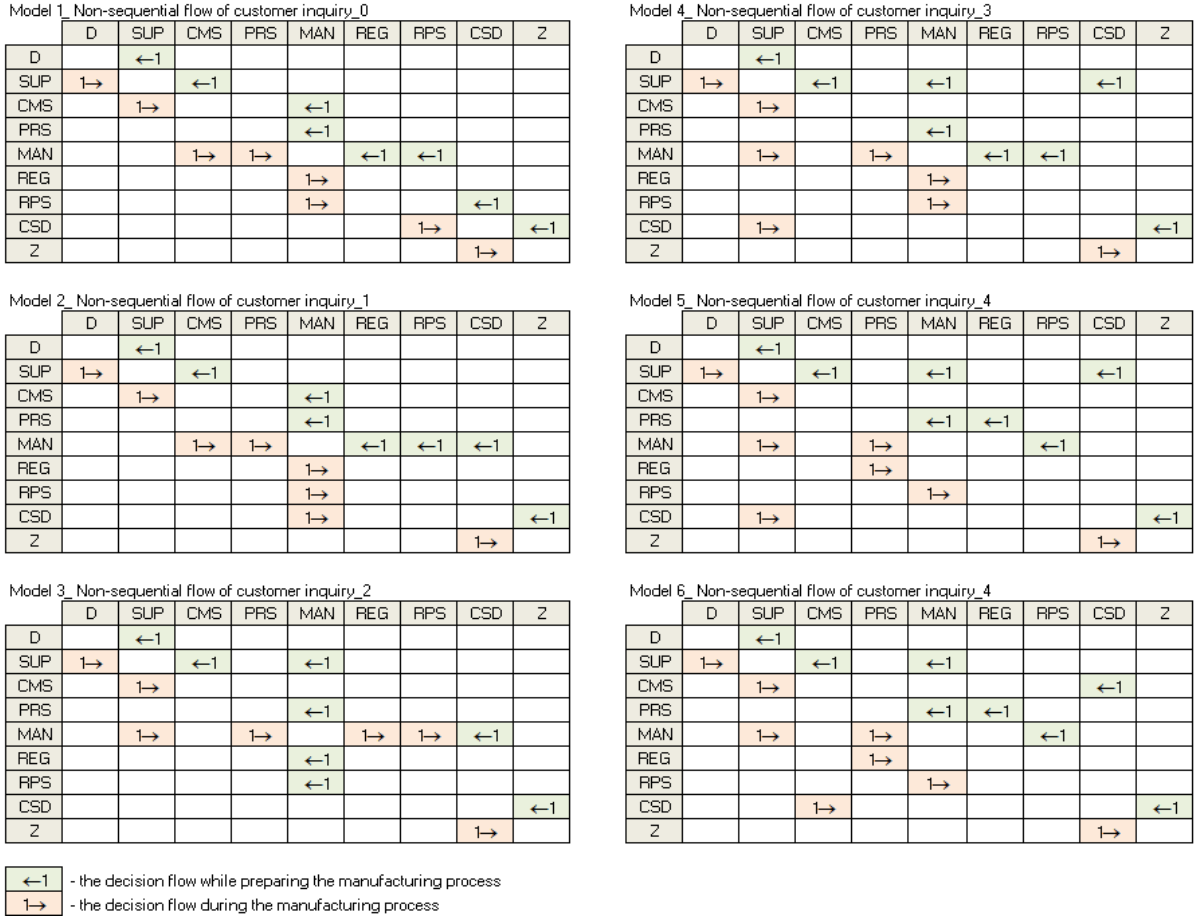
- i) in the whole logistics system: $G_{[\beta(\phi),\gamma]/(m,n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- ii) in the units of the β -th type in the logistics system: $G_{\beta(\phi)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- iii) in the γ -th logistics chain of supplies: $G_{(\gamma)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{n=1}^N \sum_{m=1}^M g_{[\beta(\phi),\gamma]/(m,n)}^k$
- iv) for the m -th customer in the logistics system: $G_{(m)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- v) for the n -th product in the whole logistics system: $G_{(n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M g_{[\beta(\phi),\gamma]/(m,n)}^k$
- vi) in the β -th unit of the γ -th logistics chain: $G_{(\beta,\gamma)}^k = \sum_{m=1}^M \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- vii) in the units of the β -th type for the m -th customer in the logistics system:
 $G_{(\beta,m)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- viii) for the n -th product in the β -th type units: $G_{(\beta,n)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M g_{[\beta(\phi),\gamma]/(m,n)}^k$
- ix) for the n -th product of the m -th customer in the logistics system:
 $G_{(m,n)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} g_{[\beta(\phi),\gamma]/(m,n)}^k$
- x) for the m -th customer in the γ -th logistics chain of supplies:
 $G_{(\gamma,m)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{n=1}^N g_{[\beta(\phi),\gamma]/(m,n)}^k$
- xi) for the n -th product in the γ -th logistics chain of supplies:
 $G_{(\gamma,n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{m=1}^M g_{[\beta(\phi),\gamma]/(m,n)}^k$

The number of already made decisions can be calculated at the k -th stage:

- i) in the whole logistics system: $S_{[\beta(\phi),\gamma]/(m,n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- ii) in the units of the β -th type in the logistics system: $S_{\beta(\phi)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- iii) in the γ -th logistics chain of supplies: $S_{(\gamma)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{n=1}^N \sum_{m=1}^M s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- iv) for the m -th customer in the logistics system: $S_{(m)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- v) for the n -th product in the whole logistics system:
 $S_{(n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- vi) in the β -th unit of the γ -th logistics chain: $S_{(\beta,\gamma)}^k = \sum_{m=1}^M \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- vii) in units of the β -th type for the m -th customer in the logistics system:
 $S_{(\beta,m)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- viii) for the n -th product in the β -th type units: $S_{(\beta,n)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{m=1}^M s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- ix) for the n -th product of the m -th customer in the logistics system:
 $S_{(m,n)}^k = \sum_{\gamma=1}^{\Gamma} \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- x) for the m -th customer in the γ -th logistics chain of supplies:
 $S_{(\gamma,m)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{n=1}^N s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$
- xi) for the n -th product in the γ -th logistics chain of supplies:
 $S_{(\gamma,n)}^k = \sum_{\beta=1}^B \sum_{\phi=0}^{\Phi} \sum_{m=1}^M s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$

After verifying the state of already made decisions, the need to introduce the course of action responsible for either improving or confirming the existing state of affairs emerges. The limits for taking an appropriate action are given according to the guidelines shown in Figure 2. It is assumed that the number of already made decisions directly influences the subsequent course of action.

Figure 2: Possible logistics routes of making decisions for orders' inquiries



Source: own work

3. The method of making decisions in the non-sequential flow of a customer's inquiry_0

Let us introduce the matrix of algorithms responsible for servicing the decision making process (19):

$$A = [a(\lambda)], \lambda = 0, 1, \dots, A \quad (19)$$

Let us assume that $\alpha(0)$ is the algorithm responsible for servicing the decision making process in case of the non-sequential flow of a customer's inquiry_0 presented in Table 1. Escalating the problem in case of not making a decision in time means that the operator with a high level of control within the organization should make a decision immediately in order to make the required decision process for the n -th order of the m -th customer order inquiry at the k -th stage possible. It is assumed that escalating the problem for $e_{\beta(\phi),\gamma}$ leads to the final making the decision which results in $s_{[\beta(\phi),\gamma]/(m,n)}^k = s(1)_{[\beta(\phi),\gamma]/(m,n)}^k$.

The sequence of actions in case of algorithm α_0 is presented in the following procedure:

1. Choose the γ -th logistics chain for $z_{m,n}^0$ according to algorithm $a(\lambda)$.
2. Direct inquiry $z_{m,n}^0$ to $e_{\beta_CSD,\gamma}$.
3. Let $e_{\beta_CSD,\gamma}$ make the decision for inquiry $z_{m,n}^0$.
4. $s_{(\beta_CSD,\gamma)/(m,n)}^k = s(1)_{(\beta_CSD,\gamma)/(m,n)}^k$? If YES, go to (5). If NO, go to (6).
5. Pass inquiry $z_{m,n}^0$ to $e_{\beta_RPS,\gamma}$. Go to (7).

6. Escalate the problem for $e_{\beta_CSD,\gamma}$ and go to (3).
7. Make the decision by $e_{\beta_RPS,\gamma}$ for inquiry $z_{m,n}^0$.
8. $s_{(\beta_RPS,\gamma)/(m,n)}^k = s(1)_{(\beta_RPS,\gamma)/(m,n)}^k$? If *YES*, go to (9). If *NO*, go to (10).
9. Pass inquiry $z_{m,n}^0$ to $e_{\beta_MAN,\gamma}$. Go to (11).
10. Escalate the problem for $e_{\beta_RPS,\gamma}$ and go to (7).
11. Make the decision by $e_{\beta_MAN,\gamma}$ for inquiry $z_{m,n}^0$.
12. $s_{(\beta_MAN,\gamma)/(m,n)}^k = s(1)_{(\beta_MAN,\gamma)/(m,n)}^k$? If *YES*, go to (13). If *NO*, go to (14).
13. Pass inquiry $z_{m,n}^0$ to $e_{\beta_PRS,\gamma}$. Go to (15).
14. Escalate the problem for $e_{\beta_MAN,\gamma}$ and go to (11).
15. Make the decision by $e_{\beta_PRS,\gamma}$ for inquiry $z_{m,n}^0$.
16. $s_{(\beta_PRS,\gamma)/(m,n)}^k = s(1)_{(\beta_PRS,\gamma)/(m,n)}^k$? If *YES*, go to (17). If *NO*, go to (18).
17. Pass inquiry $z_{m,n}^0$ to $e_{\beta_REG,\gamma}$. Go to (19).
18. Escalate the problem for $e_{\beta_PRS,\gamma}$ and go to (15).
19. Make the decision by $e_{\beta_REG,\gamma}$ for inquiry $z_{m,n}^0$.
20. $s_{(\beta_REG,\gamma)/(m,n)}^k = s(1)_{(\beta_REG,\gamma)/(m,n)}^k$? If *YES*, go to (21). If *NO*, go to (22).
21. Pass inquiry $z_{m,n}^0$ to $e_{\beta_CMS,\gamma}$. Go to (23).
22. Escalate the problem for $e_{\beta_REG,\gamma}$ and go to (19).
23. Make the decision by $e_{\beta_CMS,\gamma}$ for inquiry $z_{m,n}^0$.
24. $s_{(\beta_CMS,\gamma)/(m,n)}^k = s(1)_{(\beta_CMS,\gamma)/(m,n)}^k$? If *YES*, go to (25). If *NO*, go to (26).
25. Pass inquiry $z_{m,n}^0$ to $e_{\beta_SUP,\gamma}$. Go to (27).
26. Escalate the problem for $e_{\beta_CMS,\gamma}$ and go to (23).
27. Make the decision by $e_{\beta_SUP,\gamma}$ for inquiry $z_{m,n}^0$.
28. $s_{(\beta_SUP,\gamma)/(m,n)}^k = s(1)_{(\beta_SUP,\gamma)/(m,n)}^k$? If *YES*, go to (29). If *NO*, go to (30).
29. Pass inquiry $z_{m,n}^0$ to $e_{\beta_D,\gamma}$. Go to (31).
30. Escalate the problem for $e_{\beta_SUP,\gamma}$ and go to (26).
31. Make the decision by $e_{\beta_D,\gamma}$ for $z_{m,n}^k$.
32. $s_{(\beta_D,\gamma)/(m,n)}^k = s(1)_{(\beta_D,\gamma)/(m,n)}^k$? If *YES*, go to (33). If *NO*, go to (34).
33. Make the final decision about initiating the manufacturing process.
34. Escalate the problem for $e_{\beta_D,\gamma}$ and go to (31).

4. Conclusions

The problem emphasized in the paper belongs to the group of contemporary complex problems in the logistics environment as the speed of making decisions is the main factor influencing the effectiveness of logistics systems. Making decisions is hardly ever an easy process. Also, the whole problem has to be analysed from the point of view of its inner logistics interconnections between units within a logistics chain of supply. The main achievement presented in the article shows the method of modelling the decision-making process in individual units of the logistics chain, taking into account the need to make decisions as soon as possible. It is emphasized in the pseudocode representing this process by means of introducing the escalation process in case of each unit of the logistics chain in order to complete the decision-making process successfully.

It is advisable to consolidate the decision making process for two or more units in one of them, e.g. the manufacturing unit (MAN) with the regeneration unit (REG) as well as the production support unit (PRS) and the charge material storage (CMS). It is assumed that such an approach may lead to shortening the decision making time considerably. The main goal of the paper remains to propose an

idea how to illustrate and implement a possible solution to the problem of modelling the decision making process in the logistics system. The paper focuses on presenting the way of modelling the flow of decisions from CSD to the beginning of the supply chain. The next step which emerges should take into account the opposite flow of the decision making process. Only then the real problem can be thoroughly analysed by means of the simulation approach, however, this kind of approach requires creating the tool on the basis of the assumptions given in the paper hereby.

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PERSONNEL WORK IN SMES IN THE CZECH REPUBLIC BEFORE THE CORONA CRISIS

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Abstract

This article is a starting point for comparison of the state and changes in personnel work in SMEs in the Czech Republic before the corona crisis. The text is based on the implementation of longitudinal primary research using the method of a questionnaire survey in SMEs among managers and HR professionals in the first half of 2020. The authors aim to monitor changes in the management of personnel work in the long term. This article will generalize the most important findings on the level of personnel work in SMEs in the Czech Republic before the corona crisis. Using statistical methods, it will be stated which personnel activities are used and what importance they attach to them by the management of the organization, but also what time allowance companies use actually for the implementation of the activities. Furthermore, the results of the adopted personnel strategies, for planning the needs of employees, for managing the job description and their analysis will be presented. The article will generalize further knowledge about the practice of personnel work in SMEs. The result of the article will be a summary that will find out what problems SMEs most often deal with in personnel work, what they consider problematic and what company management plans to change in this area.

Keywords: Czech Republic, personnel activities, personnel work, research, SMEs

JEL codes: M19, M20, M54, O15

1. Introduction

The beginning of the 1980s in personnel work is characterized by a close connection between the strategic development of companies and the strategic development of human resources. During this period, selected managers acquire the positions of HR directors and thus become strategic partners of the company's management. In the given period, the importance of development strategy, educational programs, employee motivation systems and also employee evaluation procedures are growing significantly. The effective operation of any manufacturing enterprise depends on the use of human resources. Therefore, the key element in the management of a production enterprise is the function of personnel management, which should be directly linked to the overall strategic concept of enterprise development. Modern market conditions make demands not only for qualifications and qualities of employees, but also for the behaviour of enterprises with respect to human resources. In accordance with this, it became necessary to consider the management of personnel as an integrated system built on the basis of an appropriate strategy (Akhmetshin et al., 2018).

Therefore, since the mid-1990s, to this day, personnel work has been part of modern business management concepts and their main pillar. Personnel work in this period helps the processes of globalization of companies, economic activities of companies in national and international conditions

and developing competition. The importance of teamwork is growing and a number of schools of human resource management are appearing in theory. In general, we can observe a significant impact of human resource management on the performance of the organization (Šikýř et al., 2018).

This article deals with personnel work in small and medium-sized enterprises in the conditions of the Czech Republic in the period before the corona crisis. The article is based on the theoretical basis of the described issues. In addition to the characteristics of the most important personnel processes and activities in the conditions of Czech SMEs, the article, based on primary research at the beginning of 2020, represents an ideal starting point for comparing the level (changes) in the content of personnel work in these companies after the first year of corona crisis.

The presented article analyses and describes personnel work in SMEs in the Czech Republic through personnel activities, the existence or non-existence of a personnel strategy, which generally pays special attention to human resource management in a given period. It also focuses on the issue of planning the needs of employees and the quantitative structure of job descriptions in the entire organizational structure of companies' jobs. The analysis is based on data obtained by primary research in the form of a questionnaire survey. Methods of descriptive statistics and inductive statistics were used for the analysis.

In the final part of the text, the authors pay a structurally important view of the developed job descriptions, in terms of content. This approach will allow a more detailed insight into the specific implementation of personnel work in the surveyed SMEs in the Czech Republic and will later become the starting point for the prepared comparison.

2. Theoretical background

Small and medium-sized enterprises play a very important role in the structure of the Czech national economy, as they occupy 99.83% of all business entities in the Czech Republic (AMSP CR, 2018). The performance and success of these businesses depends on a number of factors. Human resources are generally considered to be a key success factor (Piazza-Georgi, 2002; Prescott and Rothwelt, 2012; Thomas and Lazar, 2014). Opinions on the position and role of human resources in companies are gradually evolving and changing. In the context of this, there are also changes in the way they are used, managed and developed. The focus of personnel work in the period after World War II corresponds to the economic effort to gain a significant position in the market and achieve prosperity in all aspects of the work process (Storey, 2007). Therefore, it focuses mainly on the development of personnel administration, which is the basis of other personnel processes. During this period, employees are perceived as one of the resources of the company, on which the management activities of managers are focused, especially at the level of operational management.

With the development of business, the approach to the use of the human factor changed in the 1960s and 1970s. Personnel work focuses more deeply on the search for new employees, where attention is focused on the defined knowledge, skills and abilities acquired on the part of employees before being accepted into the work process. Attention is also paid to employee evaluation processes. However, it is not a comprehensive use of this evaluation, but rather serves as a basis for employee remuneration (Koubek, 2015).

A significant change in personnel work comes at the turn of the 70s and 80s of the 20th century. This stage is referred to in the literature as the human resource management stage, which means emphasizing the use of employees, their individuality and individuality, which is determined by their own values and needs (Ehnert et al., 2016). Compared to other resources, human resources are capable of development and appreciation, they bring higher added value, such as their value. Only people can find ways to increase quality, improve management, use technology and other resources in the company. Economists refer to this human ability as "capital" (Donate et al, 2016; Hitka et al, 2019). Another feature of this stage is the strategic concept of human resources, i.e. staffing and utilization planning is implemented over a long period of time in order to gain strategic advantage (Armstrong, 2015; Buchanan and McCalman, 2019). The employee begins to be understood not only as a resource of the company, but above all as human capital. Human capital is part of strategic human resource management based on the analysis of personnel processes (Armstrong and Taylor, 2017; Boon et al., 2018). This view allows for a more precise orientation in the development of employees through the implementation of other personnel processes. The competitive advantage is provided by employees who have the

necessary education, knowledge and skills, corresponding to the needs of business development, and are able to use them adequately (Bierema and Callahan, 2014).

The trends of this stage continue despite various types of innovations to the present day. Gaining a strong strategic position of the company in domestic and international conditions is based on significant changes in the approach of managers and the way of human resources management. Human resources management is about using employees in employment in a way that enables companies to successfully achieve their strategic goals (Armstrong and Taylor, 2020). The focus is mainly on the ecological, social and ethical aspects of business and human resource management, in which long-term sustainability is promoted (Chams and Garcia-Blandón, 2019; Malá et al., 2019, Wikhamn, W. 2019).

The development of personnel work in Czechoslovakia and subsequently in the independent Czech Republic took place in a different way in the period after World War II until the early 1990s. This was due to a different socio-political situation, where there was a planned economy based not on the operation of a market mechanism, but on the directive management of the Communist Party. In terms of personnel work, this meant a directive personnel procedure, which was not based on the market development of the company. Therefore, the conditions in the mentioned years in personnel work cannot be compared with the development in the Western world. The impact of this is that, at present, SMEs in certain contexts are still "catching up" with the current originally "Western" SMEs, creating many differences. On the other hand, there are companies that have seen this as an opportunity for their development and their level of personnel work is comparable to foreign companies.

The personnel work, which is the subject of this article and the conducted empirical research, deals with the period immediately before the outbreak of the corona crisis. This period was characterized by an economic boom. In the company environment, this meant dynamic development, which brought a high demand for quality labour resources. There was excess demand over labor supply in the labor market. There was an intensive use of employees, and therefore some personnel processes were preferred at the expense of others. Examples include quality employee selection and employee training and development. On the contrary, some modern forms of employment of workers were used sporadically, especially in the form of part-time work and home office.

At the end of 2019, the unemployment rate in the Czech Republic was the lowest in Europe. The overall situation on the labour market was positive. According to the survey, the number of companies that planned to hire new employees continued to predominate, especially in large companies (GroupManpower, 2019).

Surveys conducted in the Czech Republic as early as 2014 (Šikýř) emphasized that the most important processes used by top managers include work performance management, employee evaluation, training and development, adaptation and work analysis (Bušina and Šikýř, 2014).

In the research presented in the article, the object of research was enterprises operating in the Czech Republic with a division into enterprises with national and supranational scope, while only findings obtained from SMEs are presented, ie enterprises according to the EU methodology with up to 250 employees. selected aspects of the state of personnel work in SMEs before the corona crisis. Attention was focused on the implementation of personnel processes, on the existence of a formalized personnel strategy, on the periodicity of planning the needs of employees and on job descriptions.

Given that the data were collected immediately before the outbreak of the corona crisis, they therefore represent an ideal starting point for assessing the impact of the corona crisis and its impact on personnel work in SMEs in the Czech Republic. For deeper knowledge and future comparisons of personal work before and after coronary crisis, the following hypotheses were established:

H1: There are statistically significant differences in the implementation of personnel processes between Czech SMEs operating at the national and supranational level.

H2: There are statistically significant differences in the implementation of personnel processes between micro, small and medium-sized enterprises in the Czech Republic.

H3: In SMEs, there are differences in the planning period for planning the needs of employees depending on the scope of the SME in the Czech Republic.

H4: In SMEs, there are differences in the planning period for planning the needs of employees depending on the size of the SME in the Czech Republic.

H5: In SMEs, there are differences in the approach to developing up-to-date job descriptions depending on the scope of the SMEs in the Czech Republic.

H6: In SMEs, there are differences in the approach to developing up-to-date job descriptions depending on the size of the SME in the Czech Republic.

3. Methodology

The article is based on the primary sociological research carried out in the Czech Republic in the period from February to March 2020 for SMEs by the method of questioning. The questionnaire consisted of 28 complex questions focused on personnel processes and their implementation. Specifically, the questionnaire contained closed and open-ended questions in which respondents could present their observations, evaluations, comments and suggestions. Questionnaires were printed, handed over to competent managers, filled in, then collected and transcribed into a data matrix in MS Excel. SPSS SW was used for statistical evaluation.

In addition to descriptive statistics, testing of established hypotheses was performed using a chi-square test, which allows to confirm / refute differences between groups. In the field of behavioural sciences, the chi-square test is some of the most commonly used non-parametric statistical tests, where the null hypothesis normally assumes that there is no statistically significant relationship between the studied phenomena, i.e. the data come from the same populations (Ramík and Čermeková, 2003). Testing was performed at a significance level of 0.05.

For research purposes, a deliberate sample was created, the structure of which considered selected criteria of SMEs, especially the criterion of multinational operation. The companies that met the set criteria were then randomly selected. The sample obtained can thus be considered representative.

4. Results and Discussion

The article is based on empirical data obtained from the total number of 224 SMEs in the Czech Republic. From the point of view of a divided research set, the primary survey was concentrated in individual categories of SMEs according to the well-known EU classification of micro, small and medium-sized enterprises. The authors especially considered companies operating in the Czech Republic and companies with transnational operations. In terms of the size of the enterprises in the sample, the largest group is represented by small enterprises (10-49 employees), of which the survey was concentrated on 36.16% of them. The second most numerous group of respondents is represented by micro-enterprises (0-10 employees; 33.93%). Medium-sized enterprises make up 29.91% of the sample, see Table 1 for more details.

Table 1: Characterization of the surveyed enterprises

Enterprises	Number of employees			Total
	Up to 10	10-49	50-249	
National	24 (37.5%)	23 (35.94%)	17 (26.56%)	64
Multinational	52 (32.5%)	58 (36.25%)	50 (31.25%)	160
Total	76	81	67	224

Source: own research

Overall, the article deals with the generalization of the most important findings about the level of personnel work in SMEs before the corona crisis. The presented conclusions generalize the opinions of employees of the current management of Czech national and multinational companies on the use of personnel processes according to their scope. The same structure presents the findings concerning the development of personnel strategy, planning the needs of employees and in more detail the results of job analysis in terms of the scope of current job descriptions in the organizational structure. The job descriptions themselves will also be analysed in terms of content.

By analysing the obtained data, we concluded that the most intensively used personnel processes are, from the point of view of the overall order of the examined processes, the selection of employees, training and development of employees. Especially SMEs operating in transnational conditions are engaged in the selection of employees up to 89.06%, i.e. the vast majority of them. Multinational companies take second place in the use of this process (90.63%). The finding confirms that SMEs appreciate the extraordinary importance of the employee selection process, as qualitative employee

selection is one of the decisive factors in competitiveness and at the same time reduces the additional costs of the employee training, adaptation and development process.

The process of training and development of employees is mostly used in multinational companies, where 91.88% of SMEs concentrate their attention on this strongly innovative strategy. For this type of SME, it is the most used personnel process from the point of view of personnel work and within the whole examined group of SMEs it occupies the 2nd place from the point of view of frequency of use.

In terms of the frequency of use of personnel processes, the recruitment and adaptation of employees ranked third in the overall ranking. This finding is a proof of good practice of SME management staff in the field of personnel work. A high degree of significance is given to these processes in multinational companies (88.75%), but also in SMEs in the Czech Republic (85.94%).

The result proving that the SME management also pays considerable attention to personnel administration can be described as a positive finding. The rate of use of this personnel process is very similar in national SMEs, where it reaches 87.5%, and in multinational companies, where it accounts for 83.75%. Personnel administration enshrines the systematicity and information resources used not only in personnel information systems, but across business processes. At the same time, personnel administration is a tool used for the benefit of managing other personnel processes, which may include, in particular, employee care and employee evaluation. These are personnel processes that play an irreplaceable role in the stabilization and development of human resources in the conditions of SMEs.

In practice, employee care is highly valued in SMEs and is used to a large extent by management in domestic companies (89.06%). In these companies, it is absolutely the most used personnel process. This shows that the management of these companies consider employees to be the most valuable resource. Managements in multinational companies attach slightly less weight to employee care than in domestic companies. Here, the process of employee care is prioritized by 80.63% of companies. The use of the employee evaluation process was equally used here. Even for this process, more space is created in the conditions of domestic companies, where 84.38% of the addressed companies actively use it.

The personnel processes described so far have been identified by research as the processes most often and most used in the practice of SMEs. Another group of investigated processes is used somewhat less, even sporadically. Larger differences between national and multinational companies were also found here. In this group of personnel processes, their use is more intensive in the group of multinational companies. From this it is possible to conclude that the international business environment creates such conditions for business that require more consistent personnel work and emphasis on HRM.

Table 2: Use of HRM processes according to the scope of enterprises

HRM processes	Scope of enterprises						
	National		Multinational		Total		p-value
	Relatively	Order	Relatively	Order	Relatively	Order	
Creating strategies, policies and other plans	35.94%	10	61.25%	9	54.02%	9	0.0006
Planning the number of employees	62.50%	7	70.63%	7	68.30%	7	0.2377
Job analysis	46.88%	8	67.50%	8	61.61%	8	0.0041
Selection of employees	89.06%	1	90.63%	2	90.18%	1	0.7226
Recruitment and adaptation of employees	85.94%	4	88.75%	3	87.95%	3	0.5592
Training and development of employees	81.25%	6	91.88%	1	88.84%	2	0.0225
Talent management	4.69%	13	11.88%	13	9.82%	13	0.1025
Determining the value of work (creation of a wage system)	40.63%	9	40.63%	11	40.63%	11	1.0000
Care for employees	89.06%	1	80.63%	5	83.04%	5	0.1285
Evaluation of employees	84.38%	5	80.63%	5	81.70%	6	0.5120
Dismissal of employees (termination of employment)	34.38%	11	53.13%	10	47.77%	10	0.0111
Personnel controlling	28.13%	12	40.00%	12	36.61%	12	0.0956
Personnel administration	87.50%	3	83.75%	4	84.82%	4	0.4798

Source: own research

Specifically, it is a higher use of the process of planning the number of employees, where in internationally operating companies 70.63% of companies report its use. In domestic companies, the use is only in the range of 62.5%. There is an even bigger difference in the use of the work analysis process. For multinational companies, 67.5% of companies use the process of labour analysis, while for domestic companies only 46.88%. These companies do not appreciate the importance of labour analysis, which is necessary to increase the efficiency of improving other business and economic processes. Surprisingly, we are also seeing a significant decline in usage in the processes of creating strategies, policies and other plans. 61.25% of internationally operating SMEs use this area, which, given the importance of these processes from the point of view of development, perspective and competitiveness, is not a guarantee of success, but rather a partial support and a bet on the effects of chance. Compared to domestic companies, however, it is a solid level of use and at least in part positive effects on the corporate economy can be expected. Domestic companies use the processes of creating strategies, policies and other plans only 35.94%. This means that almost 2/3 of domestic companies do not pay due attention to planning processes at the strategic level. The least used processes are personnel controlling and talent management, where we record the use of only 4.69% of companies in the houses of companies. At the same time, this process offers one of the most significant potentials for development and competitiveness. See Table 2 for details.

The last column of Table 2 contains the *p*-values of the chi-square tests. These values show that there is a statistically significant difference in the approach of national and multinational companies to the following personnel processes: Development of strategies, policies and other plans; Work analysis; training and development of employees and dismissal of employees. For other HRM processes, no statistically significant differences in the approach of national and multinational enterprises were demonstrated. Hypothesis H1 can therefore be accepted at the significance level of 0.05 – statistically significant differences in the implementation of personnel processes between Czech SMEs operating at the national and multinational level exist.

From the point of view of the size of the company, the highest used personnel process in micro (85.53%) and small (91.36%) companies is the selection of employees. In these types of companies, the second place is occupied by the process of training and development of employees (micro enterprise 80.26%, small enterprises 90.12%). This process took first place in large companies with 97.01%. The dominantly used processes in medium-sized companies with a frequency of over 90% also include recruitment and adaptation of employees, selection of employees, care of employees, personnel administration and evaluation of employees (listed in descending order). In the case of small businesses, the utilization rate of around 90% belongs to the processes of recruitment and adaptation of employees and the use of personnel administration. In the case of micro-enterprises, none of the processes had such a high utilization rate. This fact can be explained by the fact that very few employees work in these companies, personnel processes are not perceived as processes, but are solved through individual instructions or communication with a superior employee.

When testing the difference in the approach to HRM processes depending on their size, differences were found in the following processes: recruitment and adaptation (*p*-value 0.019), employee care (0.0204), personnel administration (0.0460). This means that hypothesis H2 was also confirmed – there are statistically significant differences in the implementation of personnel processes between micro, small and medium-sized enterprises in the Czech Republic.

Respondents were also asked to determine the time required to implement individual personnel processes. In this respect, the research brought a surprising finding that in 34.38% of cases, the management of companies in national companies was unable to determine the time required to implement personnel processes. In the case of multinational companies, it is even 38.13%. Ignorance of time-consuming necessarily leads to inefficient management of personnel processes, which is negatively transferred to the employee structure and subsequently to the overall performance of the company. From the point of view of the size of companies, micro companies have the biggest problems with determining the time intensity of personnel processes, here, as expected, (44.74%). They are amazed by the fact that small businesses were the best (29.63%).

Respondents were also asked how important the personnel processes they implement are for their company. Table 3 shows the average evaluation of the significance of individual processes in the division of enterprises according to the field of activity and according to their size. At the same time, the table also captures the overall average score of individual implemented personnel processes. The

most important process should be rating 1, on the contrary the least important process 3. The resulting average rating is in the range of 1 to 3, while lower values indicate higher importance. At first glance, perhaps paradoxically, however, the evaluation of the importance of the talent management process was correct, where we record an average mark of 1.33 for national companies, which testifies to the high importance that this companies attach to this process. According to the information above, there are not many of these companies, but when companies are already implementing this process, they pay a correspondingly high degree of attention to it. As for the size of enterprises, the highest level of attention is with micro-enterprises (1.5). An average rating of up to 1.5 was also recorded for the staff selection process. On the contrary, the least important are considered to be processes whose average evaluation is close to 3. Specifically, it is the dismissal of employees (total mark 2.36). The reasons can be seen in the statutory procedure for dismissing employees, which is very strictly defined. And also, in the underestimation of the possibility of active progress of companies in the outplacement process, which could significantly help laid-off employees in finding a new job. Other average marks are given in Table 3.

Table 3: Importance of HR processes implemented

HRM Processes	Scope of enterprises		Size of enterprises			Total
	National	Multinational	Up to10	10-49	20-249	
Creation of strategies, policies and other plans	1.65	1.63	1.57	1.62	1.7	1.64
Planning number of employees	1.74	1.79	1.81	1.75	1.58	1.71
Labour analysis	1.6	1.92	1.79	1.85	1.95	1.86
Selection of employees	1.42	1.4	1.45	1.34	1.44	1.41
Recruitment and adaptation of employees	1.53	1.7	1.69	1.67	1.61	1.65
Training and development of employees	1.63	1.69	1.67	1.68	1.66	1.67
Talent management	1.33	2	1.5	2.2	2.11	1.91
Determining the value of work (creation of a wage system)	2	1.98	1.82	2.12	2.04	1.99
Employee care	1.74	1.72	1.7	1.81	1.66	1.73
Employee evaluation	1.98	1.89	1.93	1.91	1.92	1.92
Dismissal of employees (termination of employment)	2.55	2.31	2.34	2.54	2.16	2.36
Personnel controlling	2	1.94	2.14	1.9	1.87	1.95
Personnel administration	1.55	1.72	1.81	1.68	1.52	1.67

Source: own research

A total of 38.39% of companies have developed a formalized personnel strategy. As expected, the larger the company, the higher the level of the processed personnel strategy – only 23.68% of micro-enterprises have a formalized personnel strategy. The developed and formalized personnel strategy enables companies to respond better and more flexibly to changes in the labour market. Similarly, the larger the scope of the company, the greater the degree of formalization of personnel strategy.

Another set of questions concerned employee needs planning. Regardless of the scope, the vast majority of companies plan the needs of employees only operationally. The level of operational planning of these needs decreases with the size of the company. In terms of employee needs, companies most often plan at annual intervals. The answer otherwise includes seasonal planning and planning for school years. Table 4 provides a closer look at employee needs planning.

Table 4: Planning the needs of employees in enterprises by their size and scope

Planning the needs of employees	Scope of enterprises		Size of enterprises		
	National	Multinational	Up to 10	10-49	20-249
Only operationally	53.13%	46.25%	57.89%	50.62%	34.33%
Monthly	6.25%	15.00%	11.84%	12.35%	13.43%
Semi-annually	7.81%	13.75%	6.58%	17.28%	11.94%
Annually	29.69%	24.38%	23.68%	18.52%	37.31%
Otherwise	3.13%	0.63%	0.00%	1.23%	2.99%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Source: own research

The Chi-square test confirmed the dependence of employee needs planning on the size of the company (p -value 0.0386), i.e. hypothesis H4 can be accepted; however, the effect of the scope was not proven (p -value 0.1639), i. e. hypothesis H3 is rejected.

The research also found out how many % of jobs in the organizational structure of SMEs have current job descriptions developed. The results confirmed the expectation that as the size of the company grows, so does the number of jobs for which current job descriptions are prepared. The vast majority of micro-enterprises have developed a maximum of 50% of current job descriptions. In contrast, up to 100% of job descriptions have been prepared by almost 77.61% of medium-sized enterprises. In order to increase the efficiency of business operations through better work performance, it seems appropriate that micro and small companies in particular increase the share of developed job descriptions. From the point of view of the scope of SMEs, such fundamental differences were not found, as the number of developed job descriptions does not differ much in national and multinational companies. For more details on the number of job descriptions in individual types of SMEs, see Table 5.

Table 5: Number of prepared current job descriptions

Current job descriptions	Scope of enterprises		Size of enterprises			Total
	National	Multinational	Up to 10	10-49	20-249	
Up to 50% work places	34.38%	30.00%	55.26%	25.93%	10.45%	31.25%
Up to 80% work places	7.81%	11.88%	3.95%	19.75%	7.46%	10.71%
Up to 90% work places	10.94%	8.13%	9.21%	12.35%	4.48%	8.93%
To 100% work places	46.88%	50.00%	31.58%	41.98%	77.61%	49.11%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: own research

In terms of the content of current job descriptions, companies place the greatest emphasis on the description of the overview of work activities (75.45%), on the responsibility at the given job (71.88%) and on the purpose of the job (70.98%). Employees can better understand and appreciate the importance of their work for the company as a whole from their job descriptions. Almost 50% of job descriptions also attach importance to the definition of work performance requirements (48.21%).

An interesting finding is the fact that medium-sized enterprises, in terms of the content of job descriptions, place the greatest emphasis (91.04%) on the description of an overview of work activities. This can be interpreted as meaning that the management of these companies is systematic in the performance of work on the basis of a precisely defined overview of work activities in individual jobs. In these companies, emphasis is also placed on the definition of responsibility in individual jobs (77.61%). This parameter even ranks first in small businesses (77.78%). In the second place, small enterprises pay attention to the characteristics of the purpose of work (75.31%). For micro-enterprises, the purpose of work (68.42%) dominates over the overview of work activities (65.79%) and responsibilities (60.53%). These small differences correspond to the size of companies, which emphasize the use of the human factor in terms of the purpose of their activities. For detailed information on the content of current job descriptions, see Table 6.

Table 6: Content of current job descriptions

Content of current job descriptions	Scope of enterprises		Size of enterprises			Total
	National	Multinational	Up to 10	10-49	20-249	
Purpose of work	67.19%	72.50%	68.42%	75.31%	68.66%	70.98%
Authority	46.88%	36.88%	23.68%	41.98%	55.22%	39.73%
Performance requirements	40.63%	51.25%	44.74%	40.74%	61.19%	48.21%
Workplace profile	32.81%	28.13%	26.32%	23.46%	40.30%	29.46%
Overview of work activities	76.56%	75.00%	65.79%	71.60%	91.04%	75.45%
Working conditions	34.38%	43.75%	44.74%	41.98%	35.82%	41.07%
Responsibility	64.06%	75.00%	60.53%	77.78%	77.61%	71.88%
Place equipment	10.94%	24.38%	19.74%	20.99%	19.40%	20.09%
Cooperation with other employees and departments	18.75%	24.38%	14.47%	25.93%	28.36%	22.77%
Other	1.56%	2.50%	1.32%	1.23%	4.48%	2.23%

Source: own research

In the case of authority (p -value 0.0005), performance requirements (p -value 0.0350), overview of work activities (p -value 0.0013) and responsibilities (p -value 0.0256), a statistically significant dependence on the size of the company was found. Hypothesis H6 can thus be accepted. When examining the dependence of the individual contents of job descriptions in relation to the scope of the company, the dependence of the population in the case of was recorded job equipment (p -value 0.0245). In summary, however, it can be stated that hypothesis H5 – In SMEs there are differences in the approach to the development of current job descriptions has been confirmed.

5. Conclusion

Because small and medium-sized enterprises form a very important part of the structure of the Czech national economy and people represent a key production factor, personnel work plays a crucial role not only for these enterprises, but for the entire national economy in terms of business existence and sustainability. Based on a questionnaire survey conducted among SMEs in the Czech Republic immediately before the outbreak of the corona crisis, when there was an economic boom, many interesting facts were found. If we distinguish between SMEs according to their scope for national and multinational, then we can find differences in the implementation of HRM processes. Specifically, differences in the processes of creating strategies, policies and other plans were confirmed; work analysis; training and development of employees and dismissal of employees. Different national and multinational SMEs in the Czech Republic also approach the issue of elaborating current job descriptions in the point of job place equipment. On the contrary, the influence of the scope of companies on the planning of employee needs has not been proven.

When classifying companies in terms of their size, differences in their approach to HRM recruitment and adaptation processes, employee care and personnel administration were noted. The size of the company also has an impact on planning the needs of employees and has also been reflected in a different approach to some items of current job descriptions, namely authority, performance requirements, overview of work activities and responsibilities.

COVID-19 has had a very strong impact on all businesses, especially in the area of human resources. Because the presented results reflect the approach to personnel work in SMEs in the Czech Republic immediately before the corona crisis, they represent an ideal starting point for comparing the level (changes) of the content of personnel work in these companies after the emergence of corona crisis. These changes will be the subject of subsequent research. The authors also intend to extend these conclusions to a comparative view with similar research conducted in the Slovak Republic.

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PROCESS MINING FROM E-COMMERCE WEB LOGS

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Abstract

Process Mining can be described as a process analysis method that aims to discover, monitor and improve real processes. The basic idea of process mining is to extract knowledge from available event logs from the different types of information systems, databases, transaction logs, audit trails, etc. Use and applications of process mining for analysis e-commerce websites logs should be very useful and beneficial. We can state that log analysis is very important in e-commerce because analysis of data recorded in web server log files is a basic way how to discover behavior of Web users. Log files are text files containing activity records for a specific application. In the case of web servers, logs store any requests made to the server. Logs are stored directly on the server from where the owner can download it or analyze it there. The paper deals with basic theoretical overview of using process mining for analyzing e-commerce web logs and there is also a brief description of process mining software. The main purpose of this paper is to describe advantages and current trends of using process mining in e-commerce and also introduce available Process Mining software. There is the following structure of the paper: Introduction, Methodology, E-commerce logs, Available Process Mining Software and finally Conclusion.

Keywords: e-commerce, process mining

JEL codes: D80, L81, O31

1. Introduction

Electronic trading (also known as e-commerce) is a form of trading that substantially uses modern electronic means of communication to execute commercial transactions (with its own organizational units, with suppliers, with customers). The basic infrastructure in this sense is currently the Internet and in particular its "web part," but other electronic means such as e-mail, telephone or payment cards are often used. E-commerce itself can be considered as one of the components of e-business. E-commerce is most often represented by online shops, e-shops, webshops or e-shops. B2B and B2C trade are mainly found in this area. Each modern e-commerce store incorporates a number of features capable of covering the full scope of the ecommerce solution. The term e-commerce can also be found in Google Analytics, where one part of it is aimed precisely at tracking statistics on the sale of goods and services. The paper deals with basic overview of using process mining software for analysis of e-commerce logs.

Process Mining has the greatest use in processes that have a large number of iterations. For example, processing documents, purchasing, approving access to the system, making parts or receiving orders or e-commerce systems processes. The main idea of process mining is to discover, monitor and improve real processes by extracting knowledge from event logs (van der Aalst, 2005). It is possible to observe the most common process steps, deviations from the rules, or the duration of each step. Process mining is very useful for its ability to find out how procedures in real situations work and for comparing the actual process with some predefined process (van der Aalst et al, 2004). The definition of process mining is generally the following: "a relatively young research discipline which can be described as a process analysis method that aims to discover, monitor and improve real processes. Process mining sits between computational intelligence and data mining on the one hand, and process modeling and analysis on the other hand" (van der Aalst, 2016). Process Mining Manifesto (van der Aalst et al, 2012) deals with very important aspects such as process discovery, conformance checking, social network or

organizational mining, construction of simulation models with the possibility of model extension and repair.

2. Methodology

Use and applications of process mining software have been rising for last years in the commercial sphere. We can find very expensive commercial solutions on the one hand and on the other hand there are also many open source alternatives that are free of charge for everybody. Process mining software is working with event logs because it is possible extract knowledge from available event logs from the different types of information systems, databases, transaction logs, audit trails, etc.

As part of the methodology, the e-commerce logs will be explained from the perspective of its structure and types. We can analyze for example server logs, error logs or cookie logs. Next part of the article gives a brief overview of the available Process Mining Software. The first type is open source software toolkit which code is open to read and editable for everyone. The second type of software is offered by the developers as a commercial product.

3. E-commerce logs

Log files are text files containing activity records for a specific application. In the case of web servers, logs store any requests made to the server. By reverse-engineering this data, we can then gather valuable information about the workings of the site being watched. Logs are stored directly on the server from where the owner can download it or analyze it there. We can state that log analysis is very important in e-commerce because analysis of data recorded in web server log files is a basic way how to discover behavior of Web users. There are the following three types of log files that can be analyzed (SweetCode, 2016):

- Server logs – Logs are stored in the Common or Extended Logfile Format.
- Error logs – Stores data of failed requests (missing links), authentication failures, or timeout problems.
- Cookie logs – The information stored in a cookie log helps to boost the transactionless state of web Server interactions, enabling servers to trace client access across hosted web content.

In fact, a functional web server writes every request it responds to in a file, so we can learn a lot of interesting and useful information from log files, such as:

- Site Attendance
- Site-specific attendance source (by referer)
- Clickstream Pivot (where people click from)
- Clickstream individual (where and how the user clicked from this IP)
- Viewtime (how long users stay on which page is harder to calculate)
- Errors 404 (where my links are non functional)

The issue of e-commerce website logs analysis is addressed by a wide range of authors in their scientific articles. Paper called "Business Process Mining from E-Commerce Web Logs" written by Poggi, Muthusamy, Carrera and Khalaf (2013) describes that current Web analytic tools do not provide the necessary abstracted view of the underlying customer processes and critical paths of site visitor behavior. Such information can offer insights for businesses to react effectively and efficiently. They propose applying Business Process Management (BPM) methodologies to e-commerce Website logs, and present the challenges, results and potential benefits of such an approach. Most e-shops rely on free analytics tools to help them make better decisions or build a marketing strategy. These tools suffer from the lack of features to focus on customer behavior in the online store. If the e-shop administrator chooses the wrong tool, it is possible that the customer's behavior is misunderstood and then the wrong strategy is chosen. This article emphasizes Business Process Management methods and e-commerce web logs. The authors of the article found that there is no accurate model for mining processes on web pages because each web page is different and their amount does not allow manual generation and testing. Furthermore, it has been recognized that it is better to rely on domain knowledge of the site and CBMG.

In the recapitulation, alpha miner had very inaccurate results, and the heuristic model did not show relationships between different aspects. Another strategy was to group the session before process mining, which yielded more accurate results.

Paper called “Process Mining Approach To Discover Shopping Behavior Process Model In Ecommerce Web Sites Using Click Stream Data” written by Padidem and Nalini (2017) deals with the process of mining, which is understood as a bridge between data mining and web mining and is further distinguished for two types of online shoppers. The first type is the bargain shopper and the second type is the surgical shopper. This article shows a real-time model of the two shoppers: The Bargain Shopper and The Surgical Shopper. The goal of process mining is to strengthen online customer support, increase sales, attract customers, increase e-shop loyalty and, above all, retain customers. This article proposes a model that classifies customers into 2 groups:

- The Bargain Shopper – This is a type of customer that compares the products carefully according to prices. It is therefore essential that the e-shop attracts these customers at the best prices and the customer no longer have to look for, for these customers are very attractive price offers or various types of discounts. Their behavior is described below.
- The Surgical Shopper – This type of customer knows exactly what he / she wants, accesses websites quickly and swiftly seeks information about his / her product, so it is good for e-shops to try to lure these customers for quick and easy access to information or online customer service real time.

Practical models have shown many variations and differences and must be measured with tools that are predicted for a particular type of customer.

Figure 1: The Bargain Shopper behavior



Source: Own processing based on Padidem and Nalini (2017)

Figure 2: The Surgical Shopper behavior



Source: Own processing based on Padidem and Nalini (2017)

Aivalis and Boucouvalas (2011) wrote article called "Log File Analysis of E-commerce Systems in Rich Internet Web 2.0 Applications". In this article, the author focused on trends in development languages that deal with the analysis of log files for e-commerce. In addition, the author explains Web Analytics technology using Google Analytics. The article focuses on traces that are left in the system, ie Rich Internet Applications - RIA. The main part of the article shows a design of a hybrid solution that observes the behavior of customers on the website of shops. The authors used these three methods for log analysis: Log file analysis, Page Tagging and Hybrid methods. The first method of the Log file analysis provides a careful collection of detailed information about each activity (process). They further sort these data. The second method of the Tagging pages collects data on the basis of databases that are made up of selected servers on a specific website that the customer visits, and based on their activity, stores the data in those databases. The third method is the Hybrid methods that introduces a combination of the two previous methods to reduce the possible disadvantages of these methods. An important finding that the author of the article found was that only a hybrid solution can deliver accurate results, but only a few suppliers can offer a hybrid solution. This method can be used in conjunction with Google Analytics, where the author partially demonstrated it and achieved even more accurate results. This tool makes it much easier to manipulate the resulting data. For example, you can view product ID messages,

category names (sorting), report generation, etc. It's much easier to focus on your e-shop. It is also possible to convert files into a relational SQL database. The Log File Analyzer, which the author developed, has a special tool - a toolbox with additional functions for measuring e-shop performance and customer behavior. Ordinary analyzers usually process only log files with classic data: bandwidth, visited pages, etc. This data is important for e-shop administrators to improve the e-shop. On the other hand, the e-shop administrator needs more detailed information for example: performed actions, transactions, product data, categories, orders, customers. This information is currently displayed by this tool.

4. Available Process Mining Software

Currently available on the market two types of applications for process mining. The first type is open source software toolkit which code is open to read and editable for everyone. The second type of software is offered by the developers as a commercial product.

4.1 Open Source Process Mining Software

The Open Source is very favorite and useful model that is free of charge and allows users made source code freely available for possible modification and redistribution.

PROM TOOLS

ProM is an Open Source software based on a wide plug-in support. It has open source code written in the Java programming language. The program is freely available, can be downloaded without restrictions. ProM also supports users and developers who can help with the development by designing new plug-ins. The substance of ProM is divided into parts. The core is distributed separately package as an open source GNU Public License (GPL). In contrast, plug-ins are distributed with an open source license Lesser GNU Public License (L-GPL).

APROMORE

Apromore is a platform that analyzes business processes. It also has an open source code that allows you to combine various Process-Mining options. At the same time, this software offers advanced process model management features. With Apromor, we can work on a Cloud basis or download it to your computer. Apromore provides a variety of features and includes a progressive vast array of technological processes (WEB APROMORE):

- Predictive Process Monitoring
- Variants of Mining
- Automated Discovery

4.2 Commercial Process Mining Software

Commercial based software are quite different against open source software. Developers this software selling for money and we can't read the code of programs.

CELONIS

Celonis is a solution for companies that is made up of several modules. Individual models represent business lines that Celonis can optimize. These are in particular the following: Purchase to Pay, Accounts Payable, Order to Cash, IT Service Management, Logistics, Human resources. You probably understand that the modules could be much more, so the Celonis solution offers the option to import data in CSV or EXCEL formats and perform an analysis. In a Celonis solution these services are used to make analysis, timelines, automation in processes, control payments, improve delivery, customer relationship, optimalization quality. (WEB CELONIS)

DISCO

Fluxicon's Disco software has been developed by specialists of Process Mining. Specialists who have developed this software have many years of experience in the industry. Disco using the most efficient algorithms for Process Mining, and for filtering protocols using the framework. The software is user-friendly, intuitive. Designed for the users which are process improvement experts. In disco software, we can create process maps that are based on raw data. Interactive charts are used to provide an overview of our data that contains in-depth information about attribute values, resources, and all activities. Disco contains an overview of cases where history is displayed. Another feature that Disco contains are recording filters that clean process data and focus analysis.

From <https://fluxicon.com/> we downloaded the Disco installation file and installed it on your computer hard drive. After we started, we entered the student email address of the Silesian University. Disco has offered us an education license for student purposes. The installation package included the ExampleLog.CSV file that we imported into Disco. (WEB FLUXICON)

QPR PROCESS ANALYZER

QPR developing several products about Processes in companies. QPR solution is comercial to use, so if we want to use QPR, we must pay for it. QPR product are: QPR Business Operating System, QPR ProcessAnalyzer, QPR ProcessArchitect, QPR ProcessDesigner, QPR Metrics and QPR Connectors. In this article is aim QPR ProcessAnalyzer. QPR ProcessAnalyzer is tool for process mining with special features, serves to create and show process flowcharts. On these flowcharts we can see individually process and theirs atributes. (WEB QPR)

5. Conclusion

The main idea of process mining is to discover, monitor and improve real processes by extracting knowledge from event logs. Use and applications of process mining software have been rising for last years in the commercial sphere. We can conclude that use and applications of process mining for analysis e-commerce websites logs should be very useful and beneficial. We can state that log analysis is very important in e-commerce because analysis of data recorded in web server log files is a basic way how to discover behavior of Web users.

The main purpose of this paper was to describe advantages and current trends of using process mining in e-commerce and also introduce available Process Mining software. We can find very expensive commercial solutions on the one hand and on the other hand there are also many open source alternatives that are free of charge for everybody. More detailed analysis and comparison of available Process Mining software tools for analysis of e-commerce websites logs will be subject to further research.

Acknowledgement

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THE ROLE OF BANKS' REPUTATION DURING THE COLLABORATION WITH ROMANIAN SMEs

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Abstract

The way how an enterprise collaborates with a banking unit differ from one organization to another and from one industry to another. This one can be influenced by certain factors, such as corporate reputation and its dimensions. The paper identifies how the collaboration between a banking unit and a small and medium enterprise (SME) can be influenced by the reputation of the former. To conduct a case study, quantitative research was used. With a few questionnaires distributed online, it was identified the significance that the representatives of SMEs in Romania ($N = 102$) give to the dimensions of the corporate reputation held by the banking units when they intend to collaborate with them. The questionnaire used in the research was based on the Triadic Organizational Reputation scale, a tool for measuring corporate reputation. Its attributes were assessed through the items of the questionnaire, using a 7 points Likert scale, with intervals from 1 (Total disagreement) to 7 (Total agreement). The conclusions of the paper highlight the essential role that the corporate reputation of a banking institution can play in relation to an SME.

Keywords: banking unit, corporate reputation, SME, Triadic Organizational Reputation scale.

JEL codes: G21, L14.

1. Introduction

In any country, small and medium enterprises (SMEs) play a critical role in the good development of the economy. These organizations can be considered an engine of the business sectors, both through the newly created jobs and through the revenues they generate to the state budget, represented by taxes and duties.

Sometimes, the products and services of the aforementioned enterprises are addressed to a small audience. In these cases, it is represented only by the population of a certain city, county or region, where the company has its headquarters. Such situations result in a lack of a strong reputation for SMEs, in a wider geographical area. However, does this matter to their representatives?

It is also interesting to know if this asset matters when making decisions about working with a stakeholder. Can the reputation of partner institutions influence decisions within SMEs regarding the cooperative relationship between them?

This paper addresses the questions to find the most appropriate answers. In the research approach, the focus will be put only on some of the external collaborators of SMEs, respectively banking institutions. The reason why these partners were chosen is given by one of the essential roles they have for the activity of the organizations, namely, the support of the financing.

The financial barrier is one of the obstacles in front of SME development (Sorici et al., 2010). In these cases, the banking units are some of those stakeholders who can find solutions to remove it.

Depending on the type of partner they want, SMEs face difficulties again. To be accepted by a well-known partner, organizations will need market recognition (Koporcic and Törnroos, 2020). This recognition would be possible through the implementation of strategies to build and strengthen the reputation of SMEs, by their management, since their history, in some cases, is not sufficient to transmit something (Goldberg et al., 2003).

If this collaboration, once started, will lead to sustainable financing, SMEs can benefit from long-term development. Thus, they will no longer be subject to constraints created by access to financing (World Bank Group, 2021).

The conclusions of the paper will be developed following quantitative research, which will analyse this relationship between a Romanian SME and a banking unit. Emphasis will also be placed on the importance of corporate reputation in this endeavour.

2. Literature Review

2.1 General presentation of SMEs

To better understand the importance of SMEs in an economy, the literature review section will begin with a general characterization of them.

According to the European Commission, “the category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million” (European Commission, 2003). Therefore, through this definition, the two essential elements that can classify an organization into this category are highlighted: “staff headcount” and “turnover or balance sheet total” (European Commission, 2021).

99% of all companies in the European Union (EU) are represented by SMEs (European Commission, 2021). This fact indicates the indispensable nature they have over the business activity.

Regardless of the field of activity, these organizations collaborate with different stakeholders, internal or external. According to the literature, the stakeholder represents “any group or individual who can affect or is affected by the achievement of the organization’s objectives” (Freeman, 2010, p. 46). When it comes to SMEs, we can discuss a wide portfolio, composed of different actors, who can play the role of stakeholders. Whether we are talking about employees, suppliers of raw materials, distributors, financial-banking institutions, potential customers, competitors, local and national authorities, they can all contribute to the goals of these types of enterprises. Furthermore, the list can continue.

2.2 Corporate reputation. The relationship between SMEs and banking units

As stated in the introduction, the research will focus on collaboration between SMEs and banking institutions, but also on the role that corporate reputation can play in this relationship.

A quality relationship between SMEs and banking units, as stakeholders, has mutual advantages. This type of collaboration can lead to “building a strong and consistent reputation” (Romenti, 2010, p. 310). Following this action, the banking units and the SMEs can benefit from a higher level of corporate reputation, an increase in the number of consumers or an expansion of the portfolio of collaborations with other stakeholders.

Reputation is “the way in which the public appreciates a company’s features” (Dabija, 2012, p. 4). Thus, public perception is essential for future employees while influencing the organization’s revenue. If negative customer perceptions are dominant to the expense of the positive ones, the revenue will decrease (Gray and Balmer, 1998).

Dabija (2012, p. 4) adds to the previous definition that reputation is “the end product of corporate image aggregated in time”. In this way, the value of the activities conducted by the organization, from its establishment until now, is reflected.

Depending on the direct benefits arising from the collaboration between a banking unit and an SME, the two parties sign a contract specifying the terms of the partnership. According to the researchers, these types of contracts also differ depending on the closeness between the two representatives of institutions, being “relatively vague and informal” contracts or “formal and specific” contracts (Jones, 1995, p. 409). Given that this study focuses on the relationship between an SME and a banking unit, we can talk about a formal relationship between the two entities (Kanyan et al., 2020).

The above-mentioned contracts can serve, in the future, as evidence of the collaboration between the two institutions. In this regard, an example can be represented by the situations of crisis, present even today worldwide. Given the current context, caused by the COVID-19 pandemic, the reputation

can be severely damaged, especially on the B2B market. Continuing the previous idea, about the relationships created between stakeholders, they can play a key role during such unfavourable events. Since the target audience is vulnerable, certain circumstances arise, which lead to several damages caused to the reputation of the companies. Here, according to Coombs (2007), a reconstruction of the reputation can be achieved by signalling the positive actions that have taken place between the enterprises concerned and the stakeholders. Thus, according to the same author, one tries to compensate for the negative effects during the crisis (Coombs, 2007).

Contracts signed between banks and SMEs can also play another key role. This contribution refers to the possibility of increasing the trust given to SMEs by bank representatives. An example of this case is the times when SMEs representatives are turned down when applying for a loan since banking units do not have various information regarding the potential partners. To prevent this case from happening, through a banking relationship, the situation can be in a balance, which will allow the development of a collaboration (Bass and Schrooten, 2006).

One of the advantages that SMEs can have, when collaborating with reputable banking institutions, refers to the financial aspect. Babić-Hodović et al. (2011, p. 354) state that “when a company deals with a bank whose reputation is superior compared to competition, less resources need to be allocated for maintaining and supervising the mutual relationship”. The reasoning can be significant when a decision is taken regarding collaboration with such units. In this way, the resources saved will be able to be redirected to other activities that the company perform. Through an effective assessment of financial performance, SME representatives avoid situations where they are forced to merge, sell their business or even go bankrupt (Pražák, 2019).

Studies have shown that SMEs have higher production costs than large enterprises (Hyz, 2011). Due to this reason, part of the amounts saved can be redistributed to the purchase of raw materials and materials.

Another activity, to which these funds saved could be redirected, refers to the improvement of human resources because, according to studies, the training of enterprise staff is often a more difficult process to start, due to the financial aspects (Andrei et al., 2019). Human resources are a key element in any organization, whether we are talking about the employee or the employer. Bercu and Roman (2012, p. 407) stated that one of the goals of SME management consists in “obtaining organizational performance by competent human resources, training, open approach to knowledge and involved in company growth status on a fierce competitive market”. Thus, the need is confirmed that financial resources saved can be redistributed to employees of the enterprise, through different means.

Through the attention given to them, employees can then appreciate more and more vocally the organization they belong to. Thus, “the attractiveness of the perceived organizational identity and construed external image are likely to increase” (Dutton et al., 1994, p. 253).

These situations also apply to the bank staff, who plays a significant role in creating and maintaining a strong reputation of the organization in which it operates, by providing quality services (Babić-Hodović et al., 2011).

3. Case study

3.1 Research methodology

Through this study we want to outline an overview of how the reputation of banking units can influence the decisions of SME representatives in Romania, to collaborate with them. Once the results of the research are known, banks' representatives will be able to appreciate and will be able to consider the essential aspects presented. Thus, they can then focus on improving those attributes that matter most to SMEs.

The question from which this approach started was the following: Which of the attributes of the Triadic Organizational Reputation scale (TOR scale) is of higher interest among the representatives of Romanian SMEs when the decision is taken to collaborate with a banking unit?

Next, the following research objectives were developed:

O1: to identify the reasons for starting the collaboration between an SME and a banking unit.

O2: to identify the satisfaction level of SMEs representatives, regarding collaboration with the banking unit.

The research subjects were represented by the employees of SMEs based in Romania. Their participation in this investigation was voluntary. They were not constrained by any certain situation that would force them to take part in the research. The participants were also presented with the objectives of the research and the fact that the data collected will be confidential and will not be used for other purposes than those mentioned. Thus, the General Data Protection Regulation was complied with.

The research method chosen was quantitative research, and the research tool was a questionnaire. The distribution of the questionnaire was conducted online, between January and February 2021. 102 questionnaires were collected. The SPSS Statistics software was used for data processing.

The above-mentioned instrument has been structured in three parts. The first part of the questionnaire included questions regarding the identity of SMEs from the study (average number of employees, organization's seniority on the market, their field of activity or the region in Romania where they are headquartered).

The second part included questions regarding the relationship between the SMEs from the study and the banking units with which these collaborate.

The last part, the most interesting of the study, was built on the three dimensions of the TOR scale, proposed by Agarwal et al. (2018, p. 903):

- Product and Service Efficacy (I): “refers to customers’ perceived value of products and services that includes relational equity”;
- Societal Ethicality (II): “refers to customers’ evaluation of a firm’s engagement in social and environmental responsibility towards the betterment of society in general”;
- Market Prominence (III): “refers to the firm’s current and future performance and growth prospects relative to competition”.

The aforementioned dimensions represent a focus of the most common ones in the literature, referring to the corporate reputation.

In this last section of the questionnaire, respondents were asked to express their intention regarding a potential collaboration of SMEs with a banking unit that distinguishes oneself through an attribute of the TOR scale.

3.2 Data analysis

3.2.1 Data regarding the SMEs identification

The significance of the first part of the questionnaire is given by the fact that the structural features of SMEs (Hyz, 2011), together with their reputation, can be essential factors when banking units decide to accept collaboration with them.

As presented above, the respondents were represented by employees of SMEs in Romania. 92.2% of the respondents occupy a decision-making position within the organizations, while only 7.8% of the respondents occupy a position with an executive role. The fields of activity, from which these enterprises come, are diverse, from the HORECA sector to education, transport, health, IT, trade or other services.

The average number of employees from SMEs included in this study varies, from a maximum 3 employees (68.6%), between 3 and 5 employees (5.9%) or greater than 5 employees (25.5%).

Regarding seniority on the market, 54.9% of SMEs are up to three years old. The rest of the organizations from which the respondents came, in a proportion of 45.1%, are at least 5 years old on the market in which they operate.

Most enterprises, included in this study, are headquartered in the South-East area of the country (31.4%), and followed by those based in the Central region (29.4%) and in the Bucharest-Ilfov area (23.5%). The rest of the country's regions are much less represented in this study, which lead to a limit in research.

Regarding the public to which the offer of SMEs is addressed, 96.1% of them are not limited only to the local public. Even so, their representatives believe that the corporate reputation of organizations is more important at local level than at national level. Appreciations were measured using a 5 point semantic differential scale, from 1 (very unimportant) to 5 (very important). The average score recorded for appreciating the SME reputation importance, at local level, was 4.10, with a median value

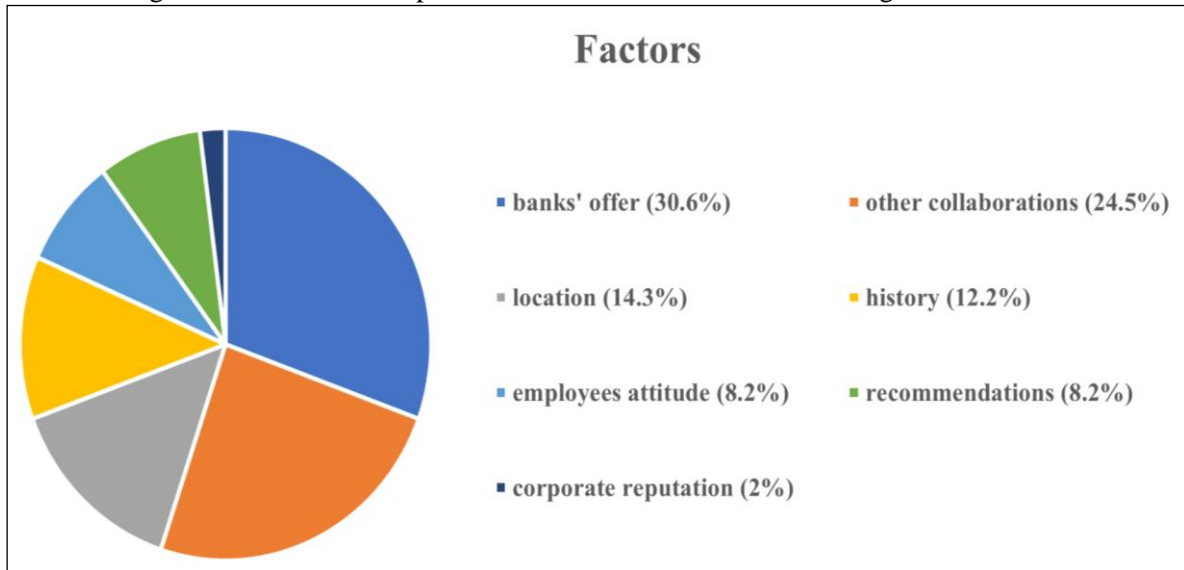
of 5.00. However, the average score recorded for the appreciation of the SME reputation importance, at national level, was 3.73, with a median value of 4.00.

3.2.2 Data on the relationship between the SMEs included in the study and the banking units

55.1% of the total SMEs included in this research have a collaboration with a bank of up to 3 years, 8.2% of the analyzed organizations have a collaboration between 3 and 5 years, while the rest of the enterprises (36.7%) have a collaboration of over 5 years.

The following figure shows the factors that formed the basis of the aforementioned partnerships.

Figure 1: The relationship between Romanian SMEs and banking units - Factors



Source: author's processing

Analyzing the results from Figure no. 1, it can be said that the banking units offer (30.6%) was the main factor underlying the collaborations with them. Another factor, almost as important, was represented by the other collaborations that SMEs representatives had with those banking units (24.5%). The element that was represented as the least is the banks' reputation (2%).

To a percentage of 91.8%, the expectations of the SMEs representatives, related to the collaboration with the banking units, were met.

Overall, the appreciation of the collaboration, that the SMEs included in this study have with the banking units, is a satisfactory one. This was measured by using a 5 point semantic differential scale, with intervals from 1 (very unsatisfactory) to 5 (very satisfactory). The average score achieved was 4.29, while the median was 4.00.

Regarding the products and services that banking units provide to SMEs, they are: current accounts (65.3%), internet banking services (18.4%) and bank credits (16.3%).

3.2.3 Data on the appreciation, by SMEs, of the importance of the TOR scale attributes, related to a banking unit

The last part of the questionnaire included questions about the intention of the Romanian SMEs representatives to collaborate with the banking units that follow one of the nine attributes of the TOR scale. For constructing the items, a 7 point Likert scale was used, with intervals from 1 (Total disagreement) to 7 (Total agreement).

Before presenting the data on their assessment, the reliability of the scale was tested, by using Cronbach's Alpha Coefficient. The results are presented in Table 1.

Table 1: Cronbach's Alpha Coefficients

Dimension	No. of items	Cronbach's Alpha
Product and Service Efficacy	3	.970
Societal Ethicality	3	.968
Market Prominence	3	.919

Source: author's processing; software-generated data

Because the results presented in the Cronbach's Alpha column of Table 1 are greater than .7, the scale used is considered reliable (Pallant, 2011).

Further, the scores achieved by each attribute of the three aforementioned dimensions will be presented. The first dimension analyzed is Product and Service Efficacy.

Table 2: Descriptive statistics (Product and Service Efficacy dimension)

Items (adapted from Agarwal et al., 2018, p. 908)	N	Mode	Median	Mean	Std. Deviation	Min.	Max.
"... offers products and services that are a good value for the money." (1)	102	7	7.00	5.65	2.095	1	7
"... is concerned about its customers." (2)	102	7	7.00	5.76	2.102	1	7
"... has employees who treat customers courteously." (3)	102	7	7.00	6.02	2.044	1	7

Source: author's processing; software-generated data

According to the results presented in Table 2, the representatives of SMEs want their company to collaborate with a banking unit that has employees who treat customers with kindness. Thus, the importance of human resources, in any organization, can be restated, but especially in the relationship with partners.

Also, the care for customers, as well as the value of the products and services provided by the banking unit, for money, are factors that could lead to the opening of a collaboration.

Table 3 shows the correlations between the items of Product and Service Efficacy dimension.

Table 3: Inter-Item Correlation Results (Product and Service Efficacy dimension)

Spearman's rho	(1)	(2)	(3)
(1)	1.000		
(2)	.791**	1.000	
(3)	.696**	.871**	1.000

Note: **p<0.01 (2-tailed), N=102.

Source: author's processing; software-generated data

The results presented in Table 3 report that the correlations are direct and represent a large relationship. In this way, starting from the attitude of the banking units employees towards the customers, substantial gains can be obtained for both parties.

The next dimension analyzed is Societal Ethicality. The first results, in this regard, are presented in Table 4, where it can be seen that lower values are recorded, as opposed to those in Table 2. This expresses some moderate intentions of SMEs representatives, related to the Societal Ethicality.

Among the items mentioned in Table 4, the least appreciated is the one referring to the efforts that a banking unit can make to create new jobs. Its indicators can be reasoned by the fact that the main role of a bank is not to enable others to engage in their units. This concern is rather a specific feature of SMEs.

Also, the results achieved by the other two attributes are reasoned by the fact that the entire public will be able to benefit from the actions that a banking unit would undertake. These achieved lower scores than those of the Product and Service Efficacy dimension because the attributes do not have a direct and strong effect on the relationships with the SMEs.

Table 4: Descriptive statistics (Societal Ethicality dimension)

Items (adapted from Agarwal et al., 2018, p. 908)	N	Mode	Median	Mean	Std. Deviation	Min.	Max.
"... supports good causes that benefit society." (4)	102	7	6.00	5.31	1.924	1	7
"... seems to make an effort to create new jobs." (5)	102	5	5.00	5.04	1.919	1	7
"... is an environmentally responsible company." (6)	102	7	6.00	5.29	2.052	1	7

Source: author's processing; software-generated data

Similar to the scores presented in Table 3, those presented in the following table express large and direct correlations between the attributes of Societal Ethicality.

Table 5: Inter-Item Correlation Results (Societal Ethicality dimension)

Spearman's rho	(4)	(5)	(6)
(4)	1.000		
(5)	.905**	1.000	
(6)	.720**	.776**	1.000

Note: **p<0.01 (2-tailed), N=102.

Source: author's processing; software-generated data

According to the results in Table 5, the largest association is between the effort that banking units would make to create new jobs and the support of good causes that would benefit society as a whole. Thus, the two actions can be considered complementary.

The assessments for the last dimension of the TOR scale are presented in Table 6.

Table 6: Descriptive statistics (Market Prominence dimension)

Items (adapted from Agarwal et al., 2018, p. 908)	N	Mode	Median	Mean	Std. Deviation	Min.	Max.
"... is a top competitor in its market." (7)	102	4	4.00	4.53	2.156	1	7
"... looks like a company with strong prospects for future growth." (8)	102	7	6.00	5.16	2.147	1	7
"... recognizes and takes advantage of market opportunities." (9)	102	7	6.00	5.02	2.175	1	7

Source: author's processing; software-generated data

Compared to all other results presented above, the items in Table 6 are the least valued. An explanation, for this situation, can be represented by the fact that the three attributes are catalogued as goals of the banking unit and not as determining factors of the possible collaboration between it and an SME.

Table 7 shows the correlations between the items of Market Prominence.

Table 7: Inter-Item Correlation Results (Market Prominence dimension)

Spearman's rho	(7)	(8)	(9)
(7)	1.000		
(8)	.732**	1.000	
(9)	.661**	.924**	1.000

Note: **p<0.01 (2-tailed), N=102.

Source: author's processing; software-generated data

The largest association, presented in Table 7, is that between the attributes that refer to the future growth perspectives of the banking unit and the recognition, respectively the fruition by it, of the opportunities existing on the market.

4. Discussions and conclusions

Following this research, we can say that once the level of reputation, held by the banking unit with which it collaborates, has been identified, SME representatives can reorganize their financial plans. The increased reputation of the partner banking units automatically means saving on the SMEs budget. This is where one of the dilemmas of their leadership comes into play. To reinvest the amount saved in the human resources or to reinvest it in the process of designing the products and services it provides to consumers?

We believe that the optimal route would start with the improvement in human resources. Once trained, these can then develop new products and services, more efficient and more attractive on the market. Also, through the attention given to them by employers, they could promote more intensely the organizations from which they come. Thus, SMEs can also benefit from a better reputation.

Even if the researchers present this information, in Romania the situation may be different.

According to the case study, reputation is not among the top factors that have determined the collaborations between SMEs and banking units. One of the reasons for these results could be the lack of information that company representatives have about the corporate reputation concept.

However, through the case study, we also highlighted that when an SME in Romania intends to start a collaboration with a banking unit, the most appreciated attributes of the TOR scale belong to the "Product and Service Efficacy" dimension. It emphasizes both the products and services provided, but also the relationships with the bank's employees or customers. The triangle formed could be a key to success for any type of inter-organizational relationship. Appreciating this dimension, Romanian SMEs express their intention to collaborate only with those banking units that offer products and services of superior quality. Therefore, having such a portfolio, their reputation seems to be a positive one.

By assessing the attribute that refers to the employees of the banking unit, is highlighted the role that efficient communication can have between the representatives of SMEs from Romania and them.

Also, the importance given to the "Product and Service Efficacy" dimension may be the factor that led to a satisfactory score for the respondents' appreciation of to relationship between the Romanian SMEs and the banking units with which they collaborate. This degree of satisfaction can be the effect of the fulfilment by the representatives of the banking units of the contractual obligations towards the client. It can also be the reason for those collaborations, which have exceeded 5 years.

If reference is made to the main reason for the collaborations between the two types of organizations mentioned above, the same dimension will be discussed. The banks offer is the main reason that led to the beginning of such cooperation.

Not least, a motivation for the lower scores achieved by the attributes of the other two dimensions can be represented by the fact that it does not highly influence the SMEs activity. These rather target either the whole community or the organization concerned, respectively the strategic positioning of the banking units.

In conclusion, starting from the financial benefits, the banking units corporate reputation, in relationship with the SMEs, allows the enterprises to improve certain weaknesses. Depending on the needs of the organization, the decisions taken by their representatives can aim either to improve the human resources or to improve the production process of the goods provided on the market. Taking these things into account, Romanian SMEs should be more interested in collaborating with those banking units that have a favourable reputation.

Limits and Future Research

The main limits of the research are represented by the number of respondents, as well as by the profile of the organizations from which they come. For this reason, a generalization of the conclusions, throughout the country, may not be the best choice.

In future, this study can be resumed on a larger sample. Also, for another future research, other stakeholders may be taken into account, to identify the importance of reputation attributes, in the view of Romanian SMEs.

Acknowledgement

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COMPARISON OF PROCESSOR ARCHITECTURES

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Abstract

The paper deals with the possibilities that new hardware architectures bring for computer users. The significant expansion of mobile devices, IoT, and wearables has enabled new processor platforms. Among personal computers and many server platforms, the most common processors are based on the x86 instruction set-based architecture. On the other hand, mobile devices use leading processors based on the ARM (Advanced RISC Machine) architecture, which matches desktop processors' performance in many respects. It turns out that the new approach of creating a chip architecture can bring significantly higher processor performance and at the same time save energy consumption. One of the technologies is the creation of SoC (System on a Chip). The paper focuses on a practical comparison of Intel and Apple processors' performance, representing two different architectures. It presents the results of functional tests, their comparison and demonstrations of the possibilities of using the new architecture in mobile computers and desktops and notebooks. For comparison, the paper uses benchmarks, comparison of compilation and execution of programs, and standard applications.

Keywords: architecture, ARM, instruction set, Intel, processor

JEL codes: Z

1. Introduction

The development of information and communication technologies affects all areas of human action. Business management, document processing, information collection and sorting, communication today cannot do without digital technologies. Despite the rapid development of hardware, there is still a demand for higher performance, miniaturization and lower power consumption. Mobile technologies, wearables and the Internet of Things are playing an increasingly important role. New processors need to be developed to increase the quality of these devices. In the field of mobile devices, ARM-type processes are commonly used today. Their quality and computing power are beginning to compete with the processors used for desktops and laptops. These devices typically use x86 instruction set processors.

After the introduction of the new Apple Silicon M1 processor, which is based on the ARM architecture and the SoC system, comparative tests are emerging between this new processor and the x86 instruction set processors. Test results show that the M1 processor can compete with x86 processors and outperform them in many ways (Deakin, 2021) (McMahon, 2021) (Rounak, 2020) (Sharma, 2021) (Turley, 2021). There are many reasons why M1 processors match or outperform x86 processors. For example, it is an SoC solution. M1 uses instructions of the same length, unlike Intel and AMD processors, which must have more complex decoders for instructions of varying sizes, which causes more complex and often slower instruction decoding. The older x86 instruction set causes problems in optimizing and increasing computing power.

The M1 contains a central processing unit (CPU), graphical processing unit (GPU), memory, input and output controllers, and many more things making up a whole computer. This is called a system on a chip (SoC). The M1 processor further includes, for example Image Processing Unit (ISP),

Digital Signal Processor (DSP), Neural Processing Unit (NPU), Video encoder/decoder, Secure Enclave (Engheim, 2020).

At the beginning of the comparison, a research question was defined. Can the Apple Silicon M1 compete with currently manufactured x86 desktop processors? The aim of this work is to practically compare x86 processors with ARM processors, especially Apple Silicon M1 processors, using tests and practical activities. Based on the existing knowledge, the hypothesis was established: Apple Silicon M1 processors surpass current x86 processors for the same class of computers.

2. Methodology

To compare different processors, it is advisable to use standard test applications, specially created programs and typical applications. Comparison of ARM processors and processors with the x86 instruction set was performed using standard benchmarks Geekbench 5, Cinebench R23.200 and Novabench 4.0.2. These tests are often used and can be run on both processor platforms. The time required to execute programs created in the Swift and C++ programming languages was another aspect of the comparison. The author of the article wrote those programs, and their goal was to test the time load of demanding algorithms working with a more significant amount of data. The programs were created using Xcode, which is optimized for both processor architectures. Because benchmarks and specialized tests may not always reflect the needs of regular users, a practical comparison of the performance of selected applications was also performed, monitoring the speed of application, CPU load and warm-up.

Comparative tests were performed on several devices with different processors. I completed most of the tests on two notebooks. The first was a 13" MacBook Pro with an Intel Core i5-8259U processor, 4 Cores, GPU Iris Plus Graphics 655, 16 GB RAM, 512 GB SSD, macOS 11.2.1 (assembly 20D74). The second was a MacBook Air 13" with an Apple M1 processor, 8 Cores (4 efficiency cores), 16 GB RAM, SSD 1 TB, macOS 11.2.1 (assembly 20D74). The tests were performed repeatedly, usually ten times. The computer with an Intel processor is offered as a medium-performance notebook. The MacBook Air with M1 processor is provided as a basic notebook model. In a practical comparison, other devices were used: iPhone 12 Pro Max, iPad Pro 11, MacBook Pro 13" (i7), MacBook Pro 16" (i9), Huawei P30, Samsung Galaxy Tab S4 10".

The results were compared using the T-test: Two-Sample Assuming Equal or Unequal Variances. Two sample t-test is used to compare the difference between the two populations. The significance level was set at 0.05. This parametric test assumes that the variances are the same in both groups. The F-Test Two-Sample tested this assumption for Variances. The data variability measured was measured in each item, and the variation coefficient was used. A t-test was performed to interpret the results of the second-degree classification. The results were processed using MS Excel and statistical software Wizard for the operating system Mac OS X and statistical software Statistics Visualizer for iPad (Řehák and Brom, 2015).

3. Results

All tables and graphs were created based on a practical comparison of the mentioned devices. The author made all comparisons of the article. The first test was performed repeatedly using the Novabench tool. Table 1 contains the results, which show that a computer with an Apple Silicon M1 processor is more powerful than a laptop with an Intel Core i5 processor. More points mean better results. The data confirm that the difference in computer performance affects the CPU and GPU the most. The M1 processor and its integrated GPU score significantly more than the Intel Core i5 and Iris Plus Graphics 655 GPUs.

Table 1: Novabench score

Novabench score	Computer	CPU	GPU	RAM	Disk
MacBook Pro 13, Intel C5, Iris Plus Graphics 655	1555	850	267	274	164
MacBook Air 13, Apple M1	2118	1071	567	309	171

Source: author

The second test was performed using the Cinebench tool (Table 2). In the test on one or more cores, a computer with an Apple Silicon M1 processor received more points and a better score. In both cases, the Apple Silicon M1 was almost 37% more powerful than the Intel Core i5. The results for M1 were better for calculations on one or more cores.

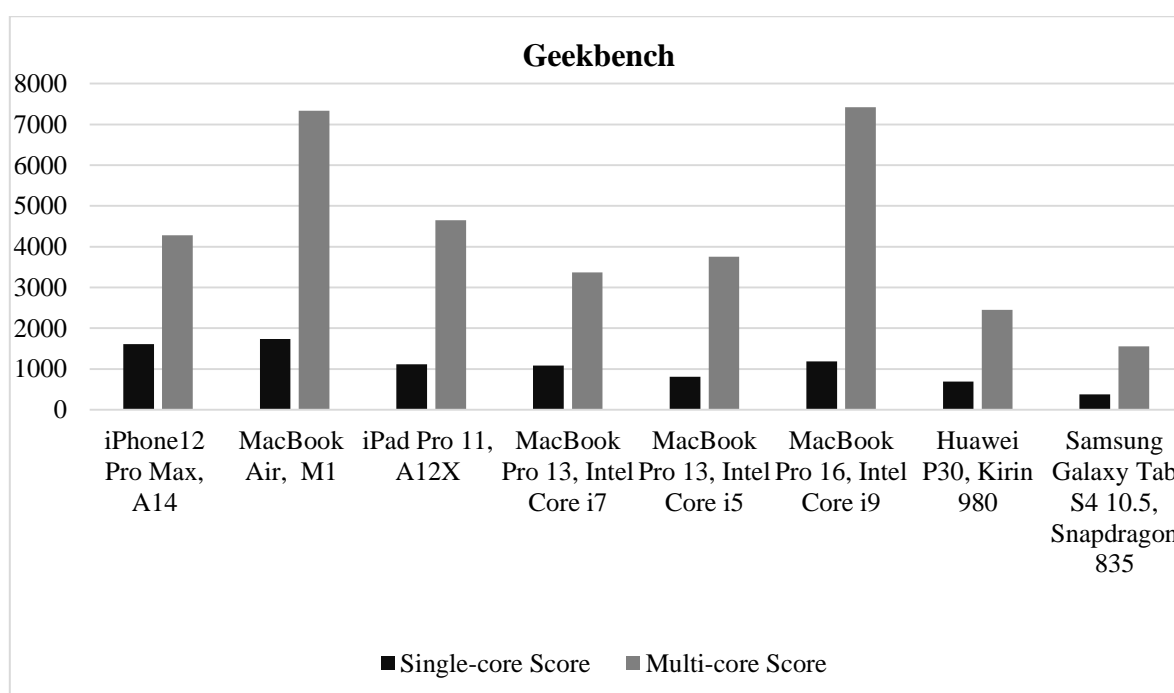
Table 2: Cinebench score

Cinebench	Multi Core	Single Core
MacBook Pro 13, Intel C5, Iris Plus Graphics 655	4459	944
MacBook Air 13, Apple M1	7026	1493

Source: author

Testing with Geekbench 5 was performed on eight devices with different processors (Figure 1). This graph shows the number of points achieved. More points mean a better result. The scores achieved by Intel desktop processors and ARM processors are not as diametrically different as they were a few years ago. The Intel Core i9 processor achieved the highest score when working with multiple cores, but only slightly outperformed the Apple Silicon M1 processor. Let's consider that the Intel Core i9 processor is designed for powerful personal computers and the M1 processor is calculated more for basic personal computer configurations. The difference seems negligible, and the question arises whether it is worth buying a more powerful processor. The computing power of multiprocessor processors is significant today. Many applications use multiple processor cores (Joy, 2018).

Figure 1: Geekbench results (more points = a better result)



Source: author

The Apple Silicon M1 in the MacBook Air 13 “and the Apple A14 in the iPhone 12 Pro Max achieved the best results when testing a single processor core. Processors with ARM architecture thus surpassed the monitored Intel processors. The results show that processors initially designed primarily for mobile devices match or even beat x86 desktop processors. The Apple Silicon M1 processor is designed for basic computer configurations. Nevertheless, it achieved similar results in the test as the Intel i9 processor, designed for the most powerful personal computers.

The Geekbench 3 also generated a Compute Score, in which a laptop with an M1 processor regained better results by 62 % (Table 3). Although both processor platforms are designed for equally equipped computers, the Apple Silicon M1 has outperformed the Intel i5 processor.

Table 3: Geekbench 5 - Compute Score

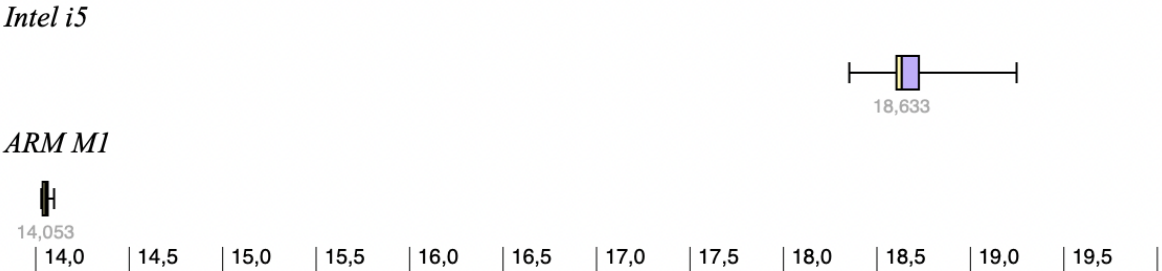
Geekbench 5	Compute Score
MacBook Pro 13, Intel C5, Iris Plus Graphics 655	7425
MacBook Air 13, Apple M1	19587

Source: author

The following graphs (Figure 2 - 10) show the results of comparing the selected programs' execution on a MacBook Pro with an Intel Core i5 processor and a MacBook Air with an M1 processor. The horizontal axis shows the time in seconds of the program being executed. The first five graphs show the results of the time required to execute programs written in the Swift programming language, compiled and run on these computers. The other four programs were written in the CPP programming language. Each test was performed ten times. Execution time was measured in each program. The measured data were processed using F-test and T-test. The null hypothesis cannot be rejected for only one program. In this case, the statistical difference was insignificant, and it cannot be stated that the program on the M1 processor was processed faster than on the Intel Core i5 processor. It was a program written using the Swift language, in which the elements of the array were deleted. In the remaining examples, the difference was always clear, exceeding the significance level, and the programs on the M1 processor were executed in a shorter time.

The graph in Figure 2 compares the Fibonacci sequence calculation time for value 45. The program was created in the Swift programming language. It is clear from the chart and the statistical evaluation that the null hypothesis must be rejected in the comparison. The results are different for both computers, and the M1 processor managed to perform the calculation in less time than the Intel Core i5 processor. The graph shows the time in seconds of program execution on individual processors using a box graph.

Figure 2: Fibonacci sequence - Swift

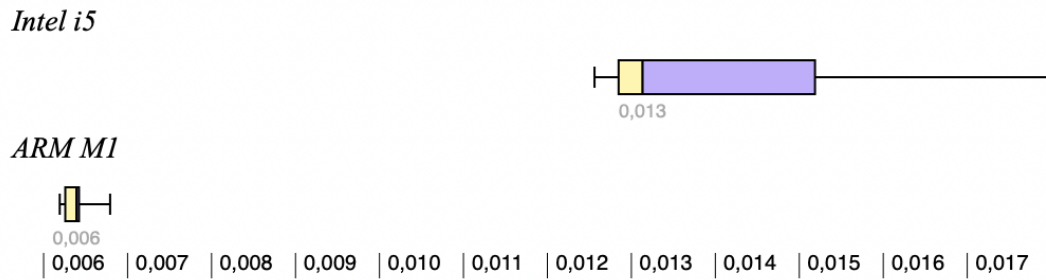


Source: author

Figures 3 - 5 show the results of a comparison of programs in which eighteen thousand elements were added to the field. Subsequently, the fields were sorted in ascending order. Another algorithm performed a reverse operation with array elements. All programs were run ten times, and execution times were recorded. Repeated measurements of program execution speed have shown that

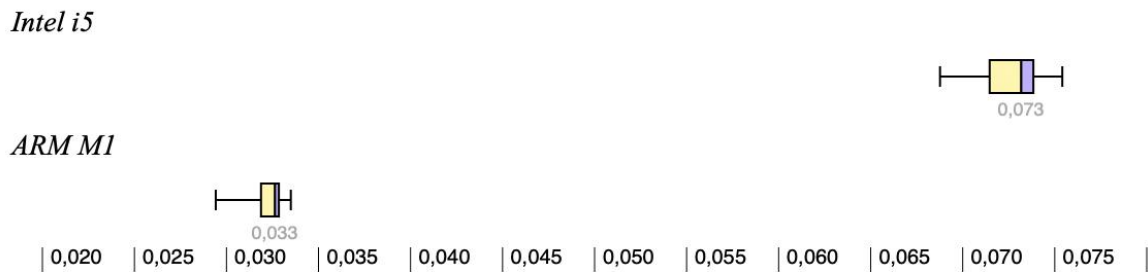
the M1 processor executes these algorithms significantly faster than the Intel Core i5. The graphs show the execution time in seconds of the programs on the individual processors using box graphs.

Figure 3: Add elements to an array - Swift



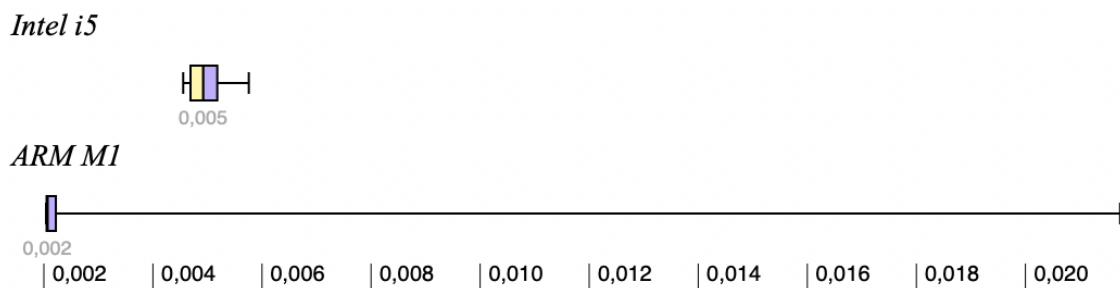
Source: author

Figure 4: Sorting array elements - Swift



Source: author

Figure 5: Reverse - Swift



Source: author

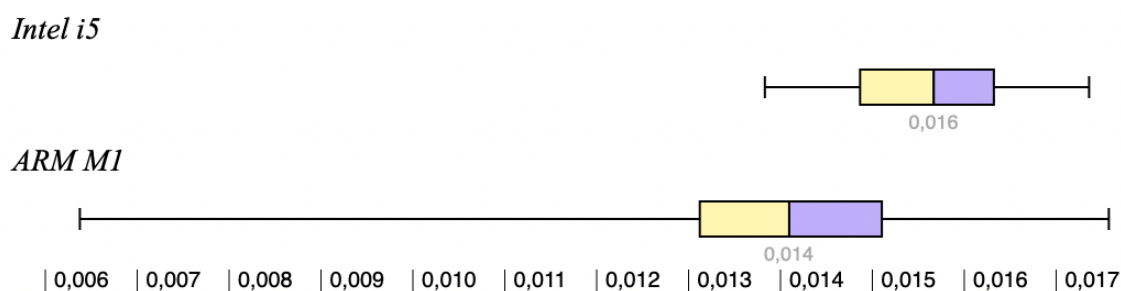
Figure 6 shows the only comparison for which the difference was not significant enough. It was a program written in the Swift programming language, in which six thousand elements in an array were taken.

```

for index in 0...6000{
    arrayCollection.remove(at: index)
}

```

Figure 6: Delete array elements - Swift



Source: author

Table 4 shows the results of the processed t-Test: Two-Sample Assuming Unequal Variances for programs that removed elements from the array. The results show that the null hypothesis cannot be rejected.

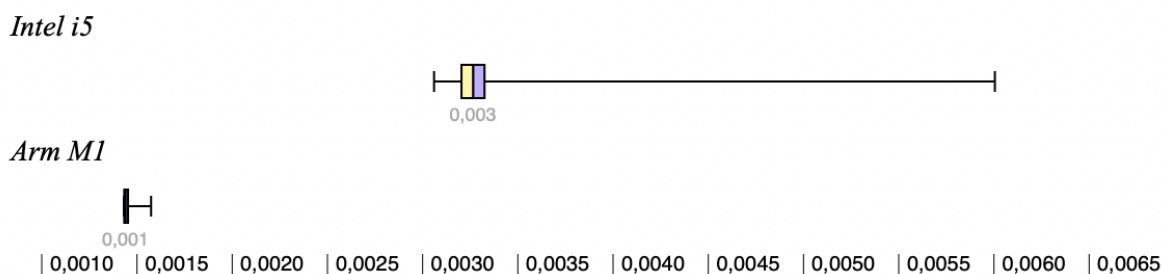
Table 4: Two-Sample Assuming Unequal Variances

	<i>Intel Core i5</i>	<i>Apple Silicon M1</i>
Mean	0,014135814	0,013665925
Variance	3,22057E-06	9,00226E-06
Observations	10	10
<i>t-Test: Two-Sample Assuming Unequal Variances</i>		
P(T<=t) two-tail		0,676856548
t Critical two-tail		2,131449546

Source: author

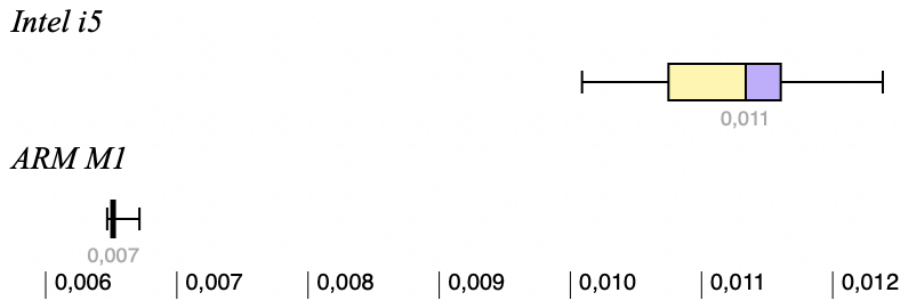
Figures 7, 8, 9 and 10 show a comparison of programs written in the C++ programming language. These programs solved the same problems as Swift programs but used different Containers and Collections. All programs were run ten times and execution times were recorded. In all cases, the statistical results show that the Apple Silicon M1 processor managed to execute programs faster than the Intel Core i5 processor. The graphs show the execution time in seconds of programs on individual processors using box graphs. The program libraries used were optimized for both processor architectures.

Figure 7: Add elements to an array – C++



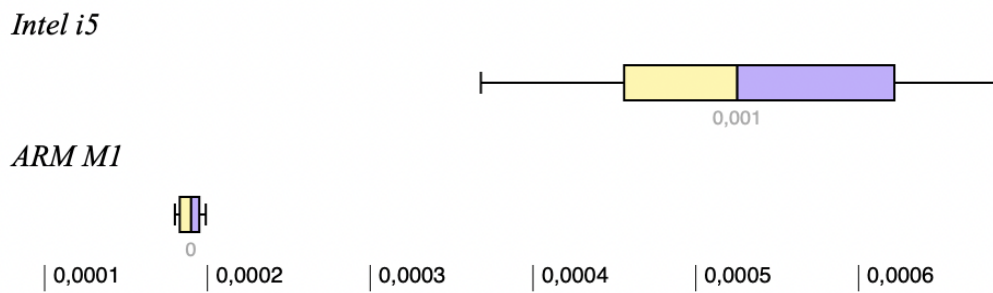
Source: author

Figure 8: Sorting array elements – C++



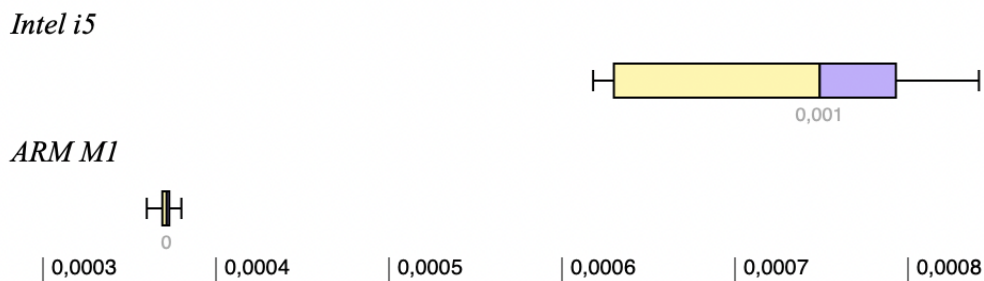
Source: author

Figure 9: Reverse – C++



Source: author

Figure 10: Delete array elements – C++



Source: author

Practical tests were performed with common applications on both mentioned notebooks. Applications optimized for the M1 processor and applications that required Rosetta 2 emulation to run were used. None of the applications ran slower on a computer with an M1 processor. On the contrary, most of their operations were performed faster, even for some running in emulation in Rosetta 2 (Haihu, 2020) (Messaudi, 2019). The same procedures were always performed on both computers and monitored where they completed more quickly. The following were used as optimized applications: iMovie and Final Cut Pro editing video applications; development tools for programming Xcode, IntelliJ IDEA, PyCharm, CLion; Pixelmator Pro photo-editing application; MS Office applications; Chrome, Safari, Firefox, Edge browsers. Non-optimized applications were Visual Studio and Android Studio development tools, VLC video player, OBS screen recording application, MS Teams and Skype communication applications.

The difference between the monitored computers was noticeable even at higher loads. During an experiment with a video meeting at MS Teams and recording the screen with OBS, the MacBook

Pro with an Intel Core i5 processor heated above 45 °C and active cooling made a noticeable noise and worked hard to cool the processor. During the same operation, the MacBook Air with the M1 processor did not exceed the computer's chassis temperature above 41 °C, even though the laptop lacked active cooling. The difference was also noted in the export of 4K video, which was 28 minutes long. The M1 computer managed 23% faster export than the Intel Core i5 computer. The computer with the Intel processor warmed up more and active cooling was working at full capacity.

It turns out that an architecture unloaded with the old x86 instruction set does not compromise so much and can provide high performance with relatively low power consumption. The processor can also decode M1 instructions faster.

The great advantage of the Apple Silicon M1 processor is the ability to run universal applications. That is, applications that can be run on desktop computers with the macOS operating system and at the same time on mobile devices with the iOS and iPad OS operating systems. This is possible because the Apple Silicon M1 processor is a continuation of the A12 Bionic mobile processors (Sarkar, 2018). For example, the LumaFusion video editing application has been practically tested. Editing and subsequent export of the video went smoothly and faster than on the iPad.

4. Conclusion

The obtained results prove that the Apple Silicon M1 processor, which uses the ARM architecture, can compete and largely replace desktop processors with the x86 instruction set. Tools benchmarking show that the computing power of M1 processors is better than that of the Intel Core i5 processor. The differences in the results were sufficiently convincing. The M1 processor also obtained better results by tracking the time required to programs created in Swift and C ++. Using and testing common applications has shown that the computing power of the processor is adequate even for applications that are not yet optimized for the ARM architecture, and therefore must run using Rosetta2 emulation.

The significant advantage is the ability to create universal applications that can be run on the desktop operating system macOS and at the same time on mobile devices such as iPhone or iPad. Economic and time requirements for the development of universal applications can be lower. Application distribution is also more comfortable.

The comparison results show that personal computers with ARM processors can bring companies increased performance even in basic configurations. In many ways, the Apple Silicon M1 processor, designed for the base class of computers, rivals today's mid-range and high-end x86 processors. Businesses can also save on the energy costs of processors through the ARM architecture.

The M1 processor also has its shortcomings. The first drawback is the need to optimize applications for the new architecture, so that processor performance does not have to be devoted to the Rosetta 2 emulator. A more significant obstacle is the impossibility of virtualizing other operating systems on macOS. Computers with an M1 processor do not yet support dual boot for another operating system. This can be a significant barrier for users who need applications only for the MS Windows operating system on the x86 platform. The development and extension of MS Windows on the ARM operating system can provide hope in this direction.

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THE IMPACT OF CUSTOMER ENGAGEMENT ON RETAILER'S BRAND EQUITY

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Abstract

Having strong brand equity is important for any business. Although the concept of brand equity has been studied in various fields, its analysis in the retail sector has not been as extensive. On the other hand, the analysis of engagement is gaining more importance in recent times. Through a conceptual model that includes the brand equity dimensions proposed by Aaker (1996), Keller (1993) and Boo et al. (2008), the present study aims to investigate the influence that engagement has on the different components of brand equity. The hypothesized casual model relates the variables that make up brand equity and the influence that engagement has on each of them, reaching the conclusion that retailer awareness, loyalty towards the retailer and retailer perceived quality are clearly influenced by engagement, with the consequences that this may imply for the retailer's brand management.

Keywords: Brand Equity, Branding, Engagement, Loyalty, Retailer.

JEL codes: M00, M31.

1. Introduction

As Aaker (1991) and Keller (1993) point out, the formation and strengthening of brand equity are vital for the company to be successful. M'Zungu et al. (2010) suggest that brand management ought to play an important role in safeguarding brand equity. A strong brand equity is a sign that there are favorable associations towards the brand by consumers and stakeholders, differentiating one brand from another (Shamma and Hassan, 2011).

Although studies can be found that identify the dimensions of a product's brand equity, as pointed out by Swoboda et al. (2016), it should be noted that the literature has not devoted much effort to the study of the brand equity of the retail trade (Beristain and Zorrilla, 2011; Broyles et al., 2009; Pappu and Quester, 2006). There are some articles that make an approach to the subject, but not taking into account the brand equity of the retail trade itself, but rather their analysis focuses on the value of

the brands marketed by it (Cuneo et al., 2012; Jara and Cliquet, 2012). Among other things, this research aims to contribute to the deepening of the study of brand equity in the retailer field. Grewal and Levy (2007) emphasize the need to research more on this topic, to which this article intends to contribute, as far as possible. Brand equity becomes an important strategic tool for retail businesses because it can lead to improved results in terms of sales and profits (Nyadzayo et al., 2011). However, as Kuvykaite and Piligrimiene (2014) point out, “consumer engagement into brand equity creation is relatively new research field and the existing studies are somewhat fragmented”.

Customer engagement is an increasingly relevant and researched topic (Banyte and Dovaline, 2014). However, studies that relate this concept to retail trade are not common. “In addition to being interesting from the theoretical perspective, it is evident that the concept also has important managerial implications” (Hepola et al., 2017).

2. Literature review and research hypotheses

2.1 Retailer’s Brand Equity

Brand equity is understood as the difference in the consumer's choice between a branded product and an unbranded one, both having the same characteristics (Yoo et al., 2000). Thus, Leone et al (2006) understand that brand equity is the added value that is linked to a specific product by the consumer's thoughts, words and actions. Products with high levels of brand equity would be considerably less valuable without the brand name (Hepola et al., 2017).

Retailers need knowledge not merely of consumer liking with the goods they offer, but also other aspects of purchasing and interacting with the store itself, as do all service marketers (Aziz et al., 2020). Brand equity appears as a major construct and retailers should take advantage of such a metric to impact customer behavior and therefore product-market performance, accounting performance and financialmarket performance (Katsikeas et al., 2016).

Wu and Tian (2008) understand the retailer's brand equity as the increase in utility or added value that its brand gives to the store, both in its ease of distinguishing it from other competitors and in its ability to generate differentiating responses.

For Troiville et al. (2019) it is important for the retailer to enhance his brand equity as it will drive to increase his share of wallet, market share, power against competitors, power against manufacturers and suppliers, his efficiency and revenue and profits.

Aaker (1996) considers that the dimensions of brand equity are brand loyalty, perceived quality, brand associations and awareness. This multidimensional concept is mainly based on the perceptions that consumers have about a brand. The author considers that these dimensions represent an effective measure for brand equity, being sensitive to detect changes and being applicable between brands, product categories and markets.

On the other hand, Keller (1993) works on the dimensions of brand equity under brand awareness, so it is necessary for the consumer to have a positive relationship with the brand. This concept proposed by the author is composed of two elements: brand awareness (which is understood as brand recognition) and brand image (defined as perceptions and reflections of the brand in the mind of the consumer).

Boo et al. (2008) propose the following dimensions in their study related to tourist destinations: awareness, perceived brand value, loyalty, perceived quality and brand image. Thus, for this work, the concept of awareness proposed by Aaker (1991) will be considered, while brand associations will be analyzed through the image, following the proposal of Boo et al. (2008) and taking into account Keller's (1993) studies on customer based brand equity.

For Switala et al. (2018) brand awareness means being aware of its existence and its relationship with a particular product. Brand awareness signifies the brand existence in the mind of customers. From the customer’s view, the potential to recognize and remember the name of the brand is considered critical component of creating strong brand equity (Aziz et al., 2020).

In the case of the retailer, awareness will be given by the consumer's ability to recognize the name of the retailer and remember it, which will activate associations in their memory that will form the image of the retailer (Hartman and Spiro, 2005).

Pappu and Quester (2006) define the perceived quality of the retailer as "the consumer's judgment on the superiority or excellence of a retailer".

Aaker (1991) considers that a consumer is more receptive to having a good image of a product or a brand if they know the brand in question. Liu et al. (2015), in their study on the brand value of museums, point out that brand awareness influences the perceived quality of its visitors.

Taking as a basis the authors cited above, in this study we want to analyze how the brand awareness of the retailer influences the quality perceived by the consumer. Thus, the following hypothesis is proposed:

H1: Retailer's brand awareness positively affects its perceived brand quality.

Zeithaml (1988) defined perceived quality as the consumer's judgment regarding the excellence or global superiority of a product. Pappu and Quester (2006) define the perceived quality of the retailer as "the consumer's judgment on the superiority or excellence of a retailer".

On the other hand, for Keller (1993), brand image is the rational or emotional perceptions that consumers assign to a specific brand or also the set of perceptions that the consumer forms about a brand as a reflection of its associations .

Gil-Saura et al. (2013) understand that image formation does not occur only from perceptions, beliefs, and knowledge about a particular store, but also from the category of retail outlets to which this store belongs (Hartman and Spiro 2005) and even from the influence that the different opinions that exist and are shared about the brand of this store may have (Martenson 2007).

For Keller (1993), the positive evaluation of perceived quality is accompanied by an improvement of the brand image. When the consumer is aware of the good quality of a product brand, a positive brand image is created, which in the case extends to the establishment (Bigné et al., 2013).

Thus, in the same vein, it is intended to analyze whether in the field of the retailer the perceived quality of the same by the consumer affects its perceived value and the second hypothesis is proposed:

H2: The perceived quality of the retailer directly affects its image

The brand image of a retailer has been a sign of interest in various studies that have been carried out in the commercial field (Jara and Cliquet, 2012; Bigné, et al., 2013; Gil-Saura et al., 2013).

For Zeithamal (1988) perceived value is "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given", while Kuo, Wu and Deng (2009) conceive perceived value as a consumer surplus that results from subtracting the highest price that consumers intended to pay for the amount actually paid for a product.

The importance that brand image has acquired in different investigations consists mainly of three points: (1) It has the capacity to increase added value (Wood, 2000), (2) it is an important source of brand value (Keller, 2003) and (3) Consumers constantly base their purchasing decisions on the perceptions obtained from a company's brand image (Kim and Kim, 2005).

Especially in the case of small companies, Cretu and Brodie (2007) point out the positive relationship that exists between brand image and its value in the relationship between manufacturers and their customers. Another author like Tsai (2005), also confirms in similar terms that the perceived value of a commercial establishment is determined in part by the image that one has of it and its brand.

H3: Retailer's brand image positively affects its perceived value.

As per Sinha and Verma (2020), "a consumer perceives value if perceived benefits are higher than the price sacrificed". In this sense, consumers' value perceptions are critical for their purchase decisions (Wang, 2015). Various marketing literatures analyze the relations between customer perceived value and customer loyalty (Swoboda et al., 2016). Perceived brand value is considered as an antecedent of customer loyalty behaviors (Brakus et al., 2009).

Regarding loyalty to a retailer, it is defined as the intention and willingness to buy back in a particular store, at the same time that the retailer's recommendation behaviors are identified (Swoboda et al., 2016). Therefore, there is a positive relationship between the perceived value of a brand and the intentions of future behavior characterized as an intention to buy back the product (Teas and Laczniak, 2004; Tsai, 2005).

In this way, the following hypothesis is proposed for the relationship between perceived value and loyalty to the retailer

H4: Retailer's perceived value positively affects consumer loyalty to it.

2.2 Customer Engagement

Engagement can be understood as a state in which one is involved, occupied and totally absorbed in something, generating consequences in forces of attraction or repulsion (Higgins and Scholer, 2009). It is also considered a mental state that presents emotional, cognitive and behavioral levels in the different interactions with the brand (Hollebeek, 2011). Engagement allows both participants in the buying process to benefit. The company gains a competitive advantage, and the consumer obtains greater satisfaction (Rajah et al., 2008; Auh et al., 2007).

Consumers who have an active engagement with the brand provide useful information for the company and help create brands that respond to the individual needs of consumers (Kuvykaite and Piligrimiene, 2014). A brand that has committed consumers will have positive consequences, both financial and non-financial, in the short and medium term (Van Doorn et al., 2010).

For Hutter et al. (2013) more customers engage with the social media activities of a brand, more awareness about the brand they can generate. Schivinski and Dabrowski (2015) conclude that user-generated content on social media impacts all dimensions of brand equity, such as brand awareness, brand loyalty and perceived quality. Along the same lines, Brodie et al. (2013) conclude that the more engaged consumers are with a brand, the greater their satisfaction, involvement, awareness, image and loyalty with respect to said brand.

H5: Engagement has a positive impact on retailer's awareness

As indicated, for Schivinski and Dabrowski (2015) the content generated by users on social media impacts perceived quality. In this sense, the work of Chahal and Rani (2017) for whom consumer engagement with the brand in social media has a clear impact on the perceived quality of the brand.

Hollebeek (2011) and Brodie et al. (2013) stated that among the consequences of engagement are perceived quality and brand loyalty.

Therefore, the following hypothesis is proposed for the retailer:

H6: Engagement positively affects retailer's perceived quality

As previously noted, Brodie et al. (2013) conclude that the more engaged consumers are with a brand, the better their perception of the retailer's brand image. Chahal and Rani (2017) reach similar conclusions by providing empirical foundations on the impact of engagement on brand image.

H7: Engagement has a positive impact on retailer's brand image

Although there are not many studies that attempt to measure the relationship between engagement and perceived brand value, there are some authors who confirm the direct influence that engagement has on value (France et al., 2015; Tregua et al., 2015). Thus, for France et al. (2016) when a customer feels passionate and immersed in the brand, they are expected to perceive an increased level of value from the brand. The more engaged a customer is, the more likely that they will derive value from (and create value for) the brand. Brodie et al. (2013) confirm that one of the consequences of customer engagement is the perceived value. In the same sense, Mollen and Wilson (2010) and Hollebeek (2013) consider that, under certain circumstances, customer engagement leads to higher levels of perceived value.

H8: Engagement has a positive impact on retailer's perceived brand value

Although it is true that nowadays there is no consensus on whether the impact of the commitment on brand loyalty is direct or indirect, the solution obtained is in line with Auh et al. (2007), who argue that there is a direct relationship between both dimensions. Likewise, Hollebeek (2011) insists that a committed consumer will show greater loyalty to the brand, thus establishing a direct and positive linear relationship. Jakkola and Alexander (2014) confirm that engaged customers display greater brand loyalty and satisfaction. Engaging with consumers plays an important role in building brand loyalty (Harrigan et al., 2017).

For his part, Bowden (2009) defines engagement as a psychological process that models the underlying mechanisms by which customer loyalty forms for new customers of a service as well as mechanisms by which loyalty may be maintained for repeat purchase customers of a service brand.

Thus, the following hypothesis is raised:

H9: Engagement has a positive impact on loyalty to the retailer.

3. Analysis and results

The population under study is made up of men and women over 18 years of age who made purchases in retail stores in the Valencian Community (Spain). Regarding the interviews carried out, a total of 623 were valid, which implies a sampling error of $\pm 4\%$ (for $p = q = 0.5$ and a confidence level of 95.5%), using a structured questionnaire with closed questions and 5-point Likert-type response scale.

In the present study, an a priori model is presented, taking into account previous research, as well as the hypotheses to be proposed. A Confirmatory Factor Analysis (CFA) is performed which shows the results presented in Table 1:

Table 1: Model CFA fit indices

χ^2	gl	<i>p</i>	SRMR	CFI
36925.202	561	<.001	.08	.920

Source: own elaboration

Both the Standardized Root Mean Square $SRMR \leq .08$ tests and the $CFI = .918 > .90$ tests allow us to conclude that the fit of the model is good and that the latent factorial structure exists based on the data obtained.

The SRMR is an absolute measure of fit and is defined as the standardized difference between the observed correlation and the predicted correlation. It is a positively biased measure and that bias is greater for small N and for low of studies (Baron and Kenny, 1986). Both the Standardized Root Mean Square $SRMR \leq .08$ tests and the $CFI = .918 > .90$ tests allow us to conclude that the fit of the model is good and that the latent factorial structure exists based on the data obtained.

Despite the fact that no other relationships have been considered, the indices indicate that a model has been chosen in which degrees of freedom are missing, although the model is shown to exist from the data. Therefore, it can be considered acceptable based on the data obtained.

In the proposed model, retailer awareness affects retailer perceived quality and this affects retailer image, which in turn affects retailer perceived value and retailer perceived value ultimately affects loyalty. On the other hand, relationships are established in which engagement affects the rest of the variables.

We can conclude that this model fitted the data: $\chi^2 = 36925.202$, $p < .001$, $CFI = .920$, y $SRMR = 0.8$.

In order to complement the conclusions provided in Table 1 about the CFA performed for the 6 measured constructs, its convergent validity and reliability are studied. The reliability (internal consistency) of the questionnaire was demonstrated by Composite Reliability (CR) indices > 0.7 (Hair et al., 2006).

Table 2: Factor loadings, SE, p-Value, Proportion Variance, AVE and CR

Items	Factor loading	S.E.	p-value	Proportion Variance	AVE	CR
Retailer Awareness (Alpha=.70)						
AW1	0.555	0.040	0.000	0.31	.40	.80
AW2	0.725	0.032	0.000	0.53		
AW3	0.534	0.040	0.000	0.29		
AW4	0.473	0.045	0.000	0.22		
AW5	0.770	0.035	0.000	0.59		
AW6	0.692	0.040	0.000	0.48		
Retailer Perceived Value (Alpha=.83)						
PV1	0.531	0.032	0.000	0.28	.54	.87
PV2	0.658	0.026	0.000	0.43		
PV3	0.807	0.019	0.000	0.65		

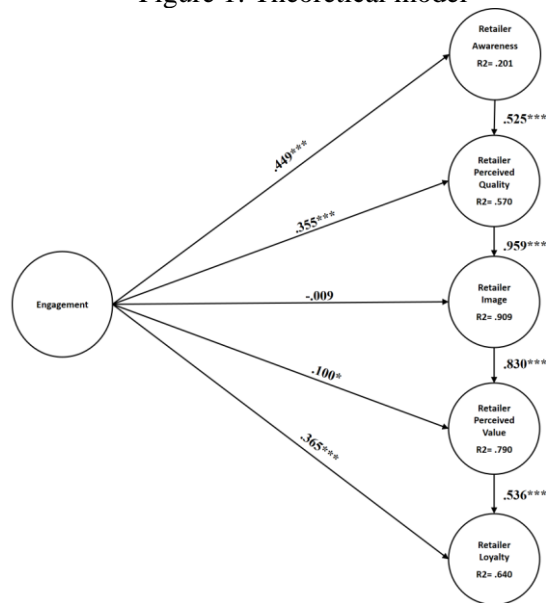
PV4	0.713	0.023	0.000	0.51		
PV5	0.846	0.016	0.000	0.72		
PV6	0.818	0.019	0.000	0.67		
Retailer Perceived Quality (Alpha=.80)						
PQ1	0.706	0.022	0.000	0.50	.49	.83
PQ2	0.777	0.018	0.000	0.60		
PQ3	0.755	0.022	0.000	0.57		
PQ4	0.485	0.033	0.000	0.24		
PQ5	0.744	0.022	0.000	0.55		
Retailer Image (Alpha=.82)						
I1	0.494	0.033	0.000	0.24	.47	.84
I2	0.650	0.026	0.000	0.42		
I3	0.788	0.021	0.000	0.62		
I4	0.680	0.024	0.000	0.46		
I5	0.700	0.024	0.000	0.49		
I6	0.755	0.023	0.000	0.57		
Retailer Loyalty (Alpha=.86)						
L1	0.812	0.018	0.000	0.66	.64	.90
L2	0.735	0.023	0.000	0.54		
L3	0.860	0.015	0.000	0.74		
L4	0.795	0.021	0.000	0.63		
L5	0.784	0.020	0.000	0.61		
Engagement (Alpha=.91)						
E1	0.745	0.020	0.000	0.56	.77	.95
E2	0.802	0.016	0.000	0.64		
E3	0.939	0.006	0.000	0.88		
E4	0.956	0.005	0.000	0.91		
E5	0.955	0.005	0.000	0.91		
E6	0.846	0.022	0.000	0.72		

SE= standard error. AVE= average variance explained. CR= composite reliability

Source: own elaboration

The hypothesized causal model is represented in the path diagram in Figure 1. It is a model with complete latent factors in which relationships are established between the different constructs that are part of the Retailer Brand Equity, as well as between the Engagement and each of the different constructs.

Figure 1: Theoretical model



Source: own elaboration

The model set collects 64% of the Loyalty variance. It receives its greatest direct effect from 'Perceived value' (.536), the lowest from Engagement (.365).

It is observed that the model is adequate, discovering that the Retailer Image explanation by Engagement is not statistically significant, preventing an excellent model from being recognized.

With respect to the rest of the relationships analyzed, it is observed that Engagement has a greater influence on retailer awareness, retailer loyalty and retailer perceived quality, in this order. There is also a lower influence of Engagement on retailer perceived value, while, as indicated, this relationship does not occur in the case of Engagement on retailer image.

Regarding the relationships of the different variables that make up the Retailer Brand Equity (H1, H2, H3, H4), it can be stated that all of them are statistically significant. It should be noted that the strongest relationship is established between Retailer Perceived Quality and Retailer Image (.959), followed by that established between Retailer Image and Retailer Perceived Value (.830). With a not so strong relationship, we find the one established between Retailer Perceived Value and Loyalty (.536) and between Retailer Awareness and Retailer Perceived Quality (.525).

4. Conclusions

This article aims to investigate the effects that Engagement has on awareness, perceived quality, image, perceived value, and loyalty in the context of retail trade. In addition, the existing relationships between the different constructs mentioned above are included, observing effects between them and highlighting the influence of perceived quality on the image of the retail trade, with the least effect being the one established in the Retailer Awareness relation on its perceived quality.

On the other hand, the main objective of the study was to analyze the influence that Engagement has on the dimensions of brand equity in the Retailer field. As previously mentioned, there are not many previous studies dedicated to the study of Retailer brand equity (Beristain and Zorrilla, 2011; Broyles et al., 2009; Pappu and Quester, 2006) and, despite the fact that the client's commitment is an increasingly relevant and investigated topic, studies that relate this concept to retail trade are not common (Banyte and Dovaline, 2014). The results allow us to affirm that the greatest influence of Engagement is produced on Retailer Awareness, its influence on brand loyalty in the retail trade also being notable. On the other hand, the results indicate that the influence of Engagement on the image of the retail trade is not significant.

The study highlights the importance of a correct management of the retailer's actions aimed at generating engagement so that greater value is generated for the brand. Thus, marketing directors of

companies dedicated to the retail trade should take into account the influence that engagement has on the development of brand equity for their brands. Proper management of engagement is important when it comes to improving retailer awareness, retailer perceived quality and retailer perceived value. Likewise, it is worth highlighting this engagement management when developing consumer loyalty towards the retailer. All this will contribute to a more favorable attitude of the consumers towards the retailer, which will lead to increase its brand value.

This study aims to help retailer marketing managers focus on those important factors affecting Retailer Brand Equity, allocating more resources to them. The model proposed in this research analyses the impact that the engagement variable has on the formation of brand equity based on its influence on the variables that make up the brand equity of the retail trade. Thus, the model helps to understand the effects that engagement has on the different variables that make up the retailer's brand equity: awareness, perceived quality, image, perceived value and retailer brand loyalty.

Since this study has been carried out without differentiating by type of retail trade, future studies could take into account the various types of existing trade (small businesses, franchises, etc.) when analysing the conclusions.

Another line of research for the future could take into account the influence of engagement in the creation of retailer brand equity depending on the type of product offered: clothing, footwear and accessories, food and drugstore and home equipment.

In addition, the regional nature of this research must be taken into account and for future studies the geographic space to be analysed could be expanded, taking into account different regions or even countries and observing possible differences in the behaviour of the interviewees.

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CRISIS MANAGEMENT STRATEGY OF SMALL AND MEDIUM-SIZED BUSINESSES DURING THE COVID-19 IN RIGA, LATVIA.

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Abstract

It is known that small and medium-sized businesses are vulnerable to crises, especially to those that affect the entire world. But in the entrepreneurial environment, there is currently not much research on how small and medium-sized business owners cope with long-term crises, such as the COVID-19 pandemic, which has affected all areas of public life. This article provides a qualitative and quantitative analysis of small and medium-sized businesses in Riga, Latvia, in the months following the introduction of special quarantine measures. We collected interview data from 5 local small and medium-sized firms, and also asked 35 entrepreneurs from different business areas to fill out our questionnaire. We found that declaring a state of emergency negatively impacts certain areas of business. Companies that are not able to accept the new realities in the world do not have the opportunity to gain the loyalty of their customers in the post-crisis world. The study also showed that some firms, even before the onset of an economic imbalance, have a crisis plan and a certain survival strategy. As a result, they have experience in dealing with such crises. The results of our research allowed us to identify the main types of survival strategies and introduce some recommendations for sustainable development that can be followed by the company in the event of a crisis.

Keywords: COVID-19, Crisis management strategy, Small and Medium-sized businesses

JEL codes: H12, M10, P30

1. Introduction

The definition of a crisis is usually understood as "the perception of an unpredictable event that threatens important expectancies of stakeholders related to health, safety, environmental, and economic issues, and can seriously impact an organization's performance and generate negative outcomes" (Coombs, 2015, p. 19). Some scientists define the crisis as "a time of the decision, an unstable or crucial time whose outcome will make a decisive difference for better or worse" (Devlin, 2007, p. 4). Once, President of the United States of America John F. Kennedy mentioned that when the word "crisis" is written in Chinese, it consists of two characters: one key represents danger, and the other - an opportunity. And this is indeed a justified statement, any crisis is a threat, but at the same time, it brings new development opportunities, to which we need to be able to adapt. Crisis management is a set of tools to simplify the work of a company during a crisis. According to some economists, the term "crisis management" can be defined as "special measures taken to solve the problems caused by the crisis" (Devlin, 2007, p. 1). The goal of companies during the onset of economic instability is to develop a strategy that can minimize damage and economic losses after the crisis (Bundy et al., 2016, p. 4). Researches conducted in our time is mostly focused on large companies, there is a lack of researches on the crisis management of small businesses (Herbane, 2010, p. 45). Small and medium-sized enterprises, due to a lack of profit, low market exposure, or other factors, may be more exposed to the crisis. But at the same time, these enterprises have an undeniable advantage - they are able to quickly adapt and learn innovative technologies, develop a system of communication with customers, and provide convenient ways to distribute goods.

The year 2020 was incredibly difficult for the world community by many criteria. The spread of the new coronavirus, called COVID-19, has led to an unprecedented crisis in various areas in all countries of the world. The crisis has had a serious impact on all spheres of public life. It changed the way people normally live, and also affected the way people communicate, work, produce goods, trade, consume, and live in general (International Trade Centre, 2020, p. 9). In late December 2019, the first cases of a new type of pneumonia were first reported in Wuhan, China. Since then, the virus has spread

at an incredible rate, taking over not only other parts of China but also other countries (Wick, 2020, p. 9). In March 2020, more than 150 countries recorded the first cases of infection with the new virus (Worldometer, 2020). On March 2, 2020, the first patient with COVID-19 coronavirus infection was diagnosed in Latvia (SPKC, 2020). COVID-19 is primarily referred to as a health crisis when state leaders around the world were forced to introduce measures to prevent the spread of the virus. However, many experts immediately stated that the pandemic will cause destabilization in the economic environment on a global scale. This was reflected in the field of finance, trade, investment, employment, education, and many other things. According to preliminary estimates of the world trade organization, world trade in 2020 may fall sharply - from 13% to 40% (International Trade Centre, 2020, p. 10). Economists claim that previous crises did not have such a serious impact on society, of course, if we are not considering crises that were caused by world wars. Some historians present an interesting theory that during each century the world experienced at least one large-scale war, in the last century there were two of them. Wars undoubtedly led to large-scale crises, but after them, the whole world began to develop along a completely different trajectory. Now experts suppose that the new coronavirus COVID-19 has become the same catalyst that will make society live differently. The epidemic that emerged in China and took over the whole world turned into a pandemic that caused fear, oppression, concern for our future in society, and marked the starting point for further alternative development. As many economists say in such cases, humanity has "opened a window of opportunity". At the same time, the pandemic has caused huge social and economic problems at all levels, including unemployment, isolation of countries, the suspension of globalization, social phobia, apathy, and disruption of trade supplies in stores.

In this article, we would like to consider the impact of the COVID-19 crisis on small and medium-sized businesses in the first 6 months after the outbreak in Latvia, most of the respondents are located in Riga. We grouped the responses of all applicants into 8 different groups, whose representatives work in such areas as transport and logistics, restaurant business, hotel business and tourism, real estate, education, beauty industry, entertainment, it and marketing. The Latvian economy is mainly focused on agriculture, chemical industry, logistics, woodworking, textile industry, food production, mechanical engineering, and green technologies (Investment and development agency of Latvia, 2020). According to statistics, in 2019, before the COVID-19 crisis, a record number of tourists visited Latvia in recent years, they spent about 806.3 million euros, which is 7.3% more than a year earlier (Central Statistical Bureau of Latvia, 2020). With such positive statistics on the tourism side, it should be noted that in the field of micro-enterprises, everything is not so successful. Since the end of 2019, small businesses have experienced great difficulties. In Latvia, on December 31, 2019, the microcredit program for small and medium-sized businesses was terminated. At the moment, economists claim that loans are usually issued to large companies that are most often associated with political elites. That is, small and medium businesses remain on the side-lines, while all the support from the government is received by large companies.

The purpose of our study is to identify possible directions for crisis planning after the onset of the crisis caused by the COVID-19 pandemic, as well as to determine which industries were most affected during the crisis, and which industries were successfully able to overcome it. The objective of our research is crisis management strategy that can be implemented in the company if it is faced with economic difficulties.

The specified research goal sets us the following tasks:

- 1) To determine the current economic situation of small and medium-sized companies that represent various industries;
- 2) To establish the amount of economic damage that the company suffered with the onset of the crisis;
- 3) To assess the possibility of overcoming the crisis situation by small and medium-sized enterprises, considering the introduction of a crisis management strategy;
- 4) To analyse which industries were most affected by the crisis.

In addition, we would like to outline the hypothesis of our research. It is hypothesized that a crisis similar to the one that caused the COVID-19 epidemic has affected all spheres of social activity, however, each industry tries to find its own individual approach to solving the emerging economic instability, and therefore uses different crisis management strategies.

This study contributes to the existing literature on crisis management of small and medium-sized businesses and indicates possible strategies for companies to survive in crises. We also develop certain recommendations for small business entrepreneurs regarding the dynamic learning of employees before the crisis and development of a strategic plan for maintaining competitiveness in a crisis situation.

2. Crisis management theory

Our literature review gathered the opinions of various researchers on the theory of crisis management in companies. The business owner should not only be engaged in the main area of their business: consulting, trade, medicine, construction, logistics, retail, or any other type of business, but also control the company's finances, personnel actions, procurement process and deal with crisis management. The main idea is that the entrepreneur is fully responsible for his business (Weltman and Silberman, 2020, p. 8). Some researchers pay attention to the role of dynamic learning in the company even before the crisis, because the social component is also involved in keeping the business afloat (Bundy et al., (2016), p. 4). Some researchers hold the position that crisis management planning is not just a science, it is a special kind of art. Science, by its definition, is the knowledge that encompasses general truths or combines the operation of certain laws, obtained, analysed, and verified using scientific methods. Art is a skill that people acquire with experience, time, study, and patience (Devlin, 2007, p. 2).

In summary, it is important to note that the crisis can test the capabilities of the company's employees and its leaders. Crisis management is implemented in the company in order to minimize the consequences of the crisis and to help the entrepreneur gain control over the situation (Coombs, 2007, p. 163). It also helps to monitor the emerging benefits that a crisis can bring. Requirements for the development of a crisis plan are extremely important for the company to ensure the continuity of the business process in the event of an economic downturn (Spillan and Hough, 2003, p. 401).

3. Repercussions of the financial meltdown after the outbreak of the epidemic in 2020,

Usually, crises lead to negative and undesirable consequences. If a company begins to feel unstable, it subsequently begins to suffer financial losses, among them we can note a reduction in staff, loss of productivity, a drop-in demand for products, and a decrease in profits (Hong, 2006, p. 295). Most often, the damage from the crisis is manifested not only in the form of financial losses but also in the form of a tarnished reputation of the company and damage to the brand (Coombs, 2015, p. 20).

During a crisis, small and medium-sized businesses almost always suffer from reduced sales, financial losses due to reduced sales, failure to meet their obligations with partners, staff reductions, partial relocation of staff to remote work (as during the current crisis due to COVID-19), or complete business closure during or after the crisis. Such events cause emotional imbalance not only among entrepreneurs and business owners but also among employees themselves (Doern, 2016, p. 8).

All these consequences were felt this year not only by representatives of small and medium-sized businesses but also by representatives of even a network of large companies known all over the world. It is noteworthy that the list of companies affected by the crisis includes one giant of the tourism industry - the world-famous short-term rental service "Airbnb". The company's CEO Brian Chesky in his interview for CNBC channel said that they spent 12 years building that business and now they lost almost all of it in the matter of 4-6 weeks (Consumer News and Business Channel, 2020). The owner of the world-famous clothing brand "Zara" closed as many as 1,200 stores around the world due to emerging epidemiological requirements. The company suffered a major financial crisis; however, the brand tries to boost online sales as much as possible to avoid complete closure (The Guardian, 2020). Another world-famous brand "Starbucks" also announced that it will permanently close its 400 stores. It will move away from the usual type of coffee shop. However, the company immediately introduced its crisis management strategy. The company's management team has reviewed its presence in the market. They introduced a new "Starbucks Pickup" coffee shop format. This model is intended for customers who prefer to order in advance and pay through the mobile application for pickup, or for customers who prefer delivery for their safety (Starbucks Corporation, 2020, p. 4).

Considering all the above facts, many experts still argue that small and medium-sized enterprises, due to their small size and low level of bureaucracy, may even have advantages over large companies in terms of employee training opportunities, adaptability, technological innovation, and customer communication (Irvine and Anderson, 2004, p. 236). However, to overcome the crisis, small businesses need support from the state, a reduction in the interest rate, or some concessions from shareholders.

In the existing researches, we can find explanations of why small firms need support in times of crisis (Burlletidis and Triantafyllopoulos, 2014, p.641). With the right support, companies can be more flexible in adapting to economic downturns as they are less resilient to inertia. Small businesses can exploit market niches and adapt to market requirements. They are less dependent on formal loans than larger firms that are heavily indebted. Export-oriented small and medium-sized businesses are best

suited to the changes. In post-crisis situations, they are of strategic importance for economic recovery, because they can restructure industries. After all, they are the source of competition for companies. The more competition arises in the market, the more there will be offers, and the higher the demand for it. This process contributes to regional development.

Thus, it becomes obvious that the importance of small and medium-sized businesses in the economy is undeniable, they have a huge impact on economic recovery and sales growth, these enterprises contribute to increasing the number of jobs, reducing unemployment, and further social progress (Bourletidis & Triantafyllopoulos, 2014: 3).

4. The special role of crisis planning and dynamic learning for SMEs

The goal of entrepreneurs is not only to develop a business plan, find investors, and select excellent employees, but also to plan an alternative work strategy in case of a crisis. Experts note that those companies that build a crisis planning strategy in advance are better able to recover from an economic downturn (Irvine and Anderson, 2006, p. 6). In science, there is no precise designation for what should be involved in the development of this strategy. Some experts believe that the development of a crisis plan should be handled by third-party specialists who work in various fields. In science, this group of people is called “third-party endorsees”. They can be organizations or individuals. The main requirement that is put forward to them is that they do not have a direct financial or any other interest in your business, but they are honest, and the entrepreneur can rely on them (Ruff and Aziz, 2016, p. 21). Regardless of who is involved in developing crisis planning, the main thing is that having the strategy itself is essential for overcoming the crisis. Some researchers even consider identifying a crisis at an early stage of its development in the company (Kuckertz et al., 2020, p. 6).

As mentioned earlier, small and medium-sized businesses can not only close during crises but also open up new areas and find new opportunities to work. To achieve this goal, companies should constantly train employees in new technologies and conduct dynamic learning. Experts believe that diverse, variable, up-to-date, and reliable knowledge will contribute to business development after crisis events (Kuckertz et al., 2020, p. 7).

Thus, we can note that timely preparation of crisis planning, proper communication with employees, dynamic and systematic learning of employees, constant contact with customers can lay a solid foundation for the crisis not to worsen the company's situation. Communication at the level of company leaders is extremely important for effective crisis management. In our research, we focus on various crisis management strategies, exploring new markets and opportunities, and the role of dynamic learning in companies.

5. Contribution

The review of the literature has shown that most often research in the field of crisis management is conducted on the example of large companies, and not on small and medium-sized businesses. In our study, we considered the geographical scope, the unique characteristics of the crisis caused by the COVID-19 epidemic, and the period during which the crisis occurred. This study contributes to the literature on crisis management in small and medium-sized businesses. The purpose of this study is to identify the various strategic decisions that entrepreneurs are making in their companies during the COVID-19 outbreak. We are also interested in the impact of the economic component on business, the existence of crisis management plans for entrepreneurs, and the variability of firms' strategies depending on its size (Watters, 2014, p. 81).

6. Background, methodology, and research design

The first confirmed case was registered in Latvia on March 2, 2020 (Center for Disease Prevention and Control, 2020). Isolation and social distancing policies have stopped work across the country. On March 12, a state of emergency was declared, schools and universities were closed. Due to the negative impact of the outbreak on the local economy, the state announced a series of measures to provide economic assistance to residents. Downtime benefits were received by 45 thousand people, and about 20 thousand were registered as unemployed (Central Statistical Bureau of Latvia, 2020). However, not everyone received this support, because, in order to receive payment for downtime, it was necessary to go through a large number of bureaucratic formalities. State aid reached only 5% of the employed. The main difficulty was that one of the conditions for receiving assistance was a condition that stated

that the legal entity for which the victim worked due to the quarantine should not have tax debts to the state. Most of the enterprises had these debts because they did not suspect that there would be a pandemic that would lead to quarantine. As a result, most workers found themselves in a rather disadvantaged position, unable to receive the funds that they had hoped for.

According to statistics from the government website, tourism-related industries have been hit hardest (Central Statistical Bureau of Latvia, 2020). Many hotels have closed. Probably, in the future, they will change owners, or bankruptcy proceedings will take place. Public catering has suffered greatly. And also, almost all industries were affected, including logistics and transit, because the volume of cargo decreased.

The purpose of our study was to analyse the problems, crisis strategies, and further prospects of small and medium-sized enterprises during the COVID-19 crisis, we aimed to obtain an objective assessment of business representatives from various fields. To do this, we used both qualitative and quantitative research methods. In our study we included the fundamental concepts presented in the research of specialists in crisis management theory as a methodological basis. Our research was carried out using the cases of 35 representatives of small and medium-sized businesses, theoretical analysis, logical-constructive analysis with the priority of a systematic approach. We also used methods of statistical analysis, analysis of expert assessments and forecasting methods, and also analysed the crisis management database. The main goal of our research was to understand the current problems, crisis planning and further development of small and medium enterprises during the crisis caused by the COVID-19 pandemic. Most of the respondents were middle and senior managers working in these companies, but in six companies we were able to get answers from the administration representatives. We used a theoretical sample. A qualitative approach using case studies seemed to us the most appropriate to achieve our goals in this work.

We received answers to our questionnaire from 35 respondents, representatives of small and medium-sized businesses from various fields. We managed to conduct more detailed interviews with some of them, namely with five representatives of different industries. They were thematically divided into 8 groups, which represent such industries as:

1. Hotel business and tourism;
2. Private education;
3. The beauty industry, cosmetology, and pharmaceuticals;
4. Restaurant business;
5. IT, marketing and mass media;
6. Transport and logistics;
7. The entertainment industry, fitness, fashion, and art;
8. Real estate.

This division was based on the theoretical ability of companies to withstand the crisis. Analysing these areas helped us develop a deeper understanding of how small and medium-sized businesses respond to the COVID-19 crisis. The companies in these groups represent different spheres of social life that cover important industries.

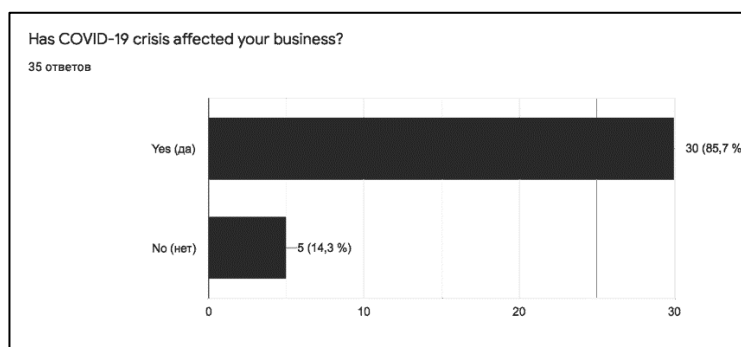
From an economic point of view, SMEs differ greatly among themselves. In Latvia, the classification of SMEs differs depending on the annual income and the number of employees. In our study, we adhered to the State Revenue Service's criteria for identifying businesses. According to the rules, the category of small and medium-sized enterprises includes enterprises with less than 250 employees and an annual turnover of not more than EUR 50 million and / or a balance sheet total of not more than EUR 43 million. A small company is a company with less than 50 employees and an annual turnover and / or balance sheet total of not more than EUR 10 million. The category of small (micro) enterprises includes enterprises with less than 10 employees and an annual turnover and / or balance sheet total of no more than EUR 2 million. The category to which the company belongs is determined based on data on the number of employees and financial indicators for the last approved reporting year (State Revenue Service, 2018).

For our research, we asked respondents to complete our questionnaire. Also, we conducted in-depth structured interviews with selected business representatives using social media (including Skype and Zoom), as required by the current epidemiological situation due to the COVID-19 outbreak. Following the European General Data Protection Regulation (GDPR), the questionnaire was completed anonymously, without using any personal data.

7. Description of respondents and survey results

We received responses from 35 representatives of small and medium enterprises. Firstly, we would like to provide general statistics on the impact of the COVID-19 crisis on small and medium-sized businesses. In Figure 1, you can see that 30 respondents, or 85.7% of the surveyed entrepreneurs, answered that the COVID-19 crisis had a significant impact on their business. And only 5 respondents, or 14.3%, answered that in terms of changing the concept of work, this crisis did not affect them.

Figure 1: Has COVID-19 crisis affected your business?



Source: author's questionnaire.

Secondly, we asked if the economic impact of the virus outbreak is being felt for the company. And we saw that 91.4% of respondents felt the consequences, and only 8.6% did not feel the onset of the crisis.

Table 1: Questions from the questionnaire

Questions in our questionnaire	Purpose of the research question
Q1 Industry	To identify the impact of the crisis on a specific industry.
Q2 Has COVID-19 affected your business?	
Q3 Employees	To determine the impact of the COVID-19 crisis on companies of different sizes.
Q4 How long has the company been in existence?	
Q5 Have you experienced crises before?	To find out if the company has experience in overcoming crises earlier.
Q7/8/9 Impact of COVID-19 on the company: was there a reduction in staff and income in the company during the crisis?	To understand the economic impact of the outbreak on the company and analyse whether the layoff is related to overcoming the crisis.
Q10 Crisis management strategies	To determine whether crisis management strategies have been introduced in the company.
Q13 Recommendations of licensing and regulatory authorities	To find out whether the company follows the recommendations of the licensing and regulatory authorities or operates independently.
Q14 Government assistance for business	To determine if the company has received government assistance.
Q15 Survival strategies	To determine whether survival strategies have been introduced in the company.
Q17 Expected time of the impacts	To get the opinion of entrepreneurs about the timing of the crisis
Q18 Unified recovery strategy	To find out if there is a unified recovery system after the crisis.
Q19 Dynamic learning	To understand whether dynamic learning is needed in a company
Q21/22 Satisfaction with government policies and company recommendations for maintaining business	To determine whether entrepreneurs are satisfied with the existing crisis policy, get recommendations for developing a possible alternative.

Source: author's questionnaire.

We have combined the responses of company representatives into 8 main groups according to the general characteristics of crisis planning and the general situation at the enterprise. The groups we analysed were numbered from 1 to 8 to simplify the name. All participants were selected for interviews

based on the following criteria: companies are small or medium-sized enterprises, experienced some or significant impact of the COVID-19 crisis, and, of course, they wish to participate in the survey voluntarily. Table 1 provides some of the questions we asked respondents to get company characteristics.

The findings of the study were carefully analysed. The results showed that virtually all industries were affected by the COVID 19 crisis. Most of the companies had similar economic impacts, survival strategies, and crisis management. Differences exist depending on the specifics of the company. Table 2 provides basic information about the eight formed groups that we obtained using the questionnaire.

Table 2: Respondents' answers by group number

Group number	Line of business	Number of Employees	Existence on the market	Introduction of crisis management strategies	Previous crises	The recommendations of regulatory authorities
№ 1 Hotel business and tourism	Travel agency	6	6	Yes	No	Independently
	Family hotel	15	12	Yes	No	Yes
№ 2 Private education	Chinese courses	25	15	Yes	No	Yes
	Foreign language courses	240	28	No	No	Yes
	Art class	7	5	Yes	No	Yes
№ 3 Beauty industry	Food additives pharmaceutical company	50	10	Yes	No	Yes
	Cosmetology clinic	10	5	Yes	No	Yes
	Beauty shop	12	15	Yes	Yes	Yes
№ 4 Restaurant business	Cafeteria	8	2	Yes	No	Yes
	Restaurant	15	3	Yes	No	Yes
№ 5 IT, marketing	The media industry	250	15	No	No	Independently
	Marketing company	1	1.5	No	No	No
	Marketing company	200	4	Yes	No	Yes
	Marketing agency	30	4	Yes	No	Independently
	Marketing company	28	6	Yes	No	Yes
	IT company	230	15	Yes	Yes	Yes
	Online entertainment	250	14	Yes	No	Yes
	IT company	110	19	No	Yes	No
	IT company	240	25	Yes	No	Yes
	Marketing agency	12	10	Yes	No	Yes
№ 6 Transport and logistics	Trading in international bulk sales	5	16	Yes	Yes	Yes
	Steel trading business	5	33	No	No	Independently
	Transport company	3	10	Yes	Yes	Independently

№ 7 Entertainment industry	Fitness club	20	12	Yes	No	Yes
	Yoga and stretching club	12	3	Yes	No	Yes
	Fitness centre	15	8	Yes	No	Yes
	Art exhibitions	170	15	Yes	No	Yes
	Event management	4	7	Yes	No	Yes
	Event management company	10	5	Yes	No	Yes
	Clothing design	1	2	Yes	No	Independently
	Handicraft production	3	2	Yes	No	Independently
№ 8 Real estate	Home sale	6	3	Yes	No	Yes
	Luxury apartments	5	4	Yes	No	Independently
	Real estate agency	7	5	Yes	No	Independently

Source: author's questionnaire.

If we summarize the answers, we can see that 77,1 % of companies have introduced crisis management strategies in their company.

In Table 3, we have provided a list of crisis management strategies that are most often introduced in companies.

Table 3: Crisis Management Strategies for SMEs

Group number Strategies	№ 1 Hotel business and tourism	№ 2 Private education	№ 3 Beauty industry	№ 4 Restaurant business	№ 5 IT, marketing	№ 6 Transport and logistics	№ 7 Entertainment industry	№ 8 Real estate
Development of the remote work plan						✓	✓	
Testing and operation of the remote work plan		✓		✓	✓	✓	✓	
Communication between employees via Skype, Webex, Microsoft Teams, Zoom, or other sources of communication	✓	✓			✓	✓	✓	
Providing leaves with payment for some employees or all employees		✓	✓	✓		✓		
Firing employees due to unforeseen circumstances	✓		✓	✓			✓	✓
Monitoring the situation			✓	✓	✓		✓	
Suspension of the company's work for an indefinite period	✓						✓	✓

Source: author's questionnaire.

In Table 4, we have outlined the survival strategies that were used by the respondents.

Table 4: Survival strategies for SMEs

Survival strategies \ Group number	№ 1 Hotel business and tourism	№ 2 Private education	№ 3 Beauty industry	№ 4 Restaurant business	№ 5 IT, marketing	№ 6 Transport and logistics	№ 7 Entertainment industry	№ 8 Real estate
Shorten operating hours	✓							
Flexible company policy and employees' stress management communication	✓			✓	✓			
Company's cost cut	✓	✓	✓	✓			✓	
Apply for small and medium-sized enterprises loan from the government	✓	✓		✓		✓	✓	✓
Exploring new products/markets/spheres for your business		✓		✓	✓	✓	✓	✓
Changing the system of communication with customers - advertising/discount promotion	✓	✓	✓	✓	✓			✓
Extend credit period with suppliers, lessors, investors	✓		✓	✓				✓

Source: author's questionnaire.

It should be noted that 57.1% of respondents said that they introduced survival strategies in their companies.

After processing all the data, we analysed each group presented in Table 2.

Group № 1 Hotel business and tourism

For this group, the COVID-19 crisis was a real challenge, as people stopped traveling and staying in hotels due to the virus. The respondents had no previous experience in overcoming crises. The representatives of these companies introduced crisis and survival strategies, and also looked for new opportunities in the local market, tried to pay more attention to tourism within the country. But, unfortunately, there were also staff reductions in firms in this area.

Group № 2 Private education

The crisis has not spared private education. All respondents, except for a company with a 28-year history, introduced crisis management. The company, which has existed for almost 30 years, managed to avoid large financial losses due to its development and popularity.

All educational institutions are temporarily closed or transferred to remote work by order of the government, which leads to a lack of income for some time. Among the consequences, we can note a decrease in sales, loss of staff, temporary loss of customers, and panic in society. However, some clients continued to engage on a remote basis, thereby supporting the company. After the crisis, companies will be forced to increase the size of advertising to attract new customers.

Group № 3 Beauty industry

From the data obtained, we concluded that the beauty industry was also affected by the crisis. Regardless of whether the company has experience in overcoming the crisis or not, the entrepreneur cannot influence the client in any way if he is afraid to be in contact with someone. The beauty salon lost revenue of 50% because, during the crisis, people were afraid of the epidemiological situation and decided to postpone going to the salon for another time. The dietary supplement company also lost some of its profits, as people prefer other types of vitamins and medicines during the pandemic, but the company quickly refocused and began selling immune-boosting vitamins, which was able to increase its revenue.

Group № 4 Restaurant business

The restaurant business as well as the tourism sector suffered a lot of losses during the crisis. The interviewed respondents said they were on the verge of closing, as it was difficult to continue to make high-quality purchases with a 60% decrease in attendance, and besides, it was still necessary to pay for the rental of premises for the restaurant. It was also quite difficult to work on delivery due to the small number of orders relative to the purchase amount. Some employees had to be fired due to a lack

of clients. Firms are currently adhering to crisis management plans, and it should be noted that the focus is on food and personnel safety.

Group № 5 IT, marketing

It should be said about this group that it faced the crisis in the most successful way. The industry of the digital sphere was practically not affected by the crisis, except in some cases. It is in this group that the respondents more often than in the other groups answered that they had not introduced any crisis strategies. Some companies admitted that the crisis brought them little profit because the only world in which people have freedom of movement in the virtual world. There were almost no layoffs in companies. Companies have a contingency plan and crisis prevention plan. The organization is responding to the COVID-19 outbreak by reducing the number of face-to-face meetings for employee safety.

Group № 6 Transport and logistics

The transportation industry has also felt the impact of the pandemic, but not as strong as other industries. Crisis management was not introduced in the company with 33 years of experience; the company managed to work as planned due to flexible policy, loyal customers, and fast reorientation of the company. In other companies, crisis strategies were introduced, and income decreased by an average of 10-20%. 2 out of 3 entrepreneurs have a crisis experience. At the moment, the firms have plans and strategies for further work. Entrepreneurs also have contingency plans and are considering product diversification and market reorientation.

Group № 7 Entertainment industry

The entertainment industry suffered heavy losses, as did the tourism industry. Agencies for organizing events suffered losses of over 70%. During the introduction of the emergency, they practically could not work. The arts industry has also been unable to host various exhibitions as public events are not held during the pandemic. In the summer, the situation improved, as it was possible to attract at least a certain number of clients. These companies tried to hold some events remotely, but this did not bring much income, compared to face-to-face events. Regarding the fitness industry, their situation was similar. Companies existed by supporting loyal customers who could do it individually. In the summer, the situation improved significantly. Fashion and craft companies also suffered some losses, but they could continue to trade online. All members of this group introduced crisis management strategies in their companies. Many entrepreneurs asked for support from the state. At the moment, they also continue to adhere to the introduced strategies.

Group № 8 Real estate

The last group is represented by the real estate sector. This area also suffered heavy losses. Elite real estate was mostly rented by foreign citizens who came for tourist purposes. Due to the decrease in demand, elite real estate began to be rented out at very unprofitable prices for owners. Real estate sales have also become less in demand. In general, the COVID-19 crisis has caused a sharp decline in demand for real estate, companies lose on average 40-50% of profits. All respondents said that they had introduced crisis management strategies and had to lay off staff. Apartments are shown mostly online or with the permission of the owner.

8. Main results

After a general analysis of the questionnaire, we can conclude that the crisis caused by the epidemic has affected all spheres of public life. Small and medium-sized enterprises especially felt the pressure. Most of the respondents noted that their company had cut staff. Based on our results, it can be noted that revenues in firms have declined by 50% on average.

The respondents reported that they faced such problems as decreased demand for products or services, financial constraints, loss of employees. Entrepreneurs for the most part believe that the effects of the financial crisis will be felt on average from one to two years.

Thus, it should be noted that the crisis caused by the COVID-19 virus is global in nature. It affects all spheres of social life and has a tendency of duration and undulation, that is, there are periods during which companies can take some measures that will help restore the financial climate in companies. Also, at certain times, companies may be completely inactive, on the verge of closing.

We also concluded that the crisis had the greatest impact on groups 1, 4, and 7. However, crisis strategies were introduced in all groups. Group 5 suffered the least losses and is considered the most stable sector in the current COVID-19 crisis. Many representatives of the companies applied for government support, but not all received it, only 20% of all respondents. Due to the lack of additional support, many companies have introduced survival strategies during the crisis. The most frequently used of them were exploring new products/markets/areas for business, reducing company costs, extending loan terms with suppliers, lessors, investors, discount and promotional offers.

Separately, we would like to consider the fact that companies that have been on the market for a long time are easier to survive the crisis. Some of them don't even introduce crisis strategies.

At the same time, it is interesting that 51.4% of respondents expressed the assumption that it is worth developing a unified strategy for the company's recovery, which can be taken as a basis for recovery after any crisis. However, the difficulty lies in the very possibility of developing such a reliable system that can forestall future crises? Perhaps this will become a direction for future research.

Based on the responses of respondents, we believe that the main points that representatives of small and medium - sized businesses should pay attention to are getting the loyalty of customers who will support you regardless of the economic situation, good relations with creditors and shareholders, who will also be able to make certain concessions in the event of a crisis, and relationships within the team, that is, the process of dynamic learning in the company. Our results showed that 88.6% of respondents believe that it is extremely important for the team.

It is necessary to conduct professional development training for employees, organize team-building events, hold seminars to listen to suggestions and changes, and train all staff in crisis planning because no one can predict how the crisis will develop further.

Representatives of companies are mostly dissatisfied with the support of small and medium-sized businesses. Only 8.6 percent of entrepreneurs are satisfied with the help they received. The voices of those who are not at all satisfied and those who are partially dissatisfied with the recommendations and support of the government were divided equally – 45.7%.

We believe that our research can complement the existing literature on crisis management and survival strategies for companies in the face of economic downturns on the scale of COVID-19. This crisis is unique in nature, it cannot be limited to only one characteristic, it affects both economic sectors and public health, and social spheres of public life. In our opinion, the positive factors are that most of the companies are focused in the future on exploring new markets, searching for new technologies and technical solutions that will help improve the situation after the crisis. The desire to search for new ideas gives hope that all companies will be able to successfully recover and even increase their capital in the future.

9. Conclusion

The impact of the pandemic crisis is becoming more pronounced for businesses, with executives across all industries taking urgent action to protect employee health and strengthening company resilience, and governments are working to keep citizens safe and prevent economic damage. Emergency measures are undoubtedly important, but entrepreneurs should not forget about developing a crisis management program for the new post-crisis reality.

We conducted a study on how the COVID-19 crisis-affected small and medium-sized businesses. In the process of our study, we completed our tasks. As the most important findings, we can point out:

- 1) During the analysis of the questionnaire, we received relevant information about the current economic and financial state of the respondents' companies, we considered the strategic path of introducing crisis planning in various fields.
- 2) We have identified the industries that the crisis has affected more than others. In our study, we also identified the crisis management strategies and survival strategies that entrepreneurs most often introduce in their companies. The received answers from the respondents were divided into 8 groups, each of which has certain characteristics.
- 3) The largest decrease in revenue was noted by companies operating in the tourism, hotel business, restaurant business, and beauty industry. Companies involved in information technology, marketing, and pharmaceuticals have suffered the least from the crisis. Only 17% of the respondents noted that the amount of profit did not suffer during the crisis. Positive dynamics of revenue are observed mainly in the IT sector. According to most of our respondents, economic recovery after the lifting of restrictive measures will take from one to two years.
- 4) Our results may differ from those obtained by other researchers in this area because the COVID-19 crisis has unique characteristics that have not been previously observed in society.
- 5) It is worth paying attention to the fact that survival strategies can depend on many factors, such as context, time, and scale of the crisis. We believe that the results obtained contribute to the existing literature on crisis management and crisis management.

COVID-19 has become a real test of sustainability not only for small and medium-sized enterprises but also for large companies. The pandemic has not only caused a public

health crisis, but also an unfavourable economic environment, that is why it is important to keep an eye on changing trends around the world to be opened to new solutions and innovations (Donthu and Gustafsson, 2020, p. 286). Now is the time to open up new perspectives and horizons for entrepreneurs, as customer needs are constantly changing in our time. Firms may try to find work opportunities in new areas. The possibilities of introducing digital and technological innovations should also be considered.

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WHY SHOULD A TIME-DRIVEN ACTIVITY-BASED COSTING APPROACH BE INTEGRATED WITH PROCESS MINING?

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Abstract

Costing systems play a crucial role in the process of providing information to companies' managers. Modern costing systems should allow for computation of different types of cost objects, while being dynamic, flexible and considering diversity and complexity of modern business processes. Activity-based costing systems (ABC) provide several advantages over traditional costing systems (TCS). In this research, we focus on time-driven activity-based costing (TDABC) systems, which are based on ABC. We established following two research questions: 1) what are the benefits of integration of TDABC and process mining (PM), and 2) how can be PM used in the initial stage of TDABC implementation. Based on the systematic review of literature, we summarize advantages and disadvantages of TDABC. Then, we show the use of PM in the initial phase of the implementation of TDABC in the form of proof of concept with use of real-world data. Finally, we discuss how can integration of PM and TDABC strengthen the advantages and limit the disadvantages of TDABC.

*Keywords: ABC, costing systems, process mining, TDABC.
JEL codes: M41, M21,*

1. Introduction

The purpose of accounting can be commonly characterized as the process of providing information to owners, creditors, governmental agencies and operating management and thus, facilitating the administration of economic resources. The facilitation of resources consists of two phases: 1) measuring and arraying economic data; 2) communicating the results of this process to interested parties. This is a basis for a decision-making process of various users with changing needs (Changra and Peperman, 1976). It is expected that in the future the need for detailed and accurate cost information will increase as a result of raising competitiveness and cost efficiency of processes (Afonso and Santana, 2016). The difficulty inherent in choosing a proper and accurate cost allocation method for enterprises has been widely discussed by academics and practitioners. Elementary forms of traditional methods, which mostly featured absorption characteristics (absorption costing) and would have been used for calculating costs of products, have been described in detail by many authors. Overhead cost allocation is one of the most serious problems within cost management for companies and the accurate information about costs is crucial for all businesses, such as manufacturing, trading, service sector, etc., (Jeyaraj, 2015). In many cases, accurate cost information about products and services, customers, suppliers and business processes can provide a competitive advantage. Popesko and Tučková (2012) identify the primary factor behind shift in organizations' cost structures to be primarily proliferation in product and service lines, and secondary factors to be technology/IT, equipment and automation.

In the early 1980s, the limitations of these traditional absorption-costing systems became wildly publicized. Traditional costing techniques are based on simplified procedures of using principles of averages, which became obsolete due to: increasing competition resulting in a need of cost reduction and more detailed information on costs of the companies; and secondly, change in the cost structure of the companies, where so called 'averagisation' can lead towards inaccurate overhead cost allocation. Popesko (2010) defines averagisation as the end result of allocating a proportionally average volume of costs of any type to all cost objects. Glen and Becker (1996) defined number of

fundamental limitations of traditional costing, e.g., significant increase in service-related costs, indirect cost of technology, etc. According to Popesko (2009), absorption costing provides accurate results when the company has very homogenous output, few departments with overheads and customers similar in nature. However, in other cases, managers have to make decisions based on misrepresented data (Popesko et al., 2015). Thus, ABC systems are better when the company has heterogeneous output with large amount of overhead costs or with great number of processes and activities (Popesko, 2010; Popesko and Tučková, 2012; Zhuang and Chang, 2017).

Variable costing helps to avoid issues relating to imprecise overhead cost allocation, whilst calculating the capacity of the company by separately measuring the company's variable and fixed costs. However, this method is unable to manage company's overheads effectively and is insufficient when it comes to producing information on total product cost (Popesko, 2009). Since the fixed costs are not being allocated to the cost objects at all, the variable costing is effective in short-term decision-making. However, production and other decisions are not short-term time horizon decisions and thus, it is inappropriate to use variable costing (Benjamin et al., 2009). Volume-based cost systems run into difficulty regarding operations that do not vary per unit sold like, e.g., sales order processing, which is driven by the number of sales orders placed by customers (Evereart et al., 2008). In such cases volume-based allocation of costs based on volume-drivers like, e.g., direct labor or volume, leads to distortions in cost figures. Moreover, the previously mentioned cost systems do not reflect on activities and processes that define the organization, unlike ABC/TDABC (Afonso and Santana, 2016). The distortion is mainly due to a lack of timing and causal relationship with resources expiring during a process (Lu et al., 2017). According to Jeyaraj (2015), traditional costing systems overestimate the costs of high-volume products and underestimate the costs of low-volume products.

Moreover, ABC approach has a lot in common with business process management (BPM). BPM aims to manage and optimize company's processes, which are defined as sequences of activities that transform inputs into desirable outputs, while taking into consideration resources and technologies. BPM is an approach that gained on popularity and is being implemented in more and more companies. This is a positive development for ABC cost systems as process-oriented thinking plays crucial role in their implementation as well as their maintenance, which similarly to BPM should be a continuous process throughout the company's lifecycle. The continuity of change and improvements regarding management of business processes, then provide means for flexibility in highly competitive and changing environments. The remainder of this paper is organized as follows. Section 2 presents an introduction to ABC and TDABC approaches and its advantages and limitations. Section 3 briefly introduces PM and its fundamental areas. Following section presents research methodology and next section presents results of our research. Finally, we conclude and discuss our results.

2. ABC and TDABC

The basic idea behind the ABC is to allocate costs to operations through the various activities in place that can be measured by cost drivers based on cost-and-effect relations (Jeyaraj, 2015; Popesko, 2010). Activity based costing is based on three assumptions (Afonso and Santana, 2016): products require activities, activities consume resources and resources cost money. ABC focuses on overhead costs of individual activities, as well as allowing for the allocation of overhead costs to operations that brought about these costs. Firstly, it assigns overhead costs to activities and then to products, orders or customers, based on consumption of individual activities (Bruggemann et al., 2005; Evereart et al., 2008; Kaplan and Cooper, 1998; Lu et al., 2017). Thus, ABC assigns more indirect costs into direct costs compared to conventional costing. ABC uses a single driver rate for each activity, which causes difficulties when dealing with multi-driver activities, e.g., sales order processing may not depend only on number of orders, but also on the type of communication media used by the customer (Demeere et al., 2009). According to Jeyaraj (2015) ABC can help identify and eliminate products and services that are unprofitable, lower prices of those that are overpriced or identify and eliminate production or service processes that are ineffective. Moreover, ABC approach can provide managers with information on how operating activities add value to outputs, and thus, as a result be able to identify and eliminate costs related to non-value adding activities (Tse and Gong, 2009; Demeere et al., 2009; Kaplan et al., 2015).

When implemented properly, ABC systems can provide more accurate product-cost data that can be used to make more informed decisions about process improvements, pricing, and managing customer relationships (Stout and Propi, 2011). There are several difficulties of applying ABC (Bruggemann et al., 2005; Stout and Propi, 2011; Jeyaraj, 2015; Ratnatunga et al., 2012; Afonso and Santana, 2016; Tse and Gong, 2009; Namazi, 2016). Firstly, ABC costing systems aim to reduce specification and aggregation errors, while causing occurrence of measurement errors as a result of complexity of modelled system. Complexity of the modelled system is another difficulty of ABC as a result of excessive granularity of observed activities, while simultaneously many times not allowing for enough granularity with regards to use of single cost-driver rate for an activity (e.g., different types of order handling – special handling, overnight delivery, etc., resulting in need for sub-activities). Complexity of modelled system was also related to computational power of the company, which is nowadays much lesser concern. Third difficulty with application of ABC is that it is time consuming to build complex ABC models. Moreover, ABC system is dependent on estimation of time spend on specific activities, which was traditionally done using employ surveys. Thus, high demand on input data is one of the most important disadvantages of ABC system. Fourth difficulty is updatability of complex ABC models. Moreover, service-oriented companies face challenges that generally do not exist for manufacturing companies (Popesko and Tučková, 2012): the output is harder to define; determining activities and cost drivers is not straightforward; data collection and measurements are more complicated; lesser predictability in response to service requests. Another disadvantage is the lack of integration of ABC costing systems and other information systems. In service-oriented organizations, defining the suitable cost object might also prove to be challenging (Popesko et al., 2015).

ABC does have a potential to deal with inaccurate overhead cost allocation of traditional costing systems, as it uses analysis of company processes to define real causes of overhead cost consumption. However, despite the theoretical superiority, the ABC model has had only moderate success in replacing the traditional volume-based absorption costing models in complex organizations worldwide. This is a result of higher demand for non-financial information that has to be registered by the company. Moreover, in complex and dynamic environments ABC often fails to capture the complexity of actual operations, it took too long to implement and was too expensive to build and maintain (Bruggemann et al., 2005). According to Afonso and Santana (2016), modern costing systems should allow for computation of different types of cost objects, while being dynamic, flexible and considering diversity and complexity of modern business processes.

To solve these problems, Kaplan and Anderson (2004) introduced the concept of time-driven activity-based costing. It was specifically designed to simplify the implementation and maintenance of ABC system (Ratnatunga et al., 2012; Tse and Gong, 2009). Unlike ABC, TDABC recognizes idle resources and therefore resource costs are allocated to cost objects only when they are actually consumed (ABC works with committed resources while TDABC works with consumed resources). TDABC provides the ability to identify and report complex and specialized transactions in a simple way by using time equations that can employ multiple drivers. As was shown by several researchers TDABC can bring positive results and better representation of company's costs. According to Evereart et al. (2008) the breakthrough lies in the time estimation, where the time required for performing the activity for each case is estimated. These are so called time drivers and TDABC unlike ABC allows for multiple drivers. Traditional costing systems ignore the critical role of time, which can affect the expected profits due to inefficiencies caused by bottlenecks (Zhuang and Chang, 2017). TDABC approach requires only two parameters to estimate: firstly, unit cost of supplying resources; and secondly, the time required to perform an activity by this resource group (Bruggemann et al., 2005; Keel et al., 2017). While time drivers are generally more accurate than transaction drivers, they are also more expensive to measure (Kaplan and Anderson, 2004). On the other hand, this reduces the need for time consuming interviews and surveys defining resource pools. The first step of ABC implementation is eliminated and the first cost assigning process is eliminated also, while preserving the second assigning process, where the time is utilized to drive costs directly from resources to cost objects (Namazi, 2016). This makes the implementation of costing system easier as the design of the system itself is easier and thus, resulting in quicker and cheaper implementation and easier software integration (Pernot et al., 2007). TDABC also better accounts for complexities of business transactions by using time equations reflecting time involved in particular process (Stout and Propi, 2011), as time

drivers are easier to maintain than transaction drivers used in ABC systems (Afonso and Santana, 2016). The model removes activity pools and the use of quantity-based resource-activity cost drivers (Ratnatunga et al., 2012). The disadvantage of TDABC is the necessity of processing big amount of data for estimating time equations. Moreover, according to Gervais et al. (2010), there are some issues at the practical level: question of use of standard or actual costs, principal of homogeneity and measurement of times.

3. Process mining

Information systems are increasingly appearing in medium and small sized companies together with raising interest in management of business processes (Tuček et al., 2013). This wave of digitization is one of the main reasons for the popularization of process mining techniques in connection with business processes. Process mining techniques seek to recognize patterns and other information within data produced by information systems. Thus, the essence of process mining is to analyze business processes that are objectively represented by data, so-called event logs.

In order to apply process mining, the log have to contain the following minimum:

- each event contained in the log must be unique and must be sorted, which in practice is solved almost exclusively using timestamps,
- one must be able to distinguish between process instances,
- there has to be a function that is able to assign activity name to each event.

There are five types of process mining approaches: process discovery, conformance checking, enhancement, online support and deviance mining. The main goal of process discovery is to find patterns in the logs, based on which a process model of the analyzed process is constructed. One of the first algorithms used for process modelling is the so-called α -algorithm (Maruster et al., 2002). However, α -algorithm was not only algorithm that remained, but other new approaches emerged. Heuristic mining was introduced to deal with noise occurring in the logs (Weijters and Ribeiro, 2011). Currently, among the most successful techniques are inductive mining and split miner (Leemans et al., 2014; Augusto et al., 2017; Augusto et al., 2018). None of the discovery methods guarantees that the discovered model really corresponds to the original process. The original process is in many cases not even entirely known. It is also not guaranteed that the discovered process model fully represents the behavior hidden in the data. It is therefore necessary to verify that the discovered process model is of good quality. The quality of the model is assessed using various criteria. These cases are addressed using conformance checking. The fundamental metrics are fitness, precision, generalization and simplicity (Aalst, 2016). The essence of process enhancement is the extension or improvement of existing process models using information from the log of the monitored process. Techniques such as adding attributes to events (such as bottlenecks, service levels, frequency of occurrence, etc.), sorting traces, or correcting (for example, redesigning the model to better reflect reality, etc.) are used to improve processes. Processes can also be improved by adding different perspectives such as organizational perspective, data perspective, etc. (Aalst, 2016). Based on the above, process enhancement can be defined as an extension or improvement of an existing process model using information from the current process record. Deviance mining attempts to discover the reasons for discrepancies in business process records. Variations in business process cases may vary depending on established performance metrics, such as time or quality, which are often defined by the process owners. One of the problems in detecting discrepancies is that the result of this analysis should not be a simple statement of differences between the monitored records, but a highlighting of statistically significant discrepancies between the two records. Deviation detection methods are based on two different approaches. The first group of techniques is based on machine learning procedures (Nguyen et al., 2016). However, it is necessary to realize that only the sequence of events is considered. The second group are techniques based on statistical analysis. This group offers more possibilities; however, it is sometimes problematic to find statistically significant differences in the data (Bolt, de Leoni and Aalst, 2016). And finally, operational support uses a combination of post mortem and pre mortem data contained in records. Post mortem data reflect on already terminated cases, while pre mortem data reflect on running cases.

4. Methodology

In the following section, we present data and research methodology. In our research, we deal with a complex real-life process of financial institution. Namely, it is the loan application process. The loan application process is represented by two event logs (Dongen, 2012; Dongen, 2017). Both logs represent loan application process in the same company; however, one is from 2012 and one is from 2017; thus, representing different timespan. 2012 log contains more than 13,000 cases, which are formed by 262,200 events each having 9 attributes. 2017 log contains more than 35,000 cases, which are formed by 561,671 events each having 22 attributes. The log contains three types of events. Each event name starts either with A, O or W. The A events are related to applications, the O events are related to offers sent to customers, and the W events are related to processing of work items of applications.

Firstly, it is necessary to prepare the logs for the application PM techniques. The logs of the loan application process are available in XES format. Thus, it was checked whether all events in the log contain the basic required attributes in the appropriate formats, i.e., case IDs, timestamps and activities. Events and related cases that did not possess required attributes or did not respect necessary formats were modified to respect them if possible. Otherwise, they were excluded together with missing values. As the focus was solely on the aforementioned attributes (case ID, activity, timestamp, resources, lifecycle transition), the rest of the attributes were ignored and no cases nor events were removed from the log based on these attributes. The output are the clean event logs. These logs are then used to discover process models that are hidden in the 2012 and 2017 logs. For this purpose, we used Apromore¹. Process discovery in Apromore is based on split miner (Augusto et al., 2018) and the discovered model is represented in the form of a BPMN diagram (Business Process Model and Notation 2.0). BPMN notation was used to discover decision points and as already mentioned in section 3, split miner performs among the best process discovery techniques. Based on this we show, how can be PM used in initial phase of TDABC which is concerned with process mapping. Moreover, we identified several activities from logs and compared the selected activities to show the importance of understanding of underlying business processes and other benefits of PM. For PM analysis we also use Disco² alongside Apromore.

5. Results and discussion

As described in section 2, TDABC and especially ABC have shortcomings related mainly to the implementation of both approaches. In this section, we discuss potential benefits of integration of PM and TDABC. Secondly, we show how can be PM used in the initial phase of TDABC. TDABC is highly reliant on analysis of the underlying processes as it allocates costs based on activities performed within the process and times required to process those activities. Identification of activities is crucial also for determination of costs per minute. Thus, initial phase of TDABC implementation consists of process mapping capturing the current state of the process (process steps, decision points and resources involved) and its associated costs. Figures 1 and 2³ present discovered process models based on available event logs from 2012 and 2017. Both figures present only common behavior occurring in the logs. Thus, the process models contain all activities, but not all transitions. By setting the process model parameters to maximum, it is possible to obtain process map representing all activities contained in the logs together with all transitions between them. Based on discovered process model, the overall workflow of the loan application process is as follows: after applying, small number of the applications is controlled for fraudulent behavior, the rest of them are controlled for completeness, after that the application is pre-accepted and the application is processed. Some applications are cancelled and the offer is sent to the rest of the customers and the contact with customer follows. In case that the customer accepts the offer, application is assessed and the loan is

¹ Apromore. [online]. Available from: <http://apromore.org/platform/tools/>

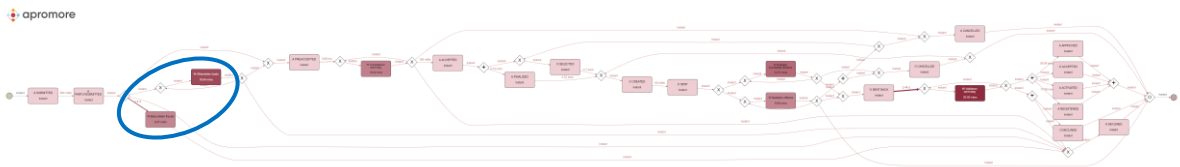
² Disco – fluxicon. [online]. Available from: <https://fluxicon.com/disco/>

³ Figures 1 and 2 serves illustration purposes due to the complexity of the process. However, based on our description of the research it is possible to reproduce process models and results of the paper.

approved. In some cases, after assessment of the application, further contact with the customer might be required to complete the application.

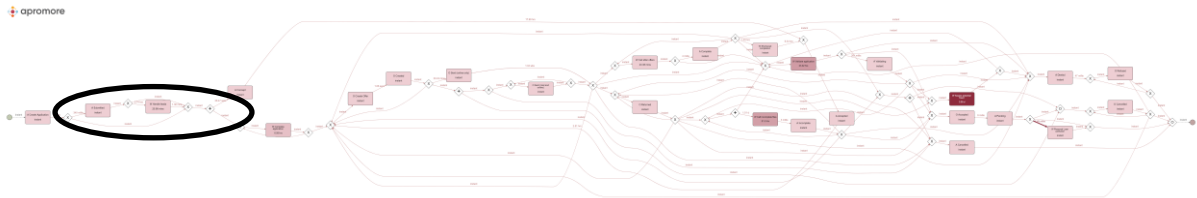
The use of PM in an initial phase of TDABC provides significant advantages over traditional approaches, which would involve interviews, workshops, observations, etc. Process mapping using traditional techniques may take up to several weeks or even months of work. Traditional approaches dealing with identification and modelling of business processes are resource intensive especially when it comes to medium or large companies. Moreover, they are done with employees of the company and may be highly influenced by employees’ perception and familiarity with only small parts of the process. Furthermore, PM allows for assessment of quality of discovered process models. Process model from Figure 1 has following qualitative characteristics: fitness is equal to 0.75, accuracy is equal to 0.76 and F–score is equal to 0.76 (F–score combines fitness and accuracy into one measure). Process model from Figure 2 has fitness equal to 0.95, accuracy equal to 0.85 and 0.90 for F-score. Both process models have high degree of quality as fitness, accuracy and F-score acquire values from interval $(0,1)$. Figure 3 shows decision points discovered in process model of 2017 log. Decision points are represented as gates in BPMN notation (red arrow in Figure 3 marks so called XOR gate).

Figure 1: Discovered process model from 2012 log (activity filter 100%, trace filter 50% and parallelism filter 100%).



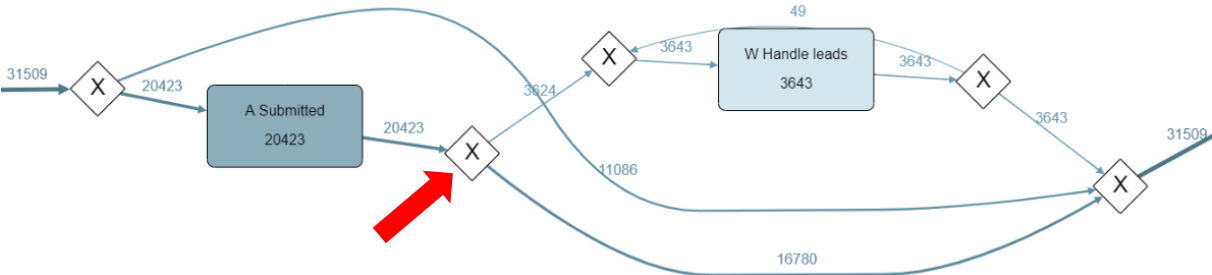
Source: author’s own

Figure 2: Discovered process model from 2017 log (activity filter 100%, trace filter 60% and parallelism filter 100%).



Source: author’s own

Figure 3: Decision points in the 2017 process model – black oval in Figure 2.



Source: author’s own

Unlike ABC, TDABC works with idle resources, however, it is done in a very simplistic way. The capacity is being estimated at 80% or 85% of theoretical capacity for both employees and machines. Rest of 20% considers breaks, communication, arrival and departure in case of employees, and maintenance, repair, scheduling, etc., in case of machines. Information systems typically record resource that handled the task alongside case ID, event ID, activity name and timestamp. Thus, it is possible to approach resources in a more sophisticated manner within the context of analyzed process. For example, while in 2012 there were 69 resources involved in loan application process, in 2017 there

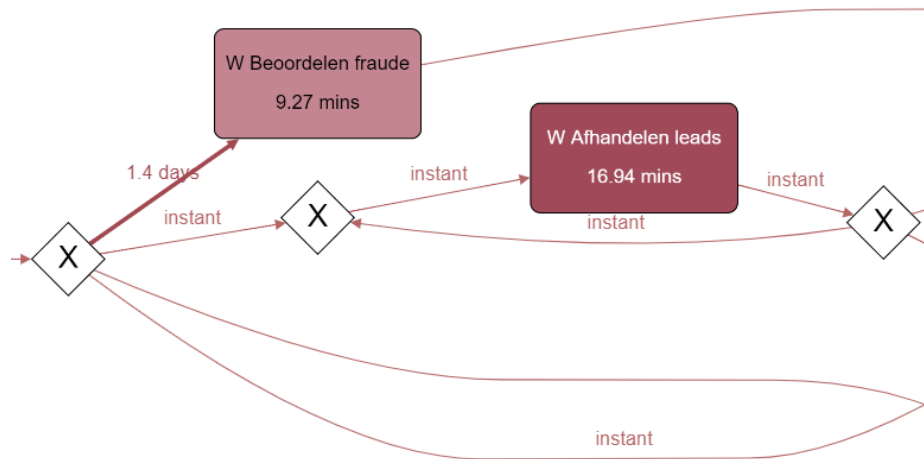
were 144 resources. Figure 4 shows resource statistics from 2017 log. It is obvious that “User_1” refers to information system as with frequency of 75,950, it spent just 2 minutes and 2 seconds processing the tasks and mean duration of 69 milliseconds. “User_2” spent in total 158 days and 21 hours processing all assigned tasks with mean duration of 13 hours and 58 minutes. It is possible to work with resources at the activity level or even at the event level using PM.

Figure 4: Resource statistics in 2017 log (from left gradually: Resources, Frequency, Relative frequency, Mean duration and Duration range)

Resource	▲ Frequency	Relative frequency	Mean duration	Duration range
User_1	75,950	13.52 %	69 millis	2 mins, 2 secs
User_3	10,863	1.93 %	5 hours, 14 mins	90 days, 21 hours
User_49	10,832	1.93 %	2 hours, 22 mins	68 days, 8 hours
User_29	9,941	1.77 %	8 hours, 27 mins	43 days, 1 hour
User_10	9,824	1.75 %	55 mins, 9 secs	51 days, 5 hours
User_123	9,308	1.66 %	8 mins, 27 secs	9 days, 1 hour
User_27	8,937	1.59 %	15 mins, 26 secs	9 days, 22 hours
User_5	8,636	1.54 %	3 hours, 35 mins	56 days, 4 hours
User_28	8,383	1.49 %	3 hours, 17 mins	117 days, 3 hours
User_121	8,119	1.45 %	27 mins, 59 secs	34 days, 23 hours
User_30	7,976	1.42 %	13 hours, 52 mins	46 days, 17 hours
User_68	7,692	1.37 %	20 hours, 13 mins	52 days, 1 hour
User_75	7,685	1.37 %	7 hours, 16 mins	49 days, 3 hours
User_100	7,590	1.35 %	1 hour, 35 mins	21 days, 21 hours
User_18	7,360	1.31 %	1 hour, 26 mins	94 days, 2 hours

Source: author’s own

Figure 5: Part of the process in blue oval from Figure 1



Source: author’s own

Figure 5 shows part of the process in blue oval from Figure 1. Transitions (arrows in Figure 4) between activities (rectangles in Figure 5) represent waiting times and are closely related to the process resources. Waiting time is a duration required for task to be processed. Processing times represent duration required to process the task. Processing times of activities can be used for estimation of time equations and determination of time drivers (see Equation 1). Activity “W_Afhandelen leads” has average processing time of 16.94 minutes over entire log. However, when it first appears in the trace, it has average processing time equal to 17.80 minutes, while in the case of its recurrence in the trace, the activity has average processing time equal to 13.34 minutes ($p_{ANOVA, \alpha=0.05} = 0.6720$). In case of activity “W_Afhandelen leads”, the time driver related to first or recurrent occurrence of activity “W_Afhandelen leads” makes difference on average 4.46 minutes. Activity “W_Afhandelen leads” occurs 4,755 times in the log during the observed period of which 763 were recurrent occurrences. Depending on the estimated cost rate of supplying capacity per unit of time, this can have a significant impact when allocating costs.

$$t_{E,A} = \beta_0 + \sum_{i=1}^n \beta_i x_i \quad (1)$$

$t_{E,A}$... time required for executing event E related to activity A,

β_i ... time consumed per unit of time driver i ,

β_0 constant amount of time required for activity A,

x_i ... i -th time driver,

i ... number of time drivers needed to run activity A.

Moreover, activity “W_Beoordelen fraude” appears to be bottle neck with average waiting time equal to 1.4 days. However, if we inspect the activity further it appears only in 108 cases in the log of more than 13,000 cases.

Most of the limitations of TDABC systems are related towards its implementation. One of such limitation are measurement errors which are a result of many estimations required for implementation of such system. However, nowadays processes are being supported through information technologies which partially address this issue. Moreover, further digitization of business processes is one of the most pronounced future trends. Even though TDABC partially addressed the resource intensive process of ABC implementation, it is still time-consuming as it is necessary to identify activities and map the process, estimate time equations and determine activity duration time drivers. These were typically done using interviews, observational and time studies self-reported data, etc. On the other hand, PM analysis is based on hard data recorded by companies' information systems and other technologies. Integration of TDABC and PM can significantly ease and accelerate the implementation process of TDABC in all of the previously mentioned areas. Furthermore, in the past better understanding of the processes and its potential improvements were byproduct of TDABC approach, but TDABC still required significant effort on otherwise unused results and non-financial data. However, this situation is changing as more and more managers implement process-oriented thinking within their organizations. Nowadays, activities such as process mapping, etc., required for TDABC approach are being implemented by companies anyway. Another advantage is that TDABC system can be easily integrated within other information systems not excluding PM software solutions. Moreover, business process management is continuous process within company and thus, it inherently supports flexibility and maintenance of the TDABC system

3. Conclusion

Overhead cost allocation is one of the most serious problems within cost management for companies and the accurate information about costs is crucial for all businesses. Costing systems play crucial role in the process of providing information to companies' managers. Modern costing systems should allow for computation of different types of cost objects, while being dynamic, flexible and considering diversity and complexity of modern business processes. ABC systems provide several advantages over traditional costing systems. In this research, we focused TDABC systems, which are based on ABC. We established following two research questions: 1) what are the benefits of integration of TDABC and process mining, and 2) how can be PM used in the initial stage of TDABC implementation. Based on the systematic review of literature we summarize advantages and limitation of TDABC. We show the use of PM in the initial phase of the implementation of TDABC in the form of proof of concept with use of real-world data addressing all the fundamental areas of TDABC implementation process. Moreover, we identified several activities from logs and compared the selected activities to show the importance of understanding of underlying business processes for TDABC. Then, we discuss how can integration of PM and TDABC strengthen the advantages and address the limitations of TDABC.

TDABC approach's limitations are mainly related to the implementation of TDABC system. As it attempted to solve the implementation difficulties of ABC systems. However, many of them were solved just partially. As we show it is possible to use PM techniques in all the resource intensive areas of TDABC like process mapping, determination of decision points, estimation of time equations and determination of time drivers to ease and speed up the process. These activities were usually done using time studies/observational studies, average estimates and self-reported, often affected by employees' perceptions and biases. On the other hand, PM analysis is based on hard data recorded by companies' information systems and other data produced by information technologies. Moreover, it offers more sophisticated approach towards human resources. Another benefit is the knowledge it generates about the efficiencies – unit cost and unit times – of critical business processes. Managers would be often surprised by how much time it takes to process a special order or to set up a new customer, or the costs of performing a quality assurance check. Companies have enjoyed immediate benefits from their models by focusing their improvement efforts on high cost and inefficient processes. In the future, our research will focus on further integration of PM techniques and TDABC

mainly in the areas of process mapping (e.g., selection of suitable discovered process model, cost-based alignment of discovered process models and event logs), use of time (use of exact times at the event level instead of estimated times at the activity level) and computation of different types of cost objects, while being dynamic, flexible and considering diversity and complexity of modern business processes.

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THE IMPORTANCE OF LIFECYCLE EXTENSION MODEL FOR IMPLEMENTATION OF RPA

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Abstract

Many information systems (IS) nowadays record data, which can be used for the purpose of business process analysis using process mining (PM) techniques. However, the usability of such data for business process analysis is limited through lifecycle extension model of recorded events. Thus, it is necessary to consider in what form should IS record data, even though company's management does not initially intend to use such data. The purpose of the research is to show the importance of lifecycle extension model and impact of different forms of lifecycle extension model on business process analysis with focus on implementation of robotic process automation (RPA). We analyzed three publicly available data sets with different forms of lifecycle extension models of recorded events using PM and compared the impact of given forms of lifecycle extension models on the analysis of business processes when used for the implementation of RPA. Based on our analysis, we recommend which forms of lifecycle transition should be used.

Keywords: business process analysis, information systems, process mining, RPA.

JEL codes: M21, M15

1. Introduction

The world's developed economies, whether we are talking about the countries of the European Union, China, the USA, Japan and others, are currently undergoing a transformation – a digital transformation. Information technology (IT) has a significant impact on the world economy not only from a macroeconomic point of view but also from a microeconomic point of view. These information technologies significantly affect all types of market entities, especially companies that achieve higher efficiency, lower costs, higher competitiveness, etc., through information technologies. However, information technologies alone cannot increase the company's efficiency, reduce its costs or increase its competitiveness. They are still just a tool, and it is necessary to approach them and manage them. This is why we observed an increase in the popularity of the discipline called Business Process Management (BPM) in recent years. With the advent of third wave of BPM (Lusk et al., 2005), a group of techniques known as process mining (PM) emerged, bringing a new perspective on business process management by combining process and data science (Dumas et al., 2018; Aalst, 2016; Aalst et al., 2011). PM techniques enable the involvement of a data-driven approach in the field of business process management. Both PM and BPM are getting significant attention and their levels of utilization are raising.

These approaches are gaining importance especially today, when the consistency between information technologies and business processes is a key factor in ensuring their effective use and thus, higher efficiency, lower costs and better competitiveness (Sokolov and Ivanov, 2015). This also applies to RPA technology. The fundamental question with RPA technology is, which business processes are suitable for its implementation. It is possible to use PM to select and redesign such processes. In addition, managerial knowledge, support and perception of RPA projects, together with a willingness to invest in complementary assets, are key to the success of RPA implementation (Schuler and Gehring, 2018). It is therefore important to find an answer to two fundamental question of RPA implementation that is: which activities to automate using RPA, and why automate these activities.

The importance of business process management is added by the fact that nowadays, it has become common practice for company's management to base decisions on information obtained from relevant data, as opposed to often inadequate past practice based on the subjective view of the manager based on perception. In this respect, operational management of which the management of business processes is a part, should not be an exception as it also fundamentally affects other companies' activities. BPM has proved to be a suitable tool due to transformation of business process management from one-time re-engineering activity to continuous managerial approach. This corresponds with the current needs of companies, which are gradually realizing that it is no longer enough to find a competitive advantage and stick to it, but need to be constantly looking for these competitive advantages. In this regard, the flexibility achieved by constantly managing business processes is a crucial factor for success. However, to achieve this, BPM and PM in particular depend on data recorded by companies' information systems, concretely process-aware information systems (PAIS). PAIS is a software system that manages and executes operational processes involving people, applications and/or information sources on the basis of process models. Examples of PAIS are workflow management systems, case-handling systems, enterprise information systems, etc. (Aalst, 2009; Dumas et al., 2005). However, necessary data can be acquired also from other commonly used information systems like, e.g., customer relationship management systems, enterprise resource planning systems, or even embedded systems. Such data is recorded in many forms, including audit trails, system logs, databases, etc. The purpose of this paper is to show the importance of lifecycle transition and impact of different forms of lifecycle transition on business process analysis using PM with focus on implementation of RPA. The remainder of this paper is organized as follows. Section 2 presents an introduction to PM and its fundamental areas and required data. Section 3 briefly introduces RPA. Following section presents research methodology and next section presents results of our research. Finally, we conclude.

2. Process mining

Process mining is a group of techniques that seek to recognize patterns and other information within data produced by business information systems. Process mining goes hand in hand with the current trend where companies base their decisions on information obtained from available data. The essence of process mining is to analyze business processes that are objectively represented by data, so-called event logs. As already mentioned, information technologies are playing an increasingly important role in the corporate sphere. This wave of digitization is one of the main reasons for the popularization of process mining techniques in connection with business processes. Information systems that record required data are increasingly appearing in medium and small companies together with raising interest in management of business processes (Tuček et al., 2013).

There are five fundamental areas of process mining: process discovery, conformance checking, enhancement, online support and deviance mining. The main goal of process discovery is to find patterns in the logs based on which a process model of the monitored process is constructed. There are tens of process discovery techniques like, e.g., different variations of α -algorithm (Maruster et al., 2002; Li et al., 2007), heuristic mining (Weijters and Ribeiro, 2011; Aalst, Adriansyah and Dongen, 2011), etc. Among the most successful techniques are inductive mining and split miner (Leemans et al., 2014; Augusto et al., 2017; Augusto et al., 2018). None of the discovery techniques guarantees that the discovered model really corresponds to the original process or full representation of the process behavior discovered in the data. It is therefore necessary to verify that the discovered process model is of good quality (Adriansyah et al., 2011; Adriansyah et al., 2015, Aalst, 2016). The essence of process enhancement is the extension or improvement of existing process models using information from the log of the monitored process. There are several types of process enhancement (Yasmin, Bukhsh and Silva, 2018): control flow correction, broadening the organizational perspective, broadening the time perspective, extension of the case perspective. Deviance mining is a group of techniques that attempts to discover the reasons for discrepancies in business process records. Variations in business process cases may vary depending on established performance metrics, such as time or quality, which are often defined by the process owners. Deviation detection methods are based on two different approaches (Dumas et al., 2018). The first group of deviance mining techniques is based on machine learning procedures (Nguyen et al., 2016). The second group are techniques based

on statistical analysis (Bolt et al., 2016; Dijkman and Wilbik, 2017). Online or operational support allows analyzing processes in real time using combination of pre mortem and post mortem data, where pre mortem denotes data from pending cases and post mortem denotes data from terminated cases (Aalst, 2016). Operational support can be implemented in three different forms, each of which has a different purpose, namely: detection, prediction and recommendation.

The data required for PM analysis have to be extracted from operational systems. Event logs used in PM have a structure designed to allow representation of key attributes of events that occurred over multiple executions of a given process. Suriadi et al., (2017) define event log as follows: An event log suitable for process mining contains data related to a single process. The event log consists of a set of cases (or traces) and is constructed as a case table in multiple record-case format. Each case consists of the sequence of events carried out in a single execution of a process (process instance or case). Each unique sequence of events from the beginning to the end of a process instance is referred to as a variant. Each case/trace belongs to exactly one variant. A variant may describe one or more cases/traces. Irrespective of type of PM analysis, the log has to contain the following minimum information (Aalst et al., 2011):

- each event contained in the log must be unique and must be sorted, which in practice is solved almost exclusively using a timestamp,
- we must be able to distinguish between process instances,
- there has to be a function that is able to assign activity name to each event.

Different types of PM analysis require different types of supporting attributes (e.g., construction of social network requires event log to contain resource information). The standard format for event logs was MXML format. However, due to several encountered limitations, new standard event log format named XES was created (Aalst, 2016). Nevertheless, there are other formats like, e.g., CSV files, or even software specific FXL files, etc. In this research, we are interested in lifecycle extension model of event log, where the lifecycle model is the transactional model used for the lifecycle transition for all events in the log and the lifecycle transition represented by each event (e.g., start, complete, schedule, etc.).

3. Robotic Process Automation

RPA technology is used to automate virtually running business processes previously performed by humans. It can be described as a software robot that can run computational processes instead of humans. Therefore, RPA can only perform the tasks for which it is taught. Ultimately, it copies actions performed by humans and does not change the flow or logic of the process. Baranauskas (2018) defines RPA as an imitation of everyday human activity based on IT, in which only a limited number of autonomous decisions are required and in most cases this activity is performed in large numbers and in a short period of time. According to Syed et al. (2020), among the most recurring topics regarding the definition of RPA are the replacement of human activity by software agents and the interaction of these agents with front-end systems similar to human agents. RPA is therefore best used for repetitive or standardized tasks that follow a certain logic, such as calculations, reports, data entry and export, etc. There are two different views on the nature of RPA software agents: (1) software agents are based on clear rules and perform mostly high-frequency repetitive routine tasks, while in the second view (2) software agents are trained on data, are complex, flexible and adapt to conditions.

In general, the application of RPA in a company is associated with increasing process speeds, reducing error rates, increasing productivity and employee motivation, resulting in a positive impact on achieving strategic goals and customer satisfaction (Smart et al., 2009; Syed et al., 2020; Lamberton, 2016). RPA operates at the interface with other systems based on an outside-in approach. For this reason, it belongs to the group called lightweight IT, unlike other BPM solutions and IS, which belong to the group of so-called heavyweight IT (Stople et al., 2017). The consequence of the former approach is the absence of the need for interventions in the IS or BPM solution itself. This change is made by replacing human resources with software robots. Thus, RPA can be integrated with virtually any system used by human workers.

According to Syed et al. (2020), benefits of RPA can be summarized in four main groups. The first group is operational efficiency which is associated with reduced durations, reduced costs and human resources, reduced manual labor and workload, and increased productivity. The second group is quality of service, as the deployment of RPA eliminates common transaction errors such as incorrect data entry, missing steps, errors in the application of rules, and human errors. The third group is implementation and integration, as RPA is relatively simpler, faster, cheaper to implement, and easier to configure and maintain compared to large IS and other forms of automation. The fourth group is risk management and compliance, as a significant number of early adopters reported that the deployment of RPA technology has led to reduced risks and increased compliance, which they consider to be a valuable benefit of RPA.

4. Methodology

In the following section, we present data and research methodology. In our research, we deal with processes of two different companies. First one is a complex real-life process of financial institution, and second one is from the area of painting and varnishing. In case of the first company, it is the loan application process. The loan application process is represented by two event logs: 2012 log and 2017 log (Donge, 2012; Dongen, 2017)¹. The logs contain three types of events. Each event name starts either with A, O or W. The A events are related to the applications, the O events are related to the offers sent to customers, and the W events are related to processing of work items of applications. In case of the second company, the data represent procurement process of one of the company's municipalities: 2019 log (Dongen, 2019). The log itself contains records from 3 municipalities, however, more than 99% of the data was produced by one municipality. Thus, we removed from the 2019 log data recorded by other two municipalities representing less than 1% of the data.

When implementing RPA, it is necessary to assess the expected improvements in performance, as they are closely related to the both fundamental questions of RPA implementation. Thus, the goal of the paper is to analyze the impact of lifecycle extension model on the results of PM analysis used for implementation of RPA. Firstly, it is necessary to prepare the logs for the application of PM techniques. The logs of the loan application process are available in XES format. Thus, it was checked whether all events in the log contain the basic required attributes in the appropriate formats, i.e., case IDs, timestamps and activity names. Events and related cases, that did not have required attributes or did not respect necessary formats, were modified to respect them if possible. Otherwise, they were excluded together with missing values. As the focus was solely on the aforementioned attributes (case ID, activity, timestamp, resources, lifecycle transition), the rest of the attributes were ignored and no cases nor events were removed from the log based on those attributes. The output is the clean event log. These logs are then used to discover process models that are contained in the 2012, 2017 and 2019 logs. For this purpose, we used Apromore². Process discovery in Apromore is based on split miner (Augusto et al., 2018) and the discovered model is represented in the form of a BPMN diagram (Business Process Model and Notation 2.0), but it is also capable of fuzzy mining and discovery of process maps. As already mentioned in section 3, split miner performs among the best process discovery techniques. We identified several activities from logs and compared the selected activities to show the importance of lifecycle extension model and its impact on implementation of RPA. This work is based on previous research, where we analyzed 2012, 2017 and 2019 logs using PM. We used discovered process models for creation of simulation models of business processes to determine which activities are suitable for RPA implementation and why based on performance point of view.

5. Results

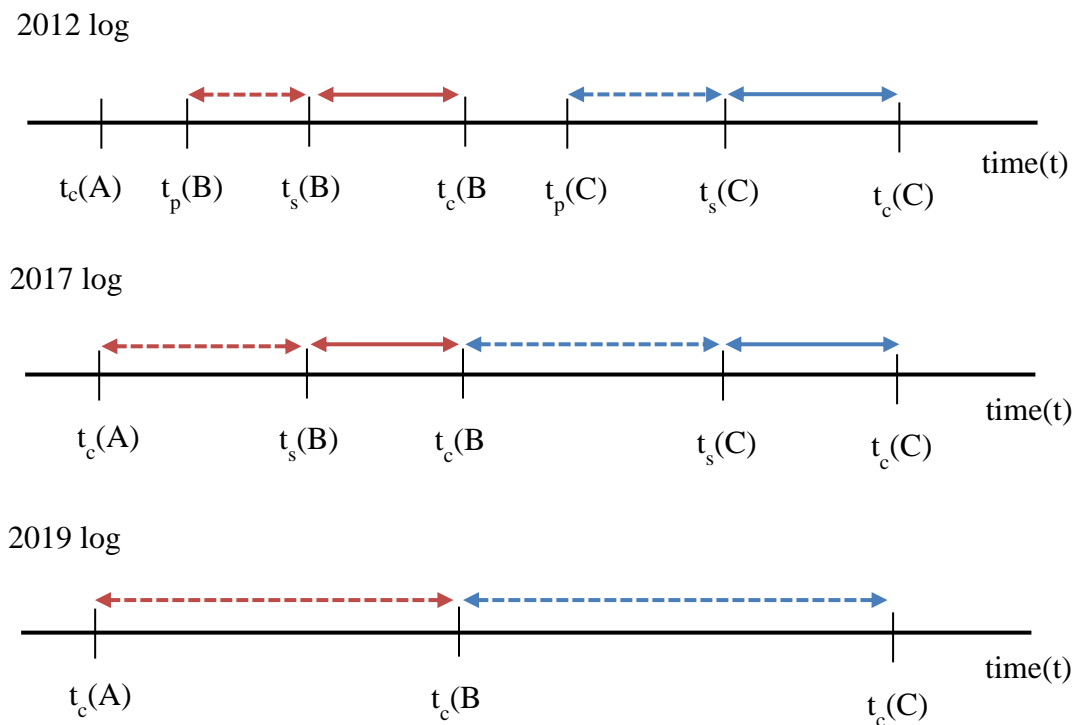
Each event in the 2012 log has one of the 3 states from defined lifecycle extension model: "Schedule", "Start" or "Complete", i.e., activity scheduling of activity A, start of activity A and end of activity A. The processing time is therefore calculated as the difference between the timestamps of the

¹ 2012 and 2017 logs represent the same loan application process of the same company, but different timespan.

² Apromore – process mining software platform. Accessed from: <http://apromore.org/platform/tools/>

"Complete" and "Start" events of each activity, respectively. The waiting time is calculated as the difference between the timestamp of event "Start" of activity B and the timestamp of event "Schedule" of activity B . Each event in the 2017 log has one of 2 states from defined lifecycle extension model: "Start "And" Complete ", i.e., the beginning of the activity and the end of the activity. The processing time is therefore calculated as the difference between the timestamps of the "Complete" and "Start" events of each activity, respectively. The waiting time is calculated as the difference between the timestamp of the "Start" event of activity B and the timestamp of the "Complete" event of activity A . Activity B must directly follow activity A in the log. The 2019 log distinguishes only the "Complete" state within the transaction lifecycle. Therefore, process and waiting times cannot be distinguished during PM analysis. The difference between the timestamp of the "Complete" event of activity B and the timestamp of the "Complete" event of activity A represents the waiting times in discovered process model. This is shown in Figure 1, where $t_i(x)$ indicates the value of the timestamp of the activity $x \in \{A, B, C\}$ in the transaction state $i \in \{p, s, c\}$, where c represents the termination state, p represents the scheduling state and s represents the beginning state. In Figure 1, the dashed double-sided arrow represents the waiting time of the activity, while the solid double-sided arrow represents the processing time of the activity. The red arrow refers to activity B , while the blue arrow refers to activity C . Thus, in the 2012 log, the waiting time is calculated as the difference of the timestamps $t_s(B) - t_p(B)$ and is represented by a red dashed double-headed arrow. Activities that have instantaneous waiting times occur in milliseconds. In the case of instant processing times, timestamps of the beginning and end of the activity are equal or undistinguishable.

Figure 1: Lifecycle extension model for 2012, 2017 and 2019 logs based on analysis of the data

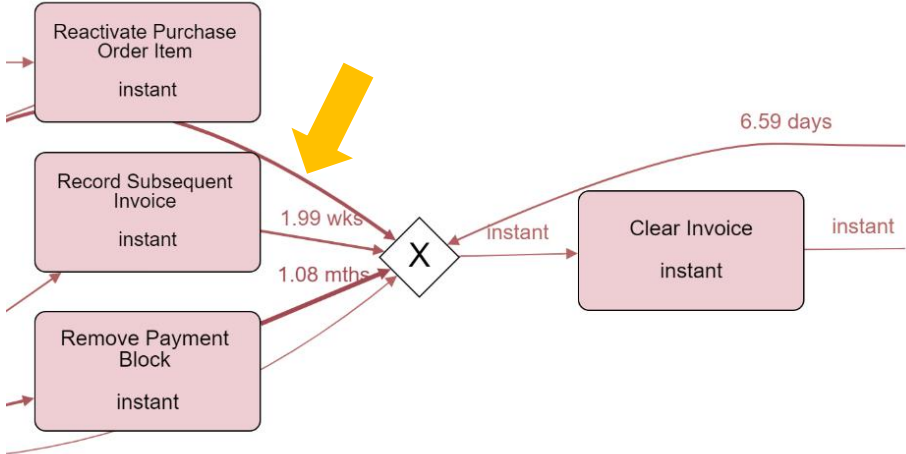


Source: author's own

Figure 2 is the excerpt of discovered process model from 2019 log. It shows the performance perspective based on one state lifecycle extension model. One can see, that the impact of one state lifecycle extension model on the performance perspective, is that all activities within the log are considered to be instant, and waiting times are represented as transitions combining both processing and waiting times. This applies to the entire discovered model. Figure 3 shows the performance perspective based on the two state lifecycle extension model from 2017 log. In the case of 2012 log,

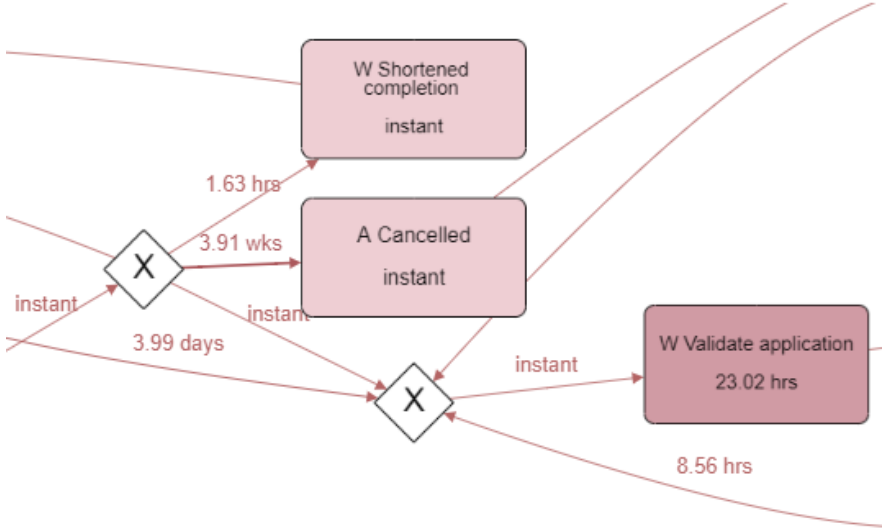
three state extension model provides essentially the same information as the two-state lifecycle extension model in 2017 log (see Figure 4). It is due to the implementation of the three-state lifecycle extension model, where the state “Schedule” is invoked when antecedent activity transitions into state “Complete”. However, for the entire 2012 log applies that $t_p(B) - t_c(A) < 1 \text{ second}$. Thus, the differentiation of states “Schedule” and “Start” does not provide further information relevant for PM analysis.

Figure 2: Performance perspective – a result of one state lifecycle extension model in 2019 log



Source: author’s own

Figure 3: Performance perspective – result of two state lifecycle extension model in 2017 log



Source: author’s own

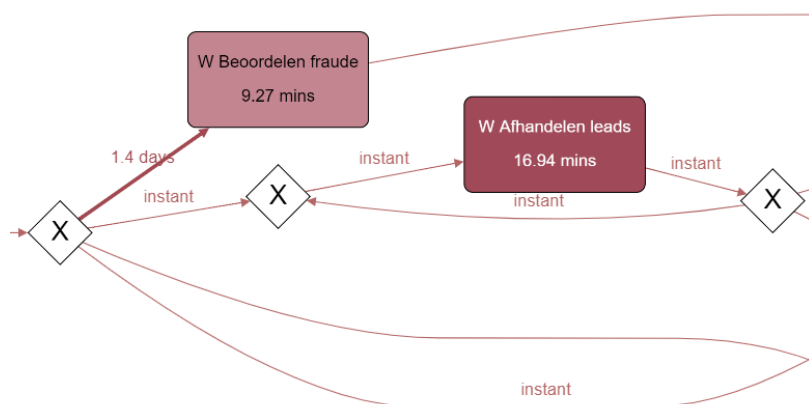
As stated in section 1, there are two fundamental questions to consider before implementation of RPA. Firstly, which activities should be automated using RPA and secondly, why automate these activities. RPA implementation is strategic decision involving assets of the company. Thus, it is necessary to consider performance in relation to both fundamental questions of RPA implementation. The answer to the second fundamental question should be given through business case. Business case presents changes to the process that will be delivered through automation of different activities through implementation of RPA.

Figures 2 and 3 contain activities “Clear invoice” and “W Validate application”. Both activities are generally speaking suitable for implementation of RPA according to the literature.

However, there are several limitations to the one state lifecycle extension model, compared to the two and three state lifecycle extension models regarding implementation of RPA. Firstly, as shown in Figures 2 and 3 it is impossible to distinguish between processing, and waiting times of observed activities in case of one state lifecycle extension model. Activity “W_Validate application” has average processing time 23.02 hours and waiting times of 3.99 days or 8.56 hours based on trace in which it occurs (see Figure 3). Activity “Clear invoice” has waiting time of 6.59 days, 1.99 weeks 1.08 months and 3.38 weeks³. This is significant, because it is usually easier to improve the efficiency of the process through waiting times rather than processing times. Changes in processing times typically require technological changes within the process, while higher efficiency regarding waiting times can be many times achieved through simpler and less resource intensive ways (like e.g., reorganization, scheduling changes, etc.). Moreover, there are various factors behind processing and waiting times. Waiting times of both activities “Clear invoice” and “W_Validate application” may be driven by actions required by suppliers in case of activity “Clear invoice” and by actions required by customers in case of activity “W_Validate application”. In such cases, it is impossible to estimate the impact of implementation of RPA using one state lifecycle extension model without assumption of elimination of both processing and waiting times entirely. Thus, many times it is necessary to work with effects of partial automation, where processing and waiting times are not eliminated entirely due to the external factors, involved non rule based behavior, etc. Without processing and waiting times, we have no borderline values for assessment of RPA implementation.

If we consider processing times of activity “W_Afhandelen leads” from 2012 log⁴, we see that its overall average processing time is 16.94 minutes (see Figure 4), but at a closer look, if the activity “W_Afhandelen leads” appears in the trace for the first time, then it has average processing time of 17.80 minutes, while in the case of its recurrent occurrence within the trace, the activity has average processing time equal to 13.34 minutes. This may indicate two different procedures for activity “W_Afhandelen leads” based on its occurrence in the trace. In such case, RPA agent would require two scripts for both scenarios based on activity’s occurrence in the trace. The same can be applied for activity “W_Validate application”, which has the overall average processing time equal to 23.02 hours, but if activity “W_Validate application” directly follows activity “O_Sent (online only)”, it has average processing time of 1.32 days. If it directly follows activity “A_Complete”, it has average processing time of 22.64 hours. Such procedural changes are important to find, as they require different scripts for RPA agents to be implemented. In addition, they may have different impacts on resulting process improvement in performance. Furthermore, it is harder to distinguish between automated and non-automated activities based on the log in case of one state lifecycle extension model. Lastly, it prevents from building accurate process models and severely limits simulation purposes, especially since probability distributions and processing and waiting times of activities may differ (see Tables 1 and 2).

Figure 4: Performance perspective – result of three state lifecycle extension model in 2012 log.



Source: author’s own.

³ Waiting time of 3.38 weeks is not visible in Figure 2 due to layout of the process model, however, it is represented by transition marked with orange arrow.

⁴ See Table 1 for English translations of activities in 2012 log.

Another limitation of one state lifecycle extension model is its work with resources. Workload reduction together with performance and efficiency are among the key areas of focus for RPA. One state lifecycle extension model makes the analysis of efficiency of human resources impossible due to the opposite nature of processing and waiting times regarding resources. Moreover, one cannot compute FTE (Full-time equivalent) for particular employees using one state lifecycle extension model. Even though many times, FTE can become deciding factor when implementing RPA.

Tables 1 and 2 show estimated probability distributions of processing and waiting times of chosen activities that provide the best fit based on data from the log. Exponential distribution and Weibull distribution are the most used distributions. Exponential distribution prevails among both processing and waiting times. Weibull distribution is the second most used distribution. BPM literature states that processing times of manual tasks follow Gaussian distribution, which is not the case for loan application process based on Tables 1 and 2. It is important to understand the data distributions of considered activities as they may have significant effect on performance analysis (like e.g., outliers, position of average to majority of data, etc.). One has to be careful when applying averages of such data in process analysis. This is again impossible using one state lifecycle extension model.

Table 1: Probabilistic distributions of selected activities in 2012 log

Activity	Probability distribution	
	Processing time	Waiting time
W_Afhandelen leads (W_Handle leads)	Gamma	Exponential
W_Beoordelen fraude (W_Assess potential fraud)	Exponential	Exponential
W_Completeren aanvraag (W_Call incomplete files)	Exponential	Weibull
W_Nabellen offertes (W_Call after offers)	Exponential	Exponential
W_Nabellen incomplete dossiers (W_Complete application)	Exponential	Weibull
W_Valideren aanvraag (W_Validate application)	Weibull	Exponential

Source: author's own

Table 2: Probabilistic distribution of selected activities in 2017 log.

Activity	Probability distribution	
	Processing time	Waiting time
W_Assess potential fraud	Exponential	Exponential
W_Call after offers	Exponential	Exponential
W_Call incomplete files	Exponential	Exponential
W_Complete application	Exponential	Weibull
W_Handle leads	Exponential	Exponential
W_Validate application	Exponential	Exponential

Source: author's own.

6. Conclusion

Many IS nowadays record data which can be used for the purpose of business process analysis using PM techniques. However, the usability of such data for business process analysis is limited through lifecycle transition of recorded events. The purpose of the research was to show the importance of lifecycle extension model and impact of different forms of lifecycle transition on business process analysis with focus on implementation of RPA. In our research, we analyzed three publicly available data sets with different forms of lifecycle extension models of recorded events. This work is based on previous research, where we analyzed 2012, 2017 and 2019 logs using PM techniques, and used discovered process models for simulations of business processes to determine

which activities are suitable for RPA implementation and why based on performance point of view. For the purpose of this research, we identified several activities from logs and compared the selected activities to show the importance of lifecycle extension model and its impact on analysis of implementation of RPA.

One state lifecycle extension model limits the ability of PM analysis of RPA implementation regarding both fundamental questions. One state lifecycle extension model prevents performance analysis of the process and limits the ability to find suitable candidates for RPA implementation and assessment of the impact of RPA implementation through process simulations or any other means. One state extension model does not differentiate between processing and waiting times, even though both use different tools for efficiency improvement. It is also much harder to estimate impact of external factor affecting implementation of RPA. It also limits analysis of deviant behavior which can have significant impact on implementation of RPA. Furthermore, we are not able to properly analyze human resources involved within the process, nor are we able to estimate FTE, even though improvements in performance of the process and reduction of employees' workload are being listed as one of the main benefits of RPA implementation. Thus, when implementing information systems, we recommend to take this issue seriously and use at least two state lifecycle extension model.

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URBAN CULTURAL TOURISM IN EUROPEAN ECONOMIC CONTEXT. THE ROLE OF MUSEUMS, THEATERS, PUBLIC LIBRARIES AND CINEMA ATTENDANCE

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Abstract

Tourism has played a significant economic part both in Europe and worldwide, which is statistically demonstrated by the growing share of this sector in the European economy in the last decades. An important contribution has been made by urban cultural tourism, that niche of tourist activity on which we focused our analysis. This paper analyzed, for the period between 2000 and 2019, the relationship between economic growth and cultural tourism from the perspective of museums, theatres, cinemas and public libraries to demonstrate the importance of cultural tourism for the urban economy. The lack of statistical data led us to exclude a number of European states and to arrange the remaining ones so as to configure two models processed using multiple linear regression (MLR). Our conclusion is that urban cultural tourism positively influences both the growth of the tourism sector and the economic growth. Of the variables analyzed, it seems that the two factors with the highest degree of attractiveness, in the case of urban cultural tourism, are museums first and then theaters. The results we have obtained are important in the decision to establish the urban development strategy. The inclusion of tourism in the urban development strategy allows not only to increase the attractiveness but also to attract revenues to local budgets, stimulates entrepreneurial activity in hotels, restaurants, shops and it has a positive impact on the labor market. Thus, the development of urban tourism has direct, indirect and induced economic and social effects that cannot be neglected. The public and entrepreneurial sectors have significantly to gain once the strategy of urban development through tourism is valued.

Keywords: cinema attendance, cultural tourism, economic growth, museums, public libraries, theatres
JEL codes: F63, O47, O52, R11, Z32

1. Introduction

The interest for culture as urban change's main resource has grown substantially during the last decades (Montalto et al., 2019). If we refer to Maslow's hierarchy of needs, the need for culture is a top-level need which appears only after all the lower needs are satisfied. Museums, theatres, cinemas and all the culture sources act as self-fulfillment tools, and the extent of their accomplishment depends on each individual (McLane, 1997).

Culture has an impact on people and local communities, changing their thinking, attitudes, and even society on the long term (Rădoi, 2020). Culture is a multidimensional sphere integrating the social and economic dimension. Montalto et al. (2019) highlight that the cultural phenomenon is only specific to urban areas. Increasing consideration for cultural values and acknowledging culture's role are

accompanied by a change in the tourism offer (Campos and Sequeira, 2019), and tourism growth determines, to a significant extent, economic growth (Eyuboglu and Eyuboglu, 2019).

However, measuring culture at the urban level remains, in most aspects, an unexplored territory, especially when referring to certain countries. Montalto et al. (2019) explain the culture's importance in economic growth, enhancing the empirical analysis, showing that cultural and creative aspects are differently distributed among European cities, allowing local authorities to approach different development strategies. The authors speak about the city's cultural vibe characterized by the number of tourist attractions and landmarks, museums, cinemas' capacity, concerts and events, theatres, tourists who spend at least one night in the city, museum visitors, cinema attendance and satisfaction with cultural facilities.

Cultural tourism as a social phenomenon, but also as an academic subject of study, dates back to the years after the Second World War, when leisure travels expanded greatly (Richards, 2018). Also, it is a type of tourist activity where the essential motivation of the visitor is to learn, discover, experiment and consume cultural attractions/products, both tangible and intangible, in a certain tourist destination (WTO, 2019).

Some cities are more visited than others because tourists look for new experiences and they want to visit cathedrals, medieval buildings, famous museums or spectacular events (Hospers, 2019). Adamo et al. (2019) also refer to urban tourism as a set of tourist resources or activities located in cities and offered to visitors. Nowadays, cultural tourism also refers to lifestyles, creativity and "daily culture" (Richards, 2018). In the last decades, the most attractive forms of urban tourism were historic urban areas and theme parks (Gospodini, 2001).

The importance of the cultural tourism's role is the generation of significant economic and social benefit for local communities; however, it is simultaneously a source of erosion and deterioration of the heritage (Diaz-Parra and Jover, 2020; Mihalič, 2020; Adie et al., 2019; Little et al., 2019; Milano et al., 2019; García-Hernández et al., 2017). Cultural tourism allows urban centres to create job places and increase revenues (Panasiuk, 2020; Khusnutdinova et al., 2019). Cultural tourism increased to such an extent because people have short holidays and they travel more, transportation became relatively convenient and allows quite fast and inexpensive travelling between urban destinations (Dumbrovská and Fialová, 2014), and cities turn to be more attractive by organizing events, becoming famous as shopping centres or cultural centres, thus offering the possibility to experiment, at the same time, elements from cultural, historic, scientific (congresses), sports, gastronomic, night-life and shopping tourism (Namberger et al., 2019). Ebejer (2019) speaks about two categories of tourists in search for experiences which are specific to cultural tourism: purposeful cultural tourists, highly motivated to travel for cultural purposes and who have deep experiences; incidental cultural tourists, for whom culture is not a purpose in se when they plan their travel, and they have superficial experiences. Also, Ebejer (2019) classifies cultural tourists in greatly motivated, i.e. people who travel to a destination specifically for cultural opportunities, motivated in part, i.e. people who travel for cultural opportunities, but also for other reasons, such as relaxation, sun, sea, and accidental cultural tourists, i.e. those who visit a destination for other reasons than culture, but afterwards engage actively in cultural activities once the destination is reached.

Economic policy plays an important role in promoting a city on the tourism map (Mansilla and Milano, 2019). The special importance of cultural tourism is recently re-acknowledged in a WTO study (2018), which shows that 89% of the national tourism administrations integrate cultural tourism in policies focused on this field. Regarding the revenues it generates, Vizcaíno Ponferrada (2015) demonstrates, in an economic analysis of the tourism's evolution in Spain, that cultural tourism has contributed the most to the increase of the annual rate of tourism revenues in this country. The author also notices that cultural tourists tend to spend more than other international tourists; this is why they play an important part in supporting Spanish museums.

This paper analyzes the relationship between economic growth and cultural tourism from the perspective of museums, theatres, cinemas and public libraries, to demonstrate the importance of cultural tourism for the urban economy, even if the studies in this field are still in an early stage (Trunfio and Campana, 2019) and there are no empirically confirmed results.

2. Literature Review

2.1 Museums and theaters

The studies on museums and their connection with tourism are relatively few, and the analysis of the relationship between cultural activity and economic performance is a challenge, especially when data referring to these aspects lack constantly or are considered as ungrounded from a methodological point of view (Rex, 2019).

Museums have always been closely connected to tourism and considered to be high-interest cultural attractions (De Varine, 2012; Cavalcante Gomes, 2001; Richards, 2001) or even primary attraction by some authors (Ignarra, 1999) given the fact that they shelter a large part of the knowledge searched by tourists during their travels. Museological institutions have become ever more a convergence centre for tourists (Brida et al., 2012). In Europe, museums are among the most visited tourist attractions and one of the most important economic assets (Carugati et al., 2005), being sources of knowledge (Kirsch and Jagošová, 2019; Pop et al., 2019), and using heritage for educational purposes, with an important role in shaping the future (Pop et al., 2019).

In the 20th century, museums became a region's pride, and local communities involved in this field as a form of social responsibility, so that nowadays this field has become a growing industry worldwide (McLean, 2017). Museums provide authenticity and disseminate values, contribute to economic regeneration, they leave their mark on leisure, tourism, education and individual's personal evolution.

In the area of cultural tourism, theatres' offer is in close connection to museums' offer. Theatre and culture provide instruments for the expression and conservation of a society. According to Obasi (2017), everyone's conception about theatre is different. Some people consider theatre a form of entertainment, others a form of education and others see theatre as both entertaining and educational.

In a broad sense, theatre includes representations, dance, opera, musical theatre (Smith, 2014) and it is a global phenomenon, just like tourism (Obasi, 2017). Even if tourism and theatres are different areas, with different organizational structures and values, they converge in the sphere of cultural tourism (Santamarta España, 2019).

It is generally known that museums and art galleries are important attractions for tourists, especially in big cities (Smith, 2003). Regarding the performing arts, it is a controversial subject. Smith (2003) argues that these attractions have a low effect in attracting non-local tourists because of the rotation of performances between cities. Song (2015) specifies that tourists feel more satisfaction when, during their visits, participate to performances. Theatre and tourism industries are, according to Song (2015), complementary and mutually beneficial.

In order to attract audience, theatres make the effort to promote their products, especially if these institutions are located in already established cultural areas. On the one hand, theatres stimulate tourism and help to establish and strengthen the destination's cultural brand, provide local experiences, are an important part of cultural tourism, are a factor in stimulating international tourism, having the power to influence tourists in their decision to return to a certain place, and offer solutions to the seasonality issue. On the other hand, tourism promotes theatres and supports them to increase their revenues by offering the possibility to increase and diversify the audience and to create new jobs, to have new theatrical performances, and to extend the seasons and life cycle of a play. Thus, theatres can be considered as tourist attractions and an element of the urban destinations' tourist brand.

Based on all these pieces of information, the aim is to study the following two research hypotheses: H1: museums and theatres, as attractions of cultural tourism, influence the growth of the tourism sector and H2: museums and theatres, as attractions of cultural tourism, influence economic growth.

2.2 Public libraries și cinema attendance

Public libraries increase the community's capacity for economic development and resilience (ULC, 2007). A report from Urban Libraries Council (ULC, 2007) points out a strong connection between investment in culture and education, on the one hand, and long-term economic success, on the other hand. This is where public libraries play their part as educational factor and cultural promoter.

These are stable and powerful instruments for cities' economy and resilience. Although the economic impact of public libraries differs between cities, they attract a significant number of visitors, especially if they are included by the tourist circuit. A public library attracts tourists in two ways: by organizing tourist visits which offer access to knowledge by means of literary, cultural, and historic heritage of a region, by the available books - especially old and limited-edition books -, and the offered services, in particular exhibitions, concerts, conferences.

Libraries became a component of the cultural tourism offer by means of coordinated partnerships between local and national institutions, non-governmental organizations and companies which want to attract an increasing number of tourists.

Cinemas, as an element used in promoting cultural tourism, are considered an educational factor because they send and receive information, distances are eliminated and people are stimulated emotionally (Grubba, 2020). All this promotes a modern form of art, strongly connected to the social and cultural field. Films and cinemas are capable of stimulating the intention to visit certain destinations (Araújo, 2012). Film-induced tourism became more present worldwide as a result of the expansion of the entertainment and tourist industries (Hudson and Ritchie, 2006). Although tourism motivated by watching a film is a reality, little has been written on this topic, especially due to the absence of statistical data (Țuclea and Nistoreanu, 2011). Most research focuses on the effect of film production and destinations intentionally or unintentionally promoted through films, and less on the effects generated when some people travel to a certain place in order to watch a certain film or to attend a specific cinematic event.

The connection between cinemas and tourism is made through film-induced tourism. This concept was introduced by Beeton (2006) and it is closely connected to the concepts: film tourism, movie tourism, movie-induced tourism, cinetourism and film-reinduced tourism (Hudson and Ritchie, 2006; Heitmann, 2010; Beeton, 2010; Araújo, 2012; Cordoso et al., 2017). Özdemir and Adan (2014) argue that films are a passive form of entertainment, and they can keep up the interest for a destination in a way that the economic operators cannot. This increases the interest in watching the film or attending a certain event and therefore the willingness to allocate money, time and to travel to a certain city or town. The common ground between film and tourism is that both allow people to experiment, see and learn new things. Film is an indirect stimulus, which determines tourists to travel by choosing a certain destination exclusively related to the activity of cinemas.

Three types of tourists have been identified according to this form of tourism: *serendipitous tourists*, those who came to practice film-induced tourism by chance, as a result of a lucky coincidence, because they were in a destination where a film was running or a festival was taking place; *general tourists*, those who are not specifically interested in a cinema destination, however, should the occasion emerge, they will attend specific events; *specific tourists*, those who intentionally look for the destination where a certain film is running or a cinema event takes place and they are not attracted by authenticity, it being replaced by personal motivation (Gjorgievski and Trpkova, 2012). The more motivated an individual is by a film, the more his need for self-actualization increases, and travel becomes a form of personal reward.

Starting from this information, we set out to study the following research hypotheses: H3: public libraries and cinemas, as attractions of cultural tourism, influence the growth of the tourism sector and H4: public libraries and cinemas, as attractions of cultural tourism, influence economic growth

3. Model and Data

3.1 Data

The indicators we took into consideration to validate the research hypotheses are specific for measuring economic growth and they are characteristic to urban cultural tourism. The indicators' values refer to the period between 2000 and 2019. Because of the impossibility to find the indicators from a single source, we had to access Eurostat, World Bank and World Tourism Organization data (Yearbook of Tourism Statistics, Compendium of Tourism Statistics and Data Files). We opted for the analysis of real GDP and real GDP per capita to characterize the economic situation. We took into account the population of each country under analysis to relate the indicators to the number of individuals. To study

the contribution of urban cultural tourism to the tourism sector, we analyzed the number of museums, public libraries, theatres and the cinema attendance in major European cities.

The empirical analysis is based on two models. The first model (Model 1) excludes several states due to the absence of data. The model analyzes the connection between tourism real GDP per capita and the cultural institutions in the big European cities, especially public libraries, theatres, cinemas and museums. In the case of this model data is missing for Cyprus, Luxemburg, the Netherlands and Austria. Tourism GDP values are missing for Belgium, Bulgaria, Ireland, Spain, and Hungary; data regarding public libraries are missing for Italy and Portugal; data regarding the number of theatres are missing for Italy; data regarding museums are missing for Belgium, Czech Republic, Ireland, Malta, and Portugal. In this situation, Model 1's research base is EU-14, with data availability as the selection criterion. Model 2 is based on the same criterion. Due to the lack of data on the number of public libraries, theatres, cinemas and cinema attendance, Italy, Cyprus, Luxembourg, the Netherlands, and Austria were eliminated from our analysis. We lack data on museums in the case of the Czech Republic, Ireland, and Malta, and also data on public libraries and museums in the case of Portugal. After removing from Model 2 the states for which data is incomplete or non-existent, 18 states from the 27 EU Member States remained under analysis.

3.2 Model

The empirical analysis was made with the help of multiple linear regression (MLR). We used two models, Model 1 and Model 2, to answer the research hypotheses. MLR is an extension of OLS regression method because it involves more than an independent variable. Thus, regression models are of the following type $Y = f(X_1, X_2, \dots, X_n) + \varepsilon$.

In the two models we study the connection between the dependent variable, in our case the question is about the tourism real GDP per capita and the real GDP per capita, and four independent variables describing the urban cultural tourism, i.e. public libraries, theatres, cinema attendance and museums. Equations (1) and (2) describe the two models:

$$\text{Model 1: } \text{GDP}_{\text{tou}} = \beta_0 + \beta_1 \cdot \text{PL} + \beta_2 \cdot \text{Th} + \beta_3 \cdot \text{Catt} + \beta_4 \cdot \text{Mz} + \varepsilon \quad (1)$$

$$\text{Model 2: } \text{GDP} = \beta_0 + \beta_1 \cdot \text{PL} + \beta_2 \cdot \text{Th} + \beta_3 \cdot \text{Catt} + \beta_4 \cdot \text{Mz} + \varepsilon \quad (2)$$

where GDP and GDP_{tou} , as dependent variables, and real GDP per capita and, respectively, tourism real GDP per capita as dependent variables. β_{i-n} are regression coefficients, and independent variables are: PL – number of public libraries in big cities, Th – number of theatres in big cities, Catt – cinema attendance in big cities, Mz – museums in big cities.

We started by presuming that there is a linearity relationship between dependent and independent variables; independent variables are not very correlated between them, and residual values are distributed normally. After modelling, regression equations are as follows:

$$\text{Model 1: } \text{GDP}_{\text{tou}} = 2662 - 0.104 \cdot \text{PL} + 3.69 \cdot \text{Th} - 292 \cdot \text{Catt} + 154.1 \cdot \text{Mz} + \varepsilon$$

$$\text{Model 2: } \text{GDP} = 7.038 - 0.0001 \cdot \text{PL} + 0.0024 \cdot \text{Th} - 0.2234 \cdot \text{Catt} + 0.3918 \cdot \text{Mz} + \varepsilon$$

4. Results

The first model shows the influence of variables describing the urban cultural tourism on the growth of European tourism industry. From the regression equation we note, in the case of the first model, the direct relationship between tourism real GDP and the number of theatres and museums in the big cities. However, the case of public libraries and cinema attendance is different. The relationship is negative for these two variables, and even strongly negative if we refer to cinema attendance. It appears that attractions and variables with an influence on the growth of the tourism industry are theatres and, in particular, museums. The first model confirms the first hypothesis (H1), but it refutes the third one (H3).

The second model shows the influence of variables describing the urban cultural tourism on the growth of European economy. From the regression equation we note, in the case of the second model, the direct relationship between real GDP and the number of theatres and museums in the big European

cities. Model 2 validates Model 1. Cinema attendance influences negatively on European economic growth. In the case of public libraries, we also note a negative relationship, but the value of the regression coefficient is at a level close to zero. We explain this fact by the effect on economic growth exerted by tourists whose objective is to visit libraries. The highest negative influence is in the case of cinema attendance.

In the case of Model 1, the marginal effect of a theatre and a museum on tourism growth is 3.69 and 154.1, respectively. The relatively high value of slope ($\beta_0 = 2662$) shows that, to a great extent, tourism industry also depends on other forms of tourism beside the cultural one. All regression coefficients are included in the confidence intervals, except for public libraries. The value of correlation coefficient shows that the first model is explained at 68.6% by its variables and the connection between variables is a relatively important one, as shown in the review table (Table 1).

In Model 2, the marginal effect of a theatre on economic growth is of 0.003, while a museum's effect is 0.392. The value differences compared to Model 1 are given by the size according to which such effects are measured. If in Model 1 we are interested in the independent variables' impact on economic growth from tourism only, in Model 2 we are interested in the impact of independent variables on economic growth in general. In both cases we notice the positive impact of the urban cultural tourism. Of all variables characterizing urban cultural tourism, museums have the highest influence on the progress of the tourism and the economic sectors. Model 2 confirms the second hypothesis (H2), but it refutes the fourth (H4).

Table 1: Review table for Model 1 and Model 2

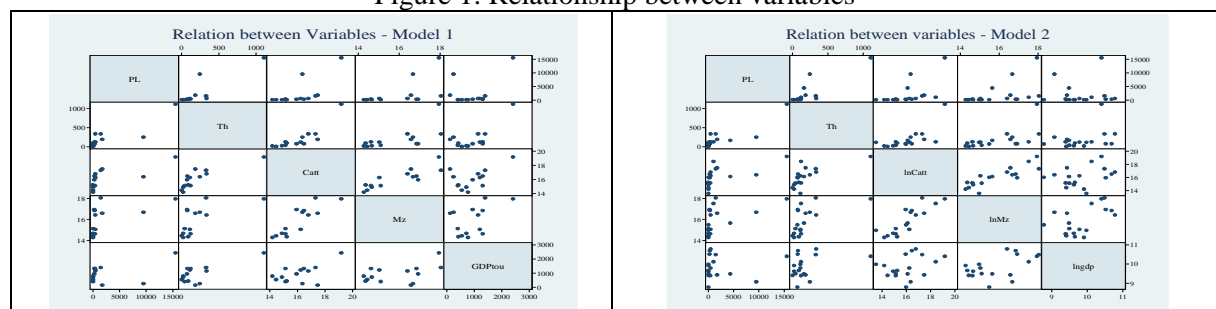
Model 1				Model 2			
Coefficients	R-squared	Confidence Intervals		Coefficients	R-squared	Confidence Intervals	
		95%	5%			95%	5%
$\beta_1 = -0.1037$	0.6860	-0.219032	0.011458	$\beta_1 = -0.00014$	0.6196	-0.0002428	-0.000042
$\beta_2 = 3.6927$		1.106786	6.278779	$\beta_2 = 0.00249$		0.0006512	0.0043477
$\beta_3 = -292.1025$		-861.0628	276.8578	$\beta_3 = -0.22378$		-0.5323528	0.0847846
$\beta_4 = 154.1184$		-249.0709	557.3076	$\beta_4 = 0.39177$		0.0706894	0.7128703
$\beta_0 = 2662.1720$		-2725.588	8049.931	$\beta_0 = 7.03765$		3.724892	10.35041

Source: authors' calculations using Stata

All regression coefficients of Model 2 are included in confidence intervals, and the correlation coefficient's value shows that variables which characterize the European urban cultural tourism describe economic growth at 61.96%. Both models show that cultural tourism in big European cities has a positive economic role, both for the development of tourist sector, and for economic growth.

The relationships between variables, for both models, are shown in Figure 1 where correlation matrices can be seen. The connection between dependent and independent variables from the two models can be seen here, and also the connection between independent variables. The graph in Figure 1 confirms the weak connection between independent variables, our initial assumption in the regression analysis.

Figure 1: Relationship between variables



Source: authors' elaboration using Stata

After testing the two models' regression parameters, we took the decision rule with a 95% probability based on the values of test t (student) and test F (Fisher). In both cases, the calculated t-test

values are in the range described by theoretical values, and the calculated F value is higher than the theoretical one, as in Table 2.

Our results validate Campos and Sequeira (2019)'s conclusions according to which cultural tourism is a type of activity where visitors' main motivation is their desire to learn, discover, experiment, and consume tangible and intangible cultural products of a destination, e.g. visiting theatres, concerts, museums, festivals, and other events, given that the attractions and activities linked to urban tourism are historical sites, museums, architecturally-interesting buildings, monuments, theatre plays, night clubs, sports events, restaurant and business centres (Gándara, 2004). Cento Bull et al. (2018) state that museums and heritage sites are educational and entertaining places which attract a high number of visitors, and Pop et al. (2019) state that they preserve and also create culture. Maintaining cultural vitality is the reward offered by museums to local community for the financial support.

Table 2: Theoretical and calculated values of t and F tests

GDP tou	Model 1				Model 2				
	t calculate d	t theoreti c	F calculate d	F theoreti c	GDP tou	t calculate d	t theoreti c	F calculate d	F theoreti c
Pl	-2.04	5.408	4.35	2.96	Pl	-3.06	4.437	5.29	4.58
Th	3.23				Th	2.92			
Catt	-1.16				Catt	-1.57			
Mz	0.86				Mz	2.64			
_con s	1.12				_con s	4.59			

Source: authors' calculations using Stata

Theatre has a considerable impact on the local economy, both in terms of direct spending on goods and services, and visitors' expenses (Shellard, 2004; Mitchell, 1993). In Great Britain, for example, theatres have a huge economic impact, amounting to approximately 2.6 billion pounds annually (Smith, 2014).

We reached the results which corroborate the conclusions of other studies involving theatres (Hughes, 2002, 2000, 1998; Bennett, 2005; Barbieri and Mahoney, 2010, Song, 2015). If our empirical analysis shows that there is a negative relationship between tourism and public libraries, and there is an almost neutral relationship between economic growth and public libraries, other researches on this subject have reached different conclusions. Soroya et al. (2014) demonstrated that public libraries contribute to community's economic growth. Karuza et al. (2017) and Modeva (2018) considers that public libraries have the capacity to deal with activities specific to cultural tourism in partnership with other organizations, museums, non-governmental organizations, state institutions or tourism agencies but the management is important.

The conclusions we reached after analyzing the relationship between the tourism growth and public libraries (Model 1) and the economic growth and public libraries (Model 2) are slightly different from those reached by the aforementioned studies. This is possible due to the difference in the methods used. The studies we referred to are theoretical-qualitative analyzes, while our analysis is empirical, and it takes into account only the number of libraries, leaving aside the indicators that describe the relationship with the economy and the effects that libraries generate.

Regarding the relationship between tourism growth and cinema attendance and economic growth and cinema attendance, the results confirm the existence of a negative connection, different from those of other studies. It is noted by Özdemir and Adan (2014) and Țuclea and Nistoreanu (2011) that, economically, the benefits of film-induced tourism are represented by the contribution to increasing the local communities' income, revitalizing certain urban destinations by improving their image, eliminating seasonality problems and increasing the destination's cultural value.

The empirical analysis performed with the help of MLR shows that both European economic growth and tourism growth depend, among the four factors analyzed, mainly on the tourists' access to theatres and museums. Thus, they must take an important position in the European cities' cultural tourism offer.

5. Conclusion

This paper deals with the cultural tourism effect on the European economic environment. We demonstrated, through both models, that urban cultural tourism has a significant influence on economic growth, whether we refer to the impact on the tourism sector or on the entire economy. Among the explanatory variables analyzed, museums stand out as a factor of attractiveness and development for cultural tourism. We have shown that theatres, also, have the same effect, but much less intensely manifested than that of museums. Public libraries and cinema attendance do not appear to be impact factors for our study's goal. However, we note that public libraries have a certain influence on economic growth, especially if we study their role in a different context: the results would be different if we analyze the impact of cultural events organized through libraries. Instead, number-wise, we demonstrated that, for the tourism sector, libraries do not contribute visibly, as we obtained a negative result. Through the two regressions we validated two of the four hypotheses initially proposed and we refuted the other two. We reached conclusions similar to the ones of Campos and Sequeira (2019), Pop et al. (2019), Cento Bull et al. (2018), Song (2015), Barbieri and Mahoney (2010), Bennett (2005), Gándara (2004), and Hughes (2002, 2000, 1998) with regard to museums and theatres' economic role, and conclusions slightly different from the ones of Modeva (2018) and Soroya et al. (2014) with regard to the public libraries' tourist and economic role, and conclusions which are clearly divergent from the ones of Özdemir and Adan (2014) and Țuclea and Nistoreanu (2011) with regard to the cinema attendance's tourist and economic role. For the sake of clarification, in order to obtain relevant empirical results about public libraries and cinema attendance's economic role, additional indicators are needed.

The most important limitation of this analysis is the lack of data. Without data covering as much time as possible and as many states as possible, we chose to exclude countries where urban cultural tourism has a significant impact on the tertiary sector and the economy. A much clearer image of the urban cultural tourism and its economic impact could be obtained by analyzing the number of festivals, concerts, exhibitions, and other variables of this kind.

This analysis contributes to enriching the literature in the field and it opens the opportunity of future research. The results are truly helping, in theory but also in practice, in configuring urban cultural tourism's development strategies, where the interest is live, i.e. in administrative centres. Therefore, our paper draws the attention on the importance of museums and theatres in stimulating urban cultural tourism and, by extrapolating, all cultural events. Additionally, our paper throws light on the fact that public libraries' impact is negative when they are analyzed only considering their number instead of their involvement into ample cultural activities. Given that the cultural theme is far from being conclusive for the mere fact that its empirical assessment is not an easy task, this paper opens the path to future scientific approaches.

The results we have obtained are important in the decision to establish the urban development strategy. The inclusion of tourism in the urban development strategy allows not only to increase the urban attractiveness but also to attract revenues to local budgets, stimulates entrepreneurial activity in hotels, restaurants, shops and it has a positive impact on the labor market. Thus, the development of urban tourism has direct, indirect and induced economic and social effects that cannot be neglected. The public and entrepreneurial sectors have significantly to gain once the strategy of urban development through tourism is valued. The advantages are bivalent. Society gains on the cultural and educational line, learns to be cosmopolitan and open to interpersonal relationships. The economy gains from the public and private sector because tourism brings revenue to local budgets and stimulates entrepreneurs. Tourists, even if they have cultural purposes, make expenses with accommodation, meals, shopping or otherwise. This is an incentive for entrepreneurs in terms of investment and innovation to which we add the one on the labor market. As long as tourism accelerates entrepreneurial activity, the number of jobs increases, and unemployment is resorbed on the labor market, and young people are absorbed. We mention that the strategy for the development of urban cultural tourism brings an increase of notoriety to the city and the region in which it is located. Simple tourists can become future investors or the tool for transmitting a positive and attractive image. Tourists discover other recreational possibilities that they did not initially consider but they can discover. Under these conditions, entrepreneurs are stimulated to create new concepts of their business through which attract and provide opportunities for their own development and for the development of the community.

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METHODOLOGIES USED TO INVESTIGATE EARLY-STAGE INVESTOR (BA AND VC) DECISION-MAKING CRITERIA

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Abstract

Investigating decision-making criteria applied by early-stage investors (business angels – BAs; and venture capitalists – VCs) is one of the main lines of research in early-stage capital decision-making. Our systematic literature review identified 101 scientific studies describing at least 3 different criteria used by investors. We found that 65.3% of the studies de facto relied on criteria identified by previous scientific studies and only 34.7% generated criteria as an outcome of their unique research. In an effort to identify the importance – weighting – of specific criteria, 39.6% of studies reported mean values, 17.8% rank values and 22.8% regression coefficients. When specific methods such as experiments or questionnaires were used, almost two-thirds of the studies just named the criteria or described them in one or two sentences. Consequently, we do not know what investors mean when they report specific criteria. A minority of the studies (40.6%) described the “real life” methodology used by investors in daily practice when trying to measure specific criteria. Despite significant successes in the decision-making criteria research over the last 40 years, there are still many gaps and blind spots, with only a minority of studies (20.8%) obtaining a deeper understanding of what investors understand by general terms such as trust, competence and personality.

Keywords: business angel, decision criteria, systematic review, venture capitalist

JEL codes: G11, G24, G32, D81, L26

1. Introduction

We can identify many different scientific approaches to investigating early-stage investor decision-making (Boocock and Woods, 1997; Silva, 2004). One of these is the decision-making criteria investors use when assessing a potential new venture investment (Zutshi et al. 1999). Decision-making theorists generally agree that decision-making criteria and their quality, quantity, organizational system and practical methodological application have a crucial effect on both the decision-making process as a whole and the final decision outcome. Therefore, if we want to understand investors' decision-making processes, we must first understand the decision-making criteria. Although business angels and venture capitalists have different decision-making criteria (Riquelme, Rickards, 1992; Petty and Gruber, 2011), especially in the later stages, particularly venture capitalists, the criteria are very similar in pre-seed and seed investments (Van Osnabrugge, 2000). In recent years, there has also been a tendency for business angels to professionalize more, which could lead to convergent decision-making criteria together with venture capitalists (Mason et al. 2019, Hsu et al. 2014). Therefore, we decided to investigate decision-making criteria among both business angels and venture capitalists together. The investor decision-making process consists of several phases, such pre-screening and the subsequent several steps of screening of proposals (Petty, Gruber, 2011). Several scholars have investigated the criteria or weighting in these phases and have shown that some criteria and weighting change during the assessment process (Riquelme and Rickards 1992; Carter and Van Auken 1994; Eisele et al. 2004; Nunes et al. 2014; Croce et al. 2017; Botelho, 2017, Pintado et al. 2007). While business opportunity is the most important aspect in the screening phase, the entrepreneur's attributes are crucial in the subsequent decision-making phases (Brush et al. 2012, Carter and Van Auken 1994).

Over the last 40 years, several hundreds of studies have been published that investigate decision-making criteria around the world. As far as we have been able to ascertain, there are several systematic reviews describing and reporting decision-making criteria (Ferrati, Muffatto, 2019; Granz et al., 2020), but we have been able to identify only a few studies attempting to describe the methodologies used in early-stage investor decision-making (Hall and Hofer, 1993; Boocock and Woods, 1997; Silva, 2004; Rostamzadeh et al. 2014). These studies are mostly empirical in nature or involve theoretical research, rather than being systematic reviews, and therefore describe only a limited number of other empirical studies. From those studies, we can see that various methodologies have been applied to identify, describe, quantify and rank decision-making criteria. We are now at the stage of knowing what criteria have been used, but we have only a fragmented understanding of the data-collection methods and the methodological approaches used to search for those criteria. Therefore, the aim of this study is to summarize and synthesize the methods used to investigate the early-stage investor decision-making criteria used to assess new ventures and business proposals.

2. Methodology

In this systematic review, we searched for empirical papers investigating decision-making criteria, using several steps. Firstly, a search was conducted of the following relevant databases: EBSCO, Web of Science and Science Direct, and we used Google Scholar Search as well. Our keywords were: “business angels”, “angel investors”, “venture capitalists” and “formal investor”, and we combined these with the following keywords: “investment decision criteria”, “decision criteria” and “investment decision making”. In the second step, we conducted a manual search of the relevant articles we found so as to identify other studies described in the articles. In the third step, we took the studies identified in two systematic reviews describing the decision-making criteria used by business angels and venture capitalists (Ferrati, Muffatto, 2019; Granz et al., 2020). Using these techniques, we accumulated 101 studies, which are reported in the results section of Table 1. There are also studies investigating the influence of one or several specific decision-making criteria, but these give little insight into the broader picture. In real life, investors make decisions based on multiple criteria, not just a few. In our search, we identified a large number of specialized studies describing one or several specific criteria, but we decided to use only those studies that had investigated at least three or more decision-making criteria.

3. Results and Discussion

This paper is about the methodologies used to investigate early-stage investor (BA and VC) decision-making criteria and the impact they have on the type of information we obtain. At the beginning of this section, we should point out that every method used to identify the decision-making criteria has its limitations, pros and cons. Also, the output of each method applied is closely connected to the data-gathering method. Therefore, if particular methods dominate in one domain, while other methods are under-represented, their limitations subsequently translate into limitations in our knowledge of that domain as a result of being generated by the methods applied. The main finding of this systematic review can be summarized as follows: the disproportionate distribution of data-gathering methods such as experiments, verbal protocols and archival records used in studies investigating investor decision-making criteria provide an incomplete picture about what we know about decision-making criteria which has many gaps and blind spots. We describe these results and limitations in the following paragraphs.

We report all our results in Table 1 and the summary results are given in the last section of that table, part VI, the last column. The structure of the table was inspired by Silva (2004) and Rostamzadeh et al. (2014). Most of the studies focus on venture capitalists (53.5%), rather than business angels (38.6%), or both these groups together (7.9%), and try to identify differences in the criteria. Many of these differences are significant. In only 3% of cases the method used was participation observation and in 9.9% of studies it was verbal protocols, whereas the dominant data-gathering methods were questionnaires (58.4%) and interviews (27.7%). Experiments (full profile 6.9% or trade-offs 5.9%) accounted for 12.9% of studies. Comparing outcomes with methods used, our results indicate that the data-gathering method used (experiment, verbal protocols, questionnaires) leads to different decision-making criteria outputs. While experiments and questionnaires tended to generate numerical mean values or ranking tables with very little description of the criteria content and meaning, verbal protocols

provided a much more detailed picture, but rarely produced numerical quantitative data. Nonetheless, the use of different data-gathering methods ensures the validity of the information obtained on decision-making criteria. Reading each empirical study, we looked for more detailed descriptions of each decision-making criterion, especially in relation to intangible criteria. When scientists reported that investors looked for entrepreneur's trustworthiness, for example, we looked at the empirical study and tried to identify the content, meaning and method the investors used to measure the trustworthiness criterion. As explained above, the breadth of the criterion description is heavily dependent on the data-gathering method, with experiments frequently simply naming criteria (29.7% of studies) or describing them in just one or two sentences (34.7%). This means that almost two-thirds of studies simply name the criteria without providing any additional detailed information about them. This approach and its limits have been discussed and criticized from early studies in the field (Boocock and Woods, 1997; Muzyka et al. 1996). It can result in us not knowing what investors mean by entrepreneur trustworthiness. This issue has been discussed by others as well (Franke et al. 2008). Another unique finding of our study is the absence of information on the methodologies investors apply when assessing intangible characteristics, especially those related to the entrepreneur, such as the entrepreneur's trustworthiness, personality, capabilities and skills. Only 40.6% of the studies contained a brief description of how investors measure these criteria. Having read all of those studies, we found that none of the investors used scientifically validated measurement tools. The studies revealed that the investors relied on their gut feeling, heuristics, impressions, subjective assessment, lay psychology and so on as their tools for measuring intangible criteria. This problem has also been identified by other scholars, who have called for more detailed and evidence-based decision-making processes (Mason and Harrison, 1996; Haines et al. 2003; Levie and Gimmon, 2008; Brettel, 2003). We can state that in two-thirds of the studies we not only do not know what investors mean by their specific criteria but neither do we know how they measure that specific criteria. This non-validated assessment approach could be one of the main reasons for the relatively high number of investments that do not meet investors' expectations and even end in failure.

Another partial aim of our review study was to investigate how scientists identify decision-making criteria in their empirical studies. Surprisingly, two-thirds of studies (65.3%) used criteria that had previously been identified by other scientists in their studies and, of those, only 18.2% had verified the old criteria by means of a new investor interview. Therefore, only 34.7% of the empirical studies produced decision-making criteria as a unique outcome of their research. This is to some extent inevitable in experimental design research or some questionnaire-based research, but it leads to what we might call "criteria recycling". For example, the initial study by MacMillan et al. (1985) was used as the only source of decision-making criteria in eight studies and as one of the main sources of decision-making criteria in dozens of other studies. One has to wonder just how much this one influential study is affecting our understanding of this paradigm. This leads us to another problem, to which we shall now turn.

In an effort to identify and measure decision-making criteria, empirical scientists have provided investors with various stimulus materials. We explored the types of proposals assessed and found that only about a third of the studies had used real proposals, while in the remainder of the studies an arbitrary stimulus had been used, such as a hypothetical venture (18.8%) or an artificially created unspecified venture (41.6%). To save on time, cost and effort many studies used very short, minimalist artificial stimulus materials consisting of only a few sentences, raising questions about the practical validity and utility of outcomes generated by this type of research. Finally, we found that when we compared studies investigating the decision-making process with studies investigating only the decision-making criteria, a mere 23.8% of the studies actually described the process. The remaining studies described the criteria relating to a specific phase (mostly screening), or investigated decision-making criteria across all the decision-making stages uniformly.

Table 1. Summary of past studies (Table structure adapted from Silva, 2004, Rostamzadeh et al. 2014).

Part I.	Argerich et al. (2013)	Bachher and Guild (1996)	Baum and Silverman (2004)	Becker-Blease and Sohl (2015)	Beim and Lévesque (2004)	Bernstein et al.(2017)	Bliss (1999)	Block et al. (2019)	Boocock and Woods (1997)	Botelho (2017)	Brettel (2003)	Brush et al. (2012)	Cardon et al. (2009)	Carpentier and Suret (2015)	Carter and Van Auken (1994)	Chen et al. (2009)
Type of research																
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processual Research							x		x	x				x	x	
Sample size/investor type	BA	VC+BA	BA	BA	VC	BA	VC	BA	VC	BA	BA	BA	BA	BA	VC	VC
venture capital firm							6		1							
Angel/venture capitalists		20 + 20				2925	6	749		289	48		203		72	55
Investments																
Proposals/applications	215		675	176	9	21			232	472		332	60	636		31
Profiles																
Type of proposals assessed																
No specific ones							x				x				x	
Proposals under consideration	x			x	x				x	x		x	x	x		x
Successful investments																
Unsuccessful investments																
Hypothetical ventures		x				x		x								
Data gathering method																
Interviews		x					x		x							
Questionnaires		x			x					x	x		x		x	x
Archival records search	x		x	x	x				x	x		x	x	x		
Verbal protocols																
Experiment (full profile)						x										
Experiment (trade-offs)								x								
Participation observation																
How criteria were identified																
Own research output									x					x		
Taken from different authors	x	x	x	x	x	x	x	x		x	x	x	x		x	x
Verification interview					x			x								
Numerical values of criteria																
none					x		x		x							
mean values	x	x		x						x		x	x		x	
ranking criteria											x					
regression coefficients				x		x		x				x	x	x		x
other numerical description			x					x					x			

Part II.	Clark (2008)	Clarysse et al. (2006)	Conti et al. (2013)	Cox et al. (2017)	Croce, et al. (2017)	Dhochak and Sharma (2016)	Eisele et al. (2004)	Feeney et al. (1999)	Fiet (1995)	Flynn (1991)	Franke et al. (2006)	Franke et al. (2008)	Frias et al. (2020)	Fried and Histrich (1994)	Gompers et al. (2020)	Hall and Hofer (1993)	Harrison et al. (2015)
Type of research																	
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processual research					x		x							x	x		
Sample size/investor type	BA	VC	VC+BA	BA	BA	VC	VC	BA	VC+BA	VC	VC	VC	BA	VC	VC	VC	BA
venture capital firm															681		
Angel/venture capitalists	24	68				4	30	153	141+81	40	51	51	36	18	885	4	12
Investments			471+417														
Proposals/applications	32			241	1942												16
Profiles																	
Type of proposals assessed																	
No specific ones						x	x	x	x	x							
Proposals under consideration	x			x	x											x	x
Successful investments			x											x	x		
Unsuccessful investments																	
Hypothetical ventures		x									x	x	x				
Data gathering method																	
Interviews								x	x	x				x			
Questionnaires	x	x				x	x	x	x	x				x	x		
Archival records search			x	x	x												
Verbal protocols								x								x	x
Experiment (full profile)											x		x				
Experiment (trade-offs)												x					
Participation observation																	
How criteria were identified																	
Own research output					x			x			x	x		x		x	
Taken from different authors	x	x	x	x		x	x		x	x			x		x		x
Verification interview									x						x		
Numerical values of criteria																	
none		x	x	x		x					x						
mean values							x			x		x			x		
ranking criteria	x				x			x	x				x	x		x	x
regression coefficients																	
other numerical description																	

Part III.	Harrison and Mason (2017)	Hindle and Wenban (1999)	Hisrich and Jankowicz (1990)	Hoenig and Henkel (2012)	Hoyos-Iruarizaga et al. (2017)	Hsu et al. (2014)	Johnson (1979)	Kaplan et al. (2009)	Kaplan and Strömberg (2000)	Karsai et al. (1998)	Knockaert et al. (2010)	Kollmann and Kuckertz (2010)	Kumar and Johri (2016)	Kumar and Kaura (2003)	Landström (1998)	Levie and Gimmon (2008)	MacMillan et al. (1985)
Type of research																	
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processual research												x					
Sample size/investor type																	
	BA	BA	VC	VC	BA	VC+BA	VC	VC	VC	VC	VC	VC	VC	VC	BA	VC+BA	VC
venture capital firm									10								
Angel/venture capitalists	127	36	5	187	293	85	120			9	68	81	22	11	44	3+3	102
Investments								50	58								
Proposals/applications																	
Profiles																	
Type of proposals assessed																	
No specific ones	x	x			x		x			x			x	x		x	x
Proposals under consideration																	
Successful investments								x	x								
Unsuccessful investments																	
Hypothetical ventures			x	x		x					x	x			x		
Data gathering method																	
Interviews		x	x							x						x	x
Questionnaires	x	x			x		x			x		x	x	x	x		x
Archival records search								x	x								
Verbal protocols																	
Experiment (full profile)																	
Experiment (trade-offs)				x		x					x						
Participation observation																	
How criteria were identified																	
Own research output							x		x				x			x	x
Taken from different authors	x	x	x	x	x	x		x		x	x	x		x	x		
Verification interview			x								x				x		
Numerical values of criteria																	
none							x					x	x		x		
mean values		x	x	x	x	x		x		x	x			x			x
ranking criteria																	
regression coefficients	x								x							x	
other numerical description																	

Part IV.	MacMillan et al. (1987)	Marçal (2019)	Mason and Botelho (2016)	Mason and Harrison (2002)	Mason and Harrison (2003)	Mason and Stark (2004)	Mason et al. (2017)	Maxwell et al. (2011)	Mishra et al. (2017)	Mitteneß et al. (2012a)	Mitteneß et al. (2012b)	Muhammad et al. (2017)	Murnieks et al. (2015)	Muzyka et al. (1996)	Narayanan et al. (2012)	Nigam et al. (2020)	Nunes et al. (2014)	Pandey and Jang (1996)
Type of research																		
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processual research		x							x						x		x	x
Sample size/investor type	VC	BA	BA	BA	BA	VC+BA	BA	BA	VC	BA	BA	VC	BA	VC	VC	VC	VC	VC
venture capital firm	67									1								20
Angel/venture capitalists		39	21	74	30	3 + 4	268		77	64	57	58	40	73	16		20	
Investments	150															47 + 55		
Proposals/applications						30		150		241	159		1988					
Profiles																		
Type of proposals assessed																		
No specific ones		x	x	x			x					x			x		x	x
Proposals under consideration					x	x		x		x	x		x					
Successful investments	x															x		
Unsuccessful investments	x															x		
Hypothetical ventures														x				
Data gathering method																		
Interviews			x				x							x	x			
Questionnaires	x	x		x			x		x	x	x	x	x	x	x		x	x
Archival records search																x		
Verbal protocols			x			x		x										
Experiment (full profile)																		
Experiment (trade-offs)														x				
Participation observation					x													
How criteria were identified																		
Own research output			x	x	x	x	x								x			
Taken from different authors	x	x						x	x	x	x	x	x	x		x	x	x
Verification interview														x				
Numerical values of criteria																		
none		x							x		x	x		x				x
mean values	x			x				x		x			x			x	x	
ranking criteria			x												x			
regression coefficients					x	x	x											
other numerical description																		

Part V.	Parhankangas and Ehrlich (2014)	Paul et al. (2007)	Pety and Gruber (2011)	Pintado et al. (2007)	Ray and Turpin (1993)	Rea (1989)	Riquelme and Rickards (1992)	Robinson (1987)	Rostamzadeh et al. (2014)	Roure and Maidique (1986)	Sandberg et al. (1989)	Shepherd (1999)	Shepherd et al. (2000)	Silva (2004)	Siskos and Zopounidis (1987)	Smith et al. (2010)	Sørheim (2003)
Type of research																	
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processual research		x	x	x			x	x			x			x			
Sample size/investor type	BA	BA	VC	VC	VC	VC	VC	VC	BA	VC	VC	VC	VC	VC	VC	BA	BA
venture capital firm	1		1											1	1		
Angel/venture capitalists		30		51	29	18	13	53	5	8	1	47	64	9		12	5
Investments		30				89				8		66					
Proposals/applications	595		3631								3			16	25	1	
Profiles							40					39					
Type of proposal assessed																	
No specific ones					x			x	x					x	x		x
Proposals under consideration	x										x						
Successful investments		x	x			x				x							
Unsuccessful investments			x			x				x							
Hypothetical ventures							x					x	x				
Data gathering method																	
Interviews		x		x			x			x				x	x		x
Questionnaires				x	x	x		x	x	x			x				x
Archival records search	x		x				x			x				x			
Verbal protocols	x										x					x	
Experiment (full profile)							x					x					
Experiment (trade-offs)																	
Participation observation														x			
How criteria were identified																	
Own research output	x	x	x					x		x	x			x	x	x	x
Taken from different authors				x	x	x	x		x			x	x				
Verification interview				x			x	x						x			
Numerical value of criteria																	
none					x		x										
mean values				x		x		x	x				x				
ranking criteria										x		x			x		
regression coefficients	x	x	x								x			x		x	x
other numerical description																	

Part VI.	Stedler and Peters (2003)	Stireletzki and Schulte (2013)	Sudek (2006)	Tyebjee and Bruno (1984)	Van Deventer and Mlambo (2009)	Van Osnabrugge (2000)	Vinig and De Haan (2002)	Wallnöfer and Hacklin (2013)	Wessendorf Hammes (2018)	Wetzel (1983)	White Dumay (2020)	Wong (2009)	Zacharakis and Meyer (1998)	Zacharakis and Meyer (2000)	Zinecker and Bolf (2015)	Zutshi et al. (1999)	Count	%
Type of research																		
Criteria research	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	101	100.0%
Processual research				x		x					x						25	24.8%
Sample size/investor type	BA	VC	BA	VC	VC	VC+BA	VC	BA	VC+BA	BA	BA	VC	VC	VC	VC	VC		
venture capital firm																	11	10.9%
Angel/venture capitalists	232		72	87	12	119+143	19	17	54	133	12	45	53	25	49	31	81	80.2%
Investments		64		90													11	10.9%
Proposals/applications			259														27	26.7%
Profiles												90					3	3.0%
Type of proposal assessed																		
No specific one	x				x	x	x	x	x	x	x		x		x	x	42	41.6%
Proposals under consideration			x														23	22.8%
Successful investments		x															12	11.9%
Unsuccessful investments																	5	5.0%
Hypothetical ventures												x		x			19	18.8%
Data gathering method																		
Interviews		x				x	x	x			x						28	27.7%
Questionnaires	x		x	x	x	x	x	x	x	x		x			x	x	59	58.4%
Archival records search		x															21	20.8%
Verbal protocols								x									10	9.9%
Experiment (full profile)													x	x			7	6.9%
Experiment (trade-offs)																	6	5.9%
Participation observation			x														3	3.0%
How criteria were identified																		
Own research output	x	x		x					x	x	x						35	34.7%
Taken from different authors			x		x	x	x	x				x	x	x	x	x	66	65.3%
Verification interview																	12	11.9%
Numerical value of criteria																		
none	x				x	x	x					x	x	x	x	x	30	29.7%
mean values									x	x							35	34.7%
ranking criteria			x	x													15	14.9%
regression coefficients		x						x			x						21	20.8%
other numerical description																		

Source: own research

3. Conclusion

When summing up our results and interpreting them into a broader picture, we identified several findings we would like to discuss. In some ways, they overlap and are closely related in their causes and effects. We interpret them organized into the following groups: validity of individual empirical findings and overall validity, still fragmented and incomplete knowledge and practical applicability. We think that all of them generate a need for new more specialized research, which we discuss in the following paragraphs.

Validity of empirical findings

We will start with the validity of empirical findings in studies we worked with and with the whole validity of our findings, which we consider as an important part of our results. We can say that the decision criteria used by early-stage investors in the process of assessment create together a certain measurement tool or model, by which investors are trying to estimate venture future potential in terms of performance. In this line of thinking, we have to ask about the validity of criteria used in investors' decision making because validation procedures play a critical role in establishing the credibility of the decision models (Qureshi, et al. 1999). Our research identified several different problems related to the validity of decision criteria.

Criterion validity and its specific part *Predictive validity* is an extent to which score, which is in our case investors' decision criteria, predicts future venture performance outcomes such as survival, growth, profitability, size etc. Investors hope that the criteria they use and apply in the process of assessment, are the best available predictors of future venture success, but in fact, investors do not know how close is the relation to the performance. Meta-analysis investigating success factors in new ventures published by Song et al. (2008) generated a list of success criteria which are not very much overlapping with criteria frequently used by investors. Similar results could be found in the meta-analysis of Unger et al. (2011). There could be several reasons for that, but our research revealed, that only a few studies are trying to identify the relation of decision criteria with real performance (Macmillan, et al. 1987; Kaplan, et al. 2009; Jain, 2001), thus identifying the gap in the scientific approach to this problem. Also, longitudinal studies, which are methodologically most suited for measuring causal relationship, are missing. To our best knowledge, we are not aware of any scientific study reporting decision criteria applied to venture selection for investment and consequent performance of that invested venture after some time period. It means that scientific community investigates early-stage investors decision criteria almost separately from the final decision outcome, which is in the long run venture performance. In future research, scientists should concentrate on longitudinal research covering all cycles: from decision criteria and process of decision-making to the performance of the invested venture. The problem with the validity of criteria could be also solved by comparing groups. Naturally, some groups of investors or individual investors have better results in terms of the performance of their investments than others. Therefore, one of the research line should be to comparing the decision process and decision criteria applied between more and less successful investors.

Another type of problems, which are methodologically related to validity are stimulus materials used in process of the criteria identification. We found that two types of stimulus materials: i) hypothetical ventures and ii) not specific ventures as artificial stimulus materials represent together 60,4% of all types of proposals assessed, which raises questions about the validity and the practical applicability of results obtained this way. Only five studies (5%) reported results for real unsuccessful and 12 (11.9 %) for successful investments.

Fragmented and incomplete knowledge

Data-gathering methods used by scientist are disproportionately distributed, resulting in an incomplete picture of investors' decision-making criteria and decision-making processes. We found that 64.4% of studies simply name or describe the decision-making criteria in one or two sentences. As a result, we do not know what investors exactly mean and what they are looking for when speaking about e.g. trustworthiness or commitment. What is the content and meaning of these terms for investors? Only 21,8% (n = 21) studies reported in detail what are some investors looking for. Another unique

contribution from our study is the finding that 65.3% of studies use criteria taken from other scientific studies. This “criteria recycling” has negative implications, which means that a new study can hardly bring a deeper understanding of the decision criteria when using a questionnaire containing criteria firstly identified almost forty years ago.

If we want to gain a more in-depth understanding of the decision-making criteria and the decision-making process as a whole, we have to expand our understanding of the methods scientists use to identify, describe, quantify and rank decision-making criteria. Therefore, in future studies, we need to concentrate more on under-represented data-gathering methods, such as direct observation, verbal protocols or trade-off experiments. We have a good general picture of decision-making criteria but have limited in-depth knowledge of specific decision-making criteria. This is especially true of intangible criteria relating to the entrepreneur. We propose that more studies should investigate how investors interpret a specific criterion, including the content and meaning.

To sum our findings in the broader perspective and with future research proposals we can say that over forty years of research generated a very good overall picture of criteria used by investors (Ferrati, Muffatto, 2019; Granz et al., 2020). Today we have a fairly decent picture of the standard list of criteria mostly used by investors. But we think that this line of research-based mostly on identifying, describing and ordering about two dozen of most important criteria exhausted its potential and new studies in this line could contribute little to our current understanding. Future research should go deeper and be more specified and detailed. We see several lines of investigation which could be organized into following groups.

Quantification of criteria weights change

The decision process consists of several phases (Petty, Gruber, 2011) and we know that the importance of criteria and their weights are changing in those phases. Only 24.8% of studies measured decision-making criteria and decision-making processes together. But from those 24.8% (n = 25) of studies we were able to identify only three studies (Carter and Van Auken, 1994; Eisele et al. 2004; Pintado et al. 2007), which reported mean values with standard deviations in different phases. So we are in the situation that we know that weights are changing, but we have very little empirical evidence of how and which criteria are changing. We think that more research should be done in the mapping process of criteria change quantification through different decision phases.

Identification of industry specific criteria

Reading each empirical study, we found that only a fragment of them investigate decision criteria in the specific industry such as technology (Bachher, Guild, 1996; Pandey, Jang, 1996; Vinig, De Haan, 2002; Zacharakis, Meyer, 1998) and all others are mixing investors into one group. Therefore, we have only a very limited understanding of criteria used by investors in concrete industries such as biotechnology, software, machinery, chemistry and others. We are not aware of any study reporting decision criteria only for the specific industry or its subcategory, despite the fact, that there are investors or groups of investors very narrowly specialized for example in the cell phone software applications, organic food production, computer numerical control machinery etc.

Need for more detailed investigation of particular criterion or group of particular criteria

This paper was aimed at investigation of all important sets of criteria used by investors. But for our better understanding, we need more studies investigating facets, nuances and levels of one specific criterion. Almost every tacit decision criterion related to an entrepreneur could be broken down into a group of sub-criteria. For example, entrepreneur experience consists of his/her entrepreneurial experience, managerial experience, industrial experience, functional (financial, marketing, production, research and development etc.) experience, start-up experience and others (Hanák, Grežo, 2020). But in empirical studies we found that most of them work with one-two types of criteria, thus missing information from others. For more informed and more structured decision making it is of course better to work with dozen individual-specific decision criteria related to an entrepreneur’s experience, than with one summary, which is frequent in today’s practice. We identified almost 300 decision criteria in

all studies together, but in studies reporting mean values of criteria importance, the mean numbers of criteria were 15.86, SD = 12.6. These numbers indicate that investors are working with a relatively small number of criteria and scientist who are describing them either. Few studies used experiments (7 full profile and 6 trade-offs) and only one of them (Franke et al. 2008) directly reporting and comparing weights of the specific criteria.

Applications for practise

In studies in our systematic review, we found that investors apply invalidated measurement tools in the process of assessment for intangible criteria such as entrepreneur's trustworthiness, personality, motivations, commitment, endurance, flexibility, passion, creativity and others de facto in all cases. Gut feeling, heuristics, impressions, subjective assessment, lay psychology and so on are the only methods used by investors, which finally generate a sub-optimal and biased decision. When investors would like to improve the quality of their decision process using scientifically validated tools is best way to start. We strongly recommend that investors should start to work on incorporating scientifically validated psychological measurement tools when assessing intangible criteria instead of gut feeling, heuristics and impressions.

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DATA-DRIVEN DECISION MAKING IN FIGURE SKATING

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Abstract

For effective management of sports training, it is necessary for coaches to monitor and compare changes in the assumptions of sports performance, depending on the cycle of sports training. Coaches can adequately decide on changes and priorities of effective individual sports training only in cases when well-established data-driven analyses of measurements of individuals are available. The paper provides a study conducted on young figure skaters aged 8-14 years included in the project of talented youth of the Czech Figure Skating Association. Data collection took place in the years from 2001 to 2020. Statistical and machine learning methods used in the study shows that during the one-year training cycle, there are demonstrably observable changes in the dynamic-strength characteristics of young figure skaters. These changes are caused both by the natural way of maturing the body of young figure skaters but also by the nature of the predominant sports training of the given cycle of sports training.

Keywords: Data analysis, decision making, figure skating, sports training, testing

JEL codes: C38, C12, I12

1. Introduction

Figure skating is a sport that requires competitors to demonstrate a huge amount of skills as well as physical fitness (Hagueanauer 2006, Heil Taylor, 2016). For athletes to achieve the highest performance, they must gradually build physical preconditions and then effectively apply them in the training of specific technical elements such as specific locomotion, step sequences, pirouettes and, above all, jumps.

Various combinations of jumping tests and locomotion speed measurements are used to objectify the monitoring of speed-force assumptions of figure skaters. (Shulman, 2002; Haguenaue, Legreneur and Monteil, 2006; Winter *et al.*, 2007; Bower *et al.*, 2010; Comuk and Erden, 2012; Gheller *et al.*, 2014; Heil, 2016; Vescovi and VanHeest, 2018a). Published results suggest that dynamic strength and speed is a very important factor in the performance of elite figure skaters.

It is simply the objective analysis of the obtained data that can help trainers to make effective decisions about the content, quantity and intensity of training resources used. Objectified long-term monitoring of morpho-functional characteristics aims to prevent possible health problems of the musculoskeletal system (Bloch, 1999; d'Hemecourt and Luke, 2012). It reveals the strengths and weaknesses of the individual and their changes over time. It helps coaches increase the effectiveness of a sports training program by detecting the relationship among load, adapting to it, and increasing athletic performance.

The importance of collecting and analysing data from the process of sports training is underlined by the current situation, where youth sports training has been fundamentally affected by restrictions for almost a year as a result of addressing the epidemiological situation in the Czech Republic. The consequences of these limitations and their effect on the physical condition of young figure skaters can only be estimated. Professional sports maintain a certain continuity, but sports performance and sports training of young people are completely stopped. Coaches will be forced to first assess how these limitations have affected the fitness and performance of their charges, define the goals, and means of

sports training in the new conditions and choose the right strategy to return to previous individual sports performance and then build the prerequisites for elite performance.

The aim of the study is to analyse and quantify the differences in the monitored indicators in young female and male figure skaters aged 8-14 years during the annual training cycle. The study has the character of a non-experimental long-term observation. It is a cross-sectional descriptive study without experimental intervention in the process of sports training. Only the results of the complete completion of three consecutive measurements of individual PRTM members are analysed.

We used some statistical methods (correlation matrices, hypotheses, and paired t-tests) and machine learning methods (clustering and nonlinear regression using kernel probability density estimates). The results are calculated in MATLAB and SPSS.

The paper is organized as follows. Section 2 describes the participant characteristics and the study method and a description of data collected for each participant. Section 3 provides the results obtained for the given data using different statistical and machine learning approaches. Section 4 discusses the results. Section 5 concludes.

2. Method

2.1. Participant Characteristics and study method

Figure skaters aged 8–14 years included in the Talented Youth Project of the Czech Figure Skating Association (hereinafter referred to as PRTM) during the years 2001-2020. This project is part of a unified system of monitoring and subsequent integration of beginning talented competitors into follow-up programs, such as youth sports centres (YSC), university sports centres (USC) and the representation of the Czech Republic. For our study, we selected a total of 96 PRTM members who participated in three consecutive measurements during one annual training cycle (66 girls and 30 boys). Testing took place during the "preparatory period" June, during the "competition period" - October of the same year and subsequently during the "preparatory period" June of the following year. All measured figure skaters met the conditions for inclusion in the PRTM at the time of measurement, they completed the measurement without health or other restrictions. If the proband did not pass retesting for any reason, he/she was excluded from the study.

We checked the organizational, time and space requirements of testing during the previous research in the years 1995-1999. Testing has a standardized course (Helešic, 1999). It consists of several consecutive parts. Measurement of anthropometric characteristics, warm-up, and self-tattooing of the explosive force of the lower limbs. Individual warm-up and training is focused on readiness to jump and run with maximum effort. The sequence of battery tests: vertical jumps, standing long jump, triple jump on the right and left leg, running at 15 m. There is a 5 min delay between individual tests. Testing outside the ice surface takes 40 minutes. Testing on ice, including grinding and incorporation 15 min. The total loading time of one proband is 60 to 70 seconds.

2.2. Measures and Covariates

The individual tests and measured characteristics were part of the anthropometric data and explosive force characteristics of the lower limb muscles. The general records included: date of birth to assess age at the time of testing, gender, and measurement date relative to the sports training cycle (OFF SEASON / SEASON). In total, the following **22 attributes** were included in our study:

- **Body mass (kg), Stature (cm), Fat (%), BMI**
Weight and height measured barefoot in a standardized way. % fat measured by calliper from 3 skin algae (Pollock and Jackson, 1985). BMI calculated according to $BMI = \text{Body mass (kg)} / \text{Stature (m)}^2$
- **Repeated Vertical Jump – RVJ: tc (s), h (cm), P_{act} (w/kg), RSI**
Measured on a JUMPER device of FiTRONiC, s.r.o. Bratislava - a test of the explosive force of lower limbs according to methodology (Tkáč and Hamar, 1990). Test duration 3x10 s. Rest interval 10 s. Average values found in the three most successful jump cycles

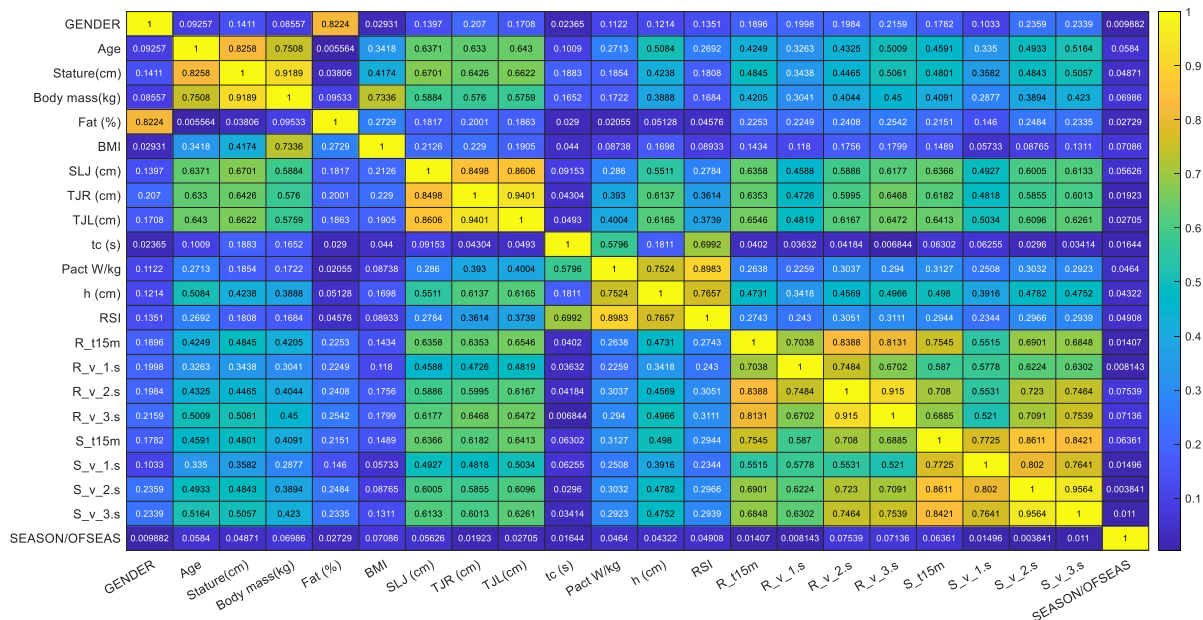
(contact time with the pad and immediately following the flight time) were recorded. The attribute "tc" is the contact time with the pad during reflection. The attribute "h" characterizes the height of the vertical stroke of the centre of gravity. The attribute "P_{act}" characterizes the performance of muscle work in the active phase of the rebound, calculated per kilogram of weight. The index "RSI" is then the coefficient of reflection efficiency calculated from $RSI = P_{act}/tc$

- **Standing Long Jump – SLJ:** Explosive force test according to the methodology (Adam *et al.*, 1988). The distance from the line of reflection to the nearest trace of impact is measured to the nearest 1 cm. We recorded the length of the two measured experiments.
- **Triple Jump Right/left – TJR/TJL)** – Test of explosive strength of lower limbs methodology according to (Grosser and Starischka, 1981; Bolgla and Keskula, 1997). The distance from the line of reflection to the nearest trace of impact after the third reflection is measured to the nearest 1 cm. We recorded the longest of three trials on each leg.
- **Running 15 m – R_t 15m, R_v 1.s; R_v 2.s; R_v 3.s** – test of running speed and acceleration of running measured on a FiTRO speed check device of FiTRONiC, s.r.o. Bratislava. We recorded the total time achieved, the average speed at intervals of 0 - 1.00 s, 1.00 - 2.00 and 2.00 - 3.00 s.
- **Skating 15 m - S_t15m, S_v 1.s, S_v 2.s, S_v 3.s** – Skating speed test and skating acceleration, measured on a FiTRO speed check device of FiTRONiC, s.r.o Bratislava. We recorded the total time achieved, the average speed at intervals of 0 - 1.00 s, 1.00 - 2.00 and 2.00 - 3.00 s

3. Results

To determine the degree of mutual linear dependence of pairs of attributes, we calculated the absolute value of the Pearson correlation coefficient for each pair; see Figure 1.

Figure 1: Absolute values of the Pearson correlation coefficient for all pairs of the attributes



Source: Own processing

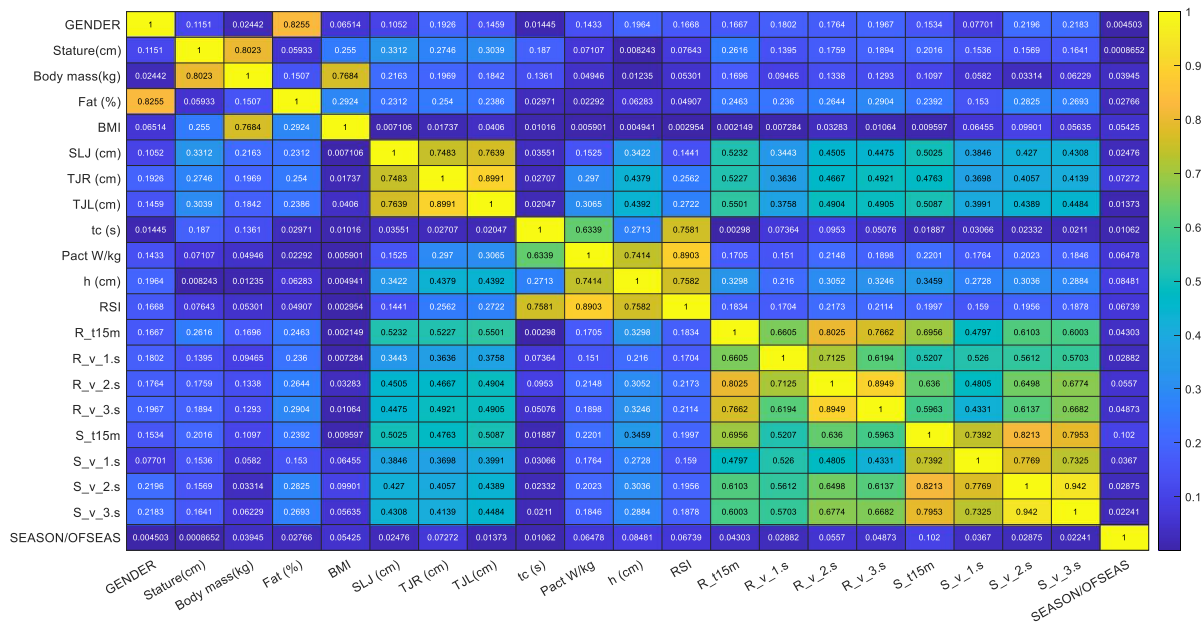
The correlation matrix suggests that there are interrelationships between the measured attributes that affect the overall distribution of data. The results of the correlation analysis point to a linear relationship between the performance characteristics of the dynamic strength of the lower limbs and the attributes Age, Stature, Body mass.

Due to the strong linear dependence in most of the pairs of the attributes, as also shown below in Figure 4, we removed this dependence from the data to observe the influence of other attributes on the performance attributes. Each attribute Y in the data was replaced by the attribute Y_{Age} given by

$$Y_{Age} = Y - \alpha_Y * Age + \beta_Y, \tag{1}$$

where the real coefficients α_Y and β_Y are determined by the least square linear regression from the formula $Y = \alpha_Y * Age + \beta_Y$. These derived attributes can be interpreted as the deviation of an individual's measurement from the value for a given individual's age determined by the linear regression on the entire data set. The absolute values of the Pearson correlation coefficient for each pair of these derived attributes are shown in Figure 2.

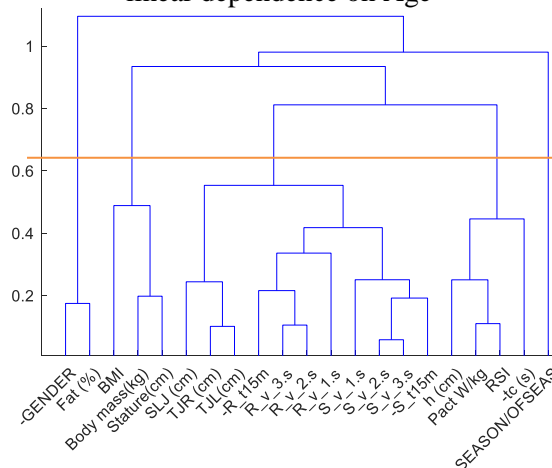
Figure 2: Absolute values of the Pearson correlation coefficient for all pairs of the attributes after removing the linear dependence on Age



Source: Own processing

We observe clusters of attributes with greater mutual correlation. These clusters are further studied in Figure 3, which shows a dendrogram of agglomerative hierarchical clustering for the correlation matrix form in Figure 2. Note that the distance between individual objects (i.e. our attributes) corresponds to $1 - \text{cor}(X, Y)$, where $\text{cor}(X, Y)$ is Pearson's linear correlation coefficient calculated for attributes X and Y , and the distance between individual clusters is given by the average distance of objects in individual clusters (so-called average-linkage clustering). The more the attributes are correlated, the lower the attributes in the graph are clustered. The orange line cuts the dendrogram into 5 distinct clusters, where the attributes are strongly correlated within each one.

Figure 3: Dendrogram of agglomerative hierarchical clustering of attributes after removal of linear dependence on Age



Source: Own processing

From the cluster analysis, it is apparent that the overall distribution of data is little affected by the date of measurement and its relationship to the training cycle (preparation period - recorded as off-season measurement (Off Season) - June and seasonal measurement (October SEASON) just before the main competition performances.

To analyse in more detail whether there are changes in the monitored attributes during one annual training cycle, we used tools for statistical testing of hypotheses. Ninety-six figure skaters underwent repeated testing according to the set conditions. Asymptotically valid critical values of the normal distribution can be used in this range of selection. In such a case, it is not necessary to strictly insist that the differences $d = x_i - y_i$ have a normal distribution (Hendl, 2015, p. 215). Paired T-tests were used to assess the significance of changes in the mean difference between individual measurements. The following Tables 1–3 show the values of paired T-tests in individual measurements.

Table 1: Paired T- test Off season - Season

OFF- SEASON	Mean DIFFERENCE	Paired Differences - ALL FEMALE + MALE					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	Interval of the					
				Lower	Upper				
Pair 1	Staturecm1 - Staturecm2	-2.167	2,251	0,230	-2,623	-1,711	-9,431	95	.000
Pair 4	Bodymasskg1 - Bodymasskg2	-1,250	1,852	0,189	-1,625	-0,875	-6,611	95	.000
Pair 7	Fat1 - Fat2	0,029	1,967	0,201	-0,370	0,427	0,143	95	.887
Pair 10	BMI1 - BMI2	-0,100	0,777	0,079	-0,257	0,058	-1,259	95	.211
Pair 13	SLJcm1 - SLJcm2	-3,000	11,920	1,217	-5,415	-0,585	-2,466	95	.015
Pair 16	TJRcm1 - TJRcm2	-22,927	29,659	3,027	-28,937	-16,918	-7,574	95	.000
Pair 19	TJLcm1 - TJLcm2	-17,458	33,139	3,382	-24,173	-10,744	-5,162	95	.000
Pair 22	tcs1 - tcs2	0,001	0,020	0,002	-0,003	0,006	0,697	95	.487
Pair 25	PactWkg1 - PactWkg2	-1,716	6,526	0,666	-3,038	-0,393	-2,576	95	.012
Pair 28	hcm1 - hcm2	-0,933	2,896	0,296	-1,520	-0,346	-3,157	95	.002
Pair 31	RSI1 - RSI2	-8,222	29,032	2,963	-14,104	-2,339	-2,775	95	.007
Pair 34	R_t15m1 - R_t15m2	0,037	0,199	0,020	-0,003	0,078	1,843	95	.068
Pair 37	R_v_1s1 - R_v_1s2	-0,070	0,494	0,050	-0,170	0,031	-1,379	95	.171
Pair 40	R_v_2s1 - R_v_2s2	0,002	0,621	0,063	-0,124	0,127	0,024	95	.981
Pair 43	R_v_3s1 - R_v_3s2	-0,026	0,708	0,072	-0,170	0,117	-0,363	95	.718
Pair 46	S_t15m1 - S_t15m2	0,082	0,251	0,026	0,031	0,133	3,195	95	.002
Pair 49	S_v_1s1 - S_v_1s2	-0,060	0,500	0,051	-0,161	0,042	-1,165	95	.247
Pair 52	S_v_2s1 - S_v_2s2	-0,088	0,543	0,055	-0,198	0,022	-1,581	95	.117
Pair 55	S_v_3s1 - S_v_3s2	-0,091	0,592	0,060	-0,211	0,029	-1,499	95	.137

Source: Own processing

Table 2: Paired T-test Season - Off season

SEASON - OFF	Mean DIFFERENCE	Paired Differences - ALL FEMALE + MALE					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	Interval of the					
				Lower	Upper				
Pair 2	Staturecm2 - Staturecm3	-3,531	3,440	0,351	-4,228	-2,834	-10,059	95	,000
Pair 5	Bodymasskg2 - Bodymasskg3	-2,776	2,474	0,252	-3,277	-2,275	-10,994	95	,000
Pair 8	Fat2 - Fat3	-0,453	2,038	0,208	-0,866	-0,040	-2,176	95	,032
Pair 11	BMI2 - BMI3	-0,448	0,848	0,087	-0,619	-0,276	-5,170	95	,000
Pair 14	SLJcm2 - SLJcm3	-5,875	12,703	1,297	-8,449	-3,301	-4,531	95	,000
Pair 17	TJRcm2 - TJRcm3	-12,948	42,835	4,372	-21,627	-4,269	-2,962	95	,004
Pair 20	TJLcm2 - TJLcm3	-19,281	40,023	4,085	-27,391	-11,172	-4,720	95	,000
Pair 23	tcs2 - tcs3	0,001	0,019	0,002	-0,003	0,004	0,280	95	,780
Pair 26	PactWkg2 - PactWkg3	-0,158	7,124	0,727	-1,602	1,285	-0,218	95	,828
Pair 29	hcm2 - hcm3	-0,103	2,676	0,273	-0,645	0,439	-0,378	95	,707
Pair 32	RSI2 - RSI3	-0,788	27,221	2,778	-6,303	4,728	-0,283	95	,777
Pair 35	R_t15m2 - R_t15m3	0,022	0,168	0,017	-0,012	0,056	1,279	95	,204
Pair 38	R_v_1s2 - R_v_1s3	-0,029	0,567	0,058	-0,144	0,086	-0,496	95	,621
Pair 41	R_v_2s2 - R_v_2s3	-0,176	0,593	0,061	-0,296	-0,055	-2,901	95	,005
Pair 44	R_v_3s2 - R_v_3s3	-0,216	0,637	0,065	-0,345	-0,087	-3,330	95	,001
Pair 47	S_t15m2 - S_t15m3	-0,007	0,187	0,019	-0,045	0,031	-0,371	95	,712
Pair 50	S_v_1s2 - S_v_1s3	0,001	0,575	0,059	-0,116	0,118	0,017	95	,986
Pair 53	S_v_2s2 - S_v_2s3	-0,059	0,632	0,065	-0,188	0,069	-0,921	95	,359
Pair 56	S_v_3s2 - S_v_3s3	-0,084	0,579	0,059	-0,201	0,034	-1,418	95	,160

Source: Own processing

A comparison of the changes (average of differences, see above) in the attributes recorded for PRTM members who underwent measurements at the end of the preparation period of consecutive seasons is shown in Table 3.

Table 3: Paired T-Test Off season - Off season

OFF - OFF	Mean DIFFERENCE	Paired Differences - ALL FEMALE + MALE					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	Interval of the					
				Lower	Upper				
Pair 3	Staturecm1 - Staturecm3	-5,698	3,662	0,374	-6,440	-4,956	-15,244	95	,000
Pair 6	Bodymasskg1 - Bodymasskg3	-4,026	3,082	0,315	-4,650	-3,402	-12,801	95	,000
Pair 9	Fat1 - Fat3	-0,424	1,961	0,200	-0,821	-0,027	-2,118	95	,037
Pair 12	BMI1 - BMI3	-0,547	1,015	0,104	-0,753	-0,342	-5,282	95	,000
Pair 15	SLJcm1 - SLJcm3	-8,875	10,291	1,050	-10,960	-6,790	-8,450	95	,000
Pair 18	TJRcm1 - TJRcm3	-35,875	44,438	4,535	-44,879	-26,871	-7,910	95	,000
Pair 21	TJLcm1 - TJLcm3	-36,740	42,878	4,376	-45,427	-28,052	-8,395	95	,000
Pair 24	tcs1 - tcs3	0,002	0,023	0,002	-0,003	0,007	0,848	95	,399
Pair 27	PactWkg1 - PactWkg3	-1,874	7,754	0,791	-3,445	-0,303	-2,368	95	,020
Pair 30	hcm1 - hcm3	-1,036	2,956	0,302	-1,635	-0,437	-3,435	95	,001
Pair 33	RSI1 - RSI3	-9,009	32,887	3,356	-15,673	-2,346	-2,684	95	,009
Pair 36	R_t15m1 - R_t15m3	0,059	0,190	0,019	0,021	0,098	3,069	95	,003
Pair 39	R_v_1s1 - R_v_1s3	-0,098	0,648	0,066	-0,230	0,033	-1,485	95	,141
Pair 42	R_v_2s1 - R_v_2s3	-0,174	0,685	0,070	-0,313	-0,035	-2,492	95	,014
Pair 45	R_v_3s1 - R_v_3s3	-0,243	0,810	0,083	-0,407	-0,078	-2,934	95	,004
Pair 48	S_t15m1 - S_t15m3	0,075	0,278	0,028	0,019	0,131	2,642	95	,010
Pair 51	S_v_1s1 - S_v_1s3	-0,059	0,589	0,060	-0,178	0,061	-0,973	95	,333
Pair 54	S_v_2s1 - S_v_2s3	-0,147	0,638	0,065	-0,276	-0,018	-2,260	95	,026
Pair 57	S_v_3s1 - S_v_3s3	-0,174	0,725	0,074	-0,321	-0,028	-2,358	95	,020

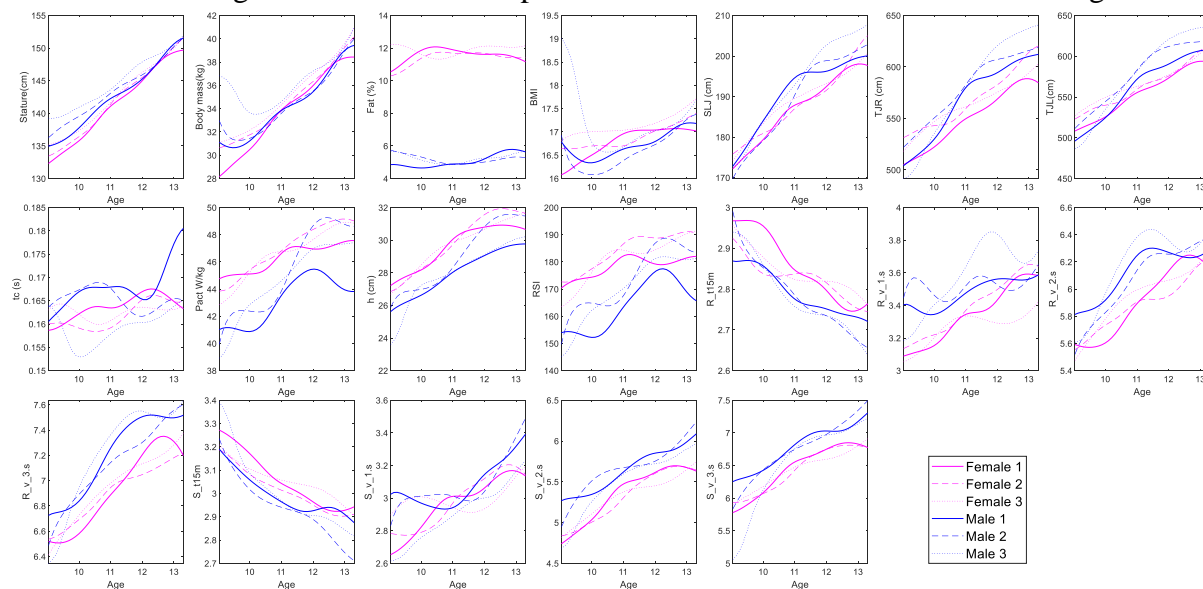
Source: Own processing

Differences that signal positive changes (distance increments, time shortening, etc.) are in our tables in the column "Mean DIFFERENCE" with a sign - and marked in orange (difference Off season 2019 Off season 2020). The increases are evident in all indicators except Fat% and BMI where there is a slight shift to a negative trend. The already mentioned positive effect of time is evident here - the maturation of the organism and the continuity of sports training on the performance of young figure skaters. The variance of the results in the indicators of locomotion speed in the 1st second of running and skating, i.e. the acceleration phase of locomotion shows positive changes, but the distribution of data is probably influenced by other hidden variables.

To allow trainers a relatively simple opportunity to assess the training status of their athletes, in the area of explosive strength of the lower limbs, we created graphs of nonlinear dependence on age, gender and performance in individual measurements (Off Season = 1; Season = 2; Off Season next year = 3) The curves thus represent trends of changes in the values of the observed attributes over time (age of the measured figure skaters). Since they are figure skaters from different clubs and with a different scope of sports training, the question of the dominance of the influence of the character of sports training over the maturation of the organism can be omitted. The curves were processed separately for girls and boys and represent the trends of changes in the observed attributes recorded in different parts of the annual training cycle. It is obvious that for some monitored attributes, gender-independent assessment of changes is possible. However, for most of them, the differences between the organisms of girls and

boys between the ages of 8 and 14 are crucial for assessing explosive power, and it would be wrong to compare these groups with each other, even though common selection criteria apply to boys and girls for inclusion in the PRTM. Simple non-linear regression of the attributes on Age is shown in Figure 4. Each curve was created based on two attributes shown on the axes (the horizontal axis is always Age), taking into consideration only a subset of data corresponding to Female or Male, and season/off-season (1, 2, 3 – according to the values above). For each pair of attributes on X and Y axes, e.g., for Age a Stature (cm), we computed an estimate of probability density function based on a kernel smoothing function `ksdensity` implemented in MATLAB. The conditional expectation $E(Y|Age)$ is then estimated based on this bivariate density function and shown on the Y axis, e.g., $E(\text{Stature (cm)} | \text{Age})$ in the top-left plot.

Figure 4: Conditional expectations of the attributes conditioned on Age



Source: Own processing

4. Discussion

The dendrogram of agglomerative hierarchical clustering of attributes (Figure 3) clearly visualizes the correlation relationships between attributes. It is clear from them that we could describe their clustering in a certain order. Performance characteristics where the athlete's body moves mainly forward (attributes SLJ, TJR, TJJ, running 15m and skating 15m) are clustered in the first level. These attributes characterize jumps in the horizontal direction and correlate earlier with locomotion attributes. Subsequently, this cluster is associated with the attributes of the vertical jump. There is a repeated indication of a strong link between gender (Gender) and the detected% fat (Fat). Anthropometric characteristics affect almost all the performance indicators we measure, and these findings are in line with generally accepted findings (Vignerová, 2006; Začková, 2009; Heil, 2016; Gugu-Gramnatopol, 2017). The extent of changes, which undoubtedly occur during the annual training cycle, is small and inconclusive from our cluster analysis and it is necessary to use other analytical tools for its closer examination.

Anthropometric data such as height and weight (Stature, Body mass) of figure skaters of the PRTM is significantly related to age and even after removing this linear dependence, these attributes are more correlated with jumps in the horizontal direction (SLJ, TJR, TJJ) as indicated in Figure 1 and 2. The effect size of the body height on the results in the jump from the place (Stature / SLJ) is $r^2 \geq 0.109$ and can therefore be considered significant (Sigmundová and Sigmund, 2012). There are indicated connections with the "biological age", i.e., the maturation of the organism rather than with the actual calendar age. Similar findings are reported (Vadocz, Siegel and Malina, 2002; Monsma and Malina, 2005; Baker *et al.*, 2013; Mostaert *et al.*, 2016; Vescovi, VanHeest and VanHeest, 2018b).

We noted that some measured attributes are less sensitive to changes in anthropometric characteristics (tc, FAT). The percentage of the inactive matter is different in both sexes from the age of 8 years. And while for boys it remains almost unchanged throughout the period, for girls there are more significant changes during the annual training cycle (see, Figure 4 Chart FAT (%) / Age). These findings are confirmed by some other published studies, e.g. (Armstrong *et al.*, 2000; Voelker, Gould and Reel, 2014; Yordanova, 2020).

Changes in vertical jump characteristics do not copy changes in anthropometric data and, surprisingly, do not have a significant relationship to% inactive matter (FAT). As Figure 1 and Figure 4 (Chart Stature / Age, Body mass / Age, SLJ / Age, TJR / Age, TJJ / Age) suggest. Locomotion attributes show a greater connection to changes in the characteristics of jumps in the horizontal direction – i.e., dynamic-force characteristics influenced by the nature of sports training than to the actual changes in anthropometric attributes. These facts are indicated in Figures 2 and 3. Repeated vertical jump and its parameters are the currently used concept for assessing the specific and explosive strength of the necessary muscle function. It is a so-called SSC (stretch-shortening cycle) defined as a form of pre-activation of muscles before contact during landing or tread during locomotion followed by the rapid eccentric action of muscle fibres in the direction of movement. These are specific characteristics of the explosive strength of the muscles of the lower limbs. Understanding changes in SSC during growth and maturation is essential to help develop appropriate performance improvement and injury management strategies (Poe,2002; Začková, 2009; Myer *et al.*, 2013; Zemková and Hamar, 2020).

When analysing the changes that occur during the end of the figure skating training period and the peak of the competition period (Table 1), we find significant changes in the height and weight of figure skaters in both sexes. Minimal changes in body composition (% fat and BMI), see Table 1 column *Sig. (2-tailed)*. In girls, the average of% fat values are significantly higher than in boys of the same age (Female 11.5%, Male 5.1%). During this period, the performance in the indicators of jumps in the horizontal and vertical direction also increases significantly. The time of support (tc - the time of contact) does not change, see Table 1 column *Sig. (2-tailed)*. For locomotion characteristics, we record positive changes but only the skating time at 15 m (R_t_15m) shows significant differences.

If we compare the results obtained during the current racing season and the peak of the preparation period for the new season, we find that, as in the previous period, anthropometric attributes increase significantly, including% fat and BMI, see Table 2 column *Sig. (2-tailed)*. As well as the attributes of jumps in the horizontal direction, see Table 2 column *Sig. (2-tailed)*. Only minimal changes occur in the characteristics of vertical jump and locomotion. A certain exception is the attributes of the average locomotion rate in the 2nd and 3rd runs, where we recorded significant changes, see Table 2 column *Sig. (2-tailed)*.

Our analyses of the differences between the measurements during the annual training cycle suggest that there are statistically significant changes in the values of anthropometric attributes, including an increase in the% fat mass in both sexes, see. Table 1 column *Sig. (2-tailed)*. The parameters of jumps in the horizontal direction also change at shorter intervals than the 1st year, see Table 1,2,3 column *Sig. (2-tailed)*. The "contact time" does not change significantly during reflection, see Table 1,2,3 column *Sig. (2-tailed)*. As was the case in previous analyses (Figure 2.3 and Table 1,2,3), it seems that this value is not much influenced by age or the nature of sports training. Other attributes of the vertical jump show a significant year-on-year increase, see Table 1,2,3. The measured attributes of locomotion speed "off ice" (R_t_15m, R_v_1.s; R_v_2.s; R_v_3.s) and "on ice" (S_t15m, S_v_1.s, S_v_2.s, S_v_3.s) also show significant positive changes with the exception of the average speed in the 1st second of running and skating. The acceleration phase of locomotion is not a significant prerequisite for the sports performance of figure skaters. The content of sports training does not prefer exercise to the speed of acceleration, and therefore we do not notice significant changes in these attributes.

The presented graphs (Figure 4) clearly show the already mentioned finding that the trends of the dependence of performance attributes on age are rather nonlinear. We see this in a certain "ripple" of the curves P_{ac}/Age , RSI / Age . We believe that these indicators are far more sensitive to the nature of sports training in a given phase of the training cycle. This is also confirmed by the results of paired T-tests (see Figures 1 and 2) where significant growth in the period between the peak of the preparation period (June) and the race period (October) is followed by relatively small changes in the following period. The position of the presented curves in the graph well captures the relationship between age and the differences in the characteristics of the organism between girls and boys, even in the early

prepubertal period. The graphs also indicate that the differences between the measurements during the annual training cycle are different for each attribute. The relative homogeneity indicated by the close positions of the curves (see Age/SLJ; TJR; TJL; S_{t15m}; S_{v_3s}) indicates relatively balanced increments during the annual training cycle, and thus some less sensitivity to the training equipment used. Curves with different positions and fluctuating courses indicate that they are more tied to the predominant character of sports training during the annual training cycle. They also indicate gender conditionality and changes that occur in young figure skaters with varying intensity in the period from 8 to 14 years. This area then deserves a far more extensive analysis.

Comparison with other similar studies is difficult. We did not find a published study that would predominantly address the various manifestations of explosive strength of the lower limbs in this age group. In the text of the mentioned study for figure skaters, they mainly focus on the vertical jump, which they consider to be the most important performance prerequisite for performance in figure skating. Experience shows that for a masterful performance it is not enough just to have technically mastered skills, but the whole complex of dynamic-force assumptions manifested both in jumps in the horizontal and vertical direction but also in the speed of locomotion.

5. Conclusion

Statistical and machine learning methods used in the presented study showed that during the one-year training cycle, there are demonstrably observable changes in the dynamic-strength characteristics of young figure skaters. These changes are caused both by the natural way of maturing the body of young figure skaters but also by the nature of the predominant sports training of the given cycle of sports training. The influence of the age of figure skaters or the length of sports training on the anthropometric and performance attributes we monitor is unquestionable. However, by using other analytical tools, we can uncover hidden links between attributes and trends in their changes. It turns out that already in the pre-adolescent period, the movement and anthropometric properties of girls and boys are different, and this is also reflected in the monitored indicators of the explosive strength of the lower limbs. By examining the clusters of attributes divided in more detail, divided according to internal correlations, we find that the dynamic strength of the muscles of the lower limbs cannot be considered a general and internally uniform ability. Coordinated actions of contraction and relaxation in the performance of the muscles involved manifest themselves in different ways. In our case, we find that performances in jumps in the horizontal direction (SLJ, TJR, TJL) have a closer connection to locomotion in running and on skates than to repeated jumps. It is also shown that these measured attributes show different dynamics of change during the annual training cycle. Figure skating is considered a complex sport. Freeriding and the compulsory program must contain elements that require different amounts of movement preconditions, including different manifestations of the explosive force of the lower limbs. Our findings show that it is not possible to reduce the control of these assumptions in the process of effective sports training of young figure skaters only to the preferred measurement of a vertical jump. For effective decision-making, it must therefore also include testing of acceleration abilities in locomotion, force impulses for horizontal hops and measurement of the vertical stroke of the centre of gravity as a prerequisite for mastering various variants of jumps.

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KNOWLEDGE SHARING AS AN IMPORTANT FACTOR FOR DECISION-MAKING IN SMEs

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Abstract

The aim of the paper is to map the knowledge sharing behaviour in the environment of small and medium-sized enterprises and to identify the factors that affect knowledge sharing environment in SMEs. The performance of the organization is currently mainly attributed to its available knowledge and information. In particular, the knowledge management (KM) system plays a key role during the Covid-19 pandemic, as the implementation of knowledge management principles can save organizations during a crisis while supporting decision-making processes and making successful decisions. The presented paper examines the topic of knowledge sharing with the emphasis on the SMEs environment. It is based on the literature review related to the topic, an analysis of partial secondary data in this area and qualitative primary data collected by the authors given the impact of the current pandemic situation on knowledge sharing. The pilot research and evaluation of secondary and primary data contributed to the study of knowledge-sharing practices and identified the main factors that facilitate the cultivation of an effective knowledge management in SMEs.

Keywords: decision making, knowledge management, knowledge sharing, small and medium-sized enterprises

JEL codes: D83, L22, M12, M14

1. Introduction

The performance of the organization is currently mainly attributed to its available knowledge and information, and intellectual capital is the most important asset of the organization. Many organizations address the benefits of knowledge management. If knowledge is properly managed, it can help organizations to improve and maintain their competitiveness. Abzari a Teimouri (2008) stated that society's ability to integrate, transfer and apply new knowledge determines the level of organizational innovation, such as the company's ability to respond effectively and faster to potential challenges, or new information. Currently, the company's biggest challenge is probably the transition to remote work and quick adaptation in personnel and material area. Hsieh et al. (2020) mentioned that knowledge management could particularly play a key role in the ongoing Covid-19 pandemic, as the precise implementation of knowledge management could lead organizations to survival during a crisis while supporting the successful performance of the entire organization.

Firstly, the literature review introduces key terms in knowledge management and the process. Several studies in knowledge management and sharing are part of the literature review. The methodology describe the secondary and primary data collection and its analysis. Key findings are presented in results and discussion part.

Small and medium-sized enterprises (SMEs) play an important role in the European economy and in the Czech Republic. They belong to leading employers. However, SMEs face unique knowledge management challenges that differ from those of their larger competitors. In the literature, we often encounter that SME's implement knowledge management approaches originally developed for larger companies. This procedure involves the risk that smaller companies will lose their typical characteristics.

Analysis of secondary data has shown that knowledge management studies conducted in SMEs are often carried out only in a selected sector, so there do not exist many studies that are general and that examine knowledge management factors and knowledge sharing behaviour of SMEs across various sectors. The aim of this paper is to emphasize the importance of the knowledge management implementation in SMEs based on the secondary data and pilot qualitative survey analysis. Based on the primary research in chosen SMEs, a case study overview was developed. It contains possible factors that may affect an implementation of the knowledge management in SMEs as well as barriers of the knowledge management implementation and techniques supporting knowledge sharing in the organization. It is crucial to acknowledge the importance of company's knowledge management culture. Knowledge sharing and knowledge transfer contribute to benefits of SMEs', such as: strategic focus on human resources, support and positive impacts on operational of the decision-making processes, organizational training, customer relationships, creativity, higher profits (Anand et al., 2021) which was proved also by the key findings in the case study and secondary data overview in this paper.

2. Literature Review

Marr et al. (2003) define knowledge management as a collective name for a group of processes and practices used by an organization with a purpose to increase its value by increasing the efficiency of its intellectual capital. In other words, knowledge management is a process that facilitates knowledge sharing behaviour and introduces learning as a continuous process of the organization (Singh, 2008).

The process of knowledge sharing, also known as the knowledge dissemination process, is defined as the transfer of knowledge between individuals, groups, or organizations through various means of communication or communication channels (Alavi & Leidner, 2001; Abubakar et al., 2019). Other authors define knowledge sharing as a set of behavior that involve exchanging information or helping others (Connelly & Kelloway 2003; Abubakar et al., 2019). Effective knowledge sharing offers an organization a chance to maximize its capacity to meet company's needs, as well as solutions that may ensure competitiveness business (Ramírez et al., 2011; Ha et al., 2016; Abubakar et al., 2019). Wong (2005) identified factors that could influence the successful knowledge management implementation, they are as follows: company's culture, the use of IT technology and leadership.

Knowledge is considered as one of the biggest sources of an organization's success and it is in company's interest to ensure that employees do not keep their knowledge to themselves but share it with the others. Research in the field of knowledge management in SMEs show many differences compared to larger companies. SMEs often have no strategic knowledge management policy and tend to apply knowledge management only at the operational level (Durst a Edvardsson, 2012). The SME sector is formally and systematically less developed compared to larger companies, that is the reason why most SMEs use a short-term unstructured approach according to learning and knowledge sharing within the organization (Durst a Edvardsson, 2012). If the employees' expertise and knowledge is effectively managed, organizations could have a great opportunity to expand their business networks and capabilities, which also applies to the sector of SMEs. SMEs could have a chance to become more competitive, however, compared to larger companies, SMEs are still less efficient in proper knowledge sharing (Eze et al., 2013).

Anand et al. (2021) stated the contribution of knowledge sharing in SMEs' in various aspects. Table 1 shows a summary of the secondary data analysis including the main findings in the field of the knowledge management in SMEs. The analysis shows that SME research is often carried out only in a selected sector, so there do not exist many studies that are general and that examine the factors of knowledge management across various sectors.

Table 1- Studies in the field of knowledge management and knowledge sharing in SMEs

Author	Year	Respondents	Aim of the study	Key findings
Eze et al.	2013	Malaysia: 680 SMEs from the manufacturing sector	The aim of this paper was to identify the factors that influence knowledge sharing between SMEs.	The results show that knowledge technology, employee motivation, an effective remuneration system, trust and encouraging company management are the most important factors in knowledge sharing.
Hassan & Raziq	2019	Pakistan: 300 SMEs	The aim of the study was to examine the influence of knowledge management dimensions on innovation ability in SMEs.	Research has shown that the adoption of knowledge management would lead to innovation in SMEs, which are currently facing financial or other resource constraints. The study also showed that the benefits of knowledge management implementation are not fully understood by SMEs, as many SMEs do not even know the concept.
Yao et al.	2020	China: 457 employees of software SMEs	The aim of this study was to examine how knowledge sharing affects the ability of technological innovation in software SMEs.	1) Culture, organizational structure, and middle management have a significant positive effect on tacit knowledge sharing. 2) Management and IT support have a significant positive effect on explicit knowledge sharing.
Cardoni et al.	2020	Italy: 219 medium-sized enterprises	This study aimed to explore the relationships between knowledge management, organizational performance measurement systems and the economic sustainability of SMEs in knowledge-based sectors.	Data analysis confirmed the positive impact of knowledge management on the economic sustainability of companies. The authors encourage SME owners and managers to design and implement a coherent knowledge management approach, which is the key to developing competitive advantage.

Source: own processing

Knowledge management is being used by many managers and professionals as they are aware of the benefits it could have on decision-making if there are deeper insights and more knowledge at hand (ALAmeri, 2015). For example, Abubakar et al. (2019) stated that there is a direct link between knowledge management and proper decision making. Because decision-making involves organizational, group, and individual levels as knowledge management does. Nonaka (1991) classified knowledge as tacit and explicit, both working independently on each other and leading organizations to success. Management of company's tacit and explicit knowledge is an essential part of effective decision making (ALAmeri, 2015).

Tacit knowledge is commonly associated with cognitive skills, such as intuition, mental models, or know-how, it could be also defined as a skill acquired by repetition of practical activities. Thus, it can be said that tacit knowledge is rooted in the various activities we perform, in the procedures we follow, and in the values we share. Tacit knowledge is being used without the need to express it verbally as it is often used unconsciously (Barták, 2006). There are certain ways to share the tacit knowledge including mentoring, storytelling, prototyping, or using of metaphors (Cho et al., 2020). Tacit knowledge can contribute to sustainable competitive advantage in organizations due to barriers to duplication by company's competitors (Gamble, 2020). Compare to that, explicit knowledge could be defined as objective or rational knowledge that can be expressed in various forms, e. g. verbally, numerically, or by mathematical formulas (Cho et al., 2020). Explicit knowledge could be easily shared which could be a positive aspect in its acquisition and application by knowledge workers.

According to Abubakar et al. (2019) there are 2 decision-making styles being used:

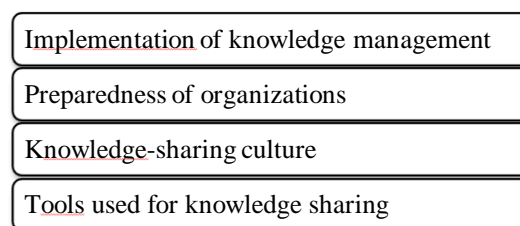
- Intuitive decision-making style,
- Rational decision-making style.

Intuition strengthens available information and ensures faster decision-making based on information and knowledge gained from previous experience and similar situations (Wray, 2017). In the case of a rational decision-making style, researchers argue that there is a need to accurately identify the object of research, generate possible solutions, and select the solution that is most likely to be implemented, and finally apply the chosen solution and evaluate the result it brought. Whereas, each decision step is influenced by knowledge management, as experts impartially analyse all the available information to decide (Abubakar et al., 2019).

ALAmeri (2015) in his study proved there is a significant association between knowledge management system, its practices and decision-making. Knowledge management system are the need of the time and organizations should adopt them for internal decision-making as well as for strategical decision-making.

Based on the literature review key elements of successful knowledge sharing were identified as follows (see Figure 1):

Figure 1: Key elements of successful knowledge sharing



Source: author's own elaboration based on Wong (2005), Abubakar et al. 2019

These elements were further used in the paper for creation of the in-depth interview and the analysis of primary data in the case study in the Chapter 4.

3. Methodology

The paper is based on the literature overview mainly related to the topic of knowledge sharing specifically in the environment of the small and medium sized enterprises. The authors defined key terms in knowledge management and knowledge sharing as well as identified key factors which influence knowledge management and it's sharing in organisations. Based on the secondary data analysis, in-depth interviews related to factors influencing the implementation, preparedness of organizations to knowledge management implementation and company culture were identified. These questions were used in in-depth interview to collect qualitative data about knowledge sharing in four selected companies analysed further in this chapter.

The authors carried out in January and March 2021 in-depth interviews consisted of four parts. Each section contained three questions related to knowledge management and knowledge sharing practices in the organization. The areas of in-depth interview were as follows:

- Factors influencing the implementation of knowledge management.
- Preparedness of organizations to knowledge management implementation.
- Organization's knowledge-sharing culture.
- Online tools used for knowledge sharing.

In the area of implementation of knowledge sharing the authors used in the interview questions related to the driving force, influence on results of implementation and reasons of success. Preparedness of organizations to knowledge management implementation was mapped based on questions focused on the attitude of the questioned SME towards knowledge management issues, possible barriers as well as the environment of knowledge storage. As crucial for knowledge sharing in SMEs also the culture was identified. Questions related to this area aimed to find out if companies do any training and development in this area, which techniques they use and if there are any formal incentives used in the SME. Last part of the interview was related to tools used in questioned companies for communication and knowledge sharing.

3.1 Research sample and data analysis

In depth interviews were carried out with owners of four anonymised SMEs. In total there were four main areas and 12 key questions used to map situation in the knowledge sharing and knowledge management in these companies. The qualitative data collection was used as a first step in the author's research in this area with the aim to continue in the topic further during the research work of the authors. The authors are aware of the limitations of the paper as the methodology of the sample selection and its size for generalisation of results. Although only four companies were used for the primary data collections and the results are not representative and they cannot be generalized, the findings provide an important basis for further research by the authors. The collection of quantitative data with regard to current developments and the importance of growing the issue of knowledge sharing in organizations in relation to decision-making is planned as a next step of the author's research activities.

4. Research results

This chapter as a case study key finding related to knowledge management and knowledge sharing in four SMEs in the Liberec regions. In-depth interviews with their owners were carried out in January and March 2021 to map situation about knowledge sharing based on the four identified elements important for the successful using of knowledge management with respect of current influence of the pandemic situation. For the case study there were the selected four SMEs described below as all companies and data were anonymized.

Company 1 operates in IT industry. The company was established in 1990 and it still innovates and grow its business. Last year during the Covid-19 pandemic the company even established a spin-off company, because they invented a specific product which did not belong to their portfolio. There is no organizational challenge as there are 12 employees, but the owner knows that with more employees there would be a need for some kind of structure. The owner is responsible for HR activities. The fluctuation of the employees is low, most people work there more than 10 years. Knowledge sharing and knowledge management is an important aspect in company's business, if the company and its employees will not educate themselves and will not innovate, the company will bankrupt or it will produce products will low value. The owner is the only person in a management and supports knowledge management and tries to encourage and support employees to be the same.

Company 2 develops and produces electronic devices – hardware. The company was established in 2016. The company works as a flexible organization and it currently it has 15 employees with which they cooperate for a long time. Last year due to Covid-19 situation the company reduced the number of its employees by 3 people. In overall the last year was successful as the company's turnover increased and company gained new customers. Due to the pandemic they had to eliminate company's expansion to Germany and England because it would be too challenging and the business is better done in person as personal relationships are important for the business. Management is very supportive in knowledge management as they consider education to be the most important thing for the overall success. In the company there is always space for the education and management support each employee to become an expert in their field. There is a given system by which they work with Google Drive and with other know-how sources. Each employee knows how to search in it and how to search information in a context as there are no folders only a basic structure.

Company 3 specialises in the development and construction of technological units from simple machines to the production of the whole units and production lines. The company was established in 2014 and currently employs 12 employees. The team is full of young people who are progressive and willing to educate themselves. The ideology of the company is to educate in trends, so the company does not stagnate on a rigid practice that had been used for 20 years and nothing has changes since then. They want to be effective that is why each project is realised with an emphasis on optimalization and reduction of costs while maintaining the maximum functionality of each product.

Company 4 is a limited liability company in the area of architecture. The company was established in 1991 and currently employs 25 people, mainly architectures, civil engineers and designers. The company has more owners and it is based on a long-time tradition. The culture of the company supports friendly atmosphere and employees are open to the common cooperation.

Table 2: Case of the knowledge sharing behaviour in selected SMEs

Factors influencing the implementation of knowledge management			
	Driving force	Influence on results	Reasons of success
Company 1	Competitiveness of the company and its products – especially in the technical sector, companies must innovate otherwise they will bankrupt	Competitive advantage, market success, increased value of intellectual capital, ability to quickly react to unexpected changes (black swan)	Management interest, trust of employees, proper communication
Company 2	Success factors: setting time to pass on some new ideas and interesting content (books, podcasts, video) and talk to each other about that Failure factors: irregular meetings, no time and leadership space	Success: practical testing, applying new ideas and thoughts Failure: “artificially” applied knowledge management – it’s only on paper, nothing really happens	Leadership by example, working groups of the teams – smaller teams, inspiration, demonstration that new activities work, celebration of small wins
Company 3	Productivity growth, possibility to create experts in a certain field who will distribute knowledge to employees in separate departments.	Choosing the right people who are interested in educating themselves as well as their team. Increase in enthusiasm of employees and their work fulfilment.	Internal motivation for personal growth, the ability to motivate employees, so they know that knowledge management makes sense to them
Company 4	Individual approach, respect of everyone’s opinion, law regulations Failure factors: no systematic approach to KM, traditional managers and habits	Competitive advantage, market success, ability to quickly react to unexpected changes Failure: management of multiple owners	Trust of employees, motivation

Source: own processing

Table 2 and 3 show the results based on the pilot survey and its primary qualitative data collected about the knowledge management in selected small enterprises in the Liberec region. Primary data listed in both tables show that all organizations support and implement knowledge management and knowledge sharing. Some activities are more formal, and some are not. All organizations had a successful year despite the Covid-19 situation.

Table 3: Case of the preparedness of organizations to knowledge management implementation

	Barriers	Attitude	Knowledge storage
Company 1	Unwillingness of management, lack of time	Trends tracking + sharing tips among each other, support for self-development	Wiki on MS Teams, customer-led folder (technical solutions, training of the employee – one to one)
Company 2	No educational support from the management, distrust of employees, organization without set boundaries/anchors/fixed points – only freedom	Divided the whole week in a specific “days” - Monday – meeting day, daily stand-up meetings of developers, “free” Fridays – team do not work on a specific tasks, hackathons	Google Drive, “libraries” of technological elements – storage of know-how, meeting minutes
Company 3	Employee education - the ability to learn quickly how to operate a new program or product, digital readiness of companies, lack of interest of employees	Trends tracking, each employee share their tips on improvements and innovations, support of the company management	Google Docs storage, own software, essential guides on how to use the tools
Company 4	Home office work as only temporary solution due to Covid-19 restrictions, digital readiness of the company, more owners	Mutual trust and willingness to help	Special designers programmes/software, meeting minutes

Source: own processing

Employees in selected companies are led to knowledge sharing behaviour and it is natural for them to share their thought, ideas and know-how during company meetings. However, the approach of the company 4 to the knowledge management is very informal. Employees have space for personal and professional development as companies support knowledge management and intellectual capital growth as in their business fields it is crucial to follow business trends, support new ideas and innovate services and products provided. In the company 4, training in specific programmes is mainly related to requirement of customers in big project. Despite the size of companies, there is mainly an advanced system of knowledge sharing and knowledge transfer. Selected enterprises are aware of the advantages of knowledge management; the main driving force why companies should adopt KM is definitely competitive advantage and productivity growth. Owners also listed market success and quick reaction to changes and trends as another important factors why company should consider to implement knowledge management system. As the Table 4 shows knowledge sharing culture is supportive in selected companies, based a lot on personal contacts without some formal incentives, mainly based on mutual inspiration.

Table 4: Case of the knowledge sharing culture in selected SMEs

	Training and development	Techniques	Incentives
Company 1	Regular employee training, training from technology suppliers, information sharing	Personal contact, regularity, knowledge database	No financial or beneficial incentives, employees are encouraged and supported by management to specialize in a particular area
Company 2	Business system within which they have set company's position, the support of education is on the 1 st place, management is active in education – lecturer of Czechitas, member of Finnish accelerator Xedu, framework	Open-source attitude is a part of team's DNA, workshops and webinars, discussions during Friday, openness of sharing	No financial or beneficial incentives, mutual inspiration, management connects people, a space for education, management support each individual to become an expert in a chosen field
Company 3	Regular employee training, support of training from third-party products (suppliers), special training plan for employees who have potential to become "experts" in a particular field	Weekly and shopfloor meetings, company-wide meetings once in a month, database in Google Docs for every project, system of coloured "traffic lights" – marking priorities of the projects, personal discussions	No financial or beneficial incentives, special support of individual employees who have potential to become experts in their field
Company 4	Support of training based on customer projects	company-wide informal meetings once in a month, design programmes, marking priorities	No financial or beneficial incentives, freedom and trustful company culture

Source: own processing

According to online tools using for communication and knowledge sharing all selected companies shared interesting data. Company 1 uses mainly MS Teams and email to communicate within the company and with external environment. The intensity of the use of online tools during Covid-19 certainly increased during the last year. The main reasons are more frequent online meetings with potential employees as well as within the company, the company now uses online and hybrid form of internal meetings. Overall effect of Covid-19 on the company was rather positive because there was a revolution in their industry caused by the need of online communication and online tools requirements, everyone was somehow forced to digitize. Company even hired 4 new employees, namely secretary, accountant, technician and programmer. Pandemic situation also resulted in some time savings because there was a possibility to have more meetings in one day even with people from various regions. Company 2 uses the same communication platforms from the very beginning and it uses mainly Google Drive and all the Google tools and Apple system. During the pandemic they started to use teleconference tools more, especially Google Meet and the usage of HubSpot CRM system became more popular among potential customers. People are now more active in appointments booking via HubSpot. Overall effect of Covid-19 on the company was rather positive as the turnover increased and there were some time

changes associated with the possibility of online meetings. Company noted also higher demand of their products. Company originally planned expansion to Germany and bigger expansion to England but these activities were limited due to the ongoing pandemic and uncertainty in the world. Company was forced to eliminate the number of its employees by 3 people, and it also eliminated public education, the owner is the lecturer of Czechitas and online webinars miss interaction with the audience. As mentioned in the Table above Company 3 uses mainly Google Docs and their own internally developed application for data collection and project communication, these tools are used from the very beginning. If there is not enough space to describe a project, then e-mail communication is used as well. For the real-time communication the company uses MS Teams, it is also used for information sharing (e.g. from individual employee trainings) and for the collection of service interventions, each employee has MS Teams on desktop device as well as in their phones. During the Covid-19 pandemic company did not register an increased use of online tools, the only change has been in the way of meetings which are nowadays held in hybrid format where some employees are in the company and some are online. Overall effect of Covid-19 on the company was rather negative as the company is dependent on its customers and their investments approving. Due to the pandemic customers started to speculate and product orders were postponed, nowadays it takes 3 – 6 months for the contract to be approved but there is no extension of the original deadline of the project. However, the volume of the projects and the amount of work remained the same as before pandemic, but most of the work was done during the autumn period. The company also dismissed some employees, but the dismissal of the employees would have taken place even without the pandemic because there was no willingness for professional growth. Company 4 has regular Skype meeting and most of employees can work from home due to the pandemic situation. However, this is not permanent a permanent state as the management considers presence of employees in the workplace as more effective for the knowledge sharing and decision making process.

Based on secondary data analysis and main results of chosen studies on knowledge management in SMEs comparison with primary data results could be made. Yao et al. (2020) stated that culture, organizational structure, and middle management have a significant positive effect on tacit knowledge sharing and that management and IT system have positive effect on explicit knowledge sharing. Based on the primary data obtained by in-depths interviews with selected SEs it could be said that knowledge sharing culture, support and encouragement of the management, trust, open communication and IT support are the main factors which effect knowledge sharing, of both tacit and explicit knowledge in these companies. Authors could also agree with Hassan a Raziq (2019) study results which showed that knowledge management would lead to innovations in SMEs. Results of the primary data analysis and the developed case study show that new employees' ideas and thoughts together with their sharing with all the teams members lead to innovations within the company. Another secondary data analysis on SMEs shows that knowledge management could have a positive impact on the economic sustainability of companies (Cardoni et al., 2020). This result was also confirmed by primary data analysis as interviewed companies' experienced successful year despite Covid-19 situation. For example, companies 1 and 2 both acquired new customers and due to successful usage of knowledge management and knowledge sharing they survived difficulties in the last year.

5. Conclusion

Knowledge management and knowledge sharing has been a topical issue nowadays and has increased its importance in connection with the pandemic situation in the last months. Many authors (as Taher, 2015, Abubakar et al., 2019 and others) confirm that processes in knowledge management influence the efficiency of an organization's decision-making ability and helps employees to make quick, informed decisions. The environment of SMEs is specific in many aspects as less formal structures and process. However knowledge management and knowledge sharing is in all organizations including SMEs crucial for the company success. As the literature review and secondary data analysis in the paper showed the authors and also SMEs themselves pay this issue an attention however the importance of it is not sometimes fully understood and sometimes limited by the sources including financial. Owners and managers of SMEs should be systematically supported to design and implement a coherent knowledge management approach. Primary data about four SMEs in the Liberec region introduced in the case study in the last part of the paper confirmed findings within the literature review and secondary data analysis. Interviewed managers of these companies confirmed in three of interviewed companies a

systematic approach to knowledge management, using of various tools to support communication and information transfer, all in the frame of less formal approach to knowledge sharing in their organisations. In-depth interviews with the owners/managers also confirmed the importance of knowledge sharing in the decisions making process of SMEs. Despite the size limitations and impossibility of primary data generalization, these are important and interesting additions to the topic and show the importance of KM for SMEs. They can work effectively with knowledge sharing and gain a competitive advantage. The paper contributes to the up to date topic of knowledge sharing from the perspective of small and medium enterprises, with regard to current situation and give the authors space for the further research.

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FREE ONLINE PROCESS SIMULATOR FOR SMALL AND MEDIUM-SIZED ENTERPRISES PROCESSES. CASE STUDY: BPSIMULATOR

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Abstract

These days, digitalization is becoming an integral part of our lives, both personally and in the workplace. The need to determine the best solutions to streamline activities in both situations involves time and financial expenses. But first, you must understand, if not the engineering behind the application, the way the application works, and the way it is employed. Or, if you can afford it, you can pay for an application tailored to your problem/business, which is quite difficult for small and medium-sized companies, due to the necessary financial investments. This paper aims to determine the efficiency of an online application, free of charge. The applied method is comparing the results of several scenarios revealed by the online application for the designed model for a small industrial processing. The comparison intends to determine, for those who are looking for such applications, whether it is efficient to invest time and resources in learning and applying them or can use simpler, better known, and closer tools. The results of the analysis and comparison determined elements of the application that can be replaced with simplistic methods but also elements that cannot be easily generated, such as real-time graphical representations or processing speed. The importance of this paper is proven by the need to simplify methods and facilitate the choice of modeling, simulation, and analysis tools of processes necessary for small and medium-sized enterprises in decision making.

Keywords: decision making, free online process simulator, small and medium-sized enterprises

JEL codes: C63

1. Introduction

Nowadays we not only talking about notions like digitalization, Industry 4.0, IoT, (Internet of Things), Artificial Intelligence (AI), Big Data, Blockchain, etc., but we are also “living” them. These technologies quickly became a part of it part of how we learn, how we communicate, how we work, how we meet, and they are a part of everyday life. We have to embrace them to be a part of the society we live in. The majority of them are affordable as part of the everyday life tools that we use. The

competition shows up when we are looking at this new technology used as part of the battles to gain market competitiveness.

In order to understand what a decision-making tool should do; we have to understand the beginnings of this kind of thinking. First Clark (1997) defines decision tools as: “techniques, tools, methods, models, frameworks, approaches, and methodologies which are available to support decision-making within strategic management”. Starting from this, nowadays, for a decision-making tool to be attractive and competitive must cover terms like strategy tools (Cheng and Havensvid, 2017), strategic management tools (Afonina, 2015), or strategic planning tools (Aldehayyat and Anchor 2008; Kalkan and Bozkurt, 2013) and ought to blend their principles and criteria to be powerful in covering all demand.

Decision tools have to satisfy not only the need of private businesses like asset renewal (Muñoz-Porcar et al., 2015) but, also, the problems raised by the public sector (Williams and Lewis, 2008). And how Köseoglu et al (2019) considered that while the decision tools concept is not new, the decision tool field is a vast, fast-evolving area of research. Qehaja et al. (2017) could add that managers don't have the luxury of dealing with a few key issues at a time and they must counter a multitude of problems from different sources simultaneously. Thus, the present tools (applications, software, etc.) should implement multi-criteria decision-making (MCDM) useful when multiple criteria need to be considered simultaneously (Jahan and Edwards, 2013). This kind of technics is used in tools and applications to answer problems such as (Mardani et al., 2015) energy, material (Zavadskas et al., 2004), manufacturing systems, production management (Rabbani et al., 2014), environment and sustainability, construction, and project management (Monghasemi et al., 2015), supply chain management (Rajesh and Ravi, 2015), quality management (Lupo, 2015), safety and risk management (Ilangkumaran, et al., 2015), technology and information management (Oztaysi, 2014), strategic management (Hosseini Nasab and Milani, 2012) or tourism management (Akincilar and Dagdeviren, 2014).

Most of the above tools are researched applications based mostly on free code software that can be applied to several types of problems and can be considered examples for anyone to use them. But this requires at least programming skills and/or time to study and implement the examples. In the end, that means costs and often being behind the competition. This is why the present paper refers to a free program that already has some MCDM elements implemented.

The importance of the present paper rises from the need to give possibilities of cheap, even free, access to technologies that offer competitive gain to small (and medium) businesses by presenting possible applications, software, and tool that can be applied to ease their decision making by simulating different scenarios of processing and systematization. The method applied here can be duplicated according to the own requirements of the business or can help to the best choice of the tools that can be useful accordingly to the problem at hand. When choosing the bpsimulator.com program, were considered the following elements: it was free, it was easy to apply, was easy to follow by those who are not specialists, was based on pick and drop technology, and it did not require additional technological elements for implementation. Thus, it was available to anyone.

2. Method

For the present study, we considered a small machining workshop containing 5 functions (machining operations), every one of them with a worker and a tool attached. Also, we considered it necessary to enhance the complexity factor by adding a 10% return of the task from the Control function to the first function. All the functions, workers, and tools have a cost of use to determine a cost comparison. The method is based on simulations of different conditions using bpsimulator.com and the study of the results and how they can be used for further improvements.

Figure 1: Initial structure of the simulated process. No simulation



Source: Web page of BP Simulator [2021]

It is necessary to point out that the present study focuses on an industrial process. This sort of process has specific features that cannot be generalized for all types of processes. Yet, bp simulator can be applied to various processes, as the online program shows in its demo online page.

The simulation design of processes in BP simulator, uses the following pick and drop elements as there are presented by the software website, their representation is shown in figure 1, compatible with modeling notation such as IDEF03 (Integrated DEFinition for Process Description Capture Method), eEPC (Estimated Earnings per Click) and BPMN (Business Process Model and Notation):

- Task generator (G) - Generator of global tasks of the business process of a certain type with a certain interval for the simulation purposes;
- Function (F) - targeted action to be performed by one or more executors in one role;
- Executor (E) - Position or role of those responsible for the execution of function;
- Resource (S) - Service or tools needed to perform the function;
- Checkpoint (C) - Auxiliary element for monitoring the process parameters at different stages its execution and control of tasks flow;
- Event (E) - Cause or an intangible result of a function;
- Procedure (P) - Set of performance features for a particular purpose;
- Input/Output (I/O) - Material or information necessary to perform the function/ Material or information generated or acquired additional properties as a result of the function;
- Regulator (R) - Regulate document directly related to the order, conditions, or results of the function;
- Comment (...) - Auxiliary element model for clarifications or comments.

For simplifying the present research and keep the simulation to be accessible to anyone (one of the objectives of the present research), we use only the first five elements offered by the BPsimulator, represented by the first row of simulation elements from figure 1 (Task generator, Function, Executor, Resource, Checkpoint).

2.1 Initial conditions

We prepared the program by imposing some initial conditions that anyone can implement at the beginning of model the problems. So, these conditions should be simple at the first sight.

Task generator – Dates and number of tasks:

- Hours from 08:00 to 12:00, tasks 200, timing: Uniformly.
- Hours from 13:00 to 17:00, tasks 200, timing: Uniformly.

Table 1: Function features. Initial conditions.

Function name	Duration ¹ per task (min.)	Delivery time (min.)	Batch size ²	Observation
Turning	5	5	1	
Milling	7	8	1	
Grinding	10	7	1	
Control	7	10	1	k
		8	1	
Storage	5	NA	NA	End of process function

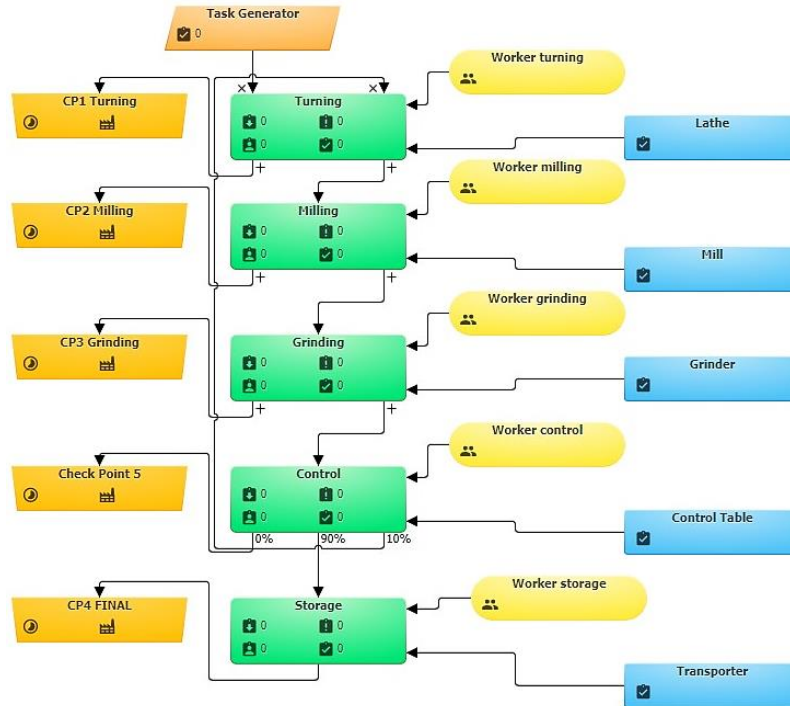
Note: ¹ for the initial conditions of process simulation, the constant duration was selected.

² batch size was set to 1 (no batch), even that the authors knew that this value will generate a low performance. The chosen value was considered for the initial conditions of process simulation.

³ the Control function was set to deliver 10% of the results of previous functions back to Turning, in order to be reprocessed. For this the 10 min. delivery time was accepted. For 90% of the previous work, an 8 min. delivery time is needed for the next function – Storage.

Source: author's simulation features

Figure 2: Initial structure of the simulated process. No simulation



Source: author’s simulation in bpsimulator.com

As seen in table 1, durations and delivery time were selected constant as values, and this setup was maintained for all the simulations, even if this choice is not a choice based on the real premises. In the case of industrial processes, these kinds of times are variable. The option has been done for the simplification of simulation and its explanations. choice

Table 2: Resource features. Initial conditions.

Resource name - Workers	Number of employees	Cost per hour (m.u.) ⁴	Resource name – machines/tools	Cost per hour (m.u.)	Function served
Worker turning	1	25	Lathe	10	Turning
Worker milling	1	35	Mill	20	Milling
Worker grinding	1	45	Grinder	30	Grinding
Worker control	1	40	Control Table	15	Control
Worker storage	1	15	Transporter	15	Storage

Note: ⁴ m.u. – monetary units.

Source: author’s simulation features

The values for resource features were randomly attributed, authors don’t consider them important for the present research objective. To control the costs values, checkpoints were applied to the following functions: Turning, Milling, Grinding, and Storage.

2.2 First simulation

After the initial conditions were established, the first simulation was run. The results of the simulation are presented primarily by the program module, specialized for dynamic representation, called Dashboard. The image of the end of the simulation is presented in figure 3. In the first simulation, we didn’t be concerned about the process finishes all the tasks generated (400 tasks in two partitions of 200 tasks each) or if the executor executors and resources numbers are enough to meet the process demands.

Figure 3: Results of initial simulation. a) Dashboard; b) model simulation values



a) Source: author's simulation in bpsimulator.com
b) Source: author's simulation in bpsimulator.com

The simulation was initiated for 9 hours, started at 08:00 AM, under the Task generator conditions (see 1.1 Initial conditions). Also, the software offers the possibility to extract few data about resource executor, seen in table 3, like employment time, employment cost (m. u.), utilization ratio (%).

Table 3: Results of initial simulation.

Resource	Employment time	Employment cost (m.u.)	Utilization ratio (%)
Worker control	05:08:00	205.33	64
Worker grinding	07:31:08	338.35	94
Worker milling	07:50:08	274.24	98
Worker storage	00:36:00	9.00	8
Worker turning	07:51:08	196.31	98

Source: author's simulation in bpsimulator.com

As figure 3. a) shows Throughput Times: processing 00:11:45 (6%), transportation 00:06:12 (3%), queue time 03:06:46 (91%), the takt time 00:01:12 and, cycle time 00:01:33. Also, the performance is 1%. Also, in figure 3.b) we can see that only 36 tasks were transmitted and finalized by the Storage function. The overallocated functions (in red border) are Turning, Milling and Grinding. Thus, a simple conclusion is that we should start to consider modifying the conditions that these functions work by.

2.3 Second simulation. "Infinite days"

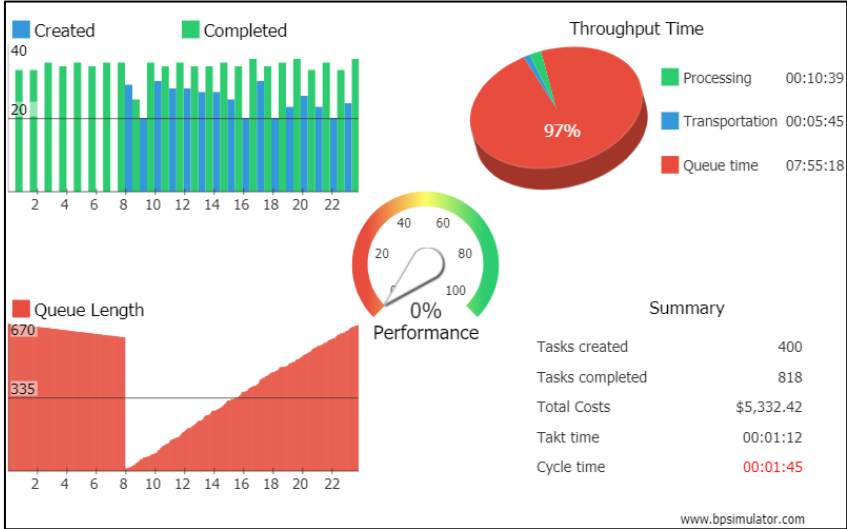
In the second simulation, we wanted to see how we can determine the necessary days to comply with all generated tasks, without changing any initial conditions. For this, considering that the common user doesn't have the additional tool to calculate (considering the time needed for each task and the money used at every function), we just try several times, adding each time nine hours.

Here we encountered the first serious problem. Because of the cyclicity of task generator at every 24 hours another 400 tasks were generated, making very difficult to determine the number of days necessary to complete the first 400 tasks. To overcome the problem, we changed to using shifts and eliminates the one-hour break that initially was implemented.

In the initial simulation we used only one shift organized as follows: work 08:00 - 12:00, break 12:00 - 13:00, work 13:00 - 17:00. Also, we realized that the program doesn't accept the time working beginning between 1 AM and 8 AM, so we have to start to generate tasks from 08 AM. Thus, we

considered 3 shifts organized from 08 AM to 08 AM the next day and we change the task generator to work from 08 AM to 24 AM (Uniformly). The results of the simulation in this condition resulted in 187 completed tasks on the final function (Storage). The graphical results are showed in figure 4, the simulation stopped at task 187 achieved in the last function (Storage). This result made us believe that the simulation, in the present conditions, with 3 shifts, should take about 3 days to finish all the tasks (about 13,000 mu). Or, if we consider every shift a day of 8 working hours, it will last about 9 days.

Figure 4: Results of the second simulation. Three shifts.



Source: author’s simulation in bpsimulator.com

As figure 4 displays Throughput Times: processing 00:10:36 (2%), transportation 00:05:45 (1%), queue time 07:55:18 (97%), the takt time 00:01:12 and, cycle time 00:01:45. Also, the performance is 0%. Because of the massive changes made between this simulation and the one before it is not convenient to compare the results of the two.

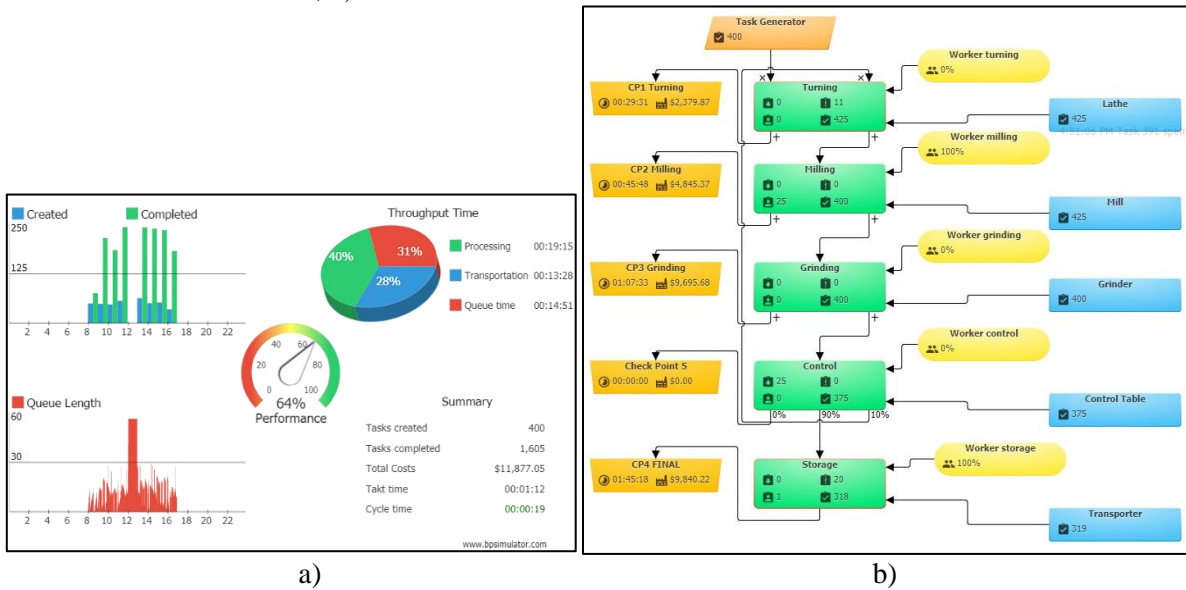
2.4 Third simulation. Batch change

To facilitate further study, we changed the batch value. In the initial simulation, the tasks were delivered between function in batch size of one (batch size: the number of tasks created by a generator or executed by a function at a time), situation met when the task is too big (too voluminous) to be transferred in more than one. But in our case, we considered smaller pieces that can be moved from one function to another in more than one piece. We randomly established that we can try to send batches of 15 tasks, delivered together when the function finished all 15. As a result, we expected a decrease in the overall time due to the diminish of delivering time. All other initial settings were the same as presented in subchapter 1.1. The last task number served by the last function was 320, which implies a final delivery time of about 10.5 hours and an approximate cost of 15,605 mu for all 400 generate tasks.

As figure 5.a) shows Throughput Times: processing 00:19:15 (40%), transportation 00:13:28 (28%), queue time 00:14:51 (31%), the takt time 00:01:12 and, cycle time 00:00:19. Also, the performance is 64%. These results reveal the better choices in conditions for the present simulation against the previous ones.

The increasing number in transport batch size will not fit the duration of all the tasks being processed because of the necessary time to process each task. This conclusion can be seen in figure 5.b) where the last task number served by the last function was 318, with a total cost of 11,256.37 mu.

Figure 5: Results simulation with the change of transport batch size. a) Dashboard for a batch size of 15 for all functions; b) model simulation values for a batch size of 25 for all functions.



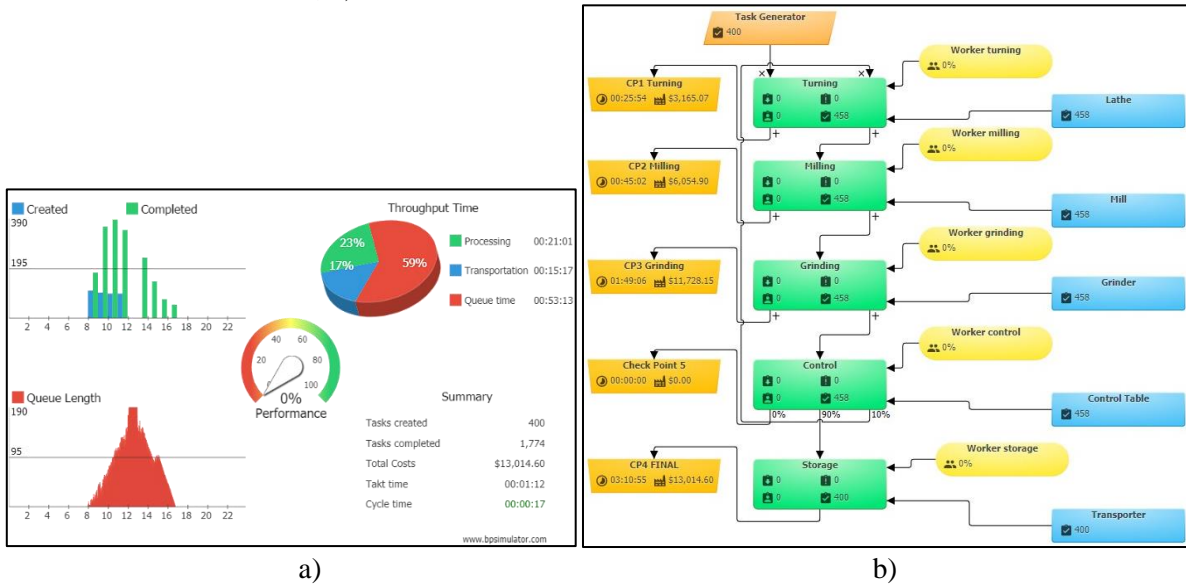
a) b)
Source: author's simulation in bpsimulator.com

Also, we must emphasize that we chose to activate the “Filling” attribute that makes the function wait until the entire batch size of tasks get processing. This canceled the time gained by using batch size by delaying the function which has to wait to receive the amount, especially when increasing the batch size. Some of the functions are blocked and don't made any processing because of this setup.

2.5 Fourth simulation. Batch change. Not filling the entire batch size

Another discovery that we made, with the help of the graphical dynamics of the program, was that the break in the task generator will help in decreasing the time of overall processing. This is why we remove the task generator break from 12:00 to 13:00. We add this to the simulation were we also remove the “Filling” but keeping the batch size of 15. The following results are presented in figure 6.

Figure 6: Results simulation with batch size and no Filling attribute. a) Dashboard for a batch size of 15 for all functions; b) model simulation values for a batch size of 15 for all functions.



a) b)
Source: author's simulation in bpsimulator.com

From figure 6.a) and b) one can see that all 400 tasks were processed in 8 hours with the price of 16,014.60 mu. Also, figure 6.a) shows Throughput Times: processing 00:21:15 (23%), transportation 00:15:17 (17%), queue time 00:53:13 (59%), the takt time 00:01:12 and, cycle time 00:00:17.

3. Conclusion

The program gave the possibility to build and simulate a small industrial process. The interface made it relatively easy to follow the results of changes that we made to achieve our goals that a system or organization has with the help to find better conditions of organizing the structure and components' attributes in order to improve the processes. The dynamical graphic representation helps to understand, even by the non-specialists, the evolution of process and take decisions accordingly to their needs. Some PROS and CONS are definite below.

- PROS: simple to use drag-and-drop interface.
- PROS: easy to practice even by nontechnical users.
- PROS: resource utilization and responsibility matrix.
- PROS: dynamic representation of simulation.

One of the reports that can be very useful is the utilization ratio of the workers. As presented in table 3. the utilization ratio (in %) give the possibility to increase the number of workers if the ratio is above 100%. Of course, this will involve higher costs.

CONS: the user must have the conditions of simulation very well defined to apply them, the program not giving a decision but only offer results to simulations.

- CONS: mathematical calculus of costs behind each function (in checkpoints) not fully explained.
- CONS: the numbers of resources cannot be modified accordingly to the process demands.
- CONS: the time setting is missing the possibility to use night shifts.

It was not the authors' intention to compare the present simulation results with more specialized programs (state-of-the-art tools and techniques) that would need specialization and specific tools (at least computational technology). Yet, the authors tried to offer process simulations using a tool that can be available to anyone. Also, the authors understand the limitations of the bp simulator, but we consider it a starting point of implementing the process simulation techniques.

One of the holdups can be the limited amount of information on how to implement the program. Sometimes, one must try several times to understand exactly what the dashboard represents accordingly with the simulation results.

Further study can be conducted by changing the number of workers to minimize the time of the process, but taking into consideration the growth of the costs. Also, the model can be changed by adding some functions that work in parallel, doubling the number of tools and worker, reducing processing time by half and doubling the cost of processing.

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RESEARCH OF THE BUSINESS INTELLIGENCE APPROACH USE IN FINTECH COMPANIES

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Abstract

This study concerns problems of providing meaningful information feed or business intelligence that accumulated from different sources as within so outside to make day-to-day operative decisions as well as to track results of application of new projects in companies that are operating in the Fintech industry. Scientific articles and other actual publications dedicated to the problems of integration of business intelligence were reviewed to compose this article. Purpose of the article is to provide theoretical guidance to increase situational awareness during decision making for companies operating in financial innovation industry. For this research was used noninvasive content analysis approach, which allows to extract specific data from text and other forms of information without intervention by the researcher. Obtained data showed effectiveness of business intelligence and was fundamental for creating the guidance.

Keywords: analytics, business intelligence, data, Fintech, innovation,

JEL codes: C80, O31, O21, O22

1. Introduction

Fintech or Financial Technology is a name given to a combination of several disciplinary subjects such as Finance, Technology Management and Innovation Management (Sung, A. et al., 2019). Fintech Company is a company which acts as a bridge between new technologies and financial services world. Through this bridge cross innovative, disruptive and often paradigm changing trends over to traditional financial services market.

Technology can be disruptive and paradigm shifting in nature, but it will bring no effect without proper internal management processes and approaches (Smith, 2020). Management means decision making that is a challenging task in the age of conveying and receiving large amount of data. Such data are often heterogeneous or a mix of information that comes from several different sources, such as commercial, financial and administrative transactions, email texts and others. (Vercellis, 2009).

Therefore, there is internal demand of a company to convert unstructured and raw data into something meaningful that can be used to make effective decisions. Business Intelligence is considered to be one of the options to deal with huge amount of data. This approach includes mathematical models and analysis methodologies (Vercellis, 2009). It allows to reorganize available data in a way that can be used in a complex process of decision making.

Business Intelligence is an adaptive measure for managers to keep their intuitive methodologies of dealing with provided information without losing accuracy and calculated outcome when making decisions. Managers are knowledge workers, but for raw data to be knowledge it should be processed in a way that can become something for a knowledge worker. Analogy can be when compiler converts string of code to a machine readable language, but this time is backward. Coder is a knowledge worker to whom machine reports by means of a compiler or in this case a business intelligence unit of a company.

Data is a structured codification of specific units of an entity. For example, customers, point of sales, items and transaction receipts. While information is data which was processed in a way that can be understandable for end-user, such as sales manager that needs to know proportion of sales receipts over €100 per week or number of loyalty card holders whose buying intensity dropped by 50% during

the last quarter (Vercellis, 2009). Finally, Knowledge is information that transformed into situational awareness for a decision maker who can see things in a global perspective, like detection of sales drop in a specific area where competitor opened his outlet recently.

Business Intelligence can help a manager to allocate scarce funds in a way that can increase a possibility of reaching optimal results. For example, there is a task for a marketing manager to prepare and execute a campaign to reduce the risk of losing customers to the competitors. While the customer base is over 200 thousand people the resources can cover only 2000. Therefore, a manager orders specific type of information from business intelligence unit that can provide knowledge of most unsatisfied and with most complains customers' list of 2000 people and direct campaign on them (Vercellis, 2009).

Artificial Intelligence, Internet of things and Blockchain technologies facilitate a flow of information and generate data more than ever before (Smith, 2020). Obviously in such digitalized environment a Fintech company, which is innovative in nature, does and will benefit of using Business Intelligence. Without Business Intelligence a firm will face increasing pressure of getting buried in raw data and paralyzed with reduced capability to catch optimal results of changing the world around, like new market needs, shift in government policy and competitors' movement.

The author of this article will try to highlight trends of increasing data flow sources and Business Intelligence usage in Fintech companies so to bring up some scientifically proved ways to show benefits of using such approach from a Fintech company perspective.

2. Method

For this study was used content analysis method as this work is based on researching specifically selected, relatively recent, within 3 years, scientific studies in the field of business intelligence approach application in innovative financial services. Therefore, this way can be practical for the task of extracting specific data from the written materials (Gheyle and Jacobs, 2017). Then code it for the purpose of detecting a pattern that can show how science moves in this multidisciplinary area as Financial Technology. In other words, the result should show data accumulation trend movement against the tools for processing that data, those tools as a part of Business Intelligence approach application in overall context of Fintech or Innovative financial services.

2.1 Research sample

As a sample for this study was selected 23 scientific works and 3 non-scientific materials which published from 2017 till 2020. The selection method was based on the principal of picking up materials that the author presumes may concern or be, at least, indirectly related to how data is accumulated, and whether there were signs of specific approach to data processing like Business Intelligence in the context of Fintech or innovative financial services. Overall 26 publications were analyzed and processed. To keep actuality of the matter, the ratio of 3 years old publications was minimized, but for the ones that are 2 or less than 1 year old it was increased in overall sample. See table 1.

Table 1: Structure of the sample

Year of publication	Scientific articles per year	Non-scientific per year		
		Books	Reports	Web articles
2017	2	-	-	-
2018	9	-	-	-
2019	5	-	-	-
2020	7	1	1	1
Sample size (total)	26			

Source: author's calculations

2.2 Coding rules

Since content analysis method allows to turn unstructured text materials or qualitative data into organized form that can be calculated and modeled like quantitative data, it was developed a specific

approach where selected and refined a list of specific words for the purpose of finding and counting them out of each material of the research. The list was prepared by the author, who believes it may cover the agenda of this research. The word counting algorithm was made in a way that allows to skip words that match the list, but they are not involved in the discussion process like from the name of the chapters, footnotes and references. Then the list of words was separated into two groups. The first group of words should concern the process of data accumulation and go under the name of Data Accumulation. For the ease of handling the name of this group was simply coded into an abbreviation DA that represents first letters of the name of the group. The identical procedure was implemented towards the second group where collected the list of words under the name of Tools and Processes and abbreviation T&P. See table 2.

Table 2: Coded categories and their descriptions

Code	Name of the group	Specific words or combination of them
DA	Data Accumulation (DA)	Data: operational data; data-driven; large data; big data. Information: financial; commercial; consumer. Transaction(s): transaction records. Report(s): reporting. Record(s). Network(s): sharing. Platform(s). Internet of things. Supply Chain(s).
T&P	Tools & Processes (T&P)	Blockchain. Knowledge management. Artificial Intelligence: AI. Communication(s). Tools: information technology application(s). Intelligence: business, market Process: data processing; structure(s). Decision: decision making. Model: modelling; visualization.

Source: author's calculations.

Due to several publications within specific year it was used a simple formula for calculating the average mean to assign final one average indicator per each year. In other words, a combined sum of indicators, from each publication, get divided into total number of publications within one year so to see an average index for that year. See the equitation below (Hyland and McClure, 2021) (1).

$$A = \frac{1}{n} \sum_{i=1}^n a_i \quad (1)$$

3. Results and discussion

The table 3 describes more detailed arrangement of data gained from calculating specific words from scientific and non-scientific materials. In this table can be seen exact number of words opposite of each individual scientific and nonscientific publication that was placed under special coded categories. Then all preliminary numbers from each publication were combined and processed using average mean formula to see a final overall indicator per each year the publications were issued. The table consists of columns with a year, numeral order, type and name of publications with 2 coded indicators as DA and T&P and average per year.

Table 3: Detailed results of word counting

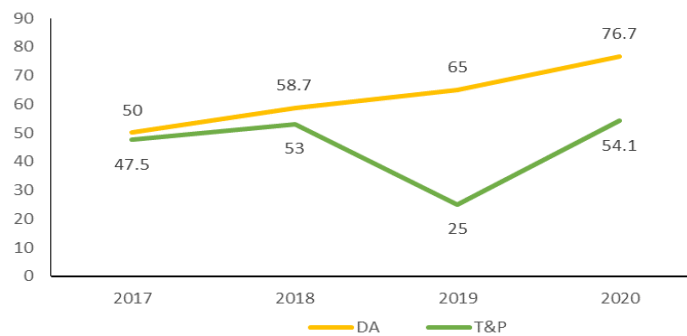
Year	Number	Type of publication	Name	DA	Average per year	T&P	Average per year
2017	1	Scientific	How Valuable Is FinTech Innovation?	72	50	89	47.5
	2	Scientific	Fintech as Financial Innovation – The Possibilities and Problems of Implementation	28		6	
2018	3	Scientific	Imitation-related performance outcomes in social trading: A configurational approach	9	58.7	24	53
	4	Scientific	Do fintech lenders penetrate areas that are underserved by traditional banks?	74		2	
	5	Scientific	Fintech and regtech: Impact on regulators and banks	87		85	
	6	Scientific	Fintech: The Impact on Consumers and Regulatory Responses	41		46	
	7	Scientific	Integrating the ‘Troublemakers’: A taxonomy for cooperation between banks and fintechs	50		18	
	8	Scientific	Some financial regulatory implications of artificial intelligence	105		132	
	9	Scientific	Why do businesses go crypto? An empirical analysis of initial coin offerings	45		68	
	10	Scientific	Blockchain, Herding and Trust in Peer-to-Peer Lending	85		77	
	11	Scientific	Responding to Disruptive Business Model Innovations: The Case of Traditional Banks Facing Fintech Entrants Prepared for Journal of Banking and Financial Technology	32		25	
2019	12	Scientific	An exploratory study of the FinTech (Financial Technology) education and retraining in UK	20	65	3	25
	13	Scientific	To FinTech and Beyond	50		42	
	14	Scientific	Bank Misconduct and Online Lending	112		36	
	15	Scientific	The emerging Cloud Dilemma: Balancing innovation with cross-border privacy and outsourcing regulations	133		32	
	16	Scientific	INFLUENCE OF FINTECH IN DAILY LIFE - A STUDY AMONG YOUNGSTERS IN CHENNAI CITY.	10		12	
2020	17	Non-scientific	Fintech Disruption in Banking – Will Neo Banking be the new normal in COVID Era?	4	76.7	7	54.1
	18	Non-scientific	Digital Disruption in Banking and its Impact on Competition	230		47	
	19	Scientific	Disruptions and Digital Banking Trends	156		61	
	20	Scientific	Toward Understanding FinTech and its Industry	77		45	
	21	Scientific	Indian banking sector: blockchain implementation, challenges and way forward	76		99	
	22	Scientific	Digital payments and consumer experience in India: a survey based empirical study	52		15	

23	Scientific	FinTech revolution: the impact of management information systems upon relative firm value and risk	41	14
24	Scientific	FinTech, economy and space: Introduction to the special issue	13	12
25	Scientific	Exploring Risks in the Adoption of Business Intelligence in SMEs Using the TOE Framework	63	216
26	Non-scientific	Blockchain, Artificial Intelligence and Financial Services	55	25

Source: author's calculations.

The visualization of the results can be seen in the chart. See figure 1. From the start till the end of 3 years - period the average number of mentioning for specific words, under the coded category DA within the sample research publications, increased robustly from 50 till 76.7, but the average number of mentioned words, in the category T&P, started weak at 47.5 mentioning on average in 2017 and gradual increase till 53 in 2018 and sudden drop in 2019 till 25 and back to steady rising 54.1 words mentioned by 2020.

Figure 1: Visualization of topicality of data accumulation (DA) vs tools and processes (T&A) for processing data



Source: author's calculations.

The visualization showed that overall tendency of discussing the topic of data accumulation in the field of innovative financial services was high for the last 3 years, while the topic of data processing approaches and tools were lagging behind. Overall it is clear that the problem of comprehensive supply of data was of paramount importance for financial services industry, but the need of getting even more form derived data by processing it using well-developed methodology was understood with some delays. Nevertheless, the concept of Business Intelligence or its elements did attract attention of scientists and business leaders.

4. Conclusion

The author of this work believes he reached the main goal of this manuscript that was in capturing and presenting the trend of increasing interest in Business Intelligence in Fintech Industry. He hopes this research could attract more attention towards importance of data processing in the age of massive data flow to and from the digital world. In that digital realm has emerged and grown companies that cost more than annual GDP of whole countries. Hence, the author presumes that digitalization will force small and medium-sized enterprises to pay more attention to data and tools for handling such data if their businesses are to survive and compete during and post COVID-19 digital world. The sheer fact of this conference is being organized and conducted online is proof of the idea how important is data sharing and processing among people all over the world.

Author, at the moment of composing this article, personally involved in the process of a Fintech's day-to-day operations and sees great opportunity for application of the Business Intelligence in the highly data-driven industry as Innovative Finance. Therefore, the main value of his research he finds in laying ground for the future studies in the field of Business Intelligence not only within Fintech Industry, but overall in modern economy, that is digital economy.

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INFORMATION SUPPORT FOR CRM DECISION MAKING AND DATABASES

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Abstract

CRM (Customer Relationship Management) systems store data about customers and their preferences. The database supporting CRM must be in very good conditions, because the CRM database is the key to optimal communication with customers, implementation of marketing campaigns and increased sales revenue. This article focuses on the optimal information support based on CRM databases to have stored data in suitable structure and up to date for CRM decision making. The method solution is based on a review of the literature, specification of suitable metrics and subsequent data collection to evaluate database support. The value added is visible in the common recommendation for database support in the form of a combination of the necessary processes and knowledge for sharing with IT users. There seems to be a gap in the optimal sharing of information and adopted database support in CRM. Several vendors provide such information to promote a better understanding of the database with a significant impact on CRM performance and information support for CRM decision making.

Keywords: CRM, database, information support, information technology, knowledge

JEL codes: C80, D70, D80

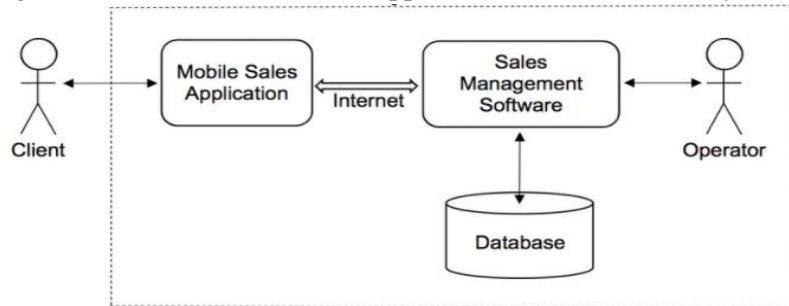
1. Introduction

The default roles of CRM (Customer Relationship Management) systems are in supported processes that work with customer data. This is a large amount of interest, from the necessary data on repositories, their editing, and other information support for marketing (Eng et al., 2020; Higgins et al., 2020), sales (Bonney et al., 2020) and services (Alaimo, 2018; Bacal, 2020). The nature of the benefits is visible in advanced knowledge (Castagna et al., 2020), which shows trends (Taylor, 2020), estimates of changes in customer behaviour (Lam et al., 2020; Rodriguez et al., 2018). Many CRMs (CRM systems) vendors present their own products, such as unique, user-friendly with intuitive navigation and adaptive menus. There is also interest in support innovations that are useful for online meetings, mobile access, and statistics. The required functions of CRMs are lead generation, lead scoring, segmentation, task management, calendar system, chat integration, marketing automation, and also document storage. IT users also evaluate free or free trial version, open-source access, or one-time license. CRMs are presented in detail through website, e-mail marketing, social networks, discussion groups and videos. It is positive to share examples of good practice and evaluations from active customers.

The CRM industry is growing rapidly, but many CRM projects are not in good conditions. In 2017, CIO magazine wrote that it was the failure of about one third of all CRM projects (Edinger, 2017). A few years later, the situation is not better. For example, MIT Sloan estimates that approximately 55% of enterprises must have short own expectations regarding ROI (Return on Investment) from implemented CRMs (GoCRM Team, 2020). Other statistics from the Gartner survey show that up to 70% of CRM projects have losses and CRM implementation has no positive effect on performance. It is also estimated that a third of all projects are cancelled (Guethoff, 2020). These numbers are extremely poor in modern global information society in terms of CRM capabilities (Zhang and Dai, 2020; Zsako, 2018) and artificial intelligence skills (Libai et al., 2020; Serova, 2019).

The CRM concept consists of people, processes, technology, and data. The performance CRMs is measured in many top lists (Capterra - CRM Software, 2021; Best CRM Software of 2021, 2020), and is influenced by the software architecture, the adopted design and methodological solution, the database structure, and the operating system too. The database is needed to store data in an optimal structure for future processing. See, block diagram in Figure 1.

Figure 1: Database in CRMs to support the sales information system



Source: Souza and Stadzisz, 2016.

Poor data is one from the main difficulties in CRM projects that have been canceled. Businessmen feel the need to be better in this area. The quality of the data stored in their CRMs is estimated only as poor (very poor) or average. This situation involves a loss of expected revenues of about 10% due to bad data (Hatfield, 2020). Database structure and correct data have one of the important roles in CRMs. CRMs works with large amount of data that are oriented to customers, potential customers, vendors and needed partners. It is also important to remember to support marketers, salespersons, and other employees who use CRM. These CRMs need a robust database. For this article, the question is about optimal care for the data stored in the database to have optimal information support for CRM decision making. To address this issue, this article is divided into several chapters, such as information support and databases, method and data, result and discussion, and conclusion. References are also available.

2. Information Support and Databases

This chapter is devoted to monitoring the current situation in CRMs. An irreplaceable place is also interested in sharing the necessary information about the adopted database support and database structure from CRMs vendors. Excellent approach is visible to Salesforce. Salesforce CRM (Salesforce, 2021) is a very good solution for small and medium businesses. The benefits are visible in cloud and mobile support, automation of mail processes, alerts and reporting. For today's pandemic, there is excellent Covid-19 consulting support through Salesforce website. So that IT users understand the importance of the database with optimal care for database structure, the necessary database support information must be shared. Salesforce has a unique concept of sharing the information needed to accurately present own CRM system with an optimal background. It is not just visible parts of the CRM system, but increasingly the trust of the IT users in the adopted solution, which must be used at the maximum level. To use the CRM system at maximum level, it needs care for all parts of CRM, including the data stored in the database.

Salesforce uses database running on the Force.com platform. It is based on a traditional relational database. The data is in tables, and these tables are specified through columns that represent a specific type of data. This information is the basic knowledge of a relational database, but many IT users do not have knowledge in this area, and they need to be reminded of these database fundamentals. The vendor goes into detail. The tables are explained in rows, the unique identifier for each row, and the relations between them (Decoding the Salesforce Database: Frequently Asked Questions, 2016). The concepts are slightly different from the database theory, but the vendor explains in detail the need relations. It is easy to understand that a table is an object, a column is a field, and a row is a record. For a practical database implementation in Salesforce, it is essential that the vendor displays sample tables, such as lead object, account object, and contact object:

- Lead object table is created with fields as Lead Owner, Lead ID, First Name, Last Name, Company, Title, Email, Lead Source.
- Account object table is created with fields as Account Owner, Account ID, Account Name, Account Type, Billing State.
- Contact object table is created with fields as Account Owner, Contact ID, First Name, Last Name, Title, Account Name, Account ID, Email, Lead Source.

The contact object is created to store data about people. The relationship with the account object is important for the contact object because the contact records have an associated account record. This information shows the important influence of database structure and integrity relations on CRM system performance. There is also interest in number of database languages, such as the Structured Query Language - SQL (Sharma, 2020).

Another inspiring example of sharing database support information in CRM is visible in SugarCRM. It is a free solution based on an open-source web application. SugarCRM states that it uses common database functions and does not use database triggers or stored procedures (SugarCRM support - Database, 2021). The reason is that this design brings the advantage of simple coding and testing through various database. SugarCRM also uses primary keys for specified tables with globally unique identifiers. Interestingly, the primary key is a column about 36 characters long. Active work with database is based on the database manager object and query. The advantage is the ability to generate an SQL statement with support all databases that are supported in SugarCRM. Another interest is natural processes with stored data, such as a full backup, making the necessary data modification, running SQL scripts, or advanced data analysis (Dongus and Bergmann, 2020).

The above example is one of the examples of optimal information support about the database implemented in CRMs. This approach is important to help IT users better understand important data, its structure, and the care required for database objects such as tables, primary keys, relations, database integrity, and SQL scripts. Information technology offers many databases to implement optimal support for data storage, such as DB2, MS SQL, MySQL, Oracle, PostgreSQL and many more. There are proven solutions, but also a small database to support the implementation of CRM in a small business. CRM vendors use different databases, for example:

- Salesforce uses Oracle database.
- SugarCRM supports MySQL and Microsoft SQL databases. Another interest is in the support of DB2 and Oracle databases (for Sugar Enterprise and Sugar Ultimate).

Special attention is paid to supported database integration via JDBC (Java Database Connectivity) and ODBC (Open Database Connectivity) for access to database management system (DBMS). The requirement is in integration with the necessary data structures and databases. IT users see the benefits of optimal database back-end support in available templates, reduced double data entry, or synchronization to get a 360-degree view on customers (Sheng, 2020), such as:

- Configurable pre-built templates that have a user-friendly interface to define business processes according to actual requirements.
- Reduce double data entry to minimize poor data entry and functional errors to ensure safe time and faster collections.
- Synchronized billing and invoice data to automate payments, workflows, and alerts.

The trend in information technology is the implementation of most instance solutions that IT users may use without IT specialists. The default requirements include dashboard-based data analysis and advanced automation processes. Such an approach must integrate appropriate software tools for everyday use with intuitive navigation and low requirements for deep knowledge. It is a flexible configuration and development using clicks without programming in SQL. The same situation is visible in database-based information support, but it requires appropriate design and optimal database knowledge for CRMs that IT users should know to use it in CRM.

3. Method and Data

The question of this article concerns the optimal care of the data stored in the database to have optimal information support for CRM decision making. The following method based on these steps is adopted for the solution:

- To monitor the current situation in selected CRMs, such as examples of good practice; this literature review is given in chapter 2 (Information Support and Databases).
- To specify the required method and metrics; they must be accepted in CRMs to implement CRM with good performance; adopted method and specified metrics are explained in this chapter 3 (Method and Data).
- To search the necessary data on CRMs and explain the real approach in IT capabilities for the daily work of IT users; the achieved results are mentioned in the following chapter 4 (Results and Discussion, part dedicated to the results).
- To design optimal knowledge of the database in CRMs, which IT users should know about the implemented CRMs in their own business; recommended approach to database back-end design is in the following chapter 4 (Results and Discussion, discussion section).

Optimal database support uses a database management system (DBMS) with implemented functions to define data in table structures, relations between tables, and to manage access for multiple IT users. The standard requirement is to have the simplest possible access, the highest speed, and no time limits. There are implemented database processes, such as:

- database connectivity,
- data migration,
- and synchronization.

These database processes must be available to IT users to have the necessary functions to work with data; therefore, the specified metrics focus on them.

4. Results and Discussion

To have the necessary data about the implementation specifies processes (via metrics) in CRM, which are linked in the database, the selected CRM systems were checked by the above metrics. The results are shown in Table 1.

This table shows a description of the CRMs that take care of the implementation of the database in CRM, and this care is also explained to IT users for better understanding. The monitored CRMs are Microsoft Dynamic CRM (Microsoft Dynamics 365/CRM, 2021; Connect PostgreSQL to Microsoft Dynamics CRM with LeadsBridge, 2020; PARTNERS, 2016), Pipeliner CRM (PostgreSQL Integration with Pipeliner CRM, 2021), Salesforce (Salesforce and PostgreSQL Integration, 2020), SugarCRM (Dongus, B. and F. Bergmann, 2020), Zoho CRM (MySQL Easy Sync for Zoho CRM, 2020; PostgreSQL Easy Sync for Zoho CRM, 2020). It is also a positive approach to long-life learning about data. Not all CRMs have such database-related information support. There are CRMs such as itracMarketer (itracMarketer, 2021), Jumplead (Jumplead, 2021), Less Annoying CRM (Less Annoying CRM, 2021), Zimplu (Zimplu, 2021) and many others that have zero or lack information about this topic. This is not good for minimizing poor data in CRM.

Table 1: Database support for CRM systems

Database processes (metrics)	Selected CRM systems	Description
Database connectivity	Pipeliner CRM	Pipeliner CRM supports PostgreSQL database integration. The interest is to synchronize all data, connections, and configurations for flexible workflows.
	Salesforce	Salesforce implements a database connector for JDBC or ODBC integration for a selected database, such as DB2, MS SQL, MySQL, Oracle, PostgreSQL, or Amazon Redshift. It is also about the ability to stream Salesforce data with a database.
	SugarCRM	SugarCRM relies on project management features to support templates and dashboards. It is interested in ability to copy SugarCRM data to a selected database, modify data, run SQL scripts, or convert SugarCRM MySQL database to PostgreSQL.
Data migration	Microsoft Dynamics CRM	Microsoft Dynamic CRM offers an interface for migrating data to the CRM system from selected databases (for example, MySQL). The process converts data from various databases to MS SQL. Data migration must create tables in the target. The metadata browser window helps IT users to select the target database for data migration.
	Microsoft Dynamics CRM	There is specialized Microsoft Dynamics CRM Adapter to support connectivity to many databases such as DB2, MySQL, Oracle, PostgreSQL, and Apache Cassandra database such as representative NoSQL database.
Synchronization (sync)	Zoho CRM	Zoho CRM has a specialized module for importing data into tables in a MySQL database. It is a synchronization that creates tables and data stored in the user's database. This process automatically creates the MySQL data structure and keeps the stored data up to date.
	Zoho CRM	Zoho CRM also offers extension for importing data into PostgreSQL. It is similar to a MySQL database. The necessary tables are created, and the data is added to the user's database.

Source: own work

From above mentioned data, the common recommendation for the optimal structure of information support of the database back-end in CRMs is specified. This is own contribution for better information support through optimal database support. Database support (DBS) is specified in the form of the optimal combination of the necessary processes and knowledge to share with IT users. The reason is a better understanding of the data importance and their storage in CRM database. It is not only a user-friendly interface, but also a way to have the right data in databases. The optimal DBS is specified by the relation:

$$DBS = \sum_{i=1}^n DBI_i, \quad (1)$$

where n=7 for the seven recommended items for database support, such as tables (DBI₁), indexes (DBI₂) and relations (DBI₃). Other needs are related to query (DBI₄), database connectivity (DBI₅), data migration (DBI₆), and synchronization (DBI₇).

Based on the literature review and monitoring of selected CRM systems, the interest in sharing recommendation and the adopted solution for database support in many CRMs is very weak. Several vendors only care about the irreplaceable value of the database with a significant impact on data storage. This article shows a gap in the optimal sharing of information and adopted processes with database links. This is also the reason why poor data is stored in databases. This reality has a wide range with an impact on performance information systems and is the same for CRMs. The concrete recommendation is to support better sharing of database back-end information in CRMs do have better knowledge of data structures; it is a long-term learning of IT users with positive impact on data quality.

5. Conclusion

The topic of this article focuses on the information support through the database integration into CRM. CRMs are responsible for communicating with customers and optimal IT support for processes related to marketing, sales, and services. The required data is stored in CRM database. This is a hidden area for IT users because they work with user-interface implemented in CRMs. In many cases, CRM projects fail or are canceled. Difficulties also are caused by poor data stored in the database. From this point of view, the interest in the database and the adopted design for the database implementation are important. There are CRM vendors who care about sharing information with IT users to have more trust from IT users. It is about supporting a better understanding of the value of important data that requires the right data in the right database structures. Examples of good practice are Salesforce and SugarCRM. But many other CRM vendors do not care, there is a visible gap in increasing interest in data to minimize poor data in the database. Based on the literature review and monitoring of the current situation in selected CRMs, the common recommendation for the optimal structure on the information support of database back-end in CRMs was specified. The method solution used specified metrics (focus on database processes), such as database connectivity, data migration, and synchronization. The monitored CRMs were Microsoft Dynamic CRM, Pipeliner CRM, Salesforce, SugarCRM, and Zoho CRM.

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SUPER-DEDUCTION FOR RESEARCH AND DEVELOPMENT IN SLOVAK COMPANIES

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Abstract

Research and development are currently the most important tools for progress in all areas of life, not only in the business sphere. Entrepreneurs in general are not always able to carry out research and development or take advantage of them. In the Slovak Republic, as in the whole of the EU, there are efforts of governments to support corporate research and development in the form of various reliefs and subsidies. The aim of the contribution is to analyze the structure of companies applying super-deduction of R&D costs in the Slovak Republic in 2015-2018 following the increase of super-deduction rates. The rate of application of the super-deduction in the individual years examined is low, despite a gradual increase in rates up to 100% (plus 100% year-on-year growth) in 2018. The assumption that the number of companies applying super-deduction would also increase with the increasing number of employees of the company has not been confirmed. In the period considered, companies with 10-50 employees applied 206 times, which was cumulatively the most over the whole period considered. This category also prevailed in the individual years under reference. The sectoral structure of companies is diverse with the overall predominant Information technology sector, followed by the Engineering and Electrical engineering sectors.

Keywords: businesses, financial information, research and development, super-deduction

JEL codes: O32, M21, H25, M40, O38

1. Introduction

The global economy is currently facing new challenges associated with globalization, the emergence of new technologies, and the transition to a knowledge-based economy. This has resulted in fast-growing markets with ever-tougher global competition that is forcing companies to provide value-added products, processes and services. Scientific knowledge of the world has become an integral part of the life needs of mankind and at the same time a necessary condition for the development of society. This has also affected companies' investment structure and the importance of certain types of investment (Ahuja, 2011). This explains why the role of R&D investment is becoming increasingly important since it is often seen as the key driver of innovative outcomes and keeping a competitive position in the market (Arkhipova et al., 2019; Akhmetshin et al., 2018; Dmitriev et al., 2018). Therefore, the R&D investment is an important factor in the long-term viability of modern companies, especially in the conditions of an ever-changing business environment (MacGregor Pelikánová, 2019a). Accordingly, companies should be motivated for the R&D investment in order to develop their competitive advantages (Ravšelj et al., 2017; 2018; 2019) or as mentioned by Staníčková and Melecký (2014), also the other factors determined competitiveness of economic entities in a specific area and conditions of the European Union. Innovative

activities are closely related to the company's survival in a globalized market and with competitiveness, which is specifically reflected in the continuous process of the renewal and improvement of goods and services as well as production processes and the economic potential of enterprises (Šebestová and Nowaková, 2015).

Research and development („R&D“) are a costly and time-consuming activity without a guaranteed result, i.e. risky. The time we are currently in is characterized by dynamic and fast-coming changes, advances and new technologies. Investment in this area can be made by the State, but also by the private sector. In view of the research and development, which is a prerequisite for a long-term prosperity and ensuring the sustainable development of the state, each developed state seeks to create the conditions for supporting research and development activities, in particular towards smart solutions (Turečková, et al., 2018).

Evidence suggests that private firms spend less on R&D than is socially optimal because the presence of externalities creates a gap between private and public profitability (Arrow 1962; Nelson 1959). In most OECD countries governments try to solve this problem through various measures, such as subsidies or fiscal incentives for R&D, in order to stimulate innovation. The effectiveness of these instruments depends on each country's fiscal system and the purposes of its programs (European Commission, 2003).

Support for research and development exists in the countries of the European Union in various forms. The decisive aim and objective of using individual forms of indirect R&D support is to motivate the business sphere to higher R&D activities, including their financial support (Turečková, 2016). Companies' investments in development and research are one of the factors that stimulate economic growth and innovation performance of both companies and the State (MacGregor Pelikánová, 2019b), both at national and regional level (Majerová, 2018). Innovation is clearly part of the R&D. Innovation is a process that has gone through a complete technological cycle from the birth of an idea, its technological development and documentation to the necessary business practices in order to enter the market in the form of a product, service or technology (Slobodnyak et al., 2020).

Individual countries are well aware of the importance of R&D in their economies, as the results of R&D have a positive impact on the development of their country's competitiveness. Within the European Union, Slovakia is one of the countries that contributes at least to the R&D from the state budget. Annually, about 1.2% of gross domestic product is spent in this area (TASR, 2016a).

The popularity of tax incentives for development and research in the world is growing. Globally, the effectiveness of the impact on innovative technologies is assessed by various tools (Bockova et al., 2016).

The aim of our research is to analyze and compare statistical data related to R&D implementation in the Slovak Republic between 2015-2018 in terms of assessing the trend of the applying the R&D tax support by entrepreneurs according to time and industry.

2. Theory background

Let us start by defining the basic concepts of research and development in a transnational context. In particular, we will focus on the legislative definition of R&D, with each State setting limits for activities that fall within this area separately, thus defining these concepts in different directions. Even concepts can resemble, or even often be, interchangeable or blended in a certain way. Definitions in country legislative documents, or from different authors, can be defined with slight variations, but in principle they are all very similar. It was this fact that led to the creation of the Frascati Manual. Published by the Organization for Economic Co-operation and Development (OECD) since 1963, this guide aims to identify R&D activities that may seem very difficult in practice.

The Frascati Manual has been a recognized standard at international level in the field of R&D for more than fifty years and is one of the most translated OECD publications. The recent seventh edition was published in 2015. Compared to previous publications in 2012, it contains more details and gives different examples from practice, allowing readers to understand the issue more easily.

According to Frascati manual, the term research and development covers three areas, namely basic research, applied research and experimental development. It defines R&D as “creative work carried out on a systematic basis to increase knowledge, including knowledge of man, culture and

society, and to use this pool of knowledge to design new applications” (OECD, 2015. Frascati Manual 2015).

The basic concepts of R&D are regulated separately by countries in their legislative documents. In the Slovak Republic, R&D is defined in Section 2 of Act No. 175/2005 Coll. on State support organizations for research and development and on amendments to Act No. 575/2001 Coll. on organizations of activities of government and organizations of central state administration, as amended. The definitions given in this Act are derived from Frascati manual definitions.

Research is defined, pursuant to Section 2(1) as: “...a systematic creative activity carried out in the field of science and technology for the needs of society and for the development of knowledge. Research shall consist of basic research and applied research” (Act No. 172/2005 Coll., 2021). It follows from Section 2(2) that research is divided into basic research, the essence of which lies in continuous creative activity without considering the consequences in future practical use (Act No. 172/2005 Coll., 2021). Applied research pursuant to Section 2(3) is defined as a creative activity aimed at acquiring new knowledge with practical realization of acquired experience in economic and social practice (Act No. 172/2005 Coll., 2021).

According to Section 2(4) the development is defined as: “...systematic creative activity in the field of science and technology using laws and knowledge acquired through research or based on practical experience in the creation of new materials, products, equipment, systems, methods and processes or their improvement” (Act No. 172/2005 Coll., 2021).

The definitions of research and development can also be based on the Order of the Ministry of Finance of the Slovak Republic of 16 December 2002 No. 23054/2002-92, which lays down details on accounting procedures and a framework chart of accounts for entrepreneurs accounting in the double-entry accounting system, as amended. The accounting procedures set out the conditions for the accounting of R&D for business entities in the double-entry accounting system in the Slovak Republic.

The definitions given in the Act on State Support Organizations of R&D in the Slovak Republic are also referred to by the Methodological Instruction on deduction of R&D expenses (costs) pursuant to Section 30 of Act No. 595/2003 Coll. on income tax, as amended. Amendment of the Act within the framework of active measures on the labor market in connection with the declaration of an emergency, a state of emergency or a state of emergency and the elimination of their consequences allows taxpayers, in limited cases, to apply an exemption from the prohibition on including expenses (costs) supported from public funds to the deduction of R&D expenses (costs) that the taxpayer can claim when filing a tax return after 31 December 2020 for the 2020 tax year (Methodological Instruction, 2021). This methodological instruction was developed following the current Covid-19 pandemic.

We identify innovation as an important part of research and development. “*Innovation is one of the first definitions of the content and specifics of innovative transformations in society, which was formed in the 19th century. It was associated with changes caused by spontaneous interactions of different cultures. At the beginning of the 20th century, this term began to be used in economic science and meant that economic growth and development depend not only on investments in labor and capital assets, but also on investments in new production technologies*” (Kazantsev, 2017). Economists understood an innovation as the embodiment of a scientific discovery in a particular technology or product. An innovation may be called the “final result” of introducing an innovation to change the management object and obtain an economic, social, environmental, scientific, technical or other effect (Fedorchenko, 2015).

A number of researchers believe that R&D is an integral part of the innovation process. There is an opposite point of view. Innovation complements the R&D process and focuses on the commercialization of research and development results. For example, it is argued (Mindeli et al., 2017) that the innovation process should include all phases of the life cycle: from the idea and concept of innovation to the phase of mass production and operation. According to other researchers (Kalabin et al., 2019; Mindeli et al., 2017), the innovation process begins with the phase of the invention and ends with the phase of development of the prototype and its transfer to mass production.

3. Data and methodology

The contribution focuses on research and development in the Slovak Republic in 2015-2018. Theoretical interpretations of research and development in legislative standards at transnational and

national levels are defined at the outset. The theoretical background is important from the point of view of understanding the R&D in the conditions of the Slovak Republic, where the following quantitative research is carried out.

In research, the processed data is collected and published by the Financial Administration of the Slovak Republic, which, under the authority of the Ministry of Finance, supervises, among other things, compliance with generally binding legal regulations, EU regulations and international treaties, which ensure the implementation of trade policy, customs policy, tax policy. It administers the collection of taxes and its main mission is to effectively collect and administer customs duties and taxes to fulfill the revenue part of the state budget of the Slovak Republic and the budget of the European Union (EU), the protection of the economic interests of the State and the protection of the expenditure part of the State budget of the Slovak Republic (Financial Administration, 2021a). Our research contains data for the Slovak Republic in the period since 2015, when the super-deduction was introduced into our legislation, until 2018, when the data is fully available. Due to the possibility of deferring business tax returns for 2019 due to the ongoing pandemic until October 2020, data for the use of the super-deduction for 2019 is not yet complete, therefore it is not quantitatively evaluated in the contribution.

We draw all information about companies applying super-deduction of R&D costs from the current lists published on the Financial Administration of the Slovak Republic. The Financial Administration of the Slovak Republic collects data on enterprises from completed and filed tax returns, in which companies indicate the number of projects, the objectives of individual projects and the amount of the super deduction they applied in the tax period.

Additional information on enterprises for the years concerned is from the finstat.sk database (Finstat, 2020). Our research included all companies in Slovakia that claimed a super deduction in each year of the monitored period of 2015-2018.

The aim of the contribution is to analyze the structure of companies applying tax super-deduction of R&D costs in the Slovak Republic in the period of 2015-2018 following the increase of super-deduction rates. The analysis of the sectoral structure was linked to the individual years examined as well as to the categories of enterprises by number of employees.

According to Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013, we class the businesses according to size criteria for micro, small and medium-sized enterprises according to the amount of assets, turnover and number of employees. In terms of the needs of our research, we divide the businesses examined into categories according to the number of employees, which replicate the requirements of the Directive for size categories of enterprises in one criterion, namely the number of employees. We list the created categories in Table 1.

Table 1: Breakdown of enterprises by number of employees (x)

Category 1	Category 2	Category 3	Category 4
$0 < x < 10$	$10 \leq x < 49$	$50 \leq x < 249$	$250 \leq x$

Source: own processing according to Directive 2013/34/EU (2021).

Given the overall low rate of application of the super-deduction costs in the period considered, it can be assumed that the administrative complexity of the process of applying this support requires a larger number of employees in companies. The research question focuses on determining whether the most companies with a super-deduction was from the category 4 with the most employees.

Based on the available information on the number of employees, we were able to evaluate 595 of the 622 super-deductions applied in the period under review, the following 18 self-employed and 9 companies did not have a public number of employees in the respective year.

As the main method of investigation, we used the quantitative statistical analysis and comparison that we use to compare the increasing number of companies that used the R&D cost (expenditure) deduction in the context of sectors and number of employees in the period considered for the period of 2015-2018.

Using abstraction, we selected the data needed for quantitative analysis. We abstracted from specific enterprises and descriptive information about enterprises to select data for statistical analysis. We divided the monitored data of enterprises according to the subject of business and the number of employees. In assessing the super-deduction applied, we abstracted from the fact that some companies

applied the super-deduction in several years, therefore these companies were repeatedly classified as applying the super-deduction in the relevant year.

4. Results and discussion

In early 2015, Slovakia introduced a new type of tax incentive aimed at supporting companies conducting corporate R&D (most common is development of new or substantially improved products, services, technologies and processes). This regime represents a transparent, fair and administratively less demanding form of fostering corporate R&D. Similar regimes have been in use for years in the world's most advanced economies (Deloitte, 2021).

The super-deduction of R&D costs represents State support for companies as well as freelancers who carry out research and development. The aid is granted in the form of a reduction in their tax obligations, since it makes it possible to deduct the higher amount of R&D expenses by including them multiple times in the tax recognized costs when filing an income tax return once the specified conditions of the Income Tax Act have been met.

Most governments apply a combination of tax incentives and direct subsidies to encourage private investment in R&D. This supports the view that the concept of the instrument is at least as important as the one used and that complementarity should be used (D'Andria et al., 2017).

With the effect as of 1 January 2015 in the Slovak Republic, Act No. 333/2014 Coll. entered into force, supplementing Act No. 595/2003 Coll. on income tax, as amended. This law added a new provision, namely Section 30c (Income Tax Act, 2020), which deals with the deduction of research and development expenses (costs) in which the term “super-deduction” was introduced. The super-deduction was introduced as a new type of tax advantage for those taxpayers who carry out research and development. This type of tax advantage is intended to motivate taxpayers to spend more money for research and development purposes, to create jobs for professionals (graduates), to increase their own competitiveness and to contribute to the development of the knowledge economy. The super-deduction may be used by the taxpayers if they carry out research and development in respect of which they incur expenses (costs) which may be deducted from the base (Financial administration, 2021b). The super-deduction for R&D has been introduced in Slovak legislation since 2015. Table 2 below shows how the individual percentages for the deduction of the costs of R&D have changed over the years since the introduction of the super-deduction.

We used data obtained based on the Act No. 595/2003 Coll. on income tax of the Slovak Republic to compile an overview (Table 2) presenting the development of the percentage of deduction of costs and the year-on-year increase in the deduction for R&D between 2015-2021. In the reference period of 2015-2017, the total percentage rate of deduction was 25% for total expenses and 25% for the personal costs of young researchers. Likewise, the year-on-year increase in the deduction was 25% in this period. Since 2018, the deduction has increased to 100% for total expenses and 100% for an average increase in expenses over two years. Since 2020 onwards, it is known that the R&D costs deduction is 200% for total expenses and 100% the average increase in expenses over two years.

Table 2: Overview of the amount of the R&D deduction (2015-2021)

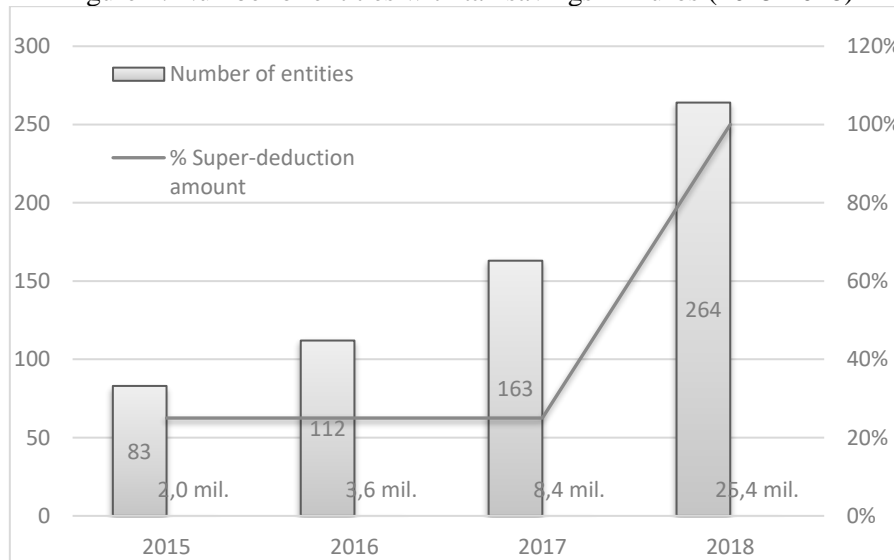
Year	2015-2017		2018-2019		2020-2021	
Tax advantage	Reduction of tax base (concurrently)		Reduction of tax base (concurrently)		Reduction of tax base (concurrently)	
Rate (%) super-deduction of R&D costs	25% total expenses + 25% (personal costs of young researchers)	25% (year-on-year increase deduction)	100 % total expenses	100% (average increase expenses for two years)	200% total expenses	100% (average increase expenses in two years)

Source: own processing according to Act No. 595/2003 Coll. on income tax (2021)

The table shows that since the super-deduction was introduced into the legislation of the Slovak Republic, it has increased every year. The impact of this growth on the number of entities with a super-deduction applied per year is shown in Figure 1, where we can observe the increasing interest of companies in applying the deduction of R&D costs (expenses). As between 2015-2017 the entitlement

to a super-deduction of R&D expenses (costs) was only 25%, this was not sufficiently motivating or beneficial for Slovak companies. In 2015, only 83 businesses claimed the super-deduction, none of which were natural. In contrast, in 2018 the number of all entities increased to 264, of which 14 are self-employed. With the increase of the super-deduction to 100% in 2018, it is clear that the self-employed people have also more boldly applied the super-deduction for R&D expenses (SmarTech, 2020).

Figure 1: Number of entities with tax savings in Euros (2015-2018)



Source: own processing according to Financial administration (2021c).

It is clear from Figure 1 that since 2015, when the super-deduction was introduced in the Slovak Republic, the number of entities that claimed the deduction has increased every year. A significant increase in entities occurred in 2017, when the deduction was claimed by 51 more entities than in 2016. The growing trend continued in 2018, with 101 more entities claiming the deduction than in 2017. This increase may be due to the fact that the amount of the deduction has increased from 25% to 100%, which means greater savings in income tax for operators. As the number of entities gradually increased, so did the cumulated amount of the applied super-deduction of costs of R&D by entrepreneurs. In 2015, the cumulated amount of the applied super deduction amounted to EUR 2.0 million, in 2016 EUR 3.6 million, in 2017 it was EUR 8.4 million and in 2018 EUR 25.4 million. The biggest difference is observed between 2017 and 2018, when the increase in the cumulated super deduction amounted to around EUR 17 million.

In view of the information available, the applicable tax rates for each year and other concessions, it is not possible to directly determine the tax savings of individual enterprises.

With the changing number of entities applying the super-deduction for R&D the number of entities and their focus changed too. In Table 3 we show the individual numbers of entities that have applied tax support according to the focus of the statistical classification of the activity and their classification according to the post of employees into our defined categories.

We divided the obtained data into categories according to the subject and focus of the enterprises (sector). Information technology, Engineering and Electrical engineering have the greatest representation in the application of tax support. Since 2018, the cost of licenses for a specialized computer program (software) can also be included in the super-deduction. The software must be directly used in the implementation of the R&D project. In this context, the Financial Directorate lists, for example, the costs of graphical and design computer programs. This, too, may result in such a high increase in the information technology sector. An important specific group for our research were self-employed. It was for this group that the super-deduction was unattractive at such a low rate with a high administrative burden. The gradual increase in the super-deduction has also included this group of entrepreneurs, thus increasing the applicants for the deduction of the costs of R&D for 2017 and the highest increase so far in 2018.

Table 3: Structure of entities applying super deduction according to the focus and classification of employees into size categories (2015-2018)

Sector	Number of taxable entities				Classification into categories by number of employees (all period 2015-2018)			
	2015	2016	2017	2018	Category 1	Category 2	Category 3	Category 4
Accounting	0	0	2	1	0	3	0	0
Activities of hospital	1	1	1	1	0	0	0	4
Activities of other member organisations	1	0	0	0	1	0	0	0
Advertising	0	1	0	2	1	2	0	0
Agriculture and forestry	2	3	2	1	1	7	0	0
Automobile industry	1	3	7	6	0	1	3	13
Clothing and footwear	0	0	0	2	0	1	1	0
Construction	0	2	1	9	3	3	3	1
Development and civil engineering	6	5	5	7	5	15	3	0
Education	0	0	0	2	0	0	0	0
Electrical engineering	13	16	22	27	6	16	28	27
Energy and mining	1	1	1	1	4	0	0	0
Engineering	11	16	22	34	7	24	24	28
Food processing industry	1	1	3	7	0	8	3	1
Gambling	0	1	0	0	0	0	0	1
Health care	1	3	3	2	6	1	2	0
Chemistry and plastics	2	2	2	6	1	4	3	4
Information technology	9	17	32	62	22	46	37	15
Intermediary activity	1	1	1	4	2	5	0	0
Law, consulting and accounting	1	1	1	3	4	1	0	0
Metalworking and metallurgy	8	10	20	20	4	18	23	13
Other Cash	1	1	1	2	0	0	0	5
Production - other	1	4	4	4	7	2	4	0
Research and development	14	10	14	18	27	24	5	0
Retail	1	4	3	6	5	6	1	0
Sales and maintenance of vehicles	0	1	2	2	0	3	2	0
Self-employment	1	0	3	14	0	0	0	0
Service	0	0	0	2	0	2	0	0
Telecommunications	0	1	2	1	0	0	1	3
Tourism and gastronomy	0	0	0	1	0	0	0	0
Transportation and logistics	1	1	1	0	3	0	0	0
Waste management	0	0	0	1	1	0	0	0
Wholesale	4	5	6	15	8	14	5	3
Wood and paper	1	1	2	1	0	0	5	0
Total number	83	112	163	264	118	206	153	118

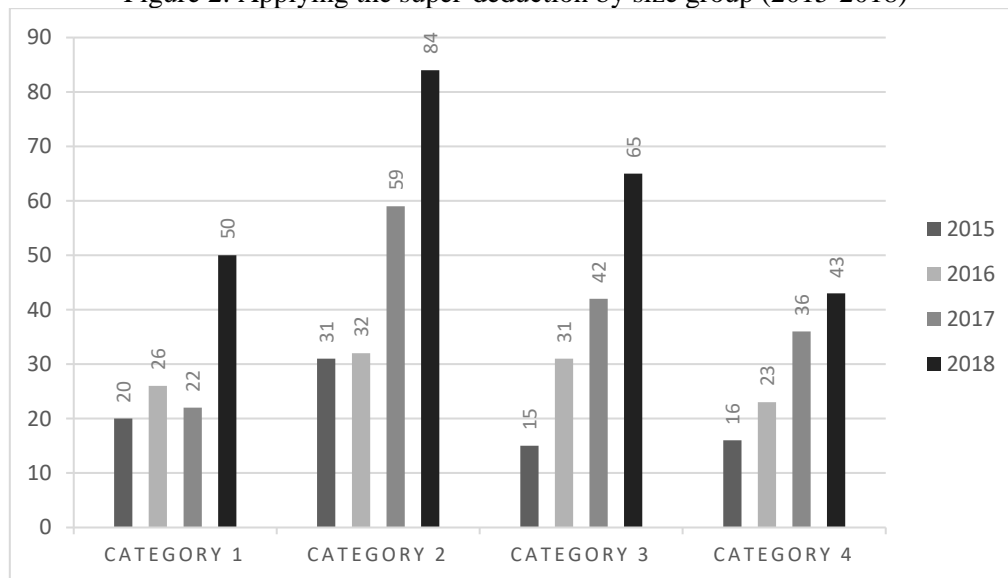
Source: own processing according to Finstat (2020)

Since the introduction of the super-deduction into the legislative regulation of the Slovak Republic, we observe certain concerns in the first years when applying it in categories 1 and 2 according to the number of employees. The gradual increase in the super deduction rate significantly affects the above mentioned enterprises, which are under staffed, and the development of R&D projects may be more administratively demanding for them than for categories 3 and 4. In the following analysis, we compare the number of enterprises and their development in the specified categories according to the number of employees, which are one of the criteria permeable to the size categories of enterprises.

In the period of 2015-2018 there were 118 category 1, 206 category 2, 153 category 3 and 118 category 4 enterprises claiming a super-deduction of R&D costs. A total of 622 companies claimed the

super-deduction during the period under review, of which 18 are self-employed and 9 companies did not disclose the number of employees, so in Figure 2 we present 595 enterprises, sorted by number of employees. During the period under review, the super-deduction was most claimed by category 2 enterprises. This concludes that the high number of employees of the company does not play an important role in the application of the super deduction of R&D costs.

Figure 2: Applying the super-deduction by size group (2015-2018)



Source: own processing according to Finstat (2020)

According to a survey carried out by Deloitte R&D Survey 2016, which was carried out in cooperation with the Slovak Agency for Investment and Trade Development, there are still a number of external factors that negatively affect research and development in Slovakia, namely in the form of a lack of information on the application of the super-deduction and a low rate since its introduction compared to neighboring countries. The availability of qualified and experienced researchers is one of the most important factors influencing the expenditure of companies (TASR, 2016b).

5. Conclusion

The aim of our research is to analyze and compare statistical data related to the implementation of R&D in the Slovak Republic between 2015-2018. The super-deduction of R&D costs came into force on 1 January 2015. We can state that the biggest change occurred in the Slovak legislation since 1 January 2018, when there was an increase in the percentage of possible deduction of research and development costs from 25% to 100%.

The R&D is considered to be one of the most important areas where efforts are being made to increase the European Union's competitiveness on a global scale. A key document on the definition of R&D is the Frascati Manual, which is published by the OECD and is used in the European Union, in the Slovak Republic the R&D is regulated by Act No. 595/2003 Coll. on income tax, Act No. 172/2005 Coll. on organization of State support for research and development and Methodological instruction on deduction of expenses (costs) for research and development pursuant to Section 30c of Act No. 595/2003 Coll. on income tax, as amended. The laws and methodological instruction are regularly updated and the changes that occur in the super-deduction of the costs of R&D are gradually becoming more attractive to entrepreneurs and are presented to companies that use the super-deduction or are about to use it. Business-used super-deductions for individual tax periods are also disclosed.

Our research shows that the annual increase in the percentage of deduction for R&D increased the number of entities that claimed the super-deduction. Between 2015-2017, when the deduction rate was 25%, 83 entities claimed the deduction in 2015, 29 more in 2016 and 163 in 2017. Only since 2018 we see an increase in the deduction to 100% and an increase in the number of entities to 264.

A possible reason why companies do not apply the deduction for R&D to the extent that in other European countries may also be the fact that there is a concern on the part of Slovak taxpayers whether the administration of the application of the deduction is not so complex that the resulting tax saving will not ultimately be of sufficient interest to them. This is also why Slovak legislators are trying to make the R&D more attractive and therefore increase the percentage of deduction every year since 2018.

In the period considered, 118 companies from category 1 (number of employees up to 10), 206 companies from category 2 (number of employees from 10 to 50), 153 companies from category 3 (number of employees from 50 to 250) and 118 companies from category 4 (number of employees more than 250) applied for super-deductions of R&D costs. According to the number of employees, out of a total of 622 super-deductions applied in the period considered, 595 were classified, the remaining companies (18 self-employed and 9 companies) did not disclose the number of employees in the relevant period. During the period under review, the super deduction was most claimed by companies in category 2 (number of employees from 10 to 50). From this we can infer that the number of applications for the super-deduction of R&D costs is not affected by the number of employees of the company and it can also be assumed that the administration of the project development does not play a significant role. It was therefore not confirmed that the number of supercomputing companies would also increase as the number of employees of the company grew.

A positive impact can be identified with the rising super-deduction rate on the annual increase in the number of companies using the super-deduction. The sectoral structure of companies is diverse with the overall predominant Information technology sector, followed by the Engineering and Electrical engineering sectors. A deeper analysis of individual quantitative and qualitative dependencies will be part of the following research.

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BUYER PERSONA: USEFULNESS OF THE METHOD IN SOCIAL MEDIA ADVERTISING

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Abstract

Despite the growing popularity of buyer persona as a tool in marketing practice, very little empirical research has been conducted in pursuit to assess its effectiveness. In this study, an experiment was designed to answer the research question about the value of the method in the domain of social network advertising. Thus, the main goal is to explain the chain of relations between buyer persona training and consequent use in advertising process with impact on final advertising performance. Six student teams were assigned with a task to create an advertisement on social network Facebook and Instagram for three brands. Half of the students participated in a buyer persona training with an experienced lecturer. Later they used the persona framework for creating ads which were then distributed via social network advertising system. Results showed that there is not enough statistical evidence to prove the buyer persona training do enable teams to generate ads which perform better in real advertising performance. In conclusion, the method value and usefulness in marketing communication is still yet to be discovered and validated. Results are valuable for all SME using social media advertising.

Keywords: buyer persona, customer profile, marketing communication, marketing research social media.

JEL codes: M32, M37

1. Introduction

Producing creative advertising ideas without consumer characteristics in mind could be very risky. This is an almost artistic approach where very little restrictions limit the author to express herself or himself. The approach is legitimate since the art is interpreted and thus the evaluation of it is highly subjective. However, marketing communication has to be understood in the same way across the market to generate a unified picture of a brand or a product. It should affect mass audiences and guide potential customers to the same or similar course of actions. Unfortunately, too often the process incorporates very little knowledge of the target audience which significantly limit the effectiveness of consecutive execution of campaigns. A certain level of empathy and understanding of the target audience is needed to generate ideas from the perspective of recipients. Human beings differ by perceptions, attitudes, behavior, motivations and lifestyles and the sociocultural gap between the marketers and customers expand hand by hand with changes in society and economy. Thus, understanding customers is consequently more complex than ever before.

To bridge this gap, the marketing research provided valuable insights for brand and marketing managers for decades. Quantitative and qualitative research design allowed to gain decisive insights about the target audiences allowing to explore, describe and explain the phenomenon. Consequently,

the creative ideas were fueled by the information about perceptions, attitudes and behavior of customers. Although there has been a continuous discussion on specific methods, marketing research as a whole has established process starting with precise problem definition and concrete research questions to be answered.

However, in recent years, popular articles and blog posts encouraging buyer persona utilization mushroomed. According to the popular bloggers and companies in the marketing community, it seems like the marketing research results are somehow incomplete and need an additional step included in the traditional research process scheme. The method has been popularized and attracted the attention of many marketers, consultants, entrepreneurs and marketing students. There is an approximate number of results: 20,200,000 on Google search for the term buyer persona. The method should, according to the majority of online articles on the topic, provide better interpretation of the data and create room for even more intensive empathy and creativity. In their blog posts, current major online consultancies and software houses such as Hubspot, Hootsuite, Shopify or Social Bakers, to name just a few, glorify the method as an essential part of online communication and marketing in general.

Despite the seeming popularity in business practice, empirical studies assessing the buyer persona method effectiveness in marketing communication are still scarce leaving huge gap between the research and practice. Academia could ignore the phenomenon further and leave the communication field using method with unproven reliability or start to reflect the rocketing popularity of the buyer personas and investigate its usefulness. We believe the latter is of high importance. Hence, this study, for the first time in history, aims to test the method in the real setting of social network advertising development. The research question here is whether the use of the persona technique will lead to an improvement in Facebook and Instagram advertising performance. The aura of the authority of mentioned brands could easily generate high trustworthiness and in fact, mislead managers and marketers. Thus, the results should provide insights mainly for marketing managers but also for junior marketers to leverage business authorities which provide only anecdotal evidence of the usefulness of the method and almost nonempirical evidence on its effectiveness.

2. Literature review

The concept of personas has been described in various areas of design and business. Specifically, product design (Miaskiewicz and Kozar, 2011; Bornet and Brangier, 2016; Long, 2009; LeRouge et al. 2013), software development (Pruitt and Grudin, 2003; Anvari et al., 2017), interaction design (Grudin and Pruitt, 2002; Blomquist and Arvola, 2002; Matthews et al., 2012) or web design (Hjalmarsson, Gustafsson, and Cronholm 2015; Thoma and Williams 2009). Not only the personas are used across disciplines, but the use is also discussed on both sides of the communication continuum. Herskovitz and Crystal (2010) used the term to describe the central character in brand storytelling. They refer to it as a brand persona and its purpose is to identify key characteristics of a brand personality.

Design personas were introduced as a tool to foster ideation and empathy with different user groups (Nielsen, 2018). It is a fictitious character, based on user, consumer or customer data gathered from interview, surveys and observations. Through a process of analysis and refinement, the data from user research is distilled into one or multiple fictitious characters and each character is developed in realistic detail, and how that character wants to interact with the design is described as task scenarios (Long, 2009). It is a simplified method of modelling users from real data to provide computer systems designers, marketing specialists or psychologists involved in an organization, with valuable information, conveyed in a personalized and engaging way (Bornet and Brangier, 2013). The challenge is not to produce as many ideas as possible but to select the ones most suited to user needs as well as being feasible (Bornet and Brangier, 2016).

Idoughi et al. (2012) point out the personas have been used in marketing research both as an alternative and as an extension of traditional market segmentation and user profiling. They refer back to Alan Cooper who first introduced personas as a tool to model the user experience (Cooper, 1999). The goal was to redirect the focus of the development process towards end-users and their needs. Instead of modelling only 'average' users, personas also consider boundary cases as well as a specific class of users with special needs. The underlying belief is that all users are a mixture of certain types of users. (Idoughi et al., 2012)

Personas are intended to guide the decision-making in design and also in marketing communication. It is a continuance of efforts from a variety of domains for identifying, constructing, and assessing segments of people (i.e., customers, audience, etc.) to optimize some performance metrics (e.g., advertising engagement, the speed of a task, ease of use, the effectiveness of effort, sales, etc.) (An et al., 2017). In conclusion, personas should provide the team or individual producer with empathy with a user or recipient and increase ideation. The producer could be a designer, product developer or marketer. For marketers, the main benefits should be higher advertising engagement via more effective consumer profiling. On the contrary, there have been to our knowledge no study, which would evaluate the method effectiveness for the marketing communication. For instance, Salminen et al. (2018) produced comprehensive analysis on limitations of personas use in the new era of online analytics yet they did not find any study assessing the effectiveness of the method in marketing communication. This is contra intuitive given strong popularization in the practical marketing world.

3. Methods

The research design to address the research question consisted of an experiment. Specifically, the static group approach was used, which is a two-group experimental design. One group, called the experimental group (EG), is exposed to the treatment, and the other, called the control group (CG), is not. Measurements on both groups are made only after the treatment (Malhotra et al. 2012). As a dependent variable, the advertising performance of an advertisement on Facebook was measured by price per thousand users reached. This number represents the quality of the content since Facebook advertising systems distribute the advertisement based on the auction system so better the advertising, lower the price to wedge into the newsfeed of the users. Unrelated samples were used, so two groups of participants were formed from which one has obtained training in buyer persona development and the other did not. Therefore, the independent variable was training and had a binomial measurement.

Hypothesis for this study was grounded in current practical phenomenon largely neglected in academia research making the classical theoretical grounding for hypothesis impossible. Thus, the hypothesis was formulated as follows:

H0: Buyer persona training does not enable teams to generate ads which perform better in real advertising performance.

H1: Buyer persona training does enable teams to generate ads which perform better in real advertising performance.

Overall, there were 14 participants, 7 in each condition selected from the undergraduate course on marketing fundamentals. There were 10 women and 4 men. The participants ranged in age from 19 to 23, with a mean age of 20,93 years ($SD=1,03$). All participants were students at Silesian University. The majors represented in the sample are Marketing 7, Social services management 3, Informatics 2, Entrepreneurship 2. Participants were recruited personally by the researcher's assistant. None of them was acquaintances of the researchers and did not know they are part of the experiment. The experiment was presented to them as a student competition and the experimental essence was revealed only after they completed a follow-up survey. Participants were allocated to conditions randomly based on the order in which they signed in.

Participants took part in the experiment in six groups consisted of two conditions (experimental and controlling) and three companies (soft drink, restaurant, start-up). All companies are long term university partners and provided access to their social network accounts free of charge. The experimental group started three hours earlier because they were subjected to group training with the professional marketing consultant. Both started with a creativity test and both groups of students later arrived in one auditorium to complete the main assignment. Participants were allocated into six teams (3 for each condition) based on the short creativity test to control for this variable and ensure the internal validity of the study. Creativity is a fundamental part of modern marketing communication synergic to efficiency and innovation (Mendelová and Zaušková, 2015). Thus, the written creativity test was handled to participants and stopwatch were used to limit the time available for each group to complete the tasks. Measures of convergent and divergent thinking were applied based on the work of prominent psychologists. Divergent thinking was measured by Alternative Use Test developed by Guilford (1967). We focused on the Fluency – the number of ideas, Originality – how unusual ideas are, and Flexibility

– the difference in categories and domains in which the alternative use was generated. Further, the Picture Competition test from Torrance Tests of Creative Thinking (Torrance, 1972) was used. For convergent thinking, the Remote Association Test was used (Mednick, 1962), which is based on the fact that some people are better than others at finding remote associates to stimulus words. Two riddles were also incorporated for problem-solving capabilities measurement. One was presented in a form of narrative, the other in the form of the famous nine-dot problem. The output was the sum of points from each part of the creative test and students were then assigned to groups based on the results so the overall creativity scores of a group did not deviate significantly from the overall average.

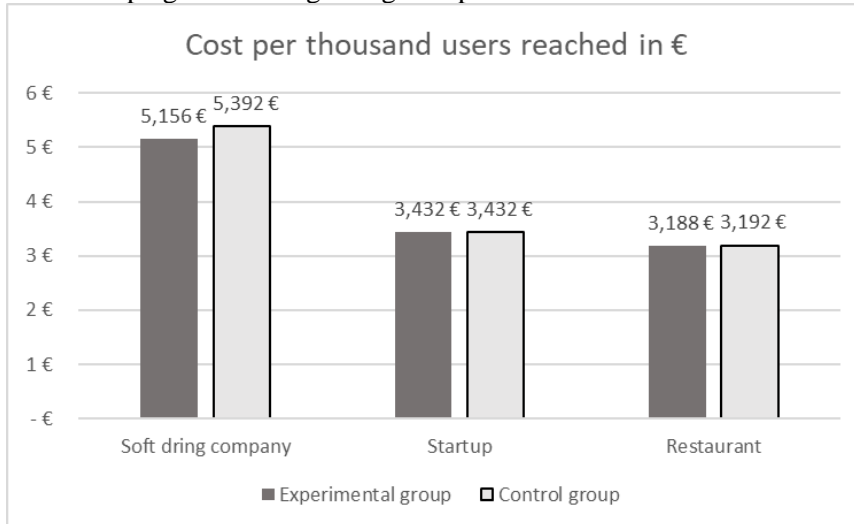
Thereafter, the main task was communicated through two pages assignment with brand and product description, brand Facebook followers detailed statistics and instructions on how to complete the task. The experimental group got another sheet of paper for creating a persona. Both get the last sheet of paper to produce drafts as well as the final version of the texts, photos and graphics (sketch with a short description). Students were asked if they understand the assignment and had one further question regarding the publicity of the advertisement they are going to produce. They were ensured the material will be public and real customers will engage with it. Then, assignments to create content were handed by the researcher and the assistant to all groups at the same time. Participants were allowed to ask additional questions regarding the assignment. Three groups asked about the specifics of the product and the type of media used for practical use of the content they produce.

All six groups managed to hand in their proposals before the one-hour time limit. To be precise, all groups handed their materials in the last 7 minutes of the limit. All groups handed completed assignments. Also, all groups in the experimental condition completed the persona exercise before they began to produce content. Text as well as graphics and photos selected by the teams differed in each pair of product categories. All advertisements were sent to be approved by the responsible person in the company before launching the campaigns online. There was just one case where students had to correct the soft drink type since they used the wrong name for the juice. Each of the advertising was then published with a budget of 50 € each. Facebook advertising system allows to split the audience into two non-overlapping samples and run A/B testing. This ensured a reliable test run. At the end of the process, the follow-up questionnaire was sent by email to students the next day and data were collected via Google forms. The questionnaire consisted of questions related to the ease of use of the concept, the confidence in the method and usefulness in advertising campaign creation process.

4. Results

Campaigns were active for four days and within this time period, all creatives combined reached 57 481 unique Facebook users. The total number of displayed advertising was 100 491. This number consists of repetitive exposure to a campaign. Thus, on average, the user has the advertisement in his or her Facebook newsfeed visible twice. Figure 1 shows the final results. The best results were observed for the restaurant advertising were on average to reach a thousand users the advertiser had to pay 3,19 €. Similar, yet slightly different results were for the start-up brand, both adverts cost 3,43 € per thousand. The least successful was soft drink company but the settings of the add were tailored for Instagram, where the whole campaign took place exclusively as a part of a deal with the brand manager. The two campaigns were slightly over five Euro per thousand.

Figure 1: Six campaigns result regarding cost per thousand users reached via advertising



Source: own data processing

As we can see there is almost no difference in creatives regarding start-up and restaurant brand. There is only a small difference in soft drink company advertising. Students with persona training managed to reduce costs per thousand users thus created a more effective campaign. Nevertheless, the data have to be statistically evaluated to set apart what is a real connection and what is just the noise in the data. Table 1 shows the results for descriptive statistics. The overall mean for the three advertisements without the use of a buyer persona is 4 (SD=1,207) and with personas 3,9 (SD=1,073).

Table 1: Descriptive group statistics

	Persona training	N	Mean	Std. Deviation	Std. Error Mean
Cost per thousand	Ad without persona	3	4,005	1,207	0,697
	Ad with persona	3	3,925	1,073	0,619

Source: own data processing

Since the independent variable was categorical and binominal, and dependent variable numerical and interval, the independent sample t-test for the mean between the groups was used to measure the relationship between variables. The test is used in situations in which there are two experimental conditions and different participants have been used in each condition (Field, 2013). Statistical software IBM SPSS was used for calculations.

Table 2: Independent sample t-test results

Independent Samples Test					
		Levene`s Test for Equality of Variances		t-test for Equality of Means	
		F	Sig.	t	df
Cost per thousand	Equal variances assumed	0,103	0,765	-0,086	4
	Equal variances not assumed			-0,086	3,946
Independent Samples Test					
		t-test for Equality of Means			
		Sig. (2-tailed)	Mean Difference	Std. Error Difference	
Cost per thousand	Equal variances assumed	0,936	-0,080	0,932	
	Equal variances not assumed	0,936	-0,080	0,932	

Source: own data processing

Further statistical processing started with the Levene`s test. This procedure tests the null hypothesis that the variances in different groups are equal (i.e. the difference between the variances is

zero) (Field, 2013). Because the $p = 0,765$, so it is greater than 0,05 and, in this case, we can conclude the Levene's test is non-significant and proceed with the test statistics for equal variances assumed. Finally, the overall $p = 0,936$, therefore we have to accept the null hypothesis and conclude that buyer persona training does not enable teams to generate ads which perform better in real advertising performance. Or in other words, there is not enough statistical evidence that buyer persona training does enable teams to generate ads which perform better in real advertising performance than teams without this training.

Since students had no previous knowledge about the process of buyer persona development, we reviewed answers in the questionnaire, so it is clear what possible problems raised when using personas. Beyond handing complete persona sheets, all students in the experimental group considered buyer persona training beneficial. The method itself was understandable and easy to use. However, one student reported the use of personas on the practical exercise to be time-consuming and find little value in the method related to the particular creative process in the task. We believe the consumption of time to create persona should be compensated by better results of the ads. However, it was not the case in this scenario. Compared to the control group, students from the experimental group reported they felt they know what to do to create marketing content and had a sense of having things under control. In the control group, the students often mentioned frustration at the beginning of the task where only data in forms of tables and graphs were presented to them. Hence, the potential benefit of creating persona could be in translation of data into human image and simplification of understanding of target audience. On the other hand, simplification should not lead to information reduction.

5. Conclusion

Intensive use of persona in user testing and software development inspired many consultants and practitioners to use and promote this method. In the marketing world, the method has been known as a buyer persona. Despite its mass popularity, this is most probably the first attempt to measure its effectiveness in the context of online marketing communication. With an experiment, the two groups of students were divided, and the experimental group received expert training in buyer persona development. Diversity in creative capabilities of the teams was purposely limited by non-random assignments into the teams based on the personal creative test. This procedure ensured that the impact of imbalance of creativity in the teams will be extensively limited. Advertising creatives by all six teams were published on Facebook and Instagram and cost per thousand users reached were measured as the dependent variable. The result of the process of hypothesis testing shows no significant influence of the training on advertisement performance. Interestingly, by controlling for creativity, our results could suggest the equal distribution of creative persons in groups could be the factor behind equal results of the campaigns. However, future research is needed to confirm such a hypothesis. We believe the results will ignite further research and until that time the practitioners should use the method cautious since it could be very time consuming however with a doubtful impact on advertising performance.

Almost every study bears some limitations and this one is not an exception. First, there were only unexperienced students included in the experiment and experienced marketers could have produced different results. Using the same research design in a practical setting will provide deeper insights into understanding the buyer persona method. Second, the sample size or the number of groups in the experiment is relatively small, however, to falsify an assumption even this amount could be regarded as sufficient. Moreover, we did not control for the quality of the lecturer so the validity of the design could be questioned. Consequently, the quality of the course will influence understanding by students. We only assumed the long-lasting successful marketing consultancy will have the quality needed for the required training. Thus, we highly encourage other researchers to independently reproduce our design and compare the results, so the role of the lecturer providing the training will be clear. We also measured only post-test, thus there is a possibility, yet very small, that training delivered by the lecturer had an impact and all participants from the experimental group would achieve poorer results without it. One could also argue about the timeframe. First, we only used personas for one piece of marketing content, so there is still a possibility that the fictitious character would be effective in the longer term. The method could secure consistency, which is an important element of brand communication. Moreover, we could not measure potential new or strengthened associations with the brands. In other words, advertising performance cannot be measured only by short-term clicks and views but also on the long-term brand

building metrics such as brand awareness and brand associations. Future research could fill this gap by attempting to measure this as the dependent variable. Second, related to the time, students in experimental group could face time pressure which may limit the power of the persona method. Scenario with longer exercise could possibly show significant differences in the results. Finally, the data provided for the students were secondary, however, most literature sources suggest also primary data collection, ethnographies or deep interview with users and customers to describe consumer profiles. Despite all the limitations one would expect at least some differences in the advertising effectiveness results.

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EXAMINATION AND VALIDATION OF THE HOLISTIC MARKETING CONCEPT AS A MARKET ORIENTATION CONSTRUCT

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Abstract

The main objective of the current research study is to explore how the market as a coordination mechanism, and the organisation as an independent entity are connected. The most widely accepted approaches of market orientation (behavioural and cultural) derive from the marketing concept, and as a central element, they identify how the organisation tries to adopt the marketing concept during its operation. The current study examines the holistic marketing concept in small and medium-sized Hungarian enterprises in the food industry. In this study, we try to match the most modern approach of the marketing concept, the so-called holistic marketing concept, to the construction of market orientation. The research is based on a questionnaire survey of 150 companies. The reliability of applied scales was tested with Cronbach's alpha, the composite reliability index and McDonald's omega. The discriminant validity was examined with the Fornell-Larcker criterion and the convergent validity was examined with CFA analysis. After the validation process, the authors found four dimensions. They are as follows: Internal Marketing, Integrated Marketing, Relationship Marketing and Societal Marketing. According to the authors, the holistic marketing concept can be a new approach of market orientation which can model, in a more suitable way, the modern and changed market conditions to measure and examine the adopted level of market orientation.

Keywords: holistic marketing concept, market orientation, small and medium-sized enterprises, validation

JEL codes: C52, L25, M14, M31

1. Introduction

The coordination mechanism that generally prevails in market economies is provided by the market institution. It is crucial that it is effectively connected with the entity directly related to it, the

company. The question arises: what kind of policy should guide the operation of a company in a dynamically changing environment? As early as at the beginning of the 1990s, Kohli and Jaworski (1990) expressed the view that theoretical principles can only be put into practice to a limited extent. Among the answers to the formulated dilemma, the authors focused on the implementation of the marketing concept and the strengthening of its practical side. In this sense, market orientation is a practical implementation of the marketing concept, in which there is a consensus among researchers, and the measurement tools developed to measure market orientation follow this principle (Kohli and Jaworski, 1990; Narver and Slater, 1990).

The philosophy of the marketing concept assumes that the key to achieving organizational goals is that the company is more effective than competitors in creating, delivering, and communicating customer value to the selected target market. The marketing concept is based on two main pillars: customer orientation and long-term profitability, which are further enhanced by target market focus and integrated/coordinated marketing. However, Kotler and Keller (2012) propose that a significant number of companies now operate in a way that is increasingly compatible with the holistic marketing concept, i.e. companies focus not only on long-term profit-making but also on customer satisfaction, supplemented with performance, internal, integrated and relationship marketing. Customer orientation and competitor orientation permeate these four areas, while they reflect the role of intelligence sharing and dissemination as well as advanced response mechanisms. Companies applying a holistic marketing concept rely on the development and design of programs, processes, and activities that pay attention to the interdependence of specific tasks.

The aim of the present article is to adapt the holistic marketing concept to make market orientation more effective and realistically measurable in the changed circumstances of today's modern market economy. So our goal is to develop a measurement tool that is suitable for measuring marketing orientation based on a new, holistic approach to the marketing concept.

1.1 Approaches to market orientation

The first proposal of the market orientation concept is attributed to Shapiro (1988), who approached market orientation from the viewpoint of the method and process of organizational decision-making. At the same time – as, *inter alia*, Kovács et al. (2017) point out in their analysis – two articles (from two different pairs of authors) were published in 1990, which were perhaps equivalent in effect to the highest possible impact on the foundation of the conceptual basis of market orientation and the development of a methodology that also allows the determination of the adapted degree of market orientation. Kohli and Jaworski's (1990) approach to market information may be the closest to the strategic approach, and the essence is that companies collect and disseminate the necessary information to boost the efficiency of inter-functional coordination. Accordingly, three critical, culturally-based elements of market orientation are identified: 1. Allocation of market information at organization-level, based on consumer needs (intelligence generation). 2. Dissemination of the obtained information between the organizational units (intelligence dissemination). 3. The responsiveness of a firm to information.

The other, so-called behaviour-based approach is attributed to the names of another pair of authors, Narver and Slater (1990). Their research focused on lasting competitive advantage and a strong corporate culture. As they defined, market orientation is an organizational culture that most effectively and efficiently induces, relative to other organizational cultures, behaviour that creates outstanding customer value and thus contributes to higher business performance. Within this, three behavioural variables were identified, in the presence of which we can speak of market orientation. These are customer and competitor orientation and coordination between organizational units. Furthermore, the authors set two conditions for market orientation to be met: the company must operate with long-term goals in mind, aiming for long-term profit focus and profitability (Narver and Slater, 1990).

After the publication of the two defining articles, the issue of market orientation came to the forefront of research. Desphandé et al.'s (1993) conception emphasizes the focus of organizational culture and consumer needs on companies. In addition to the customer approach, there is another so-called strategic approach that can be linked to Ruekert's name, which places consumer information in a strategic context (Ruekert, 1992).

In conclusion, although there are several approaches to market orientation, two perspectives are generally identified. The behavioural one (Narver and Slater, 1990) focuses more on action and activity, how the organization obtains information and how it treats the acquired information. On the other hand, the cultural approach (Kohli and Jaworski, 1990) places emphasis on certain components of organizational culture, norms, values, and attitudes (Becker and Homburg, 1999). Another research summary identified five approaches by which research can be classified into at least one of the decision-making, strategic, market intelligence, cultural-based behaviour, and consumer-oriented perspectives of market orientation (Lafferty and Hult, 2001).

1.2 Measurement of market orientation

Once the theoretical basis of market orientation has been defined, it has become important to make it measurable in some way. The following section of the paper will introduce the three most common measurement methods: the MARKOR, MKTOR, and DFW scales. All three measures use the so-called Likert scale. Depending on the theoretical basis, the authors determined the scales' dimensions (such as competitor orientation, customer orientation and inter-functional coordination), then variables that have become measurable activities were added to each dimension. These became the indicators of the measurement model, whereas dimensions were latent variables in the model. Against this background, market orientation is a latent variable determined by latent variables (dimensions). Thus, the models can be regarded as a multi-level, hierarchical relationship. A characteristic of the models is that they do not define levels below which a company can be considered market oriented or non-market oriented.

The MARKOR scale is based on the behavioural approach of Kohli and Jaworski. The scale originally consisted of 20, later 32 factors and defines market orientation along three dimensions: intelligence generation, intelligence dissemination and responsiveness, which have been explained in detail above (Kohli et al., 1993).

The MKTOR scale is based on the culturally-based perspective of Narver and Slater. However, as cultural factors are difficult to measure objectively, the three dimensions of the scale (competitor orientation, customer orientation, and interfunctional coordination) determine the degree of market orientation initially with 15 and later with 17 behavioural components/indicators (Narver and Slater, 1990; Brettel et al., 2007).

Desphandé et al. (1993) constructed a nine-statement scale (DFW) that measures the level of market orientation by measuring customer orientation, corporate culture, and organizational innovation. Later, Desphandé and Farley (2004) reviewed their previous results and synthesized the three scales to create a hybrid tool (MORTN) that focused primarily on customer orientation and was composed of 10 statements.

Efforts to develop market-oriented thinking have also emerged in the development of measurement tools. The article by González-Benito and González-Benito (2005) reveals that approximately 40% of market orientation research uses the MARKOR and 35% the MKTOR scale, and only 5% consider both theories. They concluded that although the bases of the scales are different, they are not mutually exclusive in measuring the level of market orientation, as the two scales measure the same phenomenon from different aspects with adequate efficiency and similar results. Oczkowski and Farrell (1997) analyzed both the MARKOR and MKTOR scales with reliability and validity studies. Their results suggest, that although the dimensions of both scales can be considered reliable based on Cronbach's alpha, the CFA analysis does not confirm this, and significant adaptations of the scales are needed.

In the nearly 30 years since the model was constructed, the literature on market orientation expanded and evolved, and the market has also undergone a number of changes. Several studies have examined the validity and effectiveness of the scales, and a significant proportion of the research activities studied by the authors agrees that the adaptation of tools is necessary (Bareith et al., 2013). Farrell (2002) compared the development efforts of the MARKOR and MKTOR scales and came to the conclusion that in many cases, we may encounter unfounded, haphazard modifications and improvements. In our opinion, however, we also find a good number of methodologically well-founded studies. Studying the modification procedures, we found that the research efforts are divided: some of them attempt to improve existing scales using purely quantitative procedures (Dawes, 2000; Harrison

and Walker, 2001; Hajjat, 2002) or based on the Cronbach's alpha index, which measures the reliability of scales or, with more advanced, multiple statistical techniques, using confirmatory factor analysis or structural equation modelling. Others logically focus on the literature or qualitative studies (in-depth interview, expert interview, focus group) (Oczkowski and Farrell, 1997; Avlonitis and Gounaris, 1999; Dawes, 2000).

2. Material and method

The current research is based on questionnaire-based telephone interviews, during which 150 small and medium-sized enterprises in the Hungarian food industry were interviewed. The survey was conducted in 2019, by the Szocio-Gráf Market Resesarch Ltd., based in Pécs. The sampling frame was provided by the database of the Opten company. Respondents were selected from the database using a random number generator from Microsoft Excel. The focus of the research was on SMEs operating as co-enterprises in the food industry, according to size based on headcount. The sample is representative in this respect ($\chi^2(2)=5,51$; $p=0,06$).

Table 1: The composition of the sample according to size (n=150)

Size	Enterprises (n)	Distribution (%)
Micro	89	59.3
Small	46	30.7
Medium	15	10.0

Source: authors' own editing

In 2019, there were 4,566 economic organizations registered in the CSO (Central Statistical Office) register, which met the following conditions: SME size category, TEÁOR (Statistical Classification of Economic Activities) code in the CE category (manufacturing food, beverages and tobacco products), operating in the form of a partnership, and having more than zero employees. With 95% confidence level and 10% margin of error, the required sample number is 95, based on Gill et al. (2010). The sample size, therefore, meets the requirements for generalizability.

The set of statements used to measure holistic marketing was developed based on the book by Kotler and Keller (2012). The analysis was performed with R Statistics, version 3.4.2 in the R Studio editor, using the following packages: psych and lavaan. Exceptions to this are the AVE and CR indicators, which have traditionally been calculated manually in the absence of a reliable software pack.

3. Results

3.1 Modelling the holistic marketing concept

The model measuring the holistic marketing concept was developed based on Kotler and Keller (2012). According to that, the latent variables of the model are as follows: relationship marketing, integrated marketing, internal marketing, performance marketing. During the development of the measurement model, special attention was paid to have at least five measurement variables per dimension. Since performance marketing includes the attempt to improve marketing effectiveness and efficiency and also, a society-oriented marketing philosophy, six measurement variables were identified, in case the one-dimensionality of performance marketing is not met, i.e. the effectiveness/efficiency of marketing and the company's society-oriented marketing approach formed a separate latent variable. All variables of the measurement model are presented below, which will later be limited for the sake of the validity and reliability of the model, i.e. all measurement variables (statements) that would degrade reliability or cause invalidity will be removed.

Table 2: Relationship marketing

Statements	Mean	Median	Mode	Standard deviation	Coefficient of variation	Skewness
A key goal is to build deep, lasting relationships with individuals and organizations that have an impact on the success of the company. (n=149)	4.63	5	5	0.76	16%	-2.40
Long-term partnerships are based on mutual satisfaction. (n=150)	4.91	5	5	0.38	8%	-5.23
Particular importance is attached to the relationship with customers. (n=150)	4.86	5	5	0.37	8%	-2.50
Particular importance is attached to the relationship with partners (suppliers, allies, distributors, agencies, investors). (n=149)	4.66	5	5	0.64	14%	-1.87
Particular importance is attached to the relationship with employees (n=150)	4.77	5	5	0.48	10%	-1.97

Note: on a scale from 1 to 5, where 1 stands for strong disagreement and 5 for strong agreement

Source: authors' own editing.

Table 2 shows the measurement variables (statements) measuring relationship marketing and their descriptive statistical characteristics. Based on the mean values, it can be concluded that relationship marketing is generally accepted by the companies surveyed and it is considered important by them to establish a proper relationship with those involved in the business. Both the most common and the mean value show “strong agreement”, which supports the importance of relationship marketing, more precisely, that it is considered important by the respondents.

The standard deviation and the coefficient of variation indicate that there is no significant difference in the attitudes of respondents. Regarding relationship marketing, the companies in the sample can be considered homogeneous, the coefficient of variation remains below 16% in all the cases. On examining the skewness index, a skewed distribution significantly to the left of the normal distribution can be observed, which means that the agreeing responses “thicken”. This skewness is outstanding when there is a sign of self-interest (long-term partnerships are based on mutual satisfaction). However, it is important to note that although there is significant agreement on all indicators of relationship marketing, all the statements relate to the perceived acceptance of relationship marketing and not to the actual behaviour followed. Thus, the statements measure merely the extent to which companies agree with relationship marketing and consider it important, yet it does not provide feedback on the extent to which this is reflected in their behaviour.

Table 3: Integrated marketing

Statement (number of items)	Mean	Median	Mode	Standard deviation	Coefficient of variation	Skewness
All the units and all the employees of the company have a role in creating value. (n=150)	4.63	5	5	0.60	13%	-1.37
The marketing activities are coordinated (products, pricing, sales, marketing communication). (n=149)	4.17	4	5	0.93	22%	-1.23
Our marketing activities are planned in advance. (n=149)	3.79	4	5	1.09	29%	-0.55
When designing a marketing program, we consider the impact it has on other activities. (n=148)	4.01	4	5	1.02	25%	-0.99
Marketing is a company-level activity and not the job of a single person or department. (n=147)	4.05	4	5	1.21	30%	-1.21

Note: on a scale from 1 to 5, where 1 stands for strong disagreement and 5 for strong agreement

Source: authors' own editing.

The measurement variables (statements) measuring integrated marketing and their descriptive statistical characteristics are shown in Table 3. Based on the mean values, signs of agreement can be observed in this case, as well. Although the most common response is “strong agreement”, a more significant variance and heterogeneity can be seen in the attitudes of the companies surveyed.

With a low standard deviation, there is significant agreement among respondents on accepting that all units and employees in a company have a role in value creation, as evidenced by the left skewness of the density function. Compared to this indicator, a lower mean score and a higher relative standard deviation can be found for the other statements. This is probably due to the fact that these statements already refer partly to the behaviour of integrated marketing, thus in these cases it is no longer enough to agree with the content of the statement. It already incorporates some visible, tangible content and behavioural consequences, i.e. companies coordinate marketing tools, plan marketing programs and also potential impacts are taken into consideration in planning.

In the case of the last statement, a significant (30%) relative standard deviation can be observed, which may have two causes: (1) it may result from the discrepancy between the values professed and followed, i.e. respondents agree that marketing is a company-level activity and not the job of a single person or department, however, this is not the case in actual practice; (2) incorrect decoding of the question can also result in higher variance, because if the respondent misunderstands the question, it can also be decoded as whether the company has a separate marketing department or marketing staff.

Table 4: Internal marketing

Statement (number of items)	Mean	Median	Mode	Standard deviation	Coefficient of variation	Skewness
We consider it important to employ, train and motivate employees who are ready to serve customers. (n=148)	4.41	5	5	0.85	19%	2.92
We consider it important that marketing and market goals are known to everyone within the organization (n=148)	4.01	4	4	0.96	24%	0.60
In-house marketing activities are just as important as those outside the company. (n=143)	3.98	4	5	0.99	25%	0.23
Managers share key information about the organization. (n=149)	4.67	5	5	0.60	13%	3.18
In order to meet customer needs, cooperation and proper communication between employees are essential. (n=147)	4.81	5	5	0.46	10%	5.29

Note: on a scale from 1 to 5, where 1 stands for strong disagreement and 5 for strong agreement

Source: authors' own editing

Table 4 shows the internal marketing measurement variable. As can be seen, the lowest mean score was associated with the statement that both external and internal marketing activities are important. It can be assumed that this is due to the lack of internal PR. Although an increasing number of large companies have internal marketing and internal PR departments, this can still be considered incomplete for SMEs. However, it can also be stated that the sample is relatively homogeneous, as the relative standard deviation remains below 25% in all the cases.

The statements about performance marketing are listed in the Table 5. The performance marketing pillar combines the idea of societal orientation and the importance of performance measurement, i.e. that the company must be aware of all the effects of its marketing activities, with regard to both what affects the company's effectiveness (profitability, return, efficiency) and what affects those involved in the company and the environment of the company (externalities). As can be concluded from the table, the importance of performance measurement is acknowledged in most cases (mean 4.45), although the effectiveness of marketing activities is less measured. This may be due to the fact that measuring marketing activity requires a greater degree of professional knowledge, which is not necessarily the case for SMEs.

Table 5: Performance marketing

Statement (number of items)	Mean	Median	Mode	Standard deviation	Coefficient of variation	Skewness
It is considered important to be aware of the performance (financial and non-financial impacts) of our marketing activities.(n=148)	4.45	5	5	0.88	20%	3.05
When making marketing decisions, financial and profitability aspects are also taken into account. (n=148)	4.45	5	5	0.85	19%	3.15
The effectiveness of our marketing activities (e.g. market share, returning customers, customer satisfaction, product quality) is measured. (n=148)	3.95	4	5	1.14	29%	0.15
Corporate social responsibility is considered important. (n=148)	4.14	4	5	0.93	23%	0.81
Ethical, environmental, legal and social considerations must also be taken into account when making marketing decisions.(n=148)	4.19	4	5	1.00	24%	1.77
Our company conducts or participates in programs that support charity or social responsibility or social cause. (n=148)	3.96	4	5	1.06	27%	0.34

Note: on a scale from 1 to 5, where 1 stands for strong disagreement and 5 for strong agreement.

Source: authors' own editing

3.2 Confirmatory factor analysis (CFA)

Confirmatory factor analysis was programmed using the lavaan R package. The model was constructed based on a priori estimation. In the course of the analysis, the measurement variables that did not have a significant explanatory power were excluded in the first round, and then the variables whose factor loading was considered low in the model were also excluded. In order to improve the fit indices, the covariance between the measurement variables belonging to the same latent variable in the model was allowed, however, the conditions of the model were not violated by this concession. Model fit indicators were determined by Hooper et al. (2008) and Hair et al. (2010). The fit of the model and the acceptance range are shown in the Table 6.

Table 6: Fit indices of the CFA analysis of holistic marketing

Indicator	Criterion	Fitting of the empirical model
χ^2 (szf.)		115.449 (92)
χ^2 stat. p-value	≥ 0.05	0.051
CFI	≥ 0.90	0.963
GFI	≥ 0.90	0.912
AGFI	≥ 0.60	0.870
RMSEA	≤ 0.08	0.043
TLI	≥ 0.90	0.952
IFI	≥ 0.09	0.965

Source: authors' own editing

The convergent validity of the holistic marketing concept model was examined using the AVE indicator as well as the factor loadings for each measurement variable. AVE indicator values are as follows: integrated marketing = 0.57; internal marketing = 0.56; societal marketing = 0.48; relationship marketing = 0.53. In one case (societal marketing), the value of the AVE indicator falls short of expectations (Hair et al., 2010). However, according to Lam (2012), if it falls only slightly below the 0.5 threshold, but at the same time the value of CR meets the expected value level (0.6), the convergence

of the measurement variables towards the latent variable is acceptable (that is, our indicators/scales measure the latent variable for which they are intended). Presumably, convergence was compromised in this case because there is a behavioural element among the measurement variables (the company conducts or participates in a social responsibility project) and a statement relating to two values, and as a result of the contradiction between the values perceived and followed, there is a dissonance between the measurement variables according (Wimmer, 2010). Based on the above, it can be concluded that the convergent validity of the holistic marketing concept model exists.

3.3 Exploratory factor analysis (EFA)

Having confirmed by CFA analysis that the data fit our pre-assumed structure, we checked the ordering of the statements into structures with EFA analysis and prepared our data for further studies for data reduction. This was performed using the maximum likelihood method. The total explained variance is above 60% and it is clearly visible that the measurement variables of the model are grouped into the latent variables of the a priori estimate. During EDF, only the measurement variables accepted based on the CFA were included in the study (Table 7).

Table 7: The adapted model of the holistic marketing concept ($n=150$)

Statement	IGM	ILM	SM	RM
Our marketing activities are planned in advance.	0.82	0.06	0.06	0.02
The marketing activities are coordinated (products, pricing, sales, marketing communication).	0.80	0.07	0.02	0.01
It is considered important to be aware of the performance (financial and non-financial impacts) of our marketing activities.	0.77	0.17	0.00	- 0.03
When making marketing decisions, financial and profitability aspects are also taken into account.	0.76	0.18	0.21	0.02
When designing a marketing program, we consider the impact it has on other activities.	0.71	0.20	0.26	0.13
The effectiveness of our marketing activities (e.g. market share, returning customers, customer satisfaction, product quality) are measured.	0.64	0.14	0.22	0.00
We consider it important that marketing and market goals are known to everyone within the organization.	0.27	0.79	-0.05	0.07
In-house marketing activities are just as important as those outside the company.	0.09	0.79	0.27	0.03
We consider it important to employ, train and motivate employees who are ready to serve customers.	0.18	0.65	-0.02	0.02
Our company conducts or participates in programs that support charity or social responsibility or social cause.	0.10	-0.11	0.78	- 0.06
Corporate social responsibility is considered important.	0.14	0.17	0.74	0.13
Ethical, environmental, legal and social considerations must also be taken into account when making marketing decisions.	0.43	0.14	0.55	0.11
Particular importance is attached to the relationship with the customers.	0.04	-0.01	0.00	0.82
Particular importance is attached to the relationship with partners (suppliers, allies, distributors, agencies, investors).	0.03	0.32	0.00	0.70
Long-term partnerships are based on mutual satisfaction.	0.01	-0.10	0.11	0.66

Note: RM=relationship marketing, IGM=integrated marketing, ILM=internal marketing, SM=societal marketing.

Source: authors' own editing

3.4 Discriminant validity

The results of the discriminant validity study are illustrated in Table 8. The AVE index can be seen in the second column of the Table 8, the correlation coefficients in the third, fourth, fifth, and sixth columns and the square root of the AVE index is shown in bold. If the square root of the AVE indicator is compared with the individual correlation coefficients, discriminant validity can be determined, that is, the Fornell – Larcker criterion has been met.

Table 8: Discriminant validity

	AVE	RM	IGM	ILM	SM
KM	0.531	0.729			
IM	0.567	0.146	0.753		
BM	0.562	0.243	0.500	0.750	
TkM	0.481	0.241	0.630	0.352	0.694

Note: RM=relationship marketing, IGM=integrated marketing, ILM=internal marketing, SM=societal marketing.

Source: authors' own editing

3.4 Reliability tests

The reliability of the holistic marketing scales (measurement model) was examined using three indicators: Cronbach's alpha, composite reliability, McDonald's omega. All indicators are acceptable above a threshold of 0.6. This has been accomplished by the scales used. However, in several cases (e.g. relationship marketing) a low value of the indices can be observed, which reflects weak or medium reliability. In our opinion, the reason for this is to be found in the number of items and in the composition of the sample (micro, small and medium-sized companies), as alpha and omega are test-based test methods that may be particularly sensitive to items (Table 9).

Table 9: Reliability indicators of validated scales

Dimension	Cronbach's alpha	Composite reliability (CR)	McDonald's omega (ML)
Integrated marketing	0.87	0.88	0.91
Internal marketing	0.70	0.78	0.71
Societal marketing	0.69	0.74	0.61
Relationship marketing	0.65	0.65	0.62

Source: authors' own editing

4. Conclusion

The concept of market orientation showing the realization of the marketing concept, was developed in the 1990s and several scales were developed to measure it (MARKOR, MKTOR, DFW scales). However, the market has undergone significant changes over the past 30 years and the marketing concept itself has further evolved. Numerous attempts have been made to adapt the scales to the changes with varying degrees of success. The present study also attempts to develop a scale to measure the level of market orientation based on the holistic marketing concept, one of the most modern approaches to the marketing concept.

The possible applications of the holistic marketing concept as a market orientation model among Hungarian SMEs were examined. The holistic marketing concept was modelled based on Kotler and Keller (2012) and examined on a sample comprising 150 companies. The model meets both reliability and validity requirements. However, the limitation of the results is that according to several indicators, reliability is barely within the acceptable range when modelling relationship marketing. It is advisable, in our view, to subject the model to further testing and to test its extent through further data collection. Another research direction could be to compare the level of market orientation measured using the holistic marketing concept with the results of other previous market orientation measurement tools (MARKOR, MKTOR, DFW).

The current results indicate that all the dimensions of holistic marketing can be found in Hungarian practice as well, which can be considered positive not only from the point of view of modelling, but also implies that Hungarian SMEs, although sometimes with significant variance, have the resources of a modern marketing approach (competence and skills). However, the performance marketing dimension of the original model (Kotler and Keller, 2012) could be modelled only to a limited extent, i.e. we were able to measure societal marketing, which is one of the elements of performance

marketing. The reason for this is to be found in the fact that the population surveyed may lack the abilities and skills needed to measure the effectiveness of marketing activities.

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REDUCE – AN ONLINE DECISION SUPPORT TOOL FOR REDUCTION OF INCONSISTENCY IN MULTIPLICATIVE PAIRWISE COMPARISONS

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Abstract

The aim of the paper is to introduce REDUCE, a free online decision support tool for reduction of inconsistency in multiplicative pairwise comparisons framework. Pairwise comparisons (PCs) constitute a popular technique for multiple-criteria decision making, its purpose is to assign weights to compared entities, thus providing their ranking from the best to the worst. However, pairwise comparisons provided by human experts are often inconsistent. Low levels of inconsistency, below $CR = 0.10$, where CR denotes Saaty's consistency ratio, are usually tolerated. When the inconsistency is higher, PCs have to be revised. That might pose a problem in practice, since an expert providing original preferences might not be available, or there are other obstacles preventing the revision. REDUCE is an autonomous tool for inconsistency reduction based on several algorithms that does not require an assistance of an expert. Pairwise comparisons (a complete PC matrix) form REDUCE's input. Then, a user specifies which algorithm to apply and what level of inconsistency should be achieved. A PC matrix consistent enough, and preserving the original preferences to a maximum degree, forms REDUCE's output. Moreover, REDUCE provides a calculation of weights of compared objects as well, therefore it can be used, to a certain extent, for the analytic hierarchy process (AHP) as well. We believe REDUCE may contribute to better decision making in pairwise comparisons, since small and medium enterprises usually cannot afford expensive commercial software and do not employ full-time experts in decision making as they rely on experience of their employees and free online resources. It is also a part of the architecture for innovative computer systems development operating in accordance with the idea of Industry 4.0 with methods, algorithms, embedded subsystems and dedicated software that enables the implementation of intelligent systems for enterprises and processes.

Keywords: decision making support, inconsistency reduction, Industry 4.0, pairwise comparisons, small/medium enterprises,

JEL codes: C61, C63, C88.

1. Introduction

Though pairwise comparisons (PCs) belong among the oldest decision making methods, its popularity even increased in the last decades due to expansion of sophisticated multiple-criteria decision making methods such as the analytic hierarchy/network process (AHP/ANP), PROMETHE, ELECTREE, VIKOR, PAPRIKA, the Best-Worst method (BWM), and others, see e.g. Saaty (1977, 1980), Figueira (2005) or Köksalan et al. (2011). To facilitate the use of aforementioned methods, both online and offline commercial decision support tools emerged such as Expert Choice, Super Decisions, Decision Lens, PriEsT, 1000minds, D-sight, DAME, Decision Adviser, and many others, see e.g. Siraj et al. (2013), Weistroffer and Li (2016), Oleson (2016), Perzina and Ramík (2012, 2015, 2016).

Up to date, there is no free (non-commercial) and online software tool for the reduction of inconsistency in pairwise comparisons known to the authors. The inconsistency is an omnipresent problem in PCs, since human experts are rarely seldom fully consistent when expressing their judgments, especially when the number of compared objects is relatively high. A low level of inconsistency is usually tolerated, but when the inconsistency exceeds a certain threshold, for example $CR = 0.10$, pairwise comparisons must be revised. However, in many situations the revision of PCs by an expert might not be possible. That is where a suitable software gets into action.

Therefore, the aim of this paper is to introduce and demonstrate the use of REDUCE, a free and online software tool designed for inconsistency reduction in the PC framework. Since small and medium enterprises usually cannot afford expensive commercial software, we believe REDUCE can solve the problem with inconsistency reduction, thus paving a way to better and faster decision making.

The paper is organized as follows: Section 2 briefly describes multiplicative pairwise comparison framework, inconsistency and its reduction is discussed in Section 3, and Section 4 provides information on the developed software. An application of REDUCE in Section 5 and Conclusion close the article.

2. Multiplicative pairwise comparisons

Let X be a given set of n entities to be compared. Let a_{ij} denote the preference of i -th entity over j -th entity. Also, we set $a_{ij} > 0; \forall i, j \in \{1, 2, \dots, n\}$. Pairwise comparisons are called reciprocal, if the following property is satisfied:

$$a_{ij} = \frac{1}{a_{ji}}, \forall i, j \in \{1, 2, \dots, n\}. \quad (1)$$

The property (1) is usually strictly required for multiplicative pairwise comparisons. All pairwise comparisons can be arranged into a square $n \times n$ matrix $A(a_{ij})$ called a pairwise comparison matrix (PCM):

$$A_{n \times n}(a_{ij}) = \begin{pmatrix} 1 & a_{12} & \dots & a_{1n} \\ a_{21} & 1 & \dots & a_{2n} \\ \dots & \dots & 1 & \dots \\ a_{n1} & a_{n2} & \dots & 1 \end{pmatrix}$$

Pairwise comparisons (a pairwise comparison matrix) are called consistent, if the following property is satisfied:

$$a_{ij} \cdot a_{jk} = a_{ik}; \forall i, j, k. \quad (2)$$

If and only if the matrix A is consistent, the priority vector (vector of weights) $w = (w_1, \dots, w_n)$ of all entities satisfies the following relation:

$$a_{ij} = \frac{w_i}{w_j}, \forall i, j. \quad (3)$$

A priority vector w can be derived via Saaty's eigenvalue method (EVM), see Saaty (1977):

$$Aw = \lambda_{\max} w, \quad (4)$$

where λ_{\max} is the largest positive eigenvalue of the matrix A . Usually, the vector w is normalized so that $\|w\| = 1$.

3. Inconsistency and its reduction

Since decision makers are rarely fully consistent in their judgments, the following measures of consistency, the consistency index CI and the consistency ratio CR , were proposed by Saaty (1977, 1980):

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (5)$$

$$CR = \frac{CI}{RI} \quad (6)$$

where n in (5) is the order of a pairwise comparison matrix, and RI in (6) is the so called random consistency index, see Saaty (1980).

Saaty (1980) postulated that pairwise comparison matrices with $CR < 0.10$ are consistent enough (in other words, a low level of inconsistency is acceptable). However, when the inconsistency is higher, pairwise comparisons judgments have to be revised. Either an expert adjusts his/her judgments, or, if it is not possible, inconsistency can be reduced by an algorithm for inconsistency reduction (AIR). In recent decades, many AIRs were proposed in the literature, see e.g. Xu and Wei (1999), Cao et al. (2008), Ergu et al. (2011), Benítez et al. (2011, 2012), Bozóki et al. (2015), Kulakowski et al. (2015), Szybowski (2018), Abel et al. (2018), or Mazurek et al. (2020).

Here, we present in detail the algorithm of Xu and Wei (1999), which we implemented together with Szybowski (2018) algorithm in our decision support tool called REDUCE (see the next chapter):

Let $A = (a_{ij})$ be an inconsistent PC matrix, let k be the number of iterations and let $0 < \lambda < 1$.

Then algorithm of Xu and Wei proceeds as follows:

Step 1: Let $k = 0$, let $A^{(0)} = (a_{ij}^{(0)})$ be an input matrix, and let CR^* be a consistency threshold.

Step 2: Calculate the maximal eigenvalue $\lambda_{\max}(A^{(k)})$ and corresponding (normalized) priority vector $w^{(k)}$.

Step 3: Calculate the consistency ratio $CR(A^{(k)})$.

Step 4: If $CR(A^{(k)}) < CR^*$, go to Step 6. Otherwise continue.

Step 5: Let $A^{(k+1)} = (a_{ij}^{(k+1)})$, where $a_{ij}^{(k+1)} = [a_{ij}^{(k)}]^\lambda \cdot \left[\frac{w_i^{(k)}}{w_j^{(k)}} \right]^{1-\lambda}$. Let $k = k + 1$, go to Step 2.

Step 6: Print the last value of A , w and k .

End.

The crucial step of the algorithm occurs in Step 5, where a PC matrix from the k^{th} iteration is transformed into a new (more consistent) matrix of the $(k+1)^{\text{th}}$ iteration, the proof of algorithm's convergence can be found in Xu and Wei (1999). The algorithm has one parameter, λ . In REDUCE, we set $\lambda = 0.9$, and the priority vector w is derived via the eigenvalue method.

4. REDUCE

REDUCE is an online tool available at <https://reduce.prz.edu.pl>, see Fig. 1. It is based on the Flask – a simple framework that can serve a Python logic into a web application. On the front-end side of the application standard web technologies were applied– HTML, CSS, JavaScript – with the addition of the jQuery library, which handles AJAX requests to Flask service. On the back-end, except Python and Flask, a few extra packages – NumPy, SciPy, and SymPy were used. Those libraries facilitated

implementation of reduction algorithms, especially matrix transformations and calculations of eigenvectors and eigenvalues. After computations, the results are returned - through the POST method - back to the client-side of the application. The website is hosted on a Linux server, with Unicorn, NGINX, and Certbot services.

The input of REDUCE is a $n \times n$ pairwise comparison matrix, where $n \leq 10$. Individual pairwise comparisons are manually inserted into corresponding cells. The scale for comparisons is in the interval $[1,9]$ with reciprocals, which corresponds to Saaty's (integer) fundamental scale from 1 to 9, see Saaty (1977, 1980). It should be noted that after reduction some matrix entries might exceed the value of 9. For inconsistency reduction two algorithms are available: Xu and Wei's and Szybowski's. However, the latter algorithm can be applied only for integer values (and its reciprocals) of pairwise comparisons.

In general, a user has the following available options:

- the size of a PC matrix,
- the inconsistency threshold CR,
- a possibility to use Szybowski's algorithm,
- a possibility to generate a random PC matrix,
- a possibility to reset values in a PC matrix.

REDUCE's output consists of a PC matrix with a reduced level of inconsistency, final consistency index CI and consistency ratio CR, and a priority vector w , see Fig. 2.

Figure 1: The main page of REDUCE

RZESZOW UNIVERSITY OF TECHNOLOGY DEPARTMENT OF COMPLEX SYSTEMS SILESIAAN UNIVERSITY IN OPAVA SILESIAAN UNIVERSITY SCHOOL OF BUSINESS ADMINISTRATION IN KATOWICE

REDUCE

A simple online tool for reducing inconsistency in pairwise comparison matrices

[How to use it?](#)

Size of a matrix:

Threshold of reducing CR:

Algorithm for reducing CR:

1	4	9
1/4	1	7
1/9	1/7	1

CI: 0.0724
CR: 0.1380
W: w1: 0.6939, w2: 0.2533, w3: 0.0528

Source: authors.

Figure 2: The output of REDUCE

Size of a matrix:

Threshold of reducing CR:

Algorithm for reducing CR:

1	1/3	7	1/3	1/4	1/6
3	1	1/8	4	8	2
1/7	8	1	5	1/5	1/2
3	1/4	1/5	1	6	1
4	1/8	5	1/6	1	1/4
6	1/2	2	1	4	1

CI: 1.3876
CR: 1.1119
W: w1: 0.1355, w2: 0.2081, w3: 0.2055, w4: 0.1307, w5: 0.1482, w6: 0.1719

1	0.4406	1.2534	0.6341	0.5527	0.4027
2.2695	1	0.5698	2.2234	2.6366	1.4120
0.7979	1.7551	1	2.1794	0.7572	0.8352
1.5771	0.4498	0.4588	1	1.6740	0.7894
1.8092	0.3793	1.3207	1.0482	1	0.5355
2.4833	0.7082	1.1973	1.2668	1.8673	1

CI: 0.1091
CR: 0.0874
W: w1: 0.1052, w2: 0.2332, w3: 0.1906, w4: 0.1348, w5: 0.1401, w6: 0.196

Source: authors

In the REDUCE tool development layer, the validation of the typed data relies on the client-side of the application – as the user must provide the values from range (0 ... 9) and in the case if the user selects Szybowski’s algorithm where the numbers must be integers, the function responsible for data validation first check the selected algorithm. Then the user is directly prevented from typing wrong characters into data cells with the decision tree of rules. After filling all the cells, a special listener function sends the data to the back-end side of the application to get parameters like CI, CR, and few others for the typed matrix. This function also activates Reduce! button. At that point data from all inputs of the matrix form is serialized and sent through the POST method in the AJAX query to the server. The server receives serialized data and converts it to the SymPy matrix object which is convenient to work with. After computations of parameters, the server returns values in the dictionary object which is revied by the client and placed on the website. Sending data after clicking the Reduce! button works similarly, but the server returns not only parameters but also a new reduced matrix – also in a dictionary object.

5. Application of REDUCE

The study of Zabihi et al. (2019) focused on the development of a GIS-based multiple-criteria decision making model for a citrus land suitability assessment. Five relevant criteria were selected: elevation, maximum temperature, minimum temperature, slope angle and rainfall. To determine criteria’s importance, all criteria were compared pairwise via Saaty’s scale. The resulting PC matrix is shown in Table 1, see the left-hand side. The matrix is inconsistent, since $CR = 0.055$.

Therefore, before determining weights of all criteria, the PC matrix can be transformed into a fully consistent matrix via REDUCE, see the right-hand side of Table 1.

Table 1: Pairwise comparisons of the five criteria from Zabihi et al. (2019), on the left-hand side. The transformed (by REDUCE) consistent PC matrix for the five criteria is on the right-hand side (the numbers are rounded to three decimal places).

	Elev.	Max temp	Min temp	Slope angle	Rainfall		Elev.	Max temp	Min temp	Slope angle	Rainfall
Elev.	1	5	3	7	5	Elev.	1	5.636	2.046	12.163	3.782
Max temp	1/5	1	1/3	3	1/2	Max temp	0.177	1	0.3630	2.158	0.671
Min Temp	1/3	3	1	5	3	Min Temp	0.489	2.755	1	5.9446	1.849
Slope angle	1/7	1/3	1/5	1	1/5	Slope angle	0.082	0.463	0.168	1	0.311
Rainfall	1/5	2	1/3	5	1	Rainfall	0.264	1.490	0.541	3.216	1

Source: authors

REDUCE provides the following weights of criteria (via the eigenvalue method) for the transformed matrix: elevation ($w = 0.497$), minimum temperature (0.243), rainfall (0.131), maximum temperature (0.088), and slope angle (0.041).

These result are very close to the weights obtained from the original inconsistent PC matrix: elevation (weight 0.497), minimum temperature (0.242), rainfall (0.132), maximum temperature (0.087), and slope angle (0.041). However, in the case of a higher initial inconsistency larger differences in weights can be expected to be derived from an initial and transformed matrix.

6. Conclusion

The aim of the paper was to introduce REDUCE, a free and online software tool for inconsistency reduction in pairwise comparisons. REDUCE is a user friendly program written in Python and located at <https://reduce.prz.edu.pl>. Apart from the inconsistency reduction, REDUCE also provides a derivation of a priority vector and evaluation of inconsistency in terms of Saaty's consistency index CI and consistency ratio CR , so it can be used for the analytic hierarchy process (AHP) as well.

We believe REDUCE can contribute to better decision making in the context of small and medium enterprises, which usually cannot afford expensive commercial software. Further research will focus on an expansion of REDUCE and an inclusion of additional helpful features for the multiple-criteria decision making.

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WHAT MACROECONOMIC INDICATORS AFFECT PERFORMANCE OF SMALL AND MEDIUM-SIZED ENTERPRISES?

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Abstract

This article deals with how certain economic, social, demographic, and political factors influence the short- and long-term performance of small and medium enterprises (SMEs). Eight variables were chosen, from which we expect a specific influence in both the short- and long-run. SMEs' performance is defined by using the value-added (VA) by SMEs, as a percent of the total VA by enterprises. The VA at factor costs for SMEs was firstly reported by the European Commission in 2008. The article analyzes the countries of the Visegrad Four during the period from 2008 to 2019. The article uses the tools of time series econometrics, especially the panel cointegration analysis, and the Granger causality test. The long-term relationships were confirmed between the SMEs performance and the corruption index, the gross domestic product, the life expectancy, and the unemployment rate. The short-term relationships were confirmed between the SMEs performance and the gross domestic product and the life expectancy. EViews software version 11 has been used for the calculations.

Keywords: Fisher-ADF test, Granger causality test, panel cointegration analysis, SME, VA

JEL codes: C23, L26

1. Introduction

Small and medium-sized enterprises (SME) are an important part of the healthy economy of every advanced state. Therefore, it is in the interest of every state to encourage as much as possible the emergence and development of these companies. SMEs predominate over large corporations and are a factor of development stability and dynamics. In addition, they can quickly and flexibly adapt to changes that can occur on the market (Veber and Srpová, 2012) and affect significantly middleclass growth and employment. At the same time, the increase in employment also reduces government's spending on unemployment benefit payments.

SMEs research is important from several main aspects. First, SMEs have a major influence on both gross domestic product (GDP) and unemployment. Second, the role of SMEs has significantly increased, based on their ability to adapt to the challenges of a continuously changing environment (The Economist Intelligence Unit, 2013). Third, SMEs represent the scope of free entrepreneurial initiative and entrepreneurship (Tomovska et al., 2016). SMEs have a major part in the process of promoting technical progress in society and innovation in economic activity (Ács and Audretsch, 1999), (Radas and Bozic, 2009), (Zygmunt, 2017).

SMEs are crucial for local economic development, playing a noteworthy role in job creation. The purpose of the current paper is to investigate the impact of selected macroeconomic factors on the SMEs' performance, over the period 2008–2019. SMEs are a noteworthy driver of economic development (Obi et al., 2018), being vital to most economies across the world. They represent 99% of all businesses in the European Union and in the last five years, provided about 85% of new jobs, also ensuring two-thirds of the total private sector engagement in the region (European Commission, 2021a).

This paper deals with the short-run and the long-run relationship between the value-added (VA) by SMEs, as a percent of the total VA by enterprises and certain economic, social, demographic, and political factors. The analysis was based on the panel unit root tests, co-integration tests, and causality tests. The article analyses the countries of the Visegrad Four during the period from 2008 to 2019. It is expected that causal relationships are similar in all V4 countries (the Czech Republic, Slovakia, Poland,

Hungary). The objectives and common interests of the V4 countries were described in the Visegrad Declaration (1991). One of the objectives was to create favorable conditions for direct cooperation between enterprises, for employment, for the development of social relationships. And this is the reason why the countries of V4 were selected for the analysis.

The core of this paper is the analysis of eight hypotheses concerning the relationship between selected variables and the SMEs performance for V4 countries. The positive relationship is assumed between the corruption perception index, the gross domestic product, the general government expenditure, the life expectancy at birth, education level of the population and the SMEs performance. The negative relationship is assumed between the inflation rate, the unemployment rate and the SMEs performance.

This article is structured as follows: the literature review, the methodological part and data, the empirical results and finally conclusion our findings in the last section.

2. Literature Review

As analyzing performance of SMEs and the factors which affect them is a very current topic, there are many relevant studies. This part of article presents the conclusions of select scientific papers, as related to the performance of SMEs.

Authors (Anggadwita and Mustafid, 2014) describe SMEs performance from both quantitative and qualitative aspect. They take into consideration financial results, level of production and number of customers, and also goals achievement, leadership style, employee behavior. Authors (Gupta and Batra, 2016), (Zimon, 2018) deal with factors such as market share, profitability, productivity, costs and liquidity. Arend (2014) draws on a recent survey of US SMEs to determine whether ventures have dynamic capabilities. Results show that important factors which affect performance of firm are firm's age and size. Katou (2012) tests reverse causality between human resource management policies and organizational performance, through the intervening steps of employee attitudes (satisfaction, commitment, motivation) and employee behaviors (absences, turnover, disputes), which are still relatively untested in small firms and in a non-US/UK context such as Greece. Altuntas et al. (2018) find the relationships among advanced manufacturing technology, innovation, export and firm performance by using data obtained from 310 Turkish manufacturing firms. Lien and Li (2017) describe the governance of family firms and its impact on performance. Using an analysis of a balanced panel data set of 205 publicly listed firms in Taiwan spanning 10 years (2,050 firm-years), it has been found that extensive family control has a negative impact on performance.

Although most of the published literature analyzes microeconomic factors, there are number of studies that also take into consideration the macroeconomic factors. For example, Kanu (2015) focuses on studying the influence of the general level of corruption on SMEs performance. Some of articles describes influence of the external environment on the performance of SMEs. For example, the situation in Malaysia is analyzed by Rasiah (2002), in the U.K. by Foreman-Peck, (2013), in Brazil by Figal Garone et al. (2015).

There are authors developing different types of models in order to obtain evidence on the level of firm performance: a structural model based on innovation (Hall et al., 2009), a decision model based on the application of multiple criteria decision aid method (Voulgaris et al., 2000) or a two-part equation model to investigate the key firm- and industry-specific restrictions to the firm performance (Lejarraga and Oberhofer, 2015).

Other articles dealing with V4 issues are, for example, the following. Růčková (2015) evaluates whether there is a functional dependency between the used financial sources and the reported rate of return on equity. The relationship between the real gross domestic product and the unemployment rate during the economic crisis in the countries of V4 is analysed in the paper Tvrdou (2016). The stock market integration of V4 and G7 countries is examined in the paper Baumöl (2014). The research showed that during the recent financial crisis, conditional correlations between the states of V4 have increased more significantly than after the entry of the states of V4 into the European Union. The paper (Nežinský and Baláž, 2016) examines the predictive power of the confidence indicators for developments in industrial output, producer prices and employment in the V4 countries. The Granger Causality tests are used for establishing potential causation between the confidence indicators and real economic data.

3. Data and Methodology

3.1 Data

To carry out this analysis we needed a representative variable for SME performance. The value-added (*VA*) at factor costs for SMEs is able to provide information upon the outcome obtained from the SMEs' activity. This analysis will use a series of macroeconomic indicators, which capture both economic aspects of SMEs activity and social issues, which can have an impact on the performance of SMEs. Table 1 shows the political, economic, demographic, and social indicators used in the following analysis. Eutostat was the primary data source. Other sources can be found in the Table 1. This analysis covers the 4 countries of a period twelve consecutive years.

Here, variables for the analysis are described. The choice of variables is based on the article by Cicea et al. (2019), which deals with determinants of SMEs' performance: evidence from European countries. The level of corruption (*CI*) was chosen as representation of political environment. This factor can negatively influence the activity and performance of SMEs. It has been found that corruption plays a dual role, serving as both grease and sand for entrepreneurship. The economic environment is represented by the following variables: the gross domestic product (*GDP*), the inflation rate (*IR*), and the general government expenditure (*GE*). The life expectancy at birth (*LE*) was chosen as a demographic indicator. The last group is social environment and it is represented by the education level of population (*TE*), the people at risk of poverty (*PR*), and the unemployment rate (*UN*).

Table 1: Description of variables

Variable	Description of variable	Source
VA	Value added at factor costs, % of total value added by enterprises	European Commission (2021b)
CI	Corruption index, 0-100	Transparency International (2021)
GDP	GDP per capita, Current prices	Eurostat (2021a)
GE	Government expenditure, % of GDP	Eurostat (2021b)
IR	Inflation rate (%)	Eurostat (2021c)
LE	Life expectancy, years	Eurostat (2021d)
PR	People at risk of poverty, % of total population	Eurostat (2021e)
TE	Population by educational level – Tertiary education (%)	Eurostat (2021f)
UN	Unemployment (annual average), % of active population	Eurostat (2021g)

Source: author's calculations

It is expected a specific impact of each of eight variables on the performance of SMEs. The influence in the long-run and the direction of the relationship in the short-run were tested. Following hypotheses were formulated and tested:

- H1: Corruption perception index positively influences the SMEs performance.
- H2: Gross domestic product positively influences the SMEs performance.
- H3: Inflation rate negatively influences the SMEs performance.
- H4: General government expenditure positively influences the SMEs performance.
- H5: Life expectancy positively influences the SMEs performance.
- H6: Education level of the population positively influences the SMEs performance.
- H7: People at risk of poverty negatively influences the SMEs performance.
- H8: Unemployment rate negatively influences the SMEs performance.

3.2 Panel Analysis

In this chapter stationary time series, the panel cointegration test and the long-run cointegrating vector estimates are provided. All of time series without series *IR* (inflation rate) and *TE* (education level of the population) are non-stationary and become stationary when differenced. The long-run cointegration relationships may exist between these variables, type of I(1). Before testing for cointegration, we have to investigate the order of integration of the variables. The following methods

have been described for example in the article by Streimikiene and Kasperowicz (2016). There are the panel unit root tests proposed by Levin et al. (2002), Im et al. (2003), Fisher-ADF and Fisher-PP tests proposed by Maddala and Shaowen (1999). Levin, et al. (LLC) (2002) test assumes that there is a common unit root process so that ρ_i is identical across cross-sections.

LLC test applies the following basic ADF specification:

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X_{it}^T \delta + \varepsilon_{it}, \quad (1)$$

where $\alpha = \rho - 1$, but allow the lag order for difference terms, p_i , to vary across cross-sections. The $H_0: \alpha = 1$ (there is a unit root), and the $H_1: \alpha < 0$ (there is no unit root).

Im et al. (2003) test (IPS) allows for individual unit root processes so that ρ_i may vary across cross-sections. The null hypothesis may be written as $H_0: \alpha_i = 0$, for all i ; while the alternative hypothesis is given by: $H_1: \alpha_i < 0$, for $i = 1, 2, \dots, N_1$; and $\alpha_i = 0$, for $i = N + 1, N + 2, \dots, N$; where the i may be reordered as necessary which may be interpreted as a non-zero fraction of the individual processes is stationary. Rejection of the null hypothesis does not necessarily imply that the unit root null is rejected for all i .

The Fisher-ADF and PP tests allow for individual unit root processes so that ρ_i may vary across cross-sections. The tests are all characterized by the combining of individual unit root tests to derive a panel-specific result. The tests have null hypothesis of unit root, whereas the alternative hypothesis of some cross-sections does not contain a unit root.

Each variable is integrated of order one, Pedroni's test (Pedroni, 2004) was used for panel cointegration. Pedroni's cointegration analysis allows testing the cointegration of models that involve more than one independent variable.

Panel cointegration test allows for cross-sectional interdependence with both different individual effects and deterministic trends can be defined as follows:

$$VA_{it} = \alpha_{it} + \delta_i t + \beta_{1i} CI_{it} + \beta_{2i} GDP_{it} + \beta_{3i} GE_{it} + \beta_{4i} LE_{it} + \beta_{5i} PR_{it} + \beta_{6i} UN_{it} + \varepsilon_{it}, \quad (2)$$

$$\varepsilon_{it} = \rho_{it} \varepsilon_{it-1} + u_{it}, \quad (3)$$

where $i = 1, 2, 3, 4$ represents the panel member, $t = 1, 2, \dots, 12$ refers to the time period, β represents the slope coefficient. The parameters α_{it} and δ_i allow for possibility of country-specific effects and deterministic trend effects, respectively. The term ε_{it} represents the estimated residual deviations from the long-run relationship. To test the null hypothesis of no cointegration, Pedroni (2004) suggested two types of cointegration tests: panel tests and group tests. The panel tests based on the within dimension method and includes four statistics: panel v -statistic, panel ρ -statistic, panel PP-statistic and panel ADF-statistic. The group tests based on the between dimension method which includes: group ρ -statistic, group PP-statistic and group ADF-statistic.

After establishing the panel cointegration, the long-run cointegration vector was estimated by using Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS). The selection of the methods is discussed in paper Kao and Chiang (2000). This paper argues that the panel DOLS estimator has better sample properties rather than the panel FMOLS estimators.

3.3 Testing Causality

This chapter deals with the testing of short-term relationships (Granger causality). We test whether one series acts on the other in Granger's sense for the time series pairs. If the X series acts in Granger's sense on the Y series, then the X -series values provide statistically significant information about the future Y -series values. Therefore, it is a tool that evaluates the ability of one series to predict the future values of the other. The hypothesis tested is that the series in question does not act in Granger's sense against an alternative hypothesis that denies the hypothesis tested.

4. Results

Before further analysis it is necessary to identify the order of integration of each variable. Table 2 show the results of the Fisher-ADF panel unit tests for each variable. Tests were calculated for level and first difference of variables. All variables are non-stationary and integrated of order one process, I(1), except variables *IR* (the inflation rate) and *TE* (education level of the population). These two variables are excluded from further analysis.

Table 2: Test results for panel unit roots (exogenous variables: Individual effects)

Variable		ADF - Fisher Chi-square	Variable		ADF - Fisher Chi-square
<i>VA</i>	Statistic Prob. Result	5.024 0.755 N	D(<i>VA</i>)	Statistic Prob. Result	15.024 0.035** S
<i>CI</i>	Statistic Prob. Result	7.152 0.362 N	D(<i>CI</i>)	Statistic Prob. Result	39.281 0.000*** S
<i>GDP</i>	Statistic Prob. Result	10.975 0.203 N	D(<i>GDP</i>)	Statistic Prob. Result	16.975 0.015** S
<i>GE</i>	Statistic Prob. Result	10.201 0.219 N	D(<i>GE</i>)	Statistic Prob. Result	15.759 0.042** S
<i>IR</i>	Statistic Prob. Result	17.571 0.047 S	D(<i>IR</i>)	Statistic Prob. Result	
<i>LE</i>	Statistic Prob. Result	11.612 0.314 N	D(<i>LE</i>)	Statistic Prob. Result	9.217 0.012** S
<i>PR</i>	Statistic Prob. Result	9.472 0.342 N	D(<i>PR</i>)	Statistic Prob. Result	21.574 0.002*** S
<i>TE</i>	Statistic Prob. Result	10.975 0.203 N	D(<i>TE</i>)	Statistic Prob. Result	11.812 0.198 N
<i>UN</i>	Statistic Prob. Result	8.452 0.301 N	D(<i>UN</i>)	Statistic Prob. Result	31.812 0.000*** S

Statistical significance at the 0.01 level (***), at the 0.05 level (**), at the 0.1 level (*)

Source: author's calculations

The long-term relationships were confirmed between the SMEs performance and *CI* (the corruption index), *GDP* (the gross domestic product), *LE* (the life expectancy) and *UN* (the unemployment rate). The results of the panel cointegration test statistics are presented in the Table 3. Five statistics significantly reject the null hypothesis of no cointegration, with the exception of the panel rho-statistic and group rho-statistic. The majority of the statistic tests reject the null hypothesis of no cointegration (5% significance level).

Table 3: Panel DOLS results

Test	Statistic	Prob.
Panel v-Statistic	15.358	0.000***
Panel rho-Statistic	0.479	0.647
Panel PP-Statistic	-2.423	0.011**
Panel ADF-Statistic	-2.301	0.012**
Group rho-Statistic	0.784	0.853
Group PP-Statistic	-1.932	0.028**
Group ADF-Statistic	-1.917	0.031**

Statistical significance at the 0.01 level (***), at the 0.05 level (**), at the 0.1 level (*)

Source: author's calculations

The next step is to estimate the long-run cointegrating vector between the SMEs performance and these variables. There was used the panel DOLS method. Deterministic trend and constant were taken into account. The Table 4 shows the results of the panel DOLS estimators.

Table 4: Panel DOLS results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<i>CI</i>	-0.561	0.135	-4.147	0.000***
<i>GDP</i>	0.00068	0.00013	5.091	0.000***
<i>LE</i>	2.928	0.668	4.379	0.000***
<i>UN</i>	-0.621	0.131	-4.727	0.000***

Statistical significance at the 0.01 level (***), at the 0.05 level (**), at the 0.1 level (*)

Cointegrating equation deterministics: @TREND

Source: author's calculations

Table 5 describes the acceptance or rejection of the eight hypotheses.

Table 5: Results of hypotheses

Hypotheses	Results
H1: Corruption perception index positively influences <i>VA</i>	rejected
H2: Gross domestic product positively influences <i>VA</i>	accepted
H3: Inflation rate negatively influences <i>VA</i>	not tested
H4: General government expenditure positively influences <i>VA</i>	not tested
H5: Life expectancy positively influences <i>VA</i>	accepted
H6: Education level of the population positively influences <i>VA</i>	not tested
H7: People at risk of poverty negatively influences <i>VA</i>	not tested
H8: Unemployment rate negatively influences <i>VA</i>	accepted

Source: author's calculations

The short-term relationships were confirmed between the SMEs performance and *GDP* (the gross domestic product) and *LE* (the life expectancy).

As for Granger's causality, only one null hypothesis could be rejected, as Table 6 shows.

Table 6: Granger causality tests

Null Hypothesis	F-Statistic	Prob.
Gross domestic product does not Granger cause <i>VA</i>	9.56	0.034**
<i>VA</i> does not Granger cause Gross domestic product	2.76	0.134
Life expectancy does not Granger cause <i>VA</i>	2.12	0.209
<i>VA</i> does not Granger cause Life expectancy	1.79	0.329

Statistical significance at the 0.01 level (***), at the 0.05 level (**), at the 0.1 level (*)

Source: author's calculations

It can be interpreted as follows: past values of the *GDP* help to improve the prediction of the *VA*.

5. Conclusion

SMEs are both socially and economically important at European level. That's why it is important to find means to increase their performance. It can be considered as a priority for each country. Literature review provides information about various factors affecting the performance of SMEs at a macroeconomic level. Compared to previous studies, this article is based on using panel analysis to analyze SMEs performance in the V4 countries. This method allows to determine both long-run and short-run relationships.

The main idea of this article was to find variables from economic, social, political and demographic environment, which would have influence on the SMEs performance. The political environment is represented by variable the level of corruption (*CI*). The long-term between *CI* and *VA* has been confirmed. Hypothesis that *CI* positively influences *VA* was rejected.

The economic environment is represented by variables: the gross domestic product (*GDP*), the inflation rate (*IR*), and the general government expenditure (*GE*). Variable *IR* could not be analyzed because this variable did not integrate of order one process, $I(1)$. Between *GE* and *VA* has been confirmed neither long-term nor short-term relationship. Between *GDP* and *VA* has been confirmed both long-term and short-term relationship. Hypothesis that *GDP* positively influences *VA* was accepted.

The demographic environment is represented by variable the life expectancy at birth (*LE*). Between *LE* and *VA* has been confirmed both long-term and short-term relationship. Hypothesis that *LE* positively influences *VA* was accepted.

The last group, the social environment, is represented by the education level of population (*TE*), the people at risk of poverty (*PR*), and the unemployment rate (*UN*). Variable *TE* could not be analyzed because this variable did not integrate of order one process, $I(1)$. Between *PR* and *VA* has been confirmed neither long-term nor short-term relationship. The long-term between *UN* and *VA* has been confirmed. Hypothesis that *UN* negatively influences *VA* was accepted.

By adding a theoretical macroeconomic model of SME performance, it has been possible to introduce factors that have a major impact on SME performance. This theoretical model can be used for studying the performance of SMEs in different geographical areas. It is also necessary to emphasize its limits. The main problem is the number of observations and represents a possible bias in the results. For objective reasons related to the availability of statistics data (*VA* for factor costs for SMEs first reported by the European Commission in 2008), the time frame was shortened to twelve years, but the coverage of the analysis was extended to include eight variables as influencing factors.

Next research can be extended to other factors that can influence *VA*. For an example, the income, the energy consumption or environmental issues (pollution level by category) and so on can be considered.

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DOES JOINT DECISION-MAKING FOSTER TEAM CREATIVITY? AN EMPIRICAL STUDY IN SMALL MEDIUM-SIZED ENTERPRISES

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Abstract

The purpose of this paper is to investigate how joint decision making might promote team creativity, considering the mediating role of team psychological safety and moderating role of participative leadership. Data were collected from multiple sources from 55 teams working in small and medium-sized enterprises (SMEs) in France. Confirmatory factor analysis and Hayes PROCESS macro were adopted to analyze the data. The results showed that joint decision making fosters team creativity via team psychological safety. Moreover, we found that joint decision making is more positively related to team psychological safety and team creativity under higher levels of participative leadership. The present research complements the extant studies by examining the impact of joint decision making on team creativity and, further, reveals when and how joint decision making is more likely to foster team creativity, particularly in SMEs.

Keywords: Joint decision making, participative leadership, team creativity, team psychological safety, SMEs

JEL codes: L24, M12, M53

1. Introduction

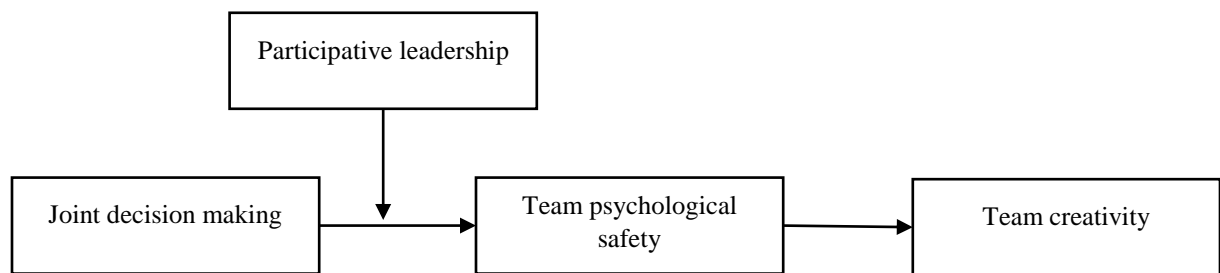
Providing high control and autonomy to team members for increasing their flexibility and creativity has become a trend in recent decades (Zhang *et al.*, 2017). The most popular leadership behavior for facilitating empowerment is the joint decision making. In the joint decision making, managers incorporate the team members' point of view in the decision making process (Guo and Wang, 2017). Joint decision making provides opportunities to the team members to give useful and original ideas during decision making process and to integrate with one another's perspectives (Chen *et al.*, 2011). Previous studies have focused more on the impact of leadership empowerment behaviors on employee's creativity (Cai *et al.*, 2019; Koh *et al.*, 2019; Yang *et al.*, 2017), but little is known about the implications of leadership empowerment behaviors on creativity of entire team.

Joint decision-making implementation doesn't always give the desired outcomes (e.g., Forrester, 2000; Gebert *et al.*, 2003). According to literature, it is more complex to realize the actual benefits of joint decision making than that it was originally thought (Ahearne *et al.*, 2005; Benoliel and Somech, 2014; Chen *et al.*, 2011; Guo and Wang, 2017; Uitdewilligen & Waller, 2018), and the researchers suggested to further investigate the boundary conditions. Research (e.g., Benoliel and Somech, 2014; Humborstad *et al.*, 2014) has acknowledged that the effectiveness of leadership empowerment behaviors is contingent upon individuals' characteristics such as emotional intelligence, goal orientation, and uncertainty avoidance. Other scholars also discuss the potential contingencies from the perspective of leadership characteristics and leader-member relationships (Gao *et al.*, 2011; Lam *et al.*, 2015). However, we lack knowledge on the role of team-level contextual factors (Guo and Wang, 2017; Kwak and Jackson, 2015).

In order to fulfill the above research gap, the present study examines whether the extent to which participative leadership will moderate the relationship between joint decision making and team creativity. This paper also develops a more comprehensive understanding of how the impact of joint decision making is transmitted on team creativity. Since the response of individual employees against the leadership empowerment behaviors has been widely studied (e.g., (Ahearne *et al.*, 2005; Miao *et al.*, 2014; Zhang and Bartol, 2010), we examine the mediating role of team psychological safety between joint decision making and team creativity. We have considered team psychological safety as an underlying mechanism because prior research suggests that team leaders are responsible for the entire teams performance rather than simply individual members (Chen *et al.*, 2007). Therefore, this study investigates the role of team psychological safety as an underlying and promising intermediate mechanism.

Accordingly, the present paper extends the existing literatures in several ways. First, it deepens our understanding of the boundary condition of the impact of joint decision making on team creativity in the French context. Given the growing prevalence of participative leadership due to its possible interference with team creativity, the present paper proposes and examines the moderating role of participative leadership style in the relationship between joint decision making and team creativity. Second, this study examines the mediating role of team psychological safety between joint team decision making and team creativity. Finally, to broaden our understanding of the impact of team joint decision making on team creativity, we investigate this relationship at levels of participative leadership. The proposed moderated mediation model is depicted in Figure 1.

Figure 1: Research model



Source: own research

2. Literature review

2.1 Joint decision making and team creativity

Team creativity refers to the collaboration among members of the team to produce novel and valuable ideas regarding products, processes, and services (Shin and Zhou, 2007). Thus, it enables vertical and horizontal integration of ideas and perspective among team members and foster creativity. Joint decision making is set of protocols through that the responsibility is shared down to the organization

hierarchy to provide team members authority over their task, and thus nurture team creativity (Ahearne et al., 2005; Leach et al., 2003; Zhang and Bartol, 2010).

Joint decision making enables teams' members more likely to be intrinsically motivated and keep them involved in innovative efforts, such as pursuing alternatives, trigger innovation, share unique information and coordinating activities, all together are more likely prompt team creativity (Amabile et al., 2004; Chen et al., 2011; Huang et al., 2010; Mathieu et al., 2006; Seibert et al., 2004; Srivastava et al., 2006; Zhang and Bartol, 2010). Furthermore, team leader being the forefront of the organization promotes joint decision making to encourage team participation and involved them in creative processes, which in turn foster team creativity and enables knowledge sharing. (Gao et al., 2011; Shin and Zhou, 2007).

2.2 The mediating role of team psychological safety

To understand the underlying process through which joint decision-making prompt team creativity, there is need to inquire about mediating mechanisms (Shalley et al., 2004; Zhang and Bartol, 2010). In this study we conceptualize team psychological safety as underline mechanism that transfer the positive effect of joint decision making on team creativity. Edmondson (1999) defines team psychological safety as a common belief among the members of the team that ensure risk taking propensity is safe for each member. Furthermore (Baer and Frese, 2003) argued that team psychological safety is critical component for team creativity as it safeguards the risk and uncertainties associated with creative ideas offered by the team members. A common phenomenon found in creative organization is that their team members are not subject to experience setbacks and criticism from top management, that enables them to pursue innovation and alternatives, for example, top management gives suggestion to improve rather than criticism (Baer and Frese, 2003; Kark and Carmeli, 2009). Learning behaviors in the teams can also be facilitated by team psychological safety (Edmondson, 1999, 2003). For example, when team members are ensured of their psychological safety, members are more willing to share knowledge, ideas, and suggestions that in turns boast effectiveness and foster team creativity.

Given that team leaders are key figure in the organization to ensure team psychological safety among other members, so to encourage the environment of team creativity. In practice, sense of team psychological safety is enhanced by joint decision-making structure within organization, as it constrains the barriers through which team members are reluctant to express their ideas and knowledge. Though the effectiveness of the psychological team safety is influence by contextual factors such as participative leadership (e.g., Wageman et al., 2012). The present study argues that joint decision making facilitates knowledge sharing among the team members, though members can openly express their views if there is high level of psychological team safety that transmit the effectiveness of joint decision making on team creativity. When team experiences low level of psychological safety they are less likely to coordinate effectively with one another and then even joint decision making are not fully helpful to reap creative ideas from team members. Indeed, team psychological safety is the underline mechanism through which the effectiveness of joint decision making turns in to high level of team creativity, thus we hypothesize:

H1. Team psychological safety will mediate the relationship between joint decision making and team creativity.

2.3 The moderating role of participative leadership

As argued earlier the effectiveness of joint decision making within organizational structure encourage team creativity when interacts with other contextual factors. One factor that interacts with joint decision making to trigger team creativity is participative leadership. Two established leadership styles in organizational studies are directive and participative leadership. Both leadership styles are completely opposed to each other, a directive leader can make the decision on their own and the involvement of the teams' members in decision making is negligible whereas participative leader encourage feedback and team involvement in the decision-making structure of the organization (Bass and Bass, 2008). Theoretically both directive and participative leadership should be treated as single construct with two opposite ends, such as

lower level of participative leadership indicates the presence of directive leader style (Mesu et al., 2015). In this study we conceptualize participative leadership as a moderating construct that increase the positive effect of joint decision making on team creativity.

Participative leadership is different from join decision making such that former is the quality of the team leader whereas later is the decision formation structure within the team. There are support from the past literatures that indicates the significant role of participative leadership style for superior firm performance and team creativity. For example, in case of small and medium size enterprises (SMEs), participative leadership is highly effective for collaboration among members, as it is helpful to engage employees emotionally to their task and encourage them to work together to achieve organizational goals (Dietz et al., 2006; Mazzarol, 2003). Moreover, participative leadership enables better joint decision making because it provides employees sense of involvement and belongingness. The positive relationship among joint decision making and team creativity can be increase with the participative role of leadership because it strengthens team commitment and involvement for better SME performance (Bass and Riggio, 2006; Edmondson, 2003). In contrast lower level of participative leadership hinders team creativity because it limits teams' members involvement in decision making, consequently team members therefore reluctant to hare knowledge.

Moreover, as argued earlier the positive effect of joint decision making on team creativity undergoes via the mediated path of psychological safety. Participative leadership thus offer moderated mediation role on this hypothesized relation because higher level of participative leadership encourages strong relationship among team members that strengthen organization commitment. Committed employees are perceived to have higher psychological safety that allow them to share tacit knowledge, which cannot otherwise be coordinated (Kim, 2020; Chughtai, 2020). Especially in case of SMEs organizational knowledge is key factor to trigger innovation and remain competitive in the market. Higher level of participative leadership ensures psychological safety among team members than further transfer to achieve team creativity through integration and knowledge transfer among team members, thus we hypothesize:

H2. Participative leadership will moderate the relationship between joint decision making and team psychological safety, such that the relationship is more positive in teams with higher levels of participative leadership.

H3. Participative leadership will moderate the indirect effects of joint decision making on team creativity, such that the relationship is more positive in teams with higher levels of participative leadership.

3. Methods

3.1 Sample and procedure

Data were collected from multiple surveys that were conducted in work teams of French organizations, including the industries of telecommunications, education, manufacturing, finance and consulting. Access to the participants were taken from each company's senior or middle-ranking manager. Prior disseminating the survey, we took consent from the participants and informed them about the study purpose. We also ensured that their responses would be kept confidential and anonymous. Moreover, it was clarified that there were no right or wrong answers to the questions, so that the respondents answer the questions as honestly as possible. We distributed the surveys in the morning and collected in the lunch break.

Out a total of 67 initially invited teams, 55 teams replied. There were no missing values, thus the final sample consisted of 55 teams (including 55 team leaders and 161 team members), providing a valid response rate of 82 percent. The team size ranged from 3 to 8 members. The average team longevity was 6.8 months. Among team members, 60.8 percent were females; the average age was 27.5 years; and 76.4 percent had a bachelor's degree or above. Among team leaders, 54.5 percent were male; the average age was 35.7 years; and 88.1 percent had a bachelor's degree or above.

3.2 Measures

To minimize the issue of common method bias, we collected data from multiple sources i.e. from the respondents and from their respective team leaders. The team members’ survey consisted of measures of joint decision making and team psychological safety. The team leaders’ survey consisted of measures of participative leadership and team creativity. All measures were translated into French by strictly following the back-translation procedure to guarantee accuracy and validity.

i. *Joint decision making.* We assessed joint decision making with a five-item scale (Zhang and Bartol, 2010) which was rated on a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. Sample item includes “My team leader often consults me on strategic decisions.” Cronbach’s α for the scale was 0.94.

ii. *Participative leadership.* We assessed participative leadership style with a five-item scale borrowed from Ogbonna and Harris (2000). Team leaders rated the scale on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Cronbach’s α for the scale was 0.88.

iii. *Team psychological safety.* Team psychological safety was measured using a five-item scale according to Edmondson (1999) (1 – strongly disagree; 5 – strongly agree). Sample item includes “No one on our team would deliberately act in a way that undermines my efforts.” Cronbach’s α for the scale was 0.91.

iv. *Team creativity.* Team creativity was measured using a five-item scale according to the work of Anderson and West (1998) and Chen (2006) (1 – strongly disagree; 5 – strongly agree). Sample item includes “Our team always expands new knowledge and skills related to the task.” Cronbach’s α for the scale was 0.86.

v. *Control variables.* Following (Guo & Wang, 2017), we controlled team size, team type, team longevity, gender, age, education, team demographic diversity and task routineness in the analyses.

4. Results

4.1 Preliminary analyses

Confirmatory factor analysis (CFA) was conducted with Amos version 25.0 to examine the validity of measurement model. The results of CFA showed that the four-factor model including all study variables had good model fit: $\chi^2/df=1.44$, CFI = 0.96, RMSEA =0.05, SRMR = .06, and was superior to the three alternative models. Next, we examined within-team agreement using Rwg to demonstrate the appropriateness of aggregating individual responses to the team level (James et al., 1984). The Rwg 0.88 for joint decision making, 0.91 for team psychological safety and 0.79 for task routineness. All values exceeded 0.70, suggesting a “good” amount of within-team inter-rater agreement. Table I presents the means, standard deviations and zero order correlations for the study’s variables. As shown, joint decision making was positively related to team psychological safety and team creativity ($r = 0.36$, $p < 0.01$; $r = 0.34$, $p < 0.01$, respectively). Team psychological safety was positively related to team creativity ($r = 0.44$, $p < 0.01$). Participative leadership was positively related to team psychological safety ($r = 0.31$, $p < 0.01$) and team creativity ($r = 0.28$, $p < 0.01$).

Table 1: Means, standard deviations, and zero order correlations among study variables

Variables	Mean	SD	1	2	3	4
1. Joint decision making	4.01	0.84	--			
2. Team psychological safety	3.55	0.78	.36**	--		
3. Team creativity	3.44	0.99	.34**	.28**	--	
4. Participative leadership	4.12	1.81	.18**	.31**	-.24**	--

Source: own research, SD = standard deviation. * $p < .05$, ** $p < .01$

4.2 Hypotheses testing

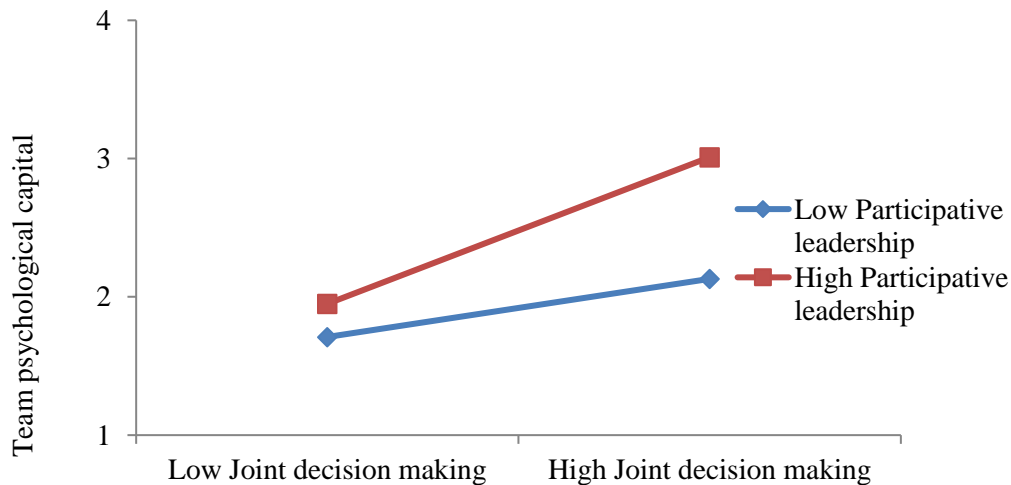
The moderated-mediation model was tested using PROCESS macro in SPSS (Model 7). This model incorporated the control variables and results of the analyses are reported in Tables II. All the hypothesized relationships were supported. There were both direct and indirect effects from joint decision making to team creativity via team psychological safety (H1). Participative leadership was found to positively moderate the relationship of joint decision making on team psychological safety. The moderation plot provided in Figure 2 showed that participative leadership had a positive effect on the relationship of joint decision making and team psychological safety. Finally, participative leadership was also found to positively moderate the relationship of joint decision making on team creativity via team psychological safety. Thus, all hypotheses (H1, H2, and H3) were supported.

Table 2: Results of moderation, indirect and moderated mediation

Moderation path`	Team psychological capital (TPC)		
	β	SE	
Joint decision making	.37**	.09	
Participative leadership (PL)	.28**	.06	
Joint decision making x PL	.16*	.08	
Bootstrapping 95% Confidence Interval			
Indirect path	β	LLCI	ULCI
Joint decision making \rightarrow TPC \rightarrow TC	.21**	.124	.488
Moderated mediation path			
Conditional indirect effect of Joint decision making on TC at different levels of PL			
PL at - 1 SD	.092	-.020	.099
PL at Mean	.117**	.101	.218
PL at +1 SD	.139**	.220	.511
Index of the moderated mediation model			
Joint decision making on TC	.10**	.031	.168

Source: own research, LLCI = lower level confidence interval, ULCI = upper level confidence interval. * $p < .05$.

Figure 2: Results of moderation



Source: own research

5. Conclusion

The present paper found that joint decision making fosters team psychological safety, which, in turn, enhances team creativity. Furthermore, participative leadership functioned as a boundary condition that enhanced the indirect relationship of joint decision making with team creativity via team psychological safety.

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SIMILARITIES OF TRANSFORMATIONAL LEADERSHIP AND STRATEGIC MANAGEMENT IN THE MULTICULTURAL ORGANIZATIONS DEMONSTRATED AS EXAMPLE OF GARDENING

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Abstract

Globalization, both in a cooperative sense and a competitive sense, has already changed the way how organizations must do business. As businesses engage more frequently in global activities such as foreign direct investment, and opening branches or satellite companies in other areas of the globe, it creates a multicultural environment. In this condition, people are attended to the global market with various cultural backgrounds, which contend with novel social, behaviors and expectations. Providing trust, integrity and alliance among multicultural employees could bring new challenges for the organizations. Therefore, several types of research have already investigated the cultural differences in the organizations, and leadership activities with helping strategic management in the multicultural organizational performance. Furthermore, this research is comparing the similarity of combination transformational leadership and strategic management with gardener attitudes for developing the performance in multicultural organizations.

*Keywords: culture, gardener attitudes, strategic management, transformational leadership
JEL codes: O35, D91, M14*

1. Introduction

Increasing rates of global migration caused people to improve their knowledge concerning cross-cultural awareness, and bring the new shape of multicultural backgrounds, which could even change the workplace demographic as well. According to Hussain (2018), “Multicultural organizations (MCOs hereafter) are omnipresent in the current economic system, and we are persistently surrounded by diverse cultures; therefore, workforce diversity is becoming the common feature of the MCO”. Also, the size, type and number of organizations operating across the globe are growing very fast. The multicultural organization is shaped when employees are coming from different cultural backgrounds and decided to work together to achieve certain common goals in the organization. Hussain (2018) argues that “at present, these MCOs possess a larger proportion of organizational workforce throughout the world economy”. Since this workforce has huge potential to organizations improving their effectiveness in the global business environment, they require a deep understanding of the mixed skills of employees from different nations. (Cox, 1993; Galbraith, 2000; Kirchmeyer and McLellan, 1991; Kirkman and Shapiro, 2001; Tung, 1993). Then, one of the biggest challenges of management studies in the 20th century was to solve the needs of the globalized economy by providing viable knowledge and know-how about the integration of the multi-cultural workforce into the classic corporate structure. For long years, the companies were futilely trying to uniform their workforce, regardless of their

backgrounds and cultures. One could say that they tried to cut shape to the shrubbery, hoping that it will bear fruit. After numerous tries, they changed the strategic approach: instead of standardization, they actively embrace the different backgrounds and cultures, harnessing their strengths and nullifying their weaknesses by actively leading them and transforming them for the better. Like gardening, strategic management and transformational leadership have the common viewpoint as investing in the future: there is no immediate reward for the nurturing and caring, the achievements can only be acquired after a long growing period and in the process, there is a constant need of weeding out and pruning the unneeded parts. Provided that it is done with great and constant care and with ever-loving passion, the result will make the effort worthwhile.

2. Culture

Culture mentions the patterns of human activity and the figurative structures which give such activities significance and importance (Harper, 2001). According to Tylor (1871), “culture or civilisation, taken in its wide ethnographic sense, is that complex which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society”. In “a vocabulary of culture and society” William (1976) defines culture as the way of life for an entire society, this includes codes of manner, dress, language, religion, rituals, and norms of attitudes such as law and ethics, and systems of belief as well as the art. So, research on both conceptual and empirical studies about cultural differences has already facilitated the creation of multiple and sometimes conflicting models of national culture in the organizational and managerial fields. These kinds of models can be used for comparing management processes, HRM policies, and business strategies across national borders in any organization.

According to our knowledge, the diversity of the culture in the organization could be compared to the several flowers and plants which are growing in the same craft. On the other hand, the role of the leadership and strategic manager could be similar to the gardener’s activities in the garden. Therefore, for better interpreting concerning our theory, in the next part, we would like to explain the concept of leadership and strategic manager in the organization very briefly.

3. Leadership

Nowadays, with the phenomena of globalization, virtual businesses and multicultural organizations, a significant role of the leadership are to recognize, determine, and analyse issues concerning the diversity of cultures. Leadership style is including the leader’s act, attitude and behaviour, which leads to certain regularity and predictability in dealing with group members (Dubrin, 2001). Several types of leadership styles have already been introduced, such as autocratic, bureaucratic, laissez-faire, charismatic, democratic, participative, situational, transactional, and transformational leadership. These various leadership styles can be used for a specific situation and condition, based on the organizational cultures as well. In our opinion, transformational leadership could provide the necessary types of skills for the employees in a multicultural organization. Transformational leaders can provide a clear vision and mission for the multicultural employees in the organization. Transformational leaders try to show a high degree of power trust, and emotional interest among the members of the multicultural organization. On the other hand, transformational leadership communicates with a high level of expectation concerning the success of the organization. Besides, a transformational leader with charismatic skill could earn more commitment from the members in the progress of the organization performance. In our opinion, transformational leadership can improve personality development as well. Because he/she is working very carefully to improve the employee’s morale which finally could improve the employee’s performance as well.

There are four behaviours characteristic of transformational leaders described by Bass and Avolio (1990):

- **Charisma:** Provides vision and clear mission for their employees.
- **Inspirational Motivation:** Providing a high level of communication uses symbols to focus efforts, expresses important purposes in simple ways.

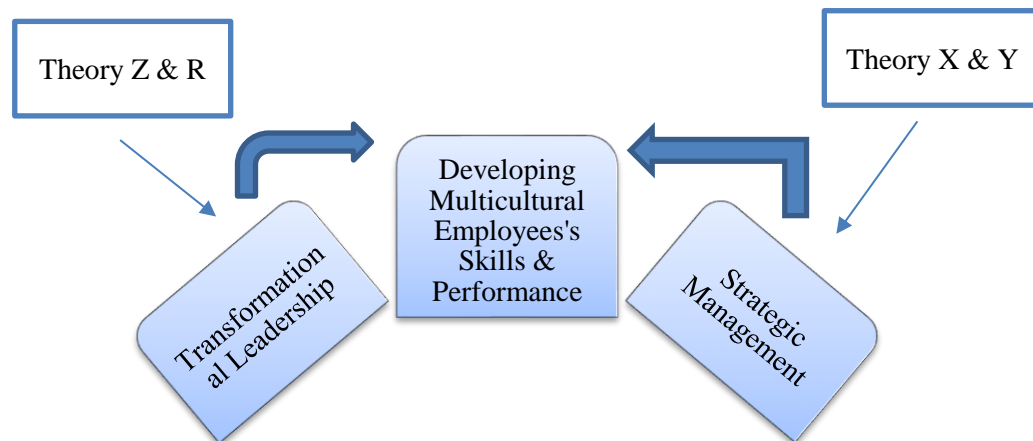
- **Intellectual Stimulation:** Critical thinking, problem-solving, encourage for innovation, and creativity
- **Individualized Consideration:** Gives the personal high level of attention, treats each employee individually, coaches and advises each of them separately

Also, the concept of transformational leadership is based on Theory Z and Theory R which is produced by William Ouchi in 1981. According to Ouchi (1981), Theory Z involves providing a friendly atmosphere for the employees in the organization to increase employees' commitment and encourage them to stay in the organization for a long time. Besides, Theory R is built on human value. For instance, this theory states that everybody needs love, feelings of majesty and respectful treatment, consequently, these three needs together bring about a positive influence on self-esteem and thus on employees' state of mind and the quality of their work and productivity, especially in the success of their performance.

4. Strategic management

Strategy management means analysing, controlling and planning the organizational activities and performance and tries to design an action plan for achieving long/short-run goals at the organization. According to Elkhdr (2019), strategic management is also called a "systematic analysis" of certain factors that involves the customers and competitors as external stakeholders, and the organization as an internal environment, which provides grounds for the organizational managerial practices. Also, strategic management is based on the PESTLE technique. PESTLE is a strategic, technique, and planning tool, which is used for evaluating the impact political, economic, social, technological, environmental and legal factors might have on a project. It involves an organization considering the external environment, and influences before starting a project, and business (Rastogi and Trivendi, 2016).

Figure 1: Combination of Transformational Leadership and Strategic Management in Developing Employee's Skills



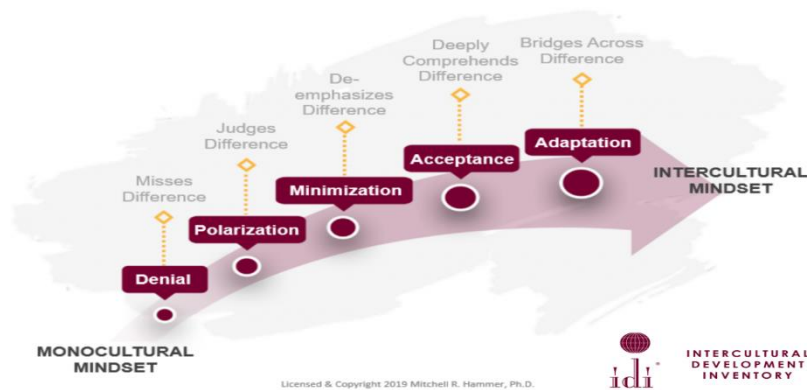
Source: own edition

According to our knowledge, strategic management could base on the Maslow theory of needs and the McGregor model as well. Maslow's hierarchy of needs is a theory in psychology introduced in his paper "A Theory of Human Motivation"(Maslow, 1943). Maslow's hierarchy of needs from the bottom to the top of the pyramid is including 5 needs: physiological needs, safety needs, belongings and love needs, esteem needs and finally self-actualization. According to Maslow's theory, one does not feel the second need until the demands of the first have been satisfied, and so on. Besides, McGregor (1960) provided two types of theories, which are named Theory X and Theory Y. McGregor (1960) believed that there are two types of managers and leaders who strongly applied Theory X or Theory Y in their organizations. For instance, Theory X describes the manager and leader who believes that employees are lazy and do not have a commitment to or responsibility for their duties in the organization. Consequently, managers believe that employees must be controlled and determined with penalties.

However, in Theory Y, the manager and leader trust that workers care about their duties and members have a commitment to and responsibility for their organization's performance. In our opinion, a combination of transformational leadership and strategic management can provide the necessary types of skills, and strategies for the employees in the multicultural organization. So, Figure 1 shows our assumption.

According to our knowledge, a combination of transformational leadership and strategic management could develop the Intercultural Development Continuum (IDC) which is determined a set of skills such as knowledge, attitude, and orientations toward cultural difference among the employees in multicultural organizations. This continuum is shaped from the developmental model of intercultural sensitivity which originally proposed by Milton Bennett (1998). Figure 2 is presented the various stages of this model.

Figure 2: Intercultural development continuum



Source: <https://idiinventory.com/generalinformation/the-intercultural-development-continuum-idc/10/7/2020>

- **Denial:** A denial mindset is determined by a person, who has limited capability for understanding the cultural differences in values, beliefs, emotional responses, attitudes, and behaviors. Individuals in this orientation are disinterested in other cultures and they are more active in avoidance of cultural difference.
- **Polarization:** This type of mindset that views cultural differences from an “us versus them” perspective. Polarization’s individual could take the form of defense such as my cultural practices are better than other cultural practices or reversal such as other cultures are better than my culture.
- **Minimization:** It is a transitional mindset between the more Mono-cultural orientations of Denial, Polarization and the more Intercultural or Global worldviews for acceptance and adaptation. Minimization highlights commonalities in both human Similarities such as basic needs and Universalism, such as global values which could provide a deeper understanding of cultural differences.
- **Acceptance:** This is an intercultural or global mindset. Individuals in acceptance orientation are recognized and appreciate patterns of other cultural difference and commonality in their own and other cultures as well. Also, individuals in acceptance orientation are more curious to learn how a cultural pattern of behavior makes sense within different cultural communities.
- **Adaptation:** This orientation consists of both cognitive frame-shifting (shifting one’s cultural perspective) and behavioral code-shifting (changing behavior in authentic and culturally appropriate ways).

Based on the discussion above, we believe that strategic management and transformational leadership provide the multicultural organization with a competitive edge, and both concepts are interlinked. Moreover, strategic management contributes towards developing a sustainable business that helps organizations to survive even during a tough situation. The influence of a transformational leader

affects organizational strategic management, and besides, it affects strategic decisions. Additionally, we believe that there is no success in management without leadership because it is impossible to achieve goals without effective leadership in multicultural organizations. According to Elkhdr (2019), “the experts of management and organizational development spend a lot of time for studying and understanding leadership because it is the single most effective management role”. A strategy manager is providing the guideline for assuring productivity and success in the multicultural organization. Consequently, we strongly believe that strategic management and leadership have a correlation relationship, which shows that both of them are parallel realities of an organization. Leaders cannot perform without good strategic decisions, and strategic management cannot be a success without helping transformational leadership in the multicultural organization.

5. Gardener attitude

Gardener attitude means to pay more attention, care, analysing, controlling plants, and the environment. It's not always simple ability and skill. A professional gardener spends all her /his time and energy for growth, and consistent habits he or she fosters growth in ways an ordinary gardener cannot. Making a masterwork is much harder, but it is worthy because of better results. Gardeners, leaderships, and strategic management have to get good at doing these things:

- **Breeding Method:** The strategic manager such as the gardeners is determined the best technology and method for planting.
- **Look for the Growth:** After sowing, watering, and considering the condition of the growing the seeds, gardener's wait for their plants to germinate and grow, similarly to the transformational leadership by providing a clear vision, and providing trust among the employees, he or she will be waiting for the employees' development.
- **Nurture in any Way Possible:** From the start, transformational leadership and the gardener has a similar objective: a seedling's growth –whether it is about a plant or a new employee, both of them have to be cared about, guided and improved properly to reach their best possible performance.
- **Plant Seeds:** Sometimes, a gardener plant different types of seeds around a highly-sought sapling to improve its growth by improving soil quality around it. Transformational leadership does the same: giving ideas, not commands to the employees for them to use, to incorporate their assessments inside their work and with this, giving them the feeling of empowerment and self-accomplishment.
- **Get Excited by the Progress:** Like a gardener getting excited by the growth and accumulation of his work, the strategic manager should show (in the proper way) the appreciation for the improvement of employees: positive mood and feedback will change the mind-set for the employees for the better.
- **Remove Impediments:** Like the gardener removing weeds from his garden, the strategic management removes obstacles from the employees' way of growth, making the best possible improvement available by providing a clear strategy. By carefully monitoring the growth process, the manager can clear out unnecessary or hurtful practices which would impede the employee's improvement.

In our opinion, a combination of transformational leadership and strategic management such as the role of the gardener in the garden can improve multicultural organizations performance.

6. Methodology and finding

In our research, we use both primary and secondary data. We used the questionnaire for collecting data because questionnaires are the best way for finding the assumptions, solutions, and possible answers to the topic of the research. We are selected randomly employees at Miskolc University as a multicultural organization, and we decided to investigate the effects of combination transformational leadership and strategic management for developing the employees' performance at

Miskolc University, Hungary. Unfortunately, COVID-19 didn't allow us to access more employees at university. So, we examined only 21 of the employees from different cultures. On the other hand, our sample size was not large enough, so, in this condition, only according to the per centation can be reported what results have been obtained based on the data observed in this study. Table 1 present the demographical result.

Table 1: Demographical characteristics of participants in this study

		N	N %
Gender	Female	12	57.1
	Male	9	42.9
Age	<=30	2	19
	>30	19	79
Degree	PhD	8	38.1
	Master	8	38.1
	Bachelor	3	14.3
	I prefer not to say	2	9.5
Marital status	Married	11	52.4
	Single	2	9.5
	In a long-term relationship	5	23.8
	Divorced	2	9.5
	I prefer not to say	1	4.8

Source: own edition

Demographical characteristic's result shows that the majority of the participants were female, over the ages of 30, and having a PhD, and Master's degree gave the most answer. Finally, the majority of employees who participated in our research were Hungarian, but we had Chicness, Iranian, and Iraqi as well. Table 2, is presented the impact of combination transformational leadership, and strategic management in the university.

Table 2: Impact of combination transformational leadership and strategic management

Transactional Leadership	Strongly Agree	Agree	Neither Disagree nor Agree	Disagree	Strongly Disagree
Management has already provided a clear strategy for the organization	9.5 %	28.6 %	23.8 %	38.1%	-----
Managers reacts to problems, if serious	14.3 %	52.4 %	19 %	9.5 %	4.8 %
Managers give rewards for innovation Ideas	14.3 %	33.3 %	38.1 %	9.5 %	4.8 %
L1: Talks about his/her most important values and beliefs	14.3 %	52.4 %	28.6 %	4.7 %	-----
L1: Specifies the importance of having a strong sense of purpose	9.5 %	57.1 %	33.4 %	-----	-----
L2: Talks optimistically about the future	19.1 %	61.9 %	9.5 %	9.5 %	-----
L3: Considers me as having different needs, abilities, and aspirations from others	19 %	47.6 %	28.6 %	4.8 %	-----
L4: Re-examines critical assumptions to question whether they are appropriate	14,3 %	61,9 %	9,5%	14,3%	-----

Sources: Rafols (2015), and own edition

L1: Idealized Influence

L2: Inspirational Motivation

L3: Individualized Consideration

L4: Intellectual Stimulation

According to table 2, we can observe that the combination of a transformational leader and strategic management at Miskolc University are providing intellectual challenges and methods for work

to their employees, and giving everything, they got to stimulate the thinking minds in the multicultural environment.

7. Discussion

According to Hatos (2006), globalisation, internationalisation and ever-emerging transnationalism have already changed the meaning of ‘specific culture’ to ‘culture general’ which is called ‘intercultural learning. Also, interpersonal and social communication skills are becoming a significant factor in cross-cultural adaptation. Therefore based on our outcomes, we believe that, as the gardener with specific knowledge about various conditions for growing different kinds of plants and flowers, and how to make them properly coexist together, transformational leadership and strategic management also make this by carefully considering different cultures and carefully selecting the teams by making the best possible synergy from their cultural strengths, making a clear plan, controlling and analysing them together could improve the overall performance by a high margin. Figures2 has presented our theory.

Figure 2: Different cultures in various outside conditions



Source: <https://www.fix.com/blog/steps-to-harden-seedlings>

According to Figure 2, different kind of plants growing from the ground. Here, the plants are representing different personalities, different individuals. The seed from where they grew out is their culture, upbringing and moral codes. The soil where they are growing from is originally their own, but by the process of replanting (starting to learn, work, live independently) they have to be accustomed to the changed environmental conditions. Like a flower replanted from a good quality soil to a rocky surface, the employee`s has to accommodate and acclimatize to be able to integrate into the multicultural organization. A combination of transformational leadership and the strategic manager could provide this environment for the employees in the organizations. Also, another part of Figure 2 shows the different weather conditions which affect the various plants and flowers. These conditions can be paraphrased into the business environment, as there are good, average, and, sadly, bad times. Every culture reacts differently to the changes of the outside. Like plants reacting differently in heavy rain, some of the cultures avoid hard times, some of them thrive in the bad weather. A leader with help of the manager could find a solution how, where and when to invest his energy, planting the right kind of plants (employees from different cultures) together regarding soil (inside conditions of an organization) and weather (outside conditions of the environment).

Figure 3: Performance of transformational leadership and strategic management as a gardener



Source: <https://www.gardeners.com/buy/gifts-for-gardeners>

Before it was mentioned that the leader's role and strategic management as a gardener are very important. Leadership studies show that without good leadership, organizations –as like weeded gardens are overrun by unwanted and harmful flora- are eventually doomed to fail. From the strategic management's perspective, the manager has gardening tools (strategy and financial means) to improve the condition of the plants (employees). They know how hard they can reach with their tools, how they can allow extra growth (reward) or prune bad branches (punish). This represents the gardener's logical side.

7. Conclusion

As we entered the 21st century, globalization became much more ordinary and prevalent in our lives. Every aspect of our life became influenced by the ever-changing, ever-growing multicultural industries and markets. Even in our workplaces, we face the same issues, meeting and cooperating with different types of colleagues from different cultures. Consequently, multicultural organizations always need good strategic management and skilful transformational leadership to be able to achieve their objectives in the global market. Both strategic management and transformational leadership are two different words having their meanings and are working together but it seems to different way and policy. Therefore, we can assume that our lives became like a lush, growing garden where every plant and flower and seed tries to find the way to fully grow into something bigger, better and more complex. In this situation, because of the shortage of space and land sustainability, the gardeners have to choose their parcel's capabilities and what to nurture and grow inside. That's why gardeners' role is paramount in this equation: they are key indicators of growth and implementers of pruning. They have to know the soil, the seed and the weather and combine this knowledge with their gardening skills to achieve what is best for them, the employee and the organization. Their success to grow their employees make ripples through their organization and hopefully, all around the world. Maybe this research is by far from all-encompassing, but we encourage other scholars to consider this idea when making their theory regarding transformational leadership and strategic management. Overall, we can say that the combination of them is the best solution for any organization which is multicultural: when the two doctrines synergize with each other (implementing the tools of a strategy of controlled measures and personal motivations), the best possible result for growth can be achieved. Like the gardener combining his tools and his work ethics to nurture his garden, a true leader will combine his techniques to achieve the best possible synergy and outcome in the organization under which he or she commands. Moreover, we have to consider that, our sample size was not large enough. Consequently, the largest sample size could modify our result. Finally, the findings of the present study carry significant limitations and suggestions which are relevant for future research. For instance, our outcomes are based on transformational leadership and strategic management, which limits the generalization of our results. Therefore, for receiving a better outcome, we will recommend the future researcher consider other types of management and leadership for their studies.

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E-STORE OWNERS' PERCEPTION OF CUSTOMER E-LOYALTY

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Abstract

Customer loyalty resonates in both academic and business communities already for decades. A turbulent growth of e-commerce market made no difference, quite contrary. The growth and specifics of the online environment also gave rise to the concept of e-loyalty. Many authors even consider it as one of critical aspects of a business growth. On the other hand, there are also authors questioning this kind of statements. For a better approximation of its real influence on businesses, it is important to find out how customer e-loyalty is perceived by business owners. Thus, the aim of this paper is to explore business owners' perception of customer e-loyalty. The research sample consists of Czech e-stores owners since e-loyalty in Czech market is authors' long-term research topic. To explore mentioned perception, the authors conducted a qualitative research using semi structured interviews developed on a previous literature review.

Keywords: customer loyalty, e-commerce, e-loyalty, SMEs, Quality research

JEL codes: M31

1. Introduction

Loyalty came to the attention of businessmen in the 1990's. (Lehtinen, 2007, p. 22). It has been associated with customer preferences of products and brands, and since the beginning of the millennium, loyalty has been associated with customer emotions. The decline in loyalty in recent years also contributes to this. Satisfied customer expectations are a prerequisite for repeating customer purchases and building loyalty, as well as recommendations to other acquaintances (Kotler, 2016). We also meet with the opinion that loyalty is "dead." As early as 1996, Reichheld and Teal (1996) began to address this idea. This was at a time when real US statistics pointed to corporate customer losses. Is that so? The authors believe that there is no clear answer to this yet. Companies should strive for their long-term growth and profits, and this is not possible without building customer loyalty, although in current practice in a highly competitive market, it is much more difficult.

Small and medium-sized enterprises have long been one of the stabilizing factors in all advanced economies. In her book, Straková (2020) states that today coronavirus pandemics small and medium-sized enterprises are experiencing one of the most difficult periods of their existence. This can be identified, because it has to face many restrictions on business from government measures around the world, not only in the Czech Republic. SMEs are the most vulnerable group in terms of their sustainability and further development. According to the author, small and medium-sized enterprises are among the most active in terms of creativity in business. Nevertheless, they are struggling with certain barriers concerning the acquisition of seed capital, access to innovation and technology. The current times and strong competitive environment limit their chances of success. On the other hand,

these conditions also bring new challenges in e-commerce market. Many purchases have moved to the online environment. Companies and customers were forced to look for new distribution channels. The flexibility of SMEs is well known, as they can adapt to changing conditions. They find it easier to find gaps in the market and have a closer relationship with their customers, which can be beneficial for building longer-term relationships and loyalty, respectively e-loyalty. There is the possibility of almost personal contact with customers.

The aim of this paper is to examine how e-shop owners perceive e-loyalty. The starting point is a brief theoretical search of professional literature and scientific studies on the researched issues. The subject of the research is customer e-loyalty and the object of the research are the owners of Czech e-shops in the category of SMEs operating on the B2C market. To meet the goal, a qualitative research was carried out through semi-structured interviews, which were prepared on the basis of a previous review of the literature. The research will be considered as a preliminary research of follow-up quantitative research. The main research question was formulated: "How do e-shop owners on the Czech market perceive customer e-loyalty?".

2. Literature review

A brief theoretical discussion will focus on the broader context of loyalty and then on the specifics of e-loyalty. According to Blechař (2015), building customer loyalty is conditioned by the continuous satisfaction of needs, although some authors question this idea (Storbacka and Lehtinen, 2002). The customer repeats his purchases from the company and recommends them in his surroundings. His relationship with the company is lengthening. Loyalty is often associated with the length of relationships, which is the goal of managed relationships with customers (Kvíčala, Starzyczná, 2020). Researchers in the Czech Republic and around the world are dealing with this issue. The definitions of loyalty are often very similar.

The latest definitions expand the concept of loyalty and include other aspects in it, such as its importance as an intangible asset of the company (Keller, 2013), or a competitive advantage according to Kotler (2016). Roberts (2019) sees loyalty as an indicator that a company is doing a good job. It offers good products in a good time, in a good place, which are the basic characteristics of the company's marketing orientation.

Various views on loyalty can be found in the literature. Experts who deal with this issue distinguish between different components of loyalty or even its phases. One-dimensional constructs of loyalty and multidimensional appear (Vébrová, 2016). The most common is the two-dimensional model of loyalty, which is also referred to as the traditional model of loyalty. The mentioned model includes behavioural and attitudinal loyalty. Behavioural loyalty is reflected, among other things, in repeated customer purchases. Thus, the frequency of purchases is evaluated, which according to Esmailpour (2015) does not give a comprehensive view of loyalty to the brand or company. Attitude loyalty is assessed according to the level of relationships and emotional ties that the customer has to the company or to the brand (Oliver, 1999). Buttle and Maklan (2015) are of the opinion that attitude loyalty depends on the customer's feelings, which are evoked by his perception and the strength of his purchasing intention, respectively motivation. Customer attitudes influence customer purchase behaviour (Kumar and Reinartz, 2006). Multidimensional models of loyalty are created by dividing attitudinal loyalty into other components, namely the cognitive and emotional (affective) components (Worthington et al, 2009). Alternatively, further fragmentation of the individual components occurs.

Many authors also address other factors that affect customer loyalty to the brand and the business. The most frequently mentioned are customer satisfaction, brand experience, quality of services, image and brand awareness or trust. The influence of costs on brand change is also assessed (Vébrová, 2016). Why is this change happening at all? Storbacka and Lehtinen (2002) believe that satisfaction may not be a necessary condition of loyalty, as we have stated before. The reason may be, for example, the price, the competition coming with a new offer on the market. But the reason can be quite elementary. The customer may need a change in his life. Even a dissatisfied customer sometimes persists in the company, because he has no hope that he would get better value elsewhere, or that he would incur inadequate switching costs.

The reason for examining e-loyalty is the huge increase in e-commerce, which is supported by the development of new technologies. This development brings new opportunities to entrepreneurs and

has an impact on changes in customers' shopping behaviour. This development is also aided by the current pandemic situation, which has brought many human activities, including trade, into the online environment.

It was mentioned in the introduction to the article that some experts are of the opinion that loyalty and e-loyalty are dead. Reichheld believes that this is not the case. Reichheld (2001) formulated certain rules of loyalty based on case studies that showed the consequences of building or ignoring loyalty. Businesses that focus their activities on finding and retaining good customers, productive employees and supportive investors continue to achieve excellent results.

Roberts (2019) sees the future of e-loyalty in building an emotional bond with the customer, which concerns strengthening attitudinal e-loyalty. The agenda of the day is e-commerce, which can provide the customer with many benefits. The customer shops in the comfort of home, can save a lot of time and does not have to travel at all. Especially in today's pandemic times, the importance of online shopping is growing. The customer can compare goods from different manufacturers and traders. Companies operating through e-shops can respond more flexibly to demand and change business conditions regarding prices, distribution and communication (Zamazalová, 2008).

E-commerce and digital marketing is a hallmark of Marketing 4.0 (Kotler et al., 2016). The pandemic situation has further accelerated the process of digitizing sales and services. SMEs are gaining new approaches to the market, not only in local conditions but also in national and international environments (Czech Invest, 2016).

Our research is focused on customer e-loyalty. How does customer loyalty manifest itself in the online environment? How it influences businesses? What are the signs of e-loyalty and how it could be build? This is the subject of our research. According to Lear and Lin (2003), loyalty in e-commerce is similar to loyalty in an offline environment and is based on the same principles. However, customer behaviour is different. Customers in the online environment, in addition to the benefits of e-commerce, which we have already mentioned above, can easily switch from one seller to another, essentially worldwide. Barriers to the transition to competition are relatively small. What will keep the customer with the company? Price sensitivity or sellers' credibility often play a role (Alba et al, 1997; Reichheld and Scheffer, 2000).

The concept of e-loyalty originated from a specific influence that changes the traditional sales environment. A number of authors already dealt with e-loyalty. However, not everyone had a clear definition (Toufaily et al, 2013). As with loyalty in traditional sales, the definitions have been constantly evolving and expanding with new aspects. The development went from behavioural e-loyalty to attitudinal e-loyalty and gave rise to the so-called integrated approach, which takes into account combinations of both approaches. However, the differences with loyalty in the offline environment are not large. Many definitions deal with repeat purchase behaviour, which is characteristic of behavioural loyalty (Gefen, 2002; Srinivasan et al, 2003; Flavian et al, 2006). Attitudinal loyalty appears in definitions that also affect the emotional and psychological component of customer behaviour (Liang et al, 2008; Toufaily et al, 2013).

There are many factors that affect e-loyalty. Some of the factors are the same as the factors for loyalty in the offline environment. These are, for example, the cost of changing the seller, customer characteristics, availability of information, etc. Different factors are mainly those associated with the environment and place of purchase, ie the Internet and e-shop, such as e-shop design, online shopping experience or user friendliness of the e-shop. In the offline environment, it is the shopping atmosphere of the store. Regarding the influence of individual factors on building e-loyalty, the greatest importance is given to customer satisfaction and trust in the seller (Bhattacharjee, 2001, Chiou, 2004, Harris and Goode, 2004, Flavian et al., 2006, Valvi and Fragkos, 2012). To what extent do e-shop owners perceive these facts? Do they evaluate customer information? Reichheld (2001) considers it very important to monitor and evaluate customer loyalty. Its monitoring serves to predict the company's financial results. Analyzes help identify the customer base and contribute to building the customer portfolio for the future. It can be assumed that e-commerce, thanks to the evaluation of transaction data (repeat purchases, average orders, conversion rate, etc.), could be at a certain advantage over standard stores, as this valuable data may still be available. Based on this analysis, it is then possible to plan appropriate marketing and sales activities with regard to the target groups of customers and their needs in order to maintain them and strengthen the motivation to buy again. In an e-commerce environment, customers only need one click to leave the e-shop or switch to another reseller, which creates a strong need to build

e-loyalty in order to reduce the likelihood of these phenomena and increase the likelihood of repeat purchases and other positive e-loyalty. Do companies ask themselves how to work with customer retention?

Despite a number of existing literature dealing with customer loyalty and e-loyalty, it is not completely clear what is the perception and knowledge of e-loyalty among B2C e-shop owners in the Czech Republic. One of the last studies devoted to this issue was carried out by PriceWise in 2020. The owners of e-shops in the Czech Republic from various areas of business were addressed. The study provided a lot of valuable information, but did not address loyalty comprehensively, whether from the point of view of behavioral loyalty or attitude (Fáborský, 2020).

3. Methods

The aim of the study is to examine the perception of e-loyalty among e-shops owners. Thus, this is an exploratory study, which serves to better understanding of the problematics, the effects influencing this problematic, to identify alternative solutions and also to establish hypotheses for causal type of research (Kozel et al., 2011). For the nature of the study, it is appropriate to use qualitative research in the form of non-standardized semi-structured interviews (Saunders et al., 2019). The research has the character of preliminary research, which will enable better orientation in the researched problematic. The research is not representative. As already mentioned, the subject of the research is the customer e-loyalty on the Czech B2C e-commerce market. The object of the research is the B2C e-shops owners.

3.1 Characteristics of the respondent sample

The sample size was not mathematically expressed in advance with regard to the nature of the research (pre-research) and the number of respondents was influenced by the time possibilities and the willingness of the e-shop owners to provide an interview. A total number of 30 respondents were contacted. In the end, only 10 respondents took part in the research. The interviews were conducted in the form of video and phone calls. Respondents were contacted in advance and acquainted with the purpose of the interview and were given topics so that they could at least partially prepare and not to be surprised by the questions. All respondents also agreed to the recording of an audio recording. In order to protect the respondents' personal information and data, the respondents will be listed under serial number 1-10.

The respondents were owners, operators or managers of e-shops. From the offered product category point of view, it had the largest share of clothing (6/10). There was also an e-shop selling office or handyman supplies and one of the e-shops sells a sports training program in the form of audio-visual materials. By the number of employees, all e-shops belong to the category of small and medium-sized enterprises. The duration of operation on the e-commerce market ranged from 1.5 to 6 years. Some e-shops (4/10) also have their own brick and mortar shop, but only turnovers from e-shops (average annual), which ranged from CZK 200,000 to 20 million per year, were taken into account in the research. One of the data obtained was also education in the field of marketing, as according to the authors' assumption, education can affect the level of knowledge in the field of customer e-loyalty. 3 out of 10 respondents have such an education. The last characteristic is the e-shop solution, i.e. the platform on which the e-shop works. The characteristic features of the respondents can be seen in Table 1.

Table 1 Characteristics of the respondent sample

Respondent	Product category	Number of employees	Duration of operation (years)	Average annual revenue (mil., CZK)	Brick and mortar store	Marketing education	E-shop solution
1	Fashion	5	4	5	No	No	Shoptet
2	Sport - training	2	2	0,2	No	No	Shoptet
3	Office goods	4	4	4	No	Yes	Shoptet
4	Fashion	12	2	2	Yes	No	Shoptet
5	Building	5	1,5	1,2	No	Yes	Rocketoo
6	Fashion	6	6	15	Yes	No	Shoptet
7	Fashion	15	5	8	Yes	No	Own
8	Fashion	11	4	6	Yes	No	Own
9	Building	5	2	1,3	No	Yes	Up gates
10	Sport/fashion	2	3	3	No	No	Shoptet

Source: own processing

During the research, it was found that 6/10 e-shops operate on the same platform (Shoptet). The authors therefore added this information to the characteristics of the respondents. A common feature of respondents' e-shop solutions is the fact that they all automatically monitor and collect data on customer behaviour without the need for any intervention or setup. Nevertheless, during the interviews it turned out that the respondents do not work sufficiently with the data and their answers were based mainly on their own perception and are not supported by real data, which caused the limitations mentioned in the final part of the article.

3.2 Questions specification

As already mentioned, the main research question was formulated: "How do e-shop owners on the Czech market perceive customer e-loyalty?". To evaluate this main research question, groups (batteries) of questions were formulated focused on:

- questions focused on relationship with customers and customer base,
- questions focused on customer e-loyalty,
- questions related to determinants customer e-loyalty and it's building.

The authors identified a set of open-ended questions that were further developed in interviews with respondents in order to obtain the necessary information to ensure that the perception of e-loyalty was explored. The questions were formulated on the basis of a literature review and also bases on a working paper (Kvíčala, Starzyczná, 2020) prepared by the authors within the ongoing project. The aim of the interviews was also to clarify the extent to which individual e-shops register e-loyal behaviour, what business results such a behaviour generates, what activities they undertake to build e-loyalty and what makes them realize such activities. Or eventually why these activities are not undertaken. Obtaining this information also clarified the level of knowledge of respondents in the field of customer loyalty and e-loyalty. During the research, the contribution of some questions was found to be insignificant for the purposes of the study and was therefore eventually excluded, some questions were modified and several questions were added on the basis of interim findings. The resulting battery of questions can be seen in Table 2.

Table 2 Battery of the questions

A) Identification and general questions
1. How long have you been running the e-shop?
2. What goods do you sell?
3. How many people are involved in the operation?
4. What average annual turnovers do you achieve?
5. Do you also have a brick and mortar store?
6. Do you have a marketing education?
7. How do you gain knowledge in the field of marketing?
B) Questions focused on relationship with customers and customer base
8. How do you build relationship with customers?
9. How do you distinguish between new and returning customers?
10. How do you distinguish between customer acquisition and retention?
C) Questions focused on customer e-loyalty.
11. How do you perceive customer e-loyalty?
12. How do you think customer e-loyalty expresses?
13. To which extent do you register such a behaviour among your customers?
D) Questions related to determinants customer e-loyalty and it's building.
14. What factors do you think influence customers e-loyalty?
15. How do you think customer e-loyalty is built?
16. What are the actions and results of the customer e-loyalty building?
17. To which extent are the products you offer unique?

Source: own processing

The answers to the questions in section A) are part of the Table 1. The answers to question No. 8 were almost identical for all respondents, except for respondents with marketing education, they all draw knowledge from available online and offline sources such as articles, books, podcasts, conferences, meetings with other e-shop operators, marketing service providers and consultants etc. None of the respondents draws knowledge from academic articles and studies.

4. Results

For better clarity and orientation in the results, the respondents' answers were concentrated in Tables 3, 4 and 5 based on the intersection of the answers. The tables thus contain the key information needed for the purpose of the study.

4.1 Relationship with customers and customer base

The first group of questions (see Table 3) provides us with the following information. Most respondents (8) build relationships with customers by trying to maximize customer satisfaction. The main emphasis is on emotions and service. When asked whether companies distinguish between new and returning customers, most respondents (6) answered in the negative. The reason was ignorance of how to do it, or minimal retention, or they saw no benefit in it. For a customer acquisition or retention question, the proportions of answers were more scattered. Most respondents (6) admitted that all campaigns are acquisitions, due to ignorance of retention campaigns. The same number of respondents confirmed that the main goal is acquisition campaigns, they organize retention minimally.

Table 3 Questions and intersection of answers focused on building relationships with customers and the customer base

Number of respondents	8. How do you build relationship with customers?
8	We strive to maximize customer satisfaction, this is key. What they emphasize: we emphasize emotions. (1), on quality of service (1), quality of service and emotions (6).
1	We base the relationship on trust, we educate customers before and after the purchase.
1	We try to create a community, we see business potential in it, we want to be friends with them.
	9. How do you distinguish between new and returning customers?
6	Most respondents do not distinguish between new and returning customers. Reasons: do not know how to do it (2), do not see the benefit in it (2), retention is minimal (2).
4	Those who distinguish between new and returning customers: carry out targeted retention campaigns (3), provide discounts to returnees (1).
	10. How do you distinguish between customer acquisition and retention?
3	All campaigns are acquisitions. Reasons: ignorance of effective implementation of retention campaigns.
3	The main goal of the campaigns is acquisition, retention only to a minimal extent.
2	Concentration on acquisition, retention campaigns have poor results.
1	One respondent confirms a 70:30 acquisition ratio to ensure growth in the customer base.
1	One respondent only confirms acquisition campaigns and the current registration of returning customers.

Source: own processing

Addressed respondents focus primarily on customer acquisition, mainly due to lack of knowledge for the implementation of retention campaigns and low business potential.

4.2 E-loyalty, its perception and consequences

The second group of questions was devoted to the perception of loyalty and its consequences (Table 4). Half of the respondents perceive loyalty as a very important factor (5). However, they do not know the real impact of sales results on e-loyalty, or consider them negligible. Only one respondent sees positives in the possibility of influencing other potential customers. To the question how do you think customer e-loyalty expresses, we got a clear answer. All respondents (10) perceive e-loyalty as repeat shopping. Some respondents associate these purchases with references, recommendations or a positive relationship with the brand. When asked whether respondents monitor loyalty in their e-shops, most respondents (6) answered in the affirmative. But he can't measure it. Only two respondents informed that about half of customers shop repeatedly. One stated that a substantial proportion of customers are loyal and another said that retention is minimal.

Table 4 E-loyalty, its perception and consequences

Number of respondents	11. How do you perceive customer e-loyalty?
5	Most respondents perceive e-loyalty as very important factor. However, they do not know the real impact or their customers' level of e-loyalty (2). Some cannot work with e-loyalty (1). However, they consider its results to be negligible (1). Only one respondent sees its positive impact, because it brings new customers through recommendations.
3	These respondents perceive e-loyalty as a key factor, generating a substantial portion of revenue (2). One respondent perceives it just at a guess because he does not know the real results (1)
2	These respondents see building e-loyalty as their priority, but they cannot quantify the real results.
	12. How do you think customer e-loyalty expresses?
10	All respondents perceive expressions of e-loyalty as repeat purchase behaviour. Specific consequences: purchases only (1), repeat purchases and references (3), repeat purchases and e-shop visits (2), repeat purchases, e-shop visits and references (1), references, advocacy and brand love (1), repeat purchases and first choice when purchasing (1), repeat purchases and referrals to friends (1).
	13. To which extent do you register such a behaviour among your customers?
6	Respondents follow expressions of e-loyalty. However, they do not know real numbers, they perceive it at a guess, they do not know how to measure it.
2	About half of customers buy again
1	A substantial part of customers is loyal
1	Retention is minimal, not according to the company's expectations

Source: own processing

4.3 Determinants of e-loyalty and its building

The following Table 5 summarizes the questions and the intersection of the answers dealing with the determinants of e-loyalty and its building. When asked which factors affect e-loyalty, almost all respondents agreed that it is customer satisfaction. They combined this satisfaction with products, trust, speed of delivery, quality of service and problem solving. Only one respondent combined satisfaction with multiple determinants of e-loyalty. Almost half of respondents (4) condition loyalty building by satisfying customer wishes. Two respondents did not say anything specific and the rest pointed to either a loyalty program or the best possible product. The question focused on support actions and the results of building e-loyalty did not turn out well. Most respondents (6) have no system or rules for building e-loyalty, no events or no relevant results. Other respondents already rely on feelings and do not know how to deal with it. There was also a mention of emotions. Most respondents (6) do not offer unique products.

Table 5 E-loyalty, its perception and consequences

Number of respondents	14. What factors do you think influence customers e-loyalty?
8	Most respondents associate e-loyalty with customer satisfaction. It is complemented by trust (1), products (2), speed of delivery (3). Three respondents also mention emotions and two communications with customers. One respondent points to the quality of services and problem solving. However, only one respondent reported multiple determinants of e-loyalty.
1	One respondent stated the speed of delivery and customer service.
1	One respondent mentioned the attractiveness of the products.
	15. How do you think customer e-loyalty is built?
6	Respondents always try to satisfy the customer (6). In addition: it caters to him (1), maximizes service quality and customer service. (2)
1	E-Loyalty programs.
1	Delivering the best possible product
2	Two respondents did not think of anything specific.
	16. What are the actions and results of the customer e-loyalty building?
6	Most respondents cannot express any specific actions or results.
1	Rather at a guess, they do not know the real results.
1	Relies on feelings and guess it brings results.
1	With the help of customer service, the results cannot be measured.
1	Do not know how to build it.
	17. To which extent are the products you offer unique?
6	Not at all.
4	100 %

Source: own processing

Now let's move on to the discussion part of the article.

5. Discussion

5.1 Relationship with customers and customer base

We will first take a look at questions focused on building relationships with customers and the customer base. As shown in table 3 most respondents did not answer the question of building customer relationships clearly. They stated they are trying to maximize customer satisfaction in general. They probably consider this to be the basic pillar of building relationships, although some experts dealing with this issue do not have a clear opinion on it. Research confirms the positive relationship between e-satisfaction and e-loyalty. (Ahmad et al., 2017; Jeon and Jeong, 2017). At the same time, it is necessary to take into account the findings of the authors who state that due to customer heterogeneity, the relationship between satisfaction and e-loyalty may vary from customer to customer (Fang, Shao, and Wen, 2016). According to many authors, satisfaction is essential for building e-loyalty (Toufaily et al., 2013), but focusing purely on satisfaction is insufficient (Faraoni et al., 2019). E-shop owners need to go deeper and understand the deeper context. E-loyalty of customers is beginning to be built in the pre-purchase phase, where the quality of services and customer expectations play a key role (Toufaily et al., 2013). In order to effectively build e-loyalty, e-shop owners must begin to consider how to work with customer expectations, how they can affect them and how to guarantee a quality of service that will lead to customer satisfaction. The difference between customer expectations and the perceived quality of services leads to customer satisfaction and dissatisfaction, which affects their e-loyalty (Valvi and Fragkos, 2012, Rust et al., 2018 Prasetya, 2021). It ought to be mentioned that some studies show that even satisfied customers are leaving the company (Hope and Player, 2012). Most of them emphasize the quality of services and emotions, which is a positive phenomenon. Thus, they perceive not only the product offer, but the entire sales and service process, which is associated with relationship marketing (Kotler, Kartajaya and Setiawan, 2016). The emphasis on the emotional side of sales is also based on current studies, which emphasize the creation of an emotional bond with the customer, which is

characteristic of attitudinal e-loyalty, as already mentioned in the theoretical part (Liang et al, 2008; Toufaily et al., 2013). Most respondents do not distinguish between new and returning customers. They either do not know how to do it or do not consider it beneficial. It can be assumed that the majority of respondents do not even segment customers and target their needs. This can negatively affect the success of the e-shop in the long run, because their marketing activities obviously do not include systematic segmentation, targeting and positioning, which would lead to the separation of acquisition and retention campaigns. At the same time, studies prove that building relationships with customers leading to e-loyalty must be based on the strategic setting of data-based acquisition and retention campaigns (Tripathi, 2014). If this is not the case, there is a risk that all marketing activities will be ineffective and even targeted customer relationship building, for example through loyalty programs, may not lead to a real increase in e-loyalty and may ultimately be loss-making. (Reinartz, Kumar, 2002, Hope and Player, 2012, Tripathi, 2014). Knowledge of new and returning customers and customer base can be considered essential for assessing and evaluating customer e-loyalty. The authors of the study by PriceWise, which deals with e-shops in the Czech Republic, were also surprised that a significant part of the respondents admitted that they did not know why customers returned to them. 12% did not know it at all and 47% knew it based on feelings. 20% confirmed that they knew based on data analysis. However, only 21% of respondents mentioned a serious approach based on regular data analysis and customer research (Fáborský, 2020). Knowing the customer requires regularity in research. As we found out in our research, most respondents implement acquisition campaigns, either due to ignorance of effective retention campaigns or implement them, but minimally. This problem is also associated with acquisition costs per customer. A PriceWise study confirms that over 60% of their respondents focus on acquisition campaigns. The question arises as to whether retention campaigns pay off at all. Of course, yes, a company that does not pay retention pays for returning customers over and over again. Interestingly, large companies operating in e-commerce pay much more attention to retention. In total, it was 42% compared to 33% of SMEs. In our sample, it was mostly micro and small enterprises (Fáborský, 2020).

5.2 E-loyalty, its perception and consequences

The intersection of responses focused on e-loyalty, its perception and consequences is presented in Table 4. Most respondents perceive e-loyalty as very important, which corresponds to the views of authors who consider loyalty / e-loyalty as a key factor for company success (Reichheld, 2000; Day, 2000; Srinivasan et al, 2002; Zeithaml et al, 2002; Yen, 2007; Valvi and Fragkos, 2012; Toufaily et al, 2013; Rust et al, 2018). All respondents associate e-loyal behaviour with repeated purchases on the e-shop, some also made recommendations to other people, a preference against competitive offers and an emotional relationship with the brand. The authors of academic studies report a number of other consequences of e-loyal behaviour, such as decreased price sensitivity (Reinartz and Kumar, 2002), willingness to spend more money (Srinivasan, et al., 2002), increased tolerance to problems (Rust et al., 2018), or even customer support substitution (Goode and Harris, 2004). An interesting finding is the fact that most respondents cannot reliably measure customer behaviour despite the fact that their e-shops automatically collect such data and provide an overview directly in the e-shop administration. As a result, majority of respondents do not know the real consequences of their customers' e-loyalty. This fact significantly reduces the likelihood that the marketing activities of e-shops will be effective, as data is the key to the correct evaluation of the situation and the making of strategic decisions (Rust et al., 2018). It follows that if e-shops do not conduct their activities on the basis of data, which they do not according to research results, their chances of long-term and consistent profitability are significantly reduced (Hope and Player, 2012, Fang, 2016). The results show that e-shops do not know the real consequences of e-loyalty and therefore cannot quantify the impact on the business results of the e-shop. The question is how they would behave if they better understood the issue of e-loyalty and knew its real impact on the e-shop. Expert studies have yielded a number of possible benefits of e-loyalty, which are listed above, but at the same time there is evidence that building e-loyalty may have no or may even have a negative effect on profitability if not supported by data (Meyer-Waarden and Benavent , 2005, Sharp et al., 2017). However, respondents do not know these, as they do not work sufficiently with the data and do not have sufficient knowledge of the issue, which is one of the key findings of the research.

5.3 Determinants of e-loyalty and its building

Regarding the factors influencing e-loyalty, the majority of respondents mentioned customer satisfaction, which is also considered by a number of authors (Bhattacharjee, 2001; Chiou, 2004; Harris and Goode, 2004; Flavian et al, 2006; Valvi and Fragkos, 2012) factor. To a lesser extent, factors such as emotions or service quality have also been mentioned, which according to some authors (Reichheld, 2000; Zeithaml et al, 2002; Li et al, 2015; Kaya et al, 2019) includes problem solving, speed of delivery or communication. with customers. According to some respondents, satisfaction is also a determinant of building e-loyalty. The e-loyalty program was also mentioned during the interviews. None of the respondents in their company has a systematic approach towards building customer e-loyalty, and if they perform certain activities, they describe them more as random or based on their own perception. With this approach, there is very little chance of building e-loyalty in the long term effectively and successfully, as this requires a comprehensive system and a clear plan (Reichheld, 2000; Srinivasan et al, 2002; Abu-Alhaija et al, 2018; Prasetya, 2021). A common feature is the perception of customer relations and e-loyalty as important factors for the success of the e-shop, and nevertheless none of the respondents reliably knows real influence and consequences of e-loyalty behaviour and does not systematically try to build e-loyalty, mostly because they do not know how. Scientific studies offer frameworks for building e-loyalty, including its antecedents, determinants and consequences, and their relationships. These could be useful for e-shops and at least help e-shops to better understand e-loyalty issues (Valvi and Fragkos, 2012, Toufaily, 2013, Kaya et al., 2019).

The authors' attention was drawn to the relationship between product availability in the competing e-shops and perceived e-loyalty, where all respondents who sell products that are not available at the competition at least at a guess register e-loyalty behaviour. However, it must be added that this phenomenon is not supported by any reliable data. This relationship has already been the subject of studies (Hawkes, 1994; Suhartanto et al, 2018; Hsu et al, 2018), which confirmed a direct positive correlation, however, none of these studies worked with data from the e-commerce market.

6. Conclusion

The aim of the article was to examine the perception of e-loyalty by e-shop owners operating on the Czech B2C market. E-shops operated by selected respondents showed similar average annual turnovers, with the exception of two e-shops, all e-shops were built on so-called box solutions and most of them on the most widespread Czech platform Shoptet. The majority of e-shops operate in the fashion industry and sell clothing. Most respondents have no marketing education and all draw on information from similar types of sources, but no one draws on scientific studies. It can therefore be assumed that the absence of education, lack of knowledge and entrepreneurial activities based on information from unverified sources can cause these reserves in building relationships with customers and developing an e-shop in general.

When asked whether they are building relationships with customers, respondents did not answer unequivocally. Eight out of ten emphasized maximizing customer satisfaction. However, there are opinions that satisfaction is not absolutely decisive in building long-term relationships and e-loyalty. Surprisingly, although most have customer data based on the type of their e-shop solution, they do not distinguish between new and returning customers. They do not use the potential of the e-shop solution. A common feature is the perception of customer loyalty and e-customer loyalty as one of the key factors of success, despite the fact that they do not know reliably both theory of the problematic and its real impact on business results. This creates a significant gap between existing theory and real practice, which can be an obstacle to the successful building of e-loyalty and the use of its potential.

One of the key findings is the fact that e-shops that offer a product that cannot be bought from competing e-shops show an increased rate of customer retention. It should be added that this is not proved by reliable data, but it is rather an estimation. However, this finding creates a space for exploring the relationship between uniqueness of the product and e-loyalty. Thus, a possible hypothesis or assumption is: "E-shops offering unique and otherwise unavailable products register a higher retention rate than e-shops offering products available in multiple e-shops." Several studies have already shown that the uniqueness of the product has a positive effect on increasing the level of attitude and behavioural loyalty / e-loyalty (Halim, 2006, Hsu et al., 2018, Su and Chang, 2018), but so far, such a study has not

been conducted in the Czech B2C e-commerce environment. To confirm or refute this hypothesis, it will be necessary to conduct quantitative research including data on customer purchase behaviour in Czech B2C e-commerce. Other hypotheses and assumptions may relate to the respondents' knowledge or perception of e-loyalty, as well as the use of e-shop platforms, etc. Subsequent research could continue in this direction.

The following managerial implications emerged from the research. Owners or operators of e-shops should continuously acquire new knowledge in the field of e-loyalty from proven sources such as scientific studies and professional literature and use this when planning marketing activities. One of the key implications is working with data. E-shops should systematically collect and evaluate customer data to obtain input for relevant performance evaluation and strategic decision making. E-shop platforms used by respondents collect such data by default, which creates the potential for better work with data without the need for technical interventions. In order to ensure the highest possible effectiveness of marketing activities, e-loyalty should be systematically built from the stage when the customer sets expectations, adequate quality of services should be ensured, which in turn leads to increased customer satisfaction and according to available literature leads to e-loyalty. E-shops should also better segment customers in order to be able to respond to customer needs and their relationship to the e-shop, which should at least lead to a distinction between new and existing customers and subsequently to a differentiation of acquisition and retention campaigns. The research found significant gaps in the knowledge of e-loyalty and data analysis among all respondents. If the e-shop is able to eliminate these, it can gain a significant competitive advantage.

The limitations of the research include the size of the sample of respondents, which is not representative, as it was a preliminary research. Another limitation is the category of products offered by e-shops, where most of the respondents fall into the category of fashion / sport and all of them also belong into micro and small companies according to the number of employees. Perhaps the most fundamental limitation is the fact that respondents responded on the basis of their own perception, which may be skewed by insufficient knowledge of real data, for greater informative value of research results, it will be crucial to include hard data. A literature review also revealed a lack of scientific literature focused on e-loyalty in Czech e-commerce, which motivates authors to further explore this issue and creates the potential for the discovery of new knowledge.

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BARRIERS TO ECO-INNOVATION: EMPIRICAL EVIDENCE FROM SLOVAK SMES

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Abstract

Eco-innovation and green technologies are key to Europe's future and they are at the heart of the EU policies. To step towards the sustainable economic growth, there is a need for much more eco-innovations to appear in SMEs. To make eco-innovation successful for a firm, it is necessary to identify the main obstacles and constraints that hinder their adoption. The aim of the paper is to assess the SME's involvement in eco-innovation activities in Slovakia and to identify the main barriers (obstacles, constraints) that Slovak SMEs perceive with regard to undertaking eco-innovations. Based on the research results formulated will be the implications for SMEs managers and policy makers in Slovakia to overcome the barriers concerned with SME's involvement in eco-innovations. Data used to identify the main barriers to eco-innovation come from the survey commissioned by the European Commission (Euro Flash Barometer 456 – SME, resource efficiency and green markets, 2018). Other sources of secondary data represent the official documents and reports of the Slovak Business Agency and Ministry of Environment of the SR. The methods used in the paper are the method of casual analysis, deduction, abstraction, comparison as well as synthesis.

Keywords: barriers to eco-innovation, eco-innovation, small and medium enterprises, Slovak Republic
JEL codes: O31, Q01, Q56

1. Introduction

Europe's economic growth over many decades has been fueled by the intensive use of resources. However, today it faces multiple challenges of stimulating the growth needed to provide jobs and well-being to its citizens, while ensuring that this growth is economically and ecologically sustainable. There is a growing challenge of resource scarcity, growing prices for materials and dependence of the European economy on imported resources. Energy use, water scarcity, land shortages, the depletion of materials and the management of waste are among the most discussed issues posing sustainability challenges (Šebestová and Sroka, 2020).

The Eco-Innovation Action Plan launched by the European Commission in December 2011, is a significant step forward for eco-innovation moving the EU beyond green technologies and fostering a comprehensive range of eco-innovative processes, products and services. Eco-innovation Action Plan efforts have been strengthened by the Green Action Plan for SMEs. The European Union "Green Action Plan for SMEs" introduced in 2014 brings together two important priorities for the European economy: supporting SMEs and promoting resource efficiency. The European Commission set the overall goal of "enabling SMEs to turn environmental challenges into business opportunities" (Green Action Plan for SMEs, 2014).

SMEs provide a special context for the study of eco-innovation due to their characteristics. Many of SME's characteristics relate to their size and comparative lack of resources, funding, personnel expertise, and financial stability compared to larger companies. Apart from disadvantages they present the advantages of flexibility and fast decision making. SMEs differ radically in terms of how open and able they are to engage in eco-innovation (Ghisetti et al., 2015).

Barriers to eco-innovation emerge as a critical factor to SME's engagement in eco-innovation. Barriers are obstacles or constraints that negatively affect the efforts of a firm towards eco-innovation. A simple classification of barriers distinguishes them as external to the firm or internal. It is recognized that barriers differ by country, sector and even region (Marin et al., 2015). Several barriers are similar to conventional innovation, while there are some additional ones which are specific to eco-innovation.

A number of actions – both “hard” (i.e. financial) and “soft” (i.e. non-financial) – could help SMEs in overcoming the barriers they face and help them to make the most of the innovation opportunities afforded to them by the transition to a green economy (European Commission, 2020).

The aim of the paper is to assess the SME's involvement in eco-innovation activities in Slovakia and to identify the main barriers the SMEs encountered with regard to undertaking eco-innovations. Based on the research results formulated will be the main implications for SMEs managers and policy makers to overcome the barriers.

2. Theoretical background

The inclusion of environmental aspects into the discussion of innovation leads to the comparably new area of environmental, green or eco-innovation. Schiederling et al. (2012) found that the first expression – environmental innovation – was favored in the 1990s, while the latter two notions were increasingly used within the last 5 years. Furthermore, the authors compared different scientific definitions that were suggested as a terminological basis for research area. In the following, several definitions are briefly summarized to illustrate the terminological variety.

Fussler and James (1996) define eco-innovation as “new products and processes which provide customer and business value but significantly decrease environmental impacts”. Hillebrand and Driessen (2002) state that green innovation “does not have to be developed with the goal of reducing the environmental burden” but it “does however, yield significant environmental benefits”. Rennings (2000) perceives eco-innovations as new approaches that help reduce environmental burdens or achieve ecological targets and differentiate between technological, organizational, social and institutional ones.

Arundel and Kemp (2009) emphasize that eco-innovation “can be motivated by economic or environmental considerations”. Including the economic perspective, Ekins (2010) considers an eco-innovation as being both economically and environmentally beneficial. These examples illustrate the broad variety of notations.

It is evident, that eco-innovation's awareness has essentially broadened, particularly where the following aspects are concerned (Alzevedo, 2014):

- Eco-innovation does not only apply to clean and resource-efficient technologies that are specifically aimed at reducing environmental harm. Every product or service generating an environmental benefit (reduced use of natural resources and lower use of emissions and waste) in relation to relevant alternatives should be recognized as an eco-innovation (Kemp and Pearson, 2007).
- Eco-innovation encompasses all environmental improvements across the whole product life cycle, concerning the way they are designed, produced, used, reused, and recycled (EIO, 2011).
- Eco-innovation, in a broader perspective, also embraces environmentally oriented organizational and marketing approaches, including eco-innovative business models, which can have effects on the consumer behaviour (EIO 2013).

Concentrating on most of these aspects and with reference to the OECD general definition of innovation, the expert group of the Eco-Innovation Observatory defines eco-innovation as “the introduction of any new or significantly improved products (good or service), processes, organizational changes or marketing solutions that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle” (EIO, 2011).

Achieving a more sustainable world and certainly more sustainable business practice are both practical and ethical concerns. An important part of making this happen, is when enterprises adopt policies that directly address social responsibility and environmental sustainability. CSR (corporate social responsibility) is today an indispensable opportunity to carry out eco-innovations and sustainable initiatives throughout the SMEs. Implementing CSR entails gaining profits but also performing socially and environmentally responsible acts. It means that SMEs limit their negative impacts on society and on the environment. CSR dictates that SMEs have a social obligation towards society and need to comply with ethical values and standards (Azevedo et al., 2014).

SMEs provide different context for the study of eco-innovations due to their characteristics. Most of them is related to their size and limited resources. However, small size can be viewed as an advantage – these enterprises are more flexible than larger enterprises and thus often better able to mobilize and capitalize for the eco-opportunities available to them (European Commission, 2020). Nevertheless, they encounter many barriers that hinder their involvement in eco-innovations.

Barriers, obstacles, or constraints are factors that affect negatively the efforts of a firm towards eco-innovation. They include resource constraints in terms of financial and human capital, information, knowledge, specific expertise, time and limited management capabilities (Del Brio and Junquera, 2003). The perception and relevance of barriers is related to the extent of SME's engagement in eco-innovation. Barriers are more important for SMEs that are engaged in environmentally innovative activity, compared to those that do not undertake any innovation activity (Marin et al., 2015; Horbach et al., 2012; Pinget et al., 2015).

There are various approaches to classification of barriers to eco-innovation. Doranova (2013) distinguishes between economic barriers, institutional barriers, technological and knowledge-based barriers and other barriers. In the study on barriers to sustainable innovation in SMEs in the context of small countries (Hadjimanolis, 2020) is presented classification of barriers as external and internal ones. External barriers include institutional barriers, lack of infrastructure, lack of external funds (financial barriers) and technological lock-in failures.

Institutional barriers are of critical importance for SMEs. Lack of regulation as well as lack of support from public institution to SMEs is a relevant barrier associated to the adoption of eco-innovation. Environmental legislation may be also viewed as a potential institutional barrier to eco-innovation due to the problems of technical specifications and deadlines to comply (Ghadge et al., 2017). Financial barriers - lack of public funds and private external funds are mentioned as significant barriers to eco-innovation by most of SMEs (Hall et al., 2002). Technological lock-in failures prevent SMEs in environmentally modern technological processes. Technological problems encountered by SMEs in the adoption of eco-innovation include the lack of modern infrastructure (Hadjimanolis, 2020). Market uncertainty also tends to be greater for green products, because of their relative newness and volatile consumer markets.

Internal barriers include some organizational constraints on the adoption of eco-innovation, lack of internal resources (human, technical, financial), but also lack of knowledge and information about eco-innovation as well as inadequate expertise in environmental technology (Del Brio and Junquera, 2003).

Empirical studies indicate, that eco-innovations are more complex and costly, they require knowledge and competences (Horbach et al., 2012; Rennings and Rammer, 2009). Many SMEs consider eco-innovation to be very risky and uncertain. Because of that, adopting eco-innovation is rather considered as a crucial process for them.

Pinget et al. (2015) have analyzed in their research of 435 French SMEs three major sets of perceived barriers to eco-innovation: cost, knowledge and the market. Cost barriers reflect a firm's difficulties in financing its innovation projects. During the innovation process, available financial resources might not be sufficient to cover the investments required, so high costs and a lack of financial resources (internal and external sources) constitute important barriers to SME's innovation. Knowledge barriers pertain to limited access to information about technology and skilled labor. Eco-innovations require specific information and knowledge, so qualified personnel and skills are important for exploring new environmental technologies. Market uncertainty tends to be greater for green products, because of their relative newness and volatile consumer markets. Similarly, access to both skilled personnel and knowledge about markets and technologies is more difficult for green goods. However, these barriers might not be identical or perceived in the same way by all SMEs (Pinget et al., 2015).

Hall et al. (2002) explain, that lack of access to appropriate external finance can act as a significant barrier to growth and innovation in SMEs and that this constraint is most commonly reported amongst smaller and younger firms that often lack access to internal sources.

Madrid-Guijarro et al. (2009) consider a lack of financial resources, poor human resources, a weak financial position and high cost and risk as internal barriers, and consider market turbulence, a lack of external partners, a lack of information and a lack of government support as external barriers. According to Madrid-Guijarro et al. (2009), cost represent the most significant barrier to innovation with a greater impact on small firms. Del Rio Gonzales (2009) indicates, that small firms lack sufficient human, technical and financial resources which hinder eco-innovations.

Marin et al. (2015) explain that perceived financial barriers deter significantly SME's environmentally innovative activities and prevent them from adopting eco-innovations. Two other studies conclude that legislation and bureaucratic processes (Rennings and Rammer, 2009) as well as lack of knowledge (Horbach et al., 2012) are perceived barriers that hinder eco-innovation.

There are many different ways to characterize SME's barriers, but the majority seem to be connected to the nature of SMEs themselves: due to their small sizes and economies of scale, smaller enterprises struggle to compete against large businesses and organizations in the market. They possess smaller teams (and thus less expertise and knowledge in their personnel base), more limited resources and are less willing or able to take sizeable risks or make large investments (European Commission, 2020).

3. Methodology

SMEs are the backbone of the Slovak non-financial business economy. They generate 55.1% of total value added (EU average is 56.4%) and the employment share of 72.7% exceeds the average EU share of 66.6%. They account for 99% of the total number of enterprises in Slovakia (SBA, 2019). SMEs have a major role in global sustainable development issues and represent an important target for public policies aimed at developing a sustainable society. They also face unique challenges, because even if they want to reduce their environmental impacts, they are limited by a relative lack of resources. Due to their resource constraints, SMEs tend to focus less on environmental questions than larger enterprises. This article therefore seeks to identify the key barriers that hinder SME's involvement in eco-innovations in Slovakia.

To fulfill the aim of the paper the following two research questions are formulated:

1. What is the proportion of Slovak SMEs undertaking eco-innovation activities (and the kind of activities) during the years 2016-2018 in comparison to EU28 average?
2. What are the main barriers (obstacles, constraints) that Slovak SMEs perceive with regard to undertaking eco-innovations?

The paper is divided into 5 parts. In the first part of the paper is presented the theoretical background to the study of barriers to eco-innovation in SMEs. In the second part the methodology of the research is described. The third part of the article presents the results of empirical research on SME's involvement in eco-innovation activities and identification of main barriers (obstacles, constraints) to eco-innovation in SMEs in Slovakia. The fourth section refers to discussion on main barriers to eco-innovation (analyzed will be the key eco-innovation barriers). The last part of the article refers to the main implications for SMEs managers and policy makers in Slovakia to overcome the barriers concerned with SME's involvement in eco-innovations and provides some conclusion.

Our study is qualitative and descriptive in nature. Data used to identify the main barriers to eco-innovation in SMEs come from the survey commissioned by the European Commission (Euro Flash Barometer 456 – SME, resource efficiency and green markets (2018) and offers the last actual entire data on the topic of barriers (obstacles, constraints) to eco-innovation in SMEs. The survey was carried out in 28 EU member states and as to the Slovakia 300 Slovak SMEs operating in manufacturing, services and in the industry sector were interviewed. The sample was selected from an international database with additional sample from local sources where necessary. Quotas were applied on company size (using three different ranges: 1-9 employees, 10-49 employees and 50-250 employees). These quotas were adjusted according to the country's universe but were reasoned in order to ensure that the sample was large enough (min. 10 enterprises). As to the Slovakia 265 micro, 24 small and 11 medium-sized enterprises were interviewed. Interviews were conducted with the key decision-makers of SMEs.

The methodology used was that of Eurobarometer survey as carried out by the EC Directorate-General for Communication.

Our analysis is aimed at seven eco-innovation activities contributing deeply to resource efficiency: a) minimizing waste, b) saving energy, c) saving materials, d) saving water, e) recycling by reusing material or waste within the company, f) designing products that are easier to maintain, repair or reuse and g) using predominantly renewable energy.

Other sources of secondary data used in our paper represent the official documents and reports of the Slovak Business Agency and Ministry of Environment of the SR.

The methods used in the paper are the method of casual analysis, deduction, abstraction, comparison as well as the synthesis.

4. Research results

Results coming from Flash Eurobarometer 456 (2018) have confirmed that most common eco-innovation actions being undertaken by EU28 SMEs during the years 2016-2018 are minimizing waste (65 % of SMEs), saving energy (63% of SMEs) and saving materials (57% of SMEs). In comparison to EU28 SMEs, the involvement of Slovak SMEs in eco-innovation activities is much lower (Table 1).

Two main eco-innovation actions being undertaken by Slovak SMEs are saving energy (58%) and saving water (45%). In comparison to EU28 countries unfavorable situation in Slovak SMEs is in the minimizing waste; it is only 44% of SMEs (Slovakia is one of the worst countries still in the year 2019), but the low results are presented also in saving materials (43%), recycling by reusing material or waste within the company (35%) and especially by using predominantly renewable energy (5%).

Table 1: Share of SMEs undertaking any of the eco-innovation activities during the years 2016-2018 (%)

	EU	SK
Minimizing waste	65	44
Saving energy	63	58
Saving materials	57	43
Saving water	47	45
Recycling, by reusing material or waste within the company	42	35
Designing products that are easier to maintain, repair or reuse	25	14
Using predominantly renewable energy	14	5

Source: Flash Eurobarometer 456, European Commission, 2018.

Enterprises that have taken at least one eco-innovation action were asked about difficulties (barriers, obstacles) they encountered when trying to set up their actions. According the results of survey, SMEs are most likely to say that they didn't encounter any difficulties when setting up eco-innovation actions (39% EU28 SMEs and 40% of Slovak SMEs).

As we can see in table 2, complex administrative or legal procedures were declared as the most mentioned difficulty (barrier) encountered by SMEs in Slovakia (30% of SMEs). Cost of environmental actions has been a barrier for 12% of surveyed SMEs. Almost 14% of Slovak SMEs have declared the barrier (difficulty) in adapting environmental legislation to their company. Lack of specific environmental expertise was most likely to report as a barrier by 8% of surveyed SMEs. Almost one in ten SMEs found a lack of demand for resource efficient products or services (9%), while 8% mention as a barrier the lack of supply of required materials, products or services.

It is evident that the most reported barrier is the complexity of administrative and legal procedures – although the responses suggest that knowledge could be shared between jurisdictions on this matter.

Table 2: Share of SMEs they encountered any of the following difficulties (barriers, obstacles) when trying to set-up eco-innovation actions (%)

	EU	SK
Complexity of administrative or legal procedures	33	30
Cost of environmental actions	24	12
Difficulty to adapt environmental legislation to your company	22	14
Lack of specific environmental expertise	20	8
Technical requirements of the legislation not being up to date	20	8
Lack of demand for resource efficient products or services	17	9
Lack of supply of required materials, products or services	14	8
None	39	40

Source: Flash Eurobarometer 456, European Commission, 2018.

Enterprises that rely on external support were asked for more detail about the kinds of external support they receive. In the Flash Eurobarometer Survey FL 456 (European Commission, 2018) lack of knowledge about funding opportunities was seen as a significant barrier. The majority of SMEs were unaware of financial incentives through government programmes for activities related to the circular economy and only roughly one-third of SMEs are aware of at least one kind of alternative financing – such as green banks, the capital market, crowdfunding, risk/venture capital, and business angel – available to them. In the Flash Eurobarometer Survey 441 on SMEs and Circular economy up to 33% of Slovak SMEs declared difficulties in accessing finance as a significant barrier when undertaking eco-innovation activities (European Commission, 2016), but in the year 2018 it was only slightly lower – up to 31 % of Slovak SMEs.

All enterprises were asked what measures would help them to support eco-innovations. The results are summarized in table 3.

Table 3: Share of SMEs indicating the measures that would help them to support eco-innovations (%)

	EU	SK
Grant or subsidies	36	28
Consultancy on how to improve resource efficiency in the company	23	17
Demonstration of new technologies or processes to improve RE	22	16
Advice on funding possibilities and financial planning for RE invest	22	10
Better cooperation between companies across sectors	20	14
Database with case studies that show benefits of RE for companies	15	10

Source: Flash Eurobarometer 456, European Commission, 2018.

Up to one third of Slovak SMEs think that grants and subsidies would help their company to support eco-innovations (28%) and this is the more mentioned form of assistance. Almost 17% of Slovak SMEs think that consultancy on how to improve eco-efficiency would help them to implement eco-innovations and 16% of SMEs have declared the demonstration of new technologies or processes. Better cooperation between companies across sectors was declared by 14% of SMEs, while advice on funding possibilities and financial planning for resource efficient investment would help up to 10% of SMEs. It is evident, that not only financial, but also non-financial actions could help SMEs in overcoming the barriers and adopting to eco-innovations.

5. Discussion

Research results confirm that Slovak SMEs face many challenges. Slovak SMEs indicated as the key barriers in setting up eco-innovation activities complex administrative or legal procedures, cost of environmental actions as well as the technical difficulty to adopt environmental legislation. Lack of specific expertise and technical requirements of legislation were also declared as the barriers. This is in line with other studies on barriers to eco-innovation that declare the importance of financial but also non-financial incentives in supporting SMEs to pursue actions related to greening and resource efficiency (European Commission, 2018).

According to the latest audit (concerning the year 2019) in the implementation of the Small Business Act for Europe Principles (SBA, 2020a), nearly a third of SMEs in Slovakia implemented

some environmental measures in 2019 (it is a 0,2% increase from 2018). Nevertheless, 47,4% of SMEs did not apply any environmental measures and were not even considering it for the future.

Multiple obstacles affect SME's involvement in eco-innovation activities in Slovakia. Results on the monitoring of the business environment in Slovakia identified the low stability of law as the key barrier to the growth and functioning of business activities. Up to 94% of SMEs declared this factor as a crucial. More than 77% of SMEs declared as a barrier to their business activities corruption, weak law enforcement (77%) and quality and access to infrastructure (71%) (SBA, 2019).

Furthermore, research on the key barriers of innovation activity in Slovakia (SBA, 2018) identified bureaucracy and corruption as the main issues encountered by businesses. All these factors combined contribute to SME's low involvement in eco-innovation in Slovakia and explain why eco-innovations are not yet amongst the top priorities or widespread practices of Slovak SMEs (EIO, 2020).

Institutional factors, regulation and policy are considered as significant factors by all SMEs. Lack of regulation as well as the lack of support from public institutions to SMEs is a relevant barrier associated to its adoption. Regulation uncertainty became a constraint to the adoption of eco-innovation by many Slovak SMEs.

Though Slovakia has implemented most of EU environmental and eco-innovation policies and measures into the SR legal system, the progress is slow. European Commission has criticized insufficient approximation of the EU directives to the SR legal system in relation to environmental protection and eco-innovation. Environmental policy stringency in Slovakia has been assessed as above average compared to OECD countries.

One of the main obstacles is the fragmentation of the innovation policy landscape. Decision making and implementation competencies are distributed amongst government bodies (ministries and governmental institutions) without coordination, which often results in overlapping, even counterproductive work (SBA, 2018). The same is true for the agenda of eco-innovation. There is no eco-innovation strategy, nor a designated body that would be in charge of coordinating this topic (EIO, 2020).

Financial barriers affect significantly SME's involvement in eco-innovation. SMEs in Slovakia indicated problems to cover high costs of meeting regulations or standards and difficulties in accessing finance as an important barrier to eco-innovation (SMEs declared grants and subsidies as a key measure that would help them to support eco-innovation activities). They face a lack of financial sources. In many cases it is a question of bureaucratic difficulties in the acquisition of capital from the financial sector as well as through public funds.

One of the obstacle to up-take of eco-innovation is lack of reliable information. SMEs do not have access to sufficient information about public support mechanism. More than $\frac{3}{4}$ or 76% of SMEs in Slovakia did not even apply for support in 2019 (SBA, 2020b). Most of SMEs are discouraged by high administrative burden.

One of the barrier is also the insufficient research system. The support for research and development has accounted in Slovakia in 2018 only 0,83% of GDP and it remains one of the lowest in the EU (EU28 average was 2,88%. The business sector investment into research and development was only 0,41% of GDP. Slovak research is furthermore dependent on European Structural and Investment Funds, with approximately 39% of R&D investments relying on foreign sources, 89% of which are EU funds (European Commission, 2020).

Lack of internal resources (human, technical, financial), but also a lack of competences within SMEs limit their environmental effort and the adoption of environmental processes and practices at the company level. Slovak SMEs face human capital barriers due to the fact that personnel have little knowledge about environmental issues.

Slovak SMEs are often confronted with a problem to implement complex administrative or legal procedures and with a lack of expertise on new processes, technologies and materials necessary to implement eco-innovation activities and to reach higher resource efficiency. This underlines the importance of highly educated persons in the field of engineering and science (Šebestová, Šperka and Čemerková, 2016). Highly educated persons in the field of engineering and science present a low share in the national workforce of population, partly due to a tendency of a "brain-drain" in Slovakia. Better conditions, international exposure and a creation of a more competitive environment could improve this situation.

The lack of qualified personnel, lack of information on markets and on technology, low attitude of personnel and managers towards change is one of the reasons for which SMEs resist to adopt eco-innovations.

There is a notable absence of non-financial support mechanism, that could directly engage with companies and guide them through practical adoption of eco-innovation solutions. Existing environmental consulting agencies in Slovakia focus predominantly on compliance with legislation, rather than environmental process innovations, in other words, on the introduction of new or significantly improved production or delivery processes that aim to reduce the environmental impact of an organization (EIO, 2020).

The results of the survey confirmed the need to develop a number of organizational solutions that can help overcome barriers to eco-innovation in Slovak SMEs. These may include: knowledge sharing, networking and clustering, environmental management schemes and education (Peterková and Zapletalová, 2018).

Over the past two years Slovakia began to adopt economic motivational tools to support the adoption of eco-innovations. New platforms for best practice sharing were developed. For example, the Green Economy Information Platform managed by the Slovak Environment Agency provides up-to-date information on policy documents, green economy and resource efficiency (Ministry of Environment of the SR, 2019b).

The need for a new, modern environmental strategy which reflects the actual situation and urgent problems of the whole system of environment has resulted at the new “Envirostrategy 2030 for Slovakia – Strategic Environmental Policy of Slovakia up to 2030” (Ministry of Environment of the SR, 2019a), which was approved in 2019. The strategy identifies basic system problems, sets 2030 targets and proposes framework measures to improve the current situation. The strategy underlines the role of eco-innovations.

6. Conclusion

It can be stated that eco-innovations in SME’s sector in Slovakia face many challenges. Based on the above analysis, the main implications for policy makers and SMEs managers in Slovakia may be formulated:

- Policy makers in Slovakia should place greater emphasis on sufficient approximation of EU directions to the legal system of the SR. They have to create effective policy programs and measures supporting SME’s involvement in eco-innovation and helping to establish a stable platform for SME’s eco-innovation.
- Public funding and expenditure in the eco-research and development is still low in Slovakia. (Government environmental and energy R&D appropriations and outlays as a share of GDP were 0.01% in 2016 compared to 0.04% as the EU average.) To tackle with this issue the state, public as well as private institutions, have to be more involved in the financial support.
- SMEs face information asymmetries, leaving them under-informed about public subsidies and eco-innovation strategies and support schemes. Public bodies should therefore take initiatives to inform SMEs about opportunities and subsidies associated with eco-innovation, to encourage greater adoption.
- Many SMEs indicated difficulties to tackle with administrative and legal procedures as well as with the lack of expertise. This underlines the importance to improve ways and opportunities for SME’s participation in knowledge transfer and in learning about best practices. The importance of skills and knowledge as well as building public-private partnerships for supporting eco-innovation in SME’s sector is evident.
- It is necessary to raise SME’s awareness about eco-innovations and green business as business with a high added value in relation to the corporate responsibility concept as well as to raise SME’s awareness about the necessity to implement stable and continual environmental business strategy.
- In cooperation with central government authorities and professional organizations, academia and non-governmental organizations, the more efficient system of formal and

informal environmental education and training for sustainable development has to be implemented.

Eco-innovations call attention to the positive contribution that the SMEs can make to sustainable development and a competitive economy. Hence, eco-innovation is understood as the combined improvement of economic and environmental performance of society.

Our study offers some contribution to the study of SME's eco-innovation in Slovakia. The main conclusion coming from the research is the identification of key barriers to eco-innovation in Slovak SMEs; the results of the study give insights into the main barriers that hinder the SME's involvement in eco-innovation in Slovakia and can be useful to managers and policy makers to encourage further actions. As the limitation of our study may be viewed that the empirical results are derived from the sample of Slovak SMEs representing the general population of SMEs not differentiating between various NACE categories (sectors) and between enterprises of various sizes. In the future we will focus on SMEs of different sectors (NACE categories), enterprises of various sizes as well as on comparison with some EU countries (V4 countries).

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INNOVATIVE FINANCIAL INDICATORS – FROM ROI TO HUMAN CAPITAL ROI

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Abstract

'Relevance Lost: The Rise and Fall of Management Accounting', this was the title of Johnson and Kaplan's groundbreaking work published in 1987. In their view, accounting remained stuck at the level of the 1920's. Companies subordinated management accounting to financial accounting and paid little attention to the investigation of the external environment. Since the beginning of the 1980's a large number of methods have been developed by economists which have assigned an increasingly important role to non-financial and non-accounting data. The methods have become more and more complex and their needs for data have been growing. We do not assume that the managers of small businesses would need methods based on complicated interrelationships, as they are able to grasp the business processes in detail. As the size of the company is growing, managers are not able to coordinate each and every process single-handedly any more, and they have to let management out of their hands. A perfect example of them are the ROI metrics elaborated more than 100 years ago, which have undergone numerous changes since their birth and nowadays several versions exist that have been developed further, such as the Human ROI, which is the subject of our article.

Keywords: HC ROI, human capital, indicators, ROI, small and medium-sized companies
JEL codes: B26, J24

1. Introduction - Financial statements as the bases for the quantification of ROI

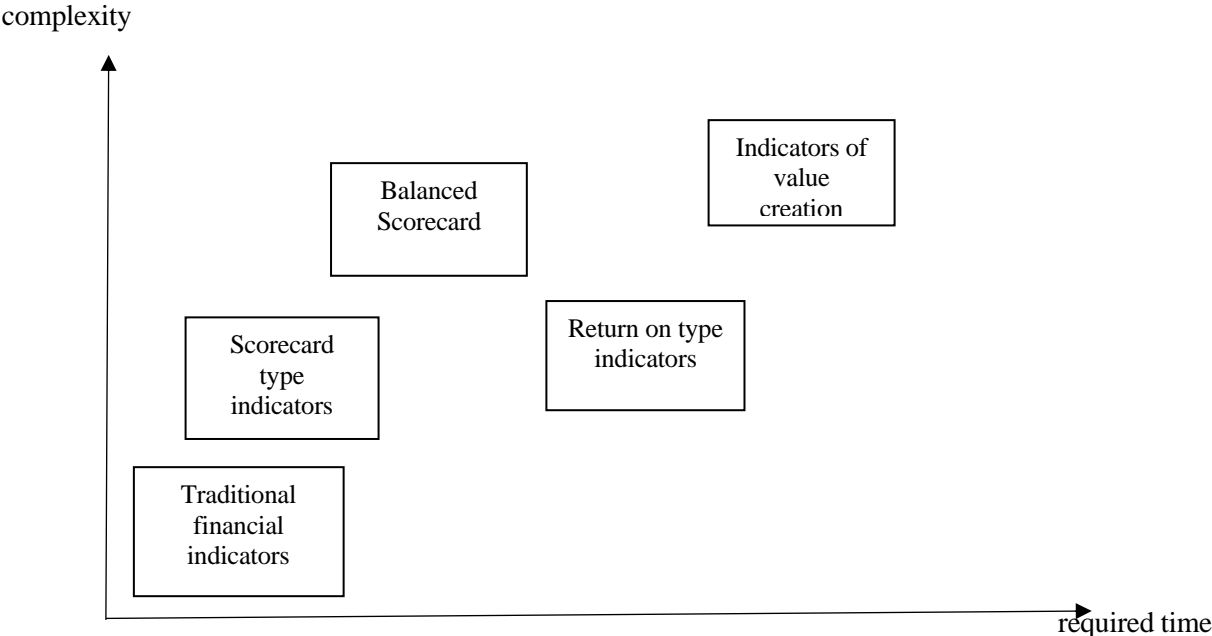
Due to advanced IT systems, entities and decision-makers have an abundance of information and data sets made available for them. Thus it became necessary to condense information and determine the indicators that help the work of management with their content. Indicators fulfil their decision support function by the selection and processing of the information relevant for decision-making. Decision-makers get condensed information and this facilitates their work of judging the suitability of

alternatives, taking decisions and coordinating the different areas. Indicators perform their controlling function by making comparisons, comparing plan-actual or base-current data. (Fenyves et al, 2018)

The condensation of information, as it is illustrated by Figure 1, has created more and more complex, time-consuming solutions demanding a lot of work. Although the development of information systems reduces the need for work and time, the interpretation of the indicators continues to be an energy-demanding activity.

The preparation, structure and content of financial statements are regulated by legal norms. They ensure that the financial statements provide information on the assets, liabilities, equity, revenues, expenditure, profit or loss, cash flows, financial performances, change in equity of the organisations subjected to the legal norms, for all the stakeholders in an accessible form, also utilizable in making economic decisions. These ensure that financial (external) accounting is an important but not a single base of information for the actors in the market. (Drury, 2015, IAS 1) Traditional financial indicators provide information about the financial situation and performance. Information provided among others are the structure of assets and liabilities, efficiency of assets, total debt, liquidity and profitability relative to various reference bases. (Horváth, 2006)

Figure 1: Classification of indicators relative to the time required for their creation and the complexity of their economic content



Source: own compilation

One of the most widely spread systems of financial indicators is the Du Pont model of metrics. The basic idea of the Du Pont model of metrics is that it is not the profit that is placed in the centre as an absolute measure, but the Return on Investment as a relative value. ROI is the key indicator of the system and it is determined as the quotient of net income and net asset value. (Pierre du Pont was of the opinion that the previous profitability indicators relative to sales revenue and costs were not suitable for assessing the performance of a company. The indicator developed to support investment decisions can be determined as the quotient of net income and net asset value. There are recommendations (Anthony et al, 2014) on what to consider ‘return’ (e.g. operating income or earnings after taxes) and ‘investment’ (non-current assets or non-current assets + certain items of current assets), but basically it is the company’s own decision to fill the two categories with content. (Brealey et al, 2011, Seal, 2010) The strength of ROI is that it is not merely a specific indicator but it is a system of metrics, the individual components of which carry important meaning themselves for the decision-maker. The indicator can be broken down into the result of two measures, the Profit Margin and the Asset Turnover Ratio. Using the profit, cost, asset and liability data that come under the responsibilities of the head of the specific decentralised unit, these two measures can be further broken down.

Traditional financial indicators used in the performance evaluation of companies are not able to provide adequate information for the management. Its cause is primarily financial accounting. Based on all the above, the limitations of traditional financial indicators can be summed up as follows:

- Traditional financial indicators give information about the past performance of organisations, and they do not have a relationship with the future, the strategy of the organisation.
- They are not suitable for preventing problems, as they consider the impact of organisational activities and consumer decisions occurred previously.
- They have a short-term approach, therefore they do not serve the strategic goals of the organisation.
- They are not of diagnostic character, they point out the problem but they cannot address the causes of the problem.
- As they are expressed in money, they are not suitable for displaying quality factors, though organisational performance consists of quantitative and qualitative components related to the completion of the assigned tasks. (Demény and Musinszki 2016; Zéman et al. 2016)

Nowadays the economic environment of companies has significantly changed, the previous constancy has been replaced by volatility, and marketing has become the centre of operation instead of production. Apart from capital-centred approach a knowledge-centred approach has emerged. Flexible adaptation to environmental changes has also entailed a change in management methods, which has required a different type of corporate governance and within that a different kind of management information system. A reliable, well-structured information system that provides continuous information to the company leaders about the processes taking place at the company, the resources, the implementation of management decisions and the environment.

Financial indicators are not able to set a direction in today's intensive competition environment for the future, typically they present a picture of some past actions, so they are only backward looking and retrospective indicators. Theoretical researches and practical experiences demonstrate that both financial and non-financial indicators are required for assessing a company's performance. A balance should be created between them, and they should be united in a complex system of indicators. This is realized among others by the balanced, performance indicator-based strategic evaluation system, the Balanced Scorecard (BSC) system, which was developed by Robert S. Kaplan and David P. Norton in the 90's of the last century. (Kaplan and Norton 1992, 1996)

While maintaining the goodness of financial ratios, we can measure parts of capital that were previously difficult to measure. There are elaborate measurements like ROI. The BSC strives to integrate financial and non-financial indicators, and this approach is echoed when we combine ROI with measuring the effectiveness of human capital.

2. Significance of Human Capital ROI (HC ROI) in company activities

The widespread use of human resource information systems and human resource planning software, as well as the growing number of employee attitude surveys mean that organisations are continuously increasing the amount of data related to human capital. Human Capital (HC) as a concept has come to be embedded in organisational culture and managerial approach. Organisations view their employees as human resources that they can invest in and develop further. In organisational context human capital is usually defined as the value-creating knowledge, abilities, skills and other capabilities of the workforce. In literature nearly 600 kinds of HC indicators are known and used. Although there have been some attempts to standardise the indicators so that the HR profession can become familiar with them, there is no widely recognised and unified methodology yet. Many professionals agree that as the HC metrics are company specific, therefore it is more reasonable not to standardise the methodology. (Houghton, 2017)

Since employee costs account for 20-70 per cent of company expenditure nowadays, it is of fundamental importance to measure the Return on Investment (ROI). Management needs a measurement system that describes and predicts the curves of employee costs and productivity. In addition, even more important are qualitative actions. Quantitative actions rather point towards cost, capacity and time. Qualitative measurements focus on value and human capital. (Fitz-enz, 2009)

Nowadays enterprises employ more underrepresented groups among the employees than before. In this unfavourable situation the maximum exploration and development of human capital, the efficiency and the quickest possible return of the human factor are of key importance. The diverse composition of employees with regard to racial, ethnic and gender data, abilities, ages and level of education may even be beneficial for a business organisation. Due to the fact, that the varied base of employees brings more knowledge, perspectives and experiences for the company. Better ideas ensure the survival of the organisation in a special situation. In addition, the encouraging and supporting atmosphere at work enables companies to be able to hire highly qualified employees for the longest possible time, and rely on them as the company's key personnel in the long term. Most of the companies have realized that the diversity of employee composition may be advantageous, but the quantification of the results of return on investment, especially in the case of human resources is a little cumbersome. (Barnett and Mattox, 2010)

Human capital is the profit margin of knowledge-based economy. The members of the organisation have individual tacit knowledge (i.e. skills required for performing their functions) (Nelson and Winter, 2004). In order to illustrate to what extent tacit knowledge characterises the human capital of the organisation, it is practicable to interpret the activities conducted in the organisation as a productive process during which the most important labour activities are assessed. Human capital has been defined at individual level as the combination of the following four factors: genetic inheritance, level of education, professional experience and approach to business life (Hudson, 1993). Human capital is important because it is a source of innovation and strategic renewal, whether it is from brain storming in a research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new leaders. Human capital is of key importance in the life of an organisation. (Fitz-enz, 2002)

While human capital embodies employees' knowledge, talent and experience, the structural capital represents codified knowledge bases that do not exist in employees' minds (e.g. databases, documents, organisational routines). Furthermore, the knowledge of enterprises imbedded in their relationships with suppliers, clients and partners is also important. The supporting role of the leader has an influencing power on the employees' organisational learning. The behaviour of top management is an important variable that should be taken into account when it is examined how an organisation makes use of human capital. The cognitive maps of top management illustrate well the basic knowledge of all organisational members and workers. Edmondson (1996) argues that management has the most important role in the development of human capital at a company. In her view it is not enough for leaders to develop appropriate organisational structures and continue to make well-reasoned decisions. Instead, the entire company and the employees should be followed with attention at each level, adapting to changing conditions. (Edmondson, 1996)

The other important condition for the development of human capital is general employee sentiment. The employee sentiment gain must be defined as the inter-relationship between employee satisfaction, commitment and motivation. Of course, these are all related to the overall culture of the organisation. The organisations the culture of which supports and encourages cooperative innovation, should try to understand what in their culture gives a comparative advantage, and these cultural properties must be developed and nurtured. Culture constitutes the beliefs, values and attitudes within an organisation, which results in a language, symbols, habits of behaviour and thought. It is increasingly recognized as the conscious or unconscious product of the conviction of top management. (Hall, 1992) Knowledge management includes three activities:

- knowledge generation - describing the way of employees' improvisation and innovation of organisations,
- knowledge integration - describing how employees transform their tacit knowledge into explicit knowledge by codifying their ideas into the system of the organisation,
- knowledge sharing - describing the socialization process, through which employees share their knowledge with one another (Nonaka and Takeuchi, 1995).

The aim of knowledge management is to explore the intellectual capital that currently exists in the organisation, and to convert this knowledge into sustainable comparative advantage by the increased business performance.

3. Efficiency and return of human capital - methodology of calculations

Bonits et al. calculated the efficiency of human capital on the basis of four factors: Revenue Factor, Expense Factor, Income Factor and Human Capital ROI. The Revenue Factor shows the basic measure of the efficiency of human capital and the aggregated result of all the factors of the management of human capital that influence the behaviour of employees. The Revenue Factor is calculated by taking into account the Total Revenue and it is divided by the full headcount of the organisation.

$$HC ROI = \frac{\text{Revenue} - (\text{Expenses} - \text{Compensation})}{\text{Compensation}} \quad (1)$$

This is the same as the calculation of the value added of investing in the human capital of the organisation. The numerator in this metric was calculated with profit adjusted for the cost of people. (Fitz-enz, 2002)

According to Bontis and Fitz-enz the return on human capital also depends on other factors, which are: employee satisfaction, employee commitment, training, employee motivation, value alignment, retention of key people, human capital, structural capital, relational capital, management leadership, process execution, knowledge generation, knowledge sharing, knowledge integration and business performance. Barnett et al. started out from the classical ROI formula in the case of human ROI, and they added that human resources constitute an important factor that must be drawn into the calculation. (Barnett and Mattox, 2010)

Return on Human Capital Investment (HC ROI), or Return on Human Capital is a measure that reflects the inter-relation between the investment in employees and organisational efficiency (Phillips et al., 2001). According to literature companies primarily use the variations of these two methods to calculate the return on human capital. One of the two methods prepares a model in respect of training costs with provided benefits and returns, the other method uses the numeric data included in the income statement to create a ratio between the profit and the capital invested in employees (i.e. between pay and benefits). Literature presents two main HC ROI models, one of them is the model developed by the Saratoga Institute. Jac Fitz-enz, the founder of the Saratoga Institute developed an analytical technique to measure the value of people capital, including human capital ROI. The measure of return developed by Fitz-enz uses the components of income statement and establishes the ratio of amounts spent on compensations and benefits relative to the adjusted profit level as below (Fitz-enz, 1990):

$$HC ROI = \frac{\text{Revenues} - [\text{Operating Expense} - (\text{Regular Compensation Cost} + \text{Benefit Cost EPTNW})]}{\text{Regular Compensation Costs} + \text{Benefit Costs EPTNW}} \quad (2)$$

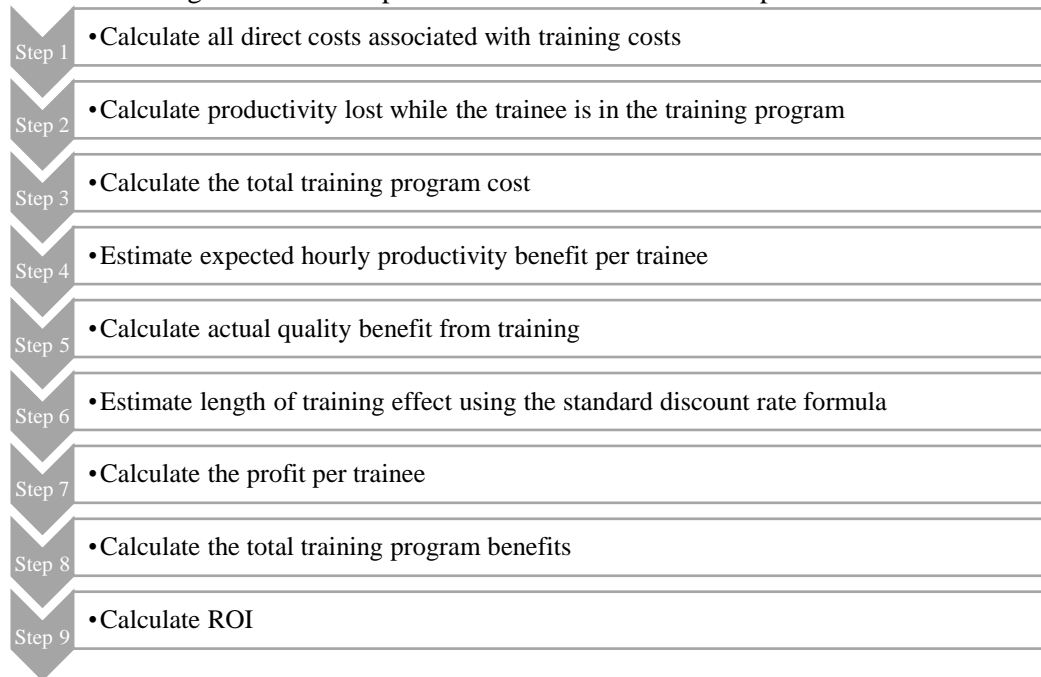
(EPTNW = excluding pay for time not worked)

In his book Fitz-enz (2009) describes a simpler version of the above model, as follows:

$$HC ROI = \frac{\text{Revenue} - (\text{Expenses} - \text{Pay and Benefits})}{\text{Pay and Benefits}} \quad (3)$$

So, if we divide the adjusted profit level with the costs of human capital (pay and benefits), and determine the sum of the profits of all the amounts invested in the compensation of human capital (excluding training and similar items) - practically, we arrive at the capital leverage of pay.

Figure 2: Nine-Step Process of the ROI Human Capital Model



Source: Corporate Executive Board, 2005, p.1.

The other model is the human capital ROI model that was developed by Edward Gordon, president of Imperial Consulting. The model available as a rather sophisticated software application requires companies to pre-define training objectives and implement operation information before entering the nine-step process in order to determine ROI. The emphasis of this model is in fact put on the cost-benefit analysis of training, comparing it to the return on employee training costs. The focus is on the return on one training at a time, but unlike in the past, the weakness of the model is that it is often not possible for companies to measure the cost of a training.

4. Investigation of the applicability of Human ROI in the Hungarian SME sector

Now it is an accepted fact that in order to create a sound basis for corporate decisions, company managers try to assess the performance of a certain area of the company or business management (financial, human resources, marketing etc.) with the help of metrics, systems of metrics. Such a metric is ROI and its further developed versions, such as Human ROI, which is the subject of this study. Is the above statement true for all company managers?

In 2019 and 2020, as part of our research, we made personal and online interviews with the heads of social enterprises and social cooperatives qualified as SMEs, during which this question was also covered. (Bozsik et al. 2020, Bozsik et al., 2020) Based on the responses it was obvious that the managers of small-sized enterprises are able to grasp the company's business processes fully in detail, and direct them without any metrics or system of metrics. With the growth of company size company managers become unable to know each area of business management in detail. In Adizes's model of company growth it is in the Go-Go stage of the organisation that the head of the enterprise is faced with the dilemma of up to what size he/she is able to control his/her business single-handedly. (Adizes 2004) One of the main reasons of the "dilemma" is to be found in the time factor. Company processes tend to become more and more diverse and complex, so the manager will not have sufficient time, even with more efficient time management, to pay special attention to each partial area of the business. There will be some areas to which the manager will devote more time, while other areas will fade into the background. This will lead, over time, to the phenomenon that the linear organisational structure that is relatively simple at the outset will start to grow into a functional structure. According to our hypothesis (the demonstration of which requires further researches), in parallel with that, company managers start to feel a need to evaluate the results and performance of the individual business areas with the help of

metrics and systems of metrics, as they are not involved in the management of certain areas on a daily basis, so they have less information.

In their study on multi-level cost systems, Kaplan and Cooper (1997) pointed out that growing companies tend to keep their traditional financial accounting systems – named as level 2 by them –, and convert the existing information into useful information for managers. The so-called level 3 system can be established without creating a new IT background, as typically, the financial system and the other information systems of the company already contain the data required for managers. The significance of level 3 lies in the fact that decision-makers – with negligible additional expenditure – can also use the data for their work that was previously gathered in the organisation.

The scope of the data that can be used depends on the actual regulatory environment. Based on labour law, tax law, accounting and mandatory statistical data provision requirements, the following data are to be collected mandatorily by an average SME in Hungary:

- According to labour law rules it is mandatory to conclude the employment contract in writing. Based on the employment contract, the employee is obliged to perform work as directed by the employer, and the employer is obliged to employ the employee and provide payment for his/her work. The employment contract includes the employer's company details and the employee's personal data, basic wage, job, the duration of the employment relationship (in its absence the employment relationship is established for an indefinite time), the place of work performance, the working time system and the duration of the trial period. The job description is a mandatory attachment to the employment contract, which contains more specific information on substitution, scope of responsibility and authority.
- As set out by the labour law, it is also mandatory to keep records of the attendance of the employees at work and the amount of working time fulfilled by the employees. The attendance sheet is very important among the labour law documents, though there are very few provisions on its correct maintenance and use. The Hungarian Labour Code (Act I of 2012) provides very briefly on it: the employer keeps records of ordinary and special working times, stand-by times, paid leaves and the content of extraordinary working time fulfilled subject to an agreement. The attendance sheet constitutes a basis for payroll accounting, therefore its existence is of key importance.
- As laid down in the labour law rules, the employee receives a salary specified in his/her employment contract, which is also a basis for contributions to pay. The tax burdens on gross salaries are divided into two main groups: taxes and contributions to be paid by the employee and the taxes contributions to be paid by the employer. The taxes and contributions charged on the employee's salary are as follows: 15 percent personal income tax ("szja" in Hungarian), 10 percent pension insurance costs, 8.5 percent health insurance and labour market contribution, as of 1 July 2020 it has been standardised as 18.5 percent social security costs). The employer is subject to the following tax and contribution payment obligations after the gross salaries: 15.5 percent social contribution tax and 1.5 percent vocational training contribution. On the payroll the contribution-type deductions must be indicated in an itemized form.
- The tax law provisions must be observed and the taxes and contributions required by the law must be deducted from the employee's gross salary and the personal income tax payment obligation must be fulfilled (currently it is 15 percent).
- The SMEs being subject to the Hungarian Accounting Act must collect their human resource costs in three groups. Wage costs, wage contributions and any cost related to human resources but not belonging to the former two groups. Such as cafeteria, cost reimbursements given to employees, and the sick leave.
- Within the framework of mandatory provision of statistical data, enterprises must collect and provide data on labour force costs. The labour force costs include apart from the wages and other personnel type payments, the welfare cost. This mandatory data provision service also means that in the daily practice it is justified to keep more detailed records of costs related to live work than required by the accounting law provisions.

- The mandatory provision of statistical data also includes a monthly, quarterly and yearly data provision on the headcount, the structure of the headcount and the working hours fulfilled by the enterprise.
- In addition to the numerical data it is mandatory to provide data on the training policy of the enterprise in the form of responses to yes-no and closed questions.

All this means that the input needs of the presented theoretical models can only partly be ensured from the existing data assets of the SMEs. Due to the mandatory statistical data provision the wages and contributions are tracked. Due to the Accounting Act the revenues and income (e.g. EBITDA) are quantified at least once a year at organisation level. However, there is no system in place for determining the result of unfulfilled working time, quantifying the investment into human capital, and measuring soft factors. So the more subtle theoretical human ROI models can only be used in the case of SMEs if the enterprise is ready to allocate more resources to the collection of data needed to quantify the models.

5. Conclusion

Human capital measures are designed to describe the workforce and characteristics of the workforce to assess the efficiency of HR processes and assess the contribution of human capital to organisational performance. Measuring human capital is unfortunately cumbersome and because of this many people do not undertake to transfer the ROI methodology to the HR area. The attempts made in the use of HC metrics to assess the economic value of human capital enterprises, for example by calculating the return on human capital investments (ROI), have brought limited successes. The HC ROI analysis should be well-founded but it is difficult to predict how the employees are going to react to investments in their human capital. The aim of “soft” metrics is to measure the attitude, behaviour and competence of employees. However, “soft” metrics often prove to be problematic. In his study Houghton gives a detailed presentation of the possibilities and components of measuring human capital. (Houghton, 2017)

Kucharčíková et al. (2018) points to another weakness: HC ROI metrics only serve as complementary indicators in the evaluation of investment efficiency because static methods are more suitable for short-term evaluation, and HC ROI indicators do not take into consideration the time value of money (inflation, uncertainty of future revenues, alternative costs, risk factors). As enterprises pay for the training of employees, this could have a positive effect on their profit even years later.

Investing in human capital is important both for the employee and the workplace, as the value of the investment will have a return in the future. It would be useful for business organisations to make an increasing number of calculations on HC ROI values based on real data, and this would also make human resource management more efficient. It is not very likely that small-sized enterprises feel the need to apply the human ROI, as the managers of these kinds of enterprises are able to grasp the business management processes in detail even without having any metrics available. With the growth of company size, when the manager does not grasp each detail of each single area of the business, the demand emerges to use various metrics and systems of metrics. One of the goals of our further researches is to identify at what size this demand appears. According to our hypothesis the demand itself emerges before having appropriate data for determining the human ROI. The manager of a medium-sized enterprise would probably need to carry out evaluation through different metrics and systems of metrics (including ROI and human ROI) but the data required for determining the metrics are not yet available at the company. Besides the lack of data, another hindering factor to the spread of human ROI among small and medium-sized companies is that in many cases the managers of enterprises do not have adequate professional knowledge to use metrics and systems of metrics that are often based on complex accounting and business management interrelations.

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COVID-19 AS AN IMPULSE FOR A SUSTAINABLE, SOCIALLY RESPONSIBLE AND ETHICAL CZECH LUXURY FASHION INDUSTRY?

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Abstract

The 1st and 2nd waves of the COVID-19 pandemic have dramatically impacted the Czech society and economy. They constitute a genuine crisis calling for a deep understanding and for drawing conclusions, they bring both threats and opportunities. Arguably, COVID-19 can be a unique impulse for a deeper engagement in sustainability, Corporate Social Responsibility (“CSR”) and generally more ethical behavior by businesses, especially if these businesses build their strategies on shared values. Czech luxury fashion businesses belong to this group and it is highly relevant to explore the impact of COVID-19 on their not- strictly financial performances. Namely, what message about COVID-19 as an impulse for their sustainability, social responsibility and ethics do their, or other, internet pages convey? To address this objective, a holistic and interdisciplinary case study exploration is performed entailing twenty Czech Luxury Fashion businesses. The critical exploration of the yielded data via a simplified Delphi method with Meta-Analysis and content analysis, teleo-logical interpretations brings surprising and partially worrisome propositions demanding further explanation.

Keywords: Corporate Social Responsibility (CSR), COVID-19, luxury fashion.

JEL codes: L21, M14, Q01, Q56.

1. Introduction

The post-modern global society is marked by an extremely vigorous competition and the drive for sustainable growth. Such an ongoing growing prosperity has its biblical roots which were re-confirmed by the German concept of *Nachhaltigkeit*, which was presented in 1713 by the Sachsen top mining administrator, Hans Carl von Carlowitz, in his influential book *Sylvicultura Oeconomica. Nachhaltigkeit*. This was based upon the long-term responsibility vis-à-vis the environment and available resources, in particular in the forest and wood industry. The *Nachhaltigkeit* got *perpetuitas* dimension and this process culminated in the 20th century with the desire for a global and eternal responsibility (Schüz, 2012). The United Nations (“UN”) embraced it already in the Universal Declaration of Human Rights (“UDHR”) and cemented the emergence of the modern concept of sustainability based on environmental, social and economic pillars, while focusing on the reconciliation of available resources as an increasing world population emerged (Meadows et al., 1972) with the Report of the World Commission on Environment and Development Report: Our Common Future prepared by the Brundtland Commission, published as the UN Annex to document A/42/427 in 1987 (“Brundtland Report 1987”) (MacGregor Pelikánová, 2019). Recently, the most relevant contribution of the UN in this respect is the UN Resolution from 2015 Transforming our world: the 2030 Agenda for Sustainable development (“UN Agenda 2030”), which brought with it its 17 Sustainable Development Goals (“SDGs”) and 169 associated targets (MacGregor Pelikánová & MacGregor, 2020). If the concept of sustainability is to be real and not futile (Bali & Fan, 2019; Turečková & Nevima, 2020), then it is absolutely instrumental to obtain a universal support for it and this including the employment of a multi-stakeholder model and cross-sector partnership (Van Tulder et al., 2016). Boldly, sustainability with its SDGs is not feasible without an effective and efficient engagement of businesses via their Corporate Social Responsibility (“CSR”) (Balcerzak & MacGregor Pelikánová, 2020).

The EU and EU law follow these trends and incorporated as strategic priorities for 2010-2020, i.e. in the Europe 2020: A strategy for smart, sustainable and inclusive growth (“Europe 2020”) and in the Green Paper: Promoting a European Framework for CSR. Regarding businesses, neither sustainability reports nor CSR reports nor Codes of Ethics are covered by a rigid mandatory framework and only large undertakings have a rather vague and hardly enforceable duty to publish the CSR information within their non-financial statements-managerial reports, see Directive 2013/34/EU, Directive (EU) 2017/1132 and Regulation 2015/884 as updated (MacGregor Pelikánová & MacGregor, 2020). Since the Commission Recommendation 2003/361/EC defines micro, small and medium-sized enterprises (SMEs) as enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million, generally SMEs are out of reach of any legal duty with respect to sustainability, CSR or ethics.

Therefore, it is up to the consideration of SMEs whether and how they will reflect them and incorporate them in their daily and strategic management (Balcerzak & MacGregor Pelikánová, 2020; MacGregor et al., 2020; MacGregor Pelikánová et al., 2021). Various patterns and trends can be observed in this respect regarding various jurisdictions (Sroka & Szántó, 2018) and several empirical studies propose that the industry suitable par excellence to be the leading flagship for sustainability, CSR and ethics programs is the luxury fashion industry (MacGregor et al., 2020; MacGregor Pelikánová et al., 2021). Indeed, the luxury fashion industry, aka slow fashion industry, has become a contrast to the fast fashion industry with its reckless drive for “cost reduction at any cost” which has devastating social and environmental impacts (Niinimäki et al. 2020). In contrast, the luxury fashion industry is based on uniqueness, value and exclusivity. Businesses from the luxury fashion industry in the EU, including in the Czech Republic, have been engaging in sustainability, CSR and ethics, and report about it and their customers (Olšanová et al, 2018), as well as other stakeholders, such as investors, expect that (MacGregor Pelikánová & MacGregor, 2020). The lavish and opulent features intimately linked to the luxury fashion products lead to expectations that there are resources and this implies superior quality, superior customer service as well as superior social reach – sustainability, CSR and ethics (Cerchia & Piccolo, 2019; MacGregor et al., 2020; MacGregor Pelikánová et al., 2021).

Then, the year 2020 with the COVID-19 pandemic came and hit the entire society, including the economy and basically each and every luxury fashion business in the EU came to the intersection, facing a reduction of turnover and profit (Jindřichovská & Uğurlu, 2020; MacGregor Pelikánová et al., 2021). Since each crisis brings threats and opportunities, it is legitimate to ask if the prima facie devastating and not only economic impact of the COVID-19 pandemic could bring as well something positive. The President of the European Commission, Ursula von der Leyen has repeatedly proposed that COVID-19 is an impulse for a greener and more sustainable EU and for more vitality (Valero, 2020). Well, what is proposed by those who have sustainability, CSR and ethics concerns as part of their long-term agenda (Arora et al., 2020)? Namely, how do Czech luxury fashion industry businesses, which are all SMEs, perceive COVID-19? Is it an impulse for being even more or differently sustainable, CSR or ethical? Or not at all? Since the financial and non-financial reports for 2020 are not yet published and changes of Codes of Ethics can hardly be expected in quickly, the only current and relevant foundation for an appropriate empirical case study is information provided online, on the Internet, either via domains of these businesses or other domains. Therefore, the study is to be performed as follows: after the establishment of theoretical background via introduction (1.) to methodologically proceed with a case study of the internet pages of 20 luxury fashion businesses (2.) and, based on a holistic Meta-Analysis coupled with a simplified panel Delphi method and content analysis, extract results and discuss them (3.). Logically, the ultimate information about the impulse is to be presented in conclusions (4.).

2. Data and methods

The materials and methods used are directly determined by the key purpose and chief objective of this paper, i.e. to explore the information provided by the Internet pages of twenty Czech luxury fashion businesses in January 2021 in order to determine what impulse is COVID-19 for their sustainability, CSR and ethics. Namely, what message in this respect do their Internet pages convey during the COVID-19 pandemic. The selection of the Internet pages is obvious, i.e. it is the platform par excellence used by businesses to provide information which later on can or should appear in their official annual and CSR reports. To put it differently, since official reports regarding 2020 are to be expected in

summer 2021 or even later, during the 1st half of 2021, the COVID-19 and sustainability approach is to be (pre)detected based on their Internet pages. To address this objective, a holistic, interdisciplinary and critical case study exploration of these Internet pages is performed while using a simplified panel Delphi method with Meta-Analysis (Silverman, 2013) and content analysis (Kuckartz, 2014), and teleological interpretations. The focus is three-fold and consequently for each of the mentioned three dimensions an appropriate standard was used: 17 SDGs for sustainability, 6 categories for CSR and 3 kinds of ethics.

It is pivotal to take a holistic approach to these Internet pages in January 2021 along with Meta-analysis (Silverman 2013), which is the technique par excellence for such a study, because it is founded upon the conviction that more information is available than conventionally admitted and realized (Schmidt & Hunter 2014), especially considering the scientific model of both direct and indirect causality (Heckman 2005) and exactly this applies to the study of Internet pages. The information located on these Internet pages calls for a descriptive analysis, while using a combination of text analysis, also known as content analysis (Kuckartz 2014), which makes replicable and valid inferences about texts and is considered an established research method, even with respect to business ethics and CSR issues (Arora et al., 2020; MacGregor Pelikánová 2019; Sroka & Lörinczy, 2015; Petera et al., 2019, Pakšiová, 2016). The selected advanced text analysis complementarily involves content quantitative and qualitative methods and is perhaps the biggest challenge of this project and relies on the synthesis and teleological interpretations (MacGregor Pelikánová 2019). Therefore, the quantitative content analysis based on automatic word scanning is rejected and instead the qualitative content analysis based on reading via a simplified panel Delphi method with a manual scoring is used with respect to a large part of the segment of Czech luxury fashion businesses. Hence 20 Czech luxury fashion businesses with their Internet pages were to be explored, see Table 1.

Table 1: Case Study – Twenty Czech fashion businesses and their key parameters

	Type	Origin	2018 or 2019 Turnover in CZK	Domain – URL
Alpine Pro	Top outdoor	1994, Brno	735 million	Alpinepro.cz
Bandi Vamos	Men formal	2012, Ostrava	320 million	Bandi.cz
Blažek Praha	Men formal	1997, Praha	564 million	Blazek.cz
E Daniely	Formal	1991, Praha	less than 40 million	Edaniely.cz
E.L. fashion design	Women formal	2000, Praha	42 million	Elodevysperky.cz
Evona	Underwear	1992, Chrudim	147 million	Evona.cz
Kama	Knitwear	1989, Praha	40 million	Kama.cz
Kara Trutnov	Formal leather	1997, Trutnov	351 million	Kara.cz
Koutný Prostějov	Mens formal	1995, Prostějov	435 million	Koutny.cz
Litex	Sportwear	1991, Litomyšl	Less than 40 million	Litex.cz
Modestia	Formal	1996, Praha	Less than 40 million	Modestia.cz
Moira	Underwear	2001, Praha	97 million	Moira.cz
Pietro Filipi	General fashion	1998, Praha	431 million	Pietro-filipi.com
Pleas	Underwear	1994, Havlíčkův Brod	1 059 million	Pleas.cz
Styx	Underwear	1996, Praha	12 million	Styx-underwear.cz
Timo	Underwear	1992, Praha	120 million	timo.czthe
Tonak	Hats	1990, Nový Jičín	436 million	tonak.cz
Triola	Underwear	1994, Praha	138 million	Triola.cz
Verino	Formal	1996, Brno	less than 40 million	Verino.cz
Volansky Fashion	Formal	1996, Hodonín	55 million	volansky.cz

Source: prepared by the Author based on her own research of the Internet – domains of businesses and justice.cz

Each and every one of these Internet domains with its information is explored to consider the possible impulse of the COVID-19 (key words “COVID”, “coronavirus”, face masks”) for each of the mentioned related three spheres. Firstly, the impulse for sustainability is assessed based on the information about 17 SDGs: (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being, (4)

Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reducing Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals.

Secondly, the impulse for CSR is assessed based on the well-established 6 CSR categories:

- environment protection;
- employee matters;
- social matters and community concerns;
- respect for human rights;
- anti-corruption and bribery matters;
- R&D activities.

Thirdly, the impulse for ethics, i.e. to a system of moral principles of the given business (Sroka & Lörinczy, 2015), is assessed based on 3 kinds of ethics (Hooker, 1996; Law, 1999):

- Bentham utilitarian or consequentialist ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”);
- Kantian deontological ethics based on science of duty focusing rather on good intention than consequences (“good intention”)
- Aristotelian ethics about how to live the good life (“good sense of human life”).

A panel of three independent experts checked and read information on the mentioned 20 Internet pages and used scoring (+) or (++) or (+++) regarding the presence and depth of engagement with the sustainability (SDGs), CSR (6 categories) and ethics (3 kinds), while following a universal set of guidelines and simple questionnaires prepared by the Author. Namely, weak, general and/or not verifiable statements received (+), while moderately concrete and verifiable got (++) and detail oriented, verifiable and actionable earned (+++) (Van Tulder et al., 2016). All three experts (RKM, LM, EDC) have experience in this respect and a strong law and/or economic background. Two of them are women (LM, EDC) and one is a man (RKM). Thus, their scoring met the expertise expectations, and possible heuristic shortcomings were overcome after cleaning scoring discrepancies in the first and second rounds. In order to maintain the homogeneity, no interviews or other more ephemeral methods have been employed, i.e. the consistency and academic robustness have been boosted by the strict reliance on the semi-official and quasi permanent inside online resources freely available to the large public – internal Internet pages.

3. Results and Discussion

The internet page of each of the 20 Czech luxury fashion business was approached and the included information was analyzed and scored, while separately paying attention to COVID19 as the impulse for each of the three dimensions. The simplified panel Delphi method brought highly interesting results offering a pathway for a relevant discussion. Table 2, below, indicates whether and how COVID-19/coronavirus/face masks were mentioned by these Internet pages on January 5th, 2021.

Table 2: Information related to the COVID-19/coronavirus/face masks on Internet pages ... as an impulse for sustainability (SDGs)

	Domain - URL	COVID/coronavivirus
Alpine Pro	Alpinepro.cz	Offering COVID gel – business (CZK 99)
Bandi Vamos	Bandi.cz	0
Blažek Praha	Blazek.cz	0
E Daniely	Edaniely.cz	0
E.L. fashion design	Elodevysperky.cz	Offering face masks – business (CZK 260)
Evona	Evona.cz	Offering face masks for FREE (Chrudim) – local charity
Kama	Kama.cz	Offering face masks – business (CZK 160)
Kara Trutnov	Kara.cz	0
Koutný Prostějov	Koutny.cz	0
Litex	Litex.cz	Offering face masks – business (CZK 99)
Modestia	Modestia.cz	0

Moira	Moira.cz	Offering face masks – business (CZK 100)
Pietro Filipi	Pietro-filipi.com	Offering face masks – business (CZK 130)
Pleas	Pleas.cz	Offering face masks – business (5 for CZK 250)
Styx	Styx-underwear.cz	Offering face masks – business (4 for CZK 299)
Timo	timo.cz	Offering face masks – business (CZK 199)
Tonak	tonak.cz	0
Triola	Triola.cz	Offering SPECIAL nano face masks – Czech patent (1 mask + 10 filters = CZK 299)
Verino	Verino.cz	0
Volansky Fashion	volansky.cz	0

Source: prepared by the Author based on her own research of the Internet – domains of businesses

Only Evona and Triola demonstrated, via their Internet pages, indices to use COVID-19 as an impulse for sustainability, CSR and ethics. The search for heuristic ad hoc expanded, i.e. names of these twenty businesses along with pre-selected key words (COVID, coronavirus, face masks) were put in in the Internet browser. The search brought forth the following additional information:

- Blažek Praha became, due to COVID-19 insolvent;
- E.Daniely produces face mask without any profit;
- Kara is behind in its rent payment;
- Koutný Prostějov does face masks for saving corps;
- Pietro Filipi is behind in rent payments;
- Pleas did one million face masks;
- Tonak allegedly overcharged the town Nový Jičín with respect to face masks.

Therefore, the extended results could be summarized as follows. 11 out of 20 businesses do not provide any indices about the COVID-19 impulse. In contrast, 9 out of the 20 businesses reported about the COVID-19, but only 2 via their Internet pages (Evona, Triola). Regarding the remaining 7, COVID means serious insolvency potential/issue for 3 of them (Blažek, Kara, Pietro Filipi), while for other 3, COVID means an impulse for a larger production of masks (Pleas), but without profit (E.Daniely, Koutný Prostějov). A dark sheep is allegedly Tonak, which arguably used COVID-19 and the dramatic need for face masks as an “opportunity” to produce and sell to the municipality overpriced face masks, see https://www.idnes.cz/ostrava/zpravy/rouska-cena-mesta.A200325_540685_ostrava-zpravy_woj ex. These results, especially regarding the 6 businesses dealing in particular with COVID-19 (E.Daniely, Evon, Koutný Prostějov, Pleas, Tonak, Triola) have to be subjected to the discussion regarding all three dimensions.

3.1 COVID-19 as an impulse for sustainability - 17 SDGs perspective

COVID-19 is a sustainability impulse for 2 out of 20 businesses, based on their Internet domain, and for another 4 out of 20 businesses, based on a general Internet search. Table 3, below, summarizes the involved sustainability type, i.e. indicates appropriate SDGs. A clear prevalence goes to SDG 3 Good Health and Well-being, SDG 9 Industry, Innovation and Infrastructure, SDG 11 Sustainable Cities and Communities, SDG 16 Peace, Justice, and Strong Institutions and SDG 17 Partnerships for the Goals.

Table 3: COVID-19 as an impulse for sustainability (17 SDGs)

Business	COVID-19 related action	SDG
E Daniely	Masks without profit	SDG 3, SDG 17
Evona	Masks for free (Chrudim)	SDG 3, SDG 9, SDG 11, SDG 16, SDG 17
Koutný Prostějov	Masks for saving corps	SDG 3, SDG 17
Pleas	Massive production of masks	SDG 17
Tonak	Overcharging for face masks	Anti SDG 1, Anti SDG 3, Anti SDG 12, Anti SDG 17
Triola	Special nano face masks (patent)	SDG 3, SDG 9

Source: own processing of the Author based on the business domains (Evona and Triola) and generally Internet.

Manifestly, COVID-19 represents only an extremely weak impulse for sustainability for the Czech luxury fashion businesses. Naturally, businesses facing insolvency and bankruptcy could hardly be expected to engage in massive sustainable endeavors. However, the large majority of the observed businesses are not in such a disastrous financial situation and could/should do much more towards sustainability. In addition, even if they get into it, they seldom report about it on their Internet pages. This sad result confirms prior studies proposing a dramatic information asymmetry between businesses and SDGs (Balcerzak & MacGregor Pelikánová, 2020; Bali & Fan, 2019).

3.2 COVID-19 as an impulse for CSR – 6 CSR categories perspective

COVID-19 is a CSR impulse for 2 out of 20 businesses, based on their Internet domain, and for another 4 out of 20 businesses, based on a general Internet search. Table 4, below, summarizes the involved CSR type, i.e. indicates appropriate CSR categories. Out of 6 well established CSR categories, the involved are employee matters, social matters and community matters (Evona) and R&D (Triola), while surprisingly other categories, including environment protection, are totally omitted.

Table 3: COVID-19 as an impulse for CSR (6 CSR categories)

Business	COVID-19 related action	SDG
E Daniely	Masks without profit	Employee matters, social matters and community concerns
Evona	Masks for free (Chrudim)	Employee matters, social matters and community concerns
Koutný Prostějov	Masks for saving corps	Employee matters, social matters and community concerns
Pleas	Massive production of masks	Employee matters, social matters and community concerns
Tonak	Overcharging for face masks	Anti - social matters and community concerns
Triola	Special nano face masks (patent)	Employee matters, social matters and community concerns, R&D

Source: own processing of the Author based on the business domains (Evona and Triola) and generally Internet.

Manifestly, COVID-19 represents only an extremely weak impulse for the CSR for the Czech luxury fashion businesses. Naturally, businesses facing insolvency and bankruptcy could hardly be expected to engage in massive CSR endeavors. However, the large majority of the observed businesses are not in such a disastrous financial situation and could/should do much more for CSR. Well, at least some studies propose that customers expect that very strongly (Cerchia & Piccolo, 2019). Much appreciation is deserved by Evona with its altruistic social matters and community concerns and Triola with its pioneering CSR approach focusing on R&D and co-operating in this respect with its daughter company Nano Medical s.r.o, along with Ms. Marcela Munzarová. In particular, it is AntiMicrobe Web R with the 99.9% catchment of viruses and bacteria and with a high air permeability.

3.3 COVID-19 as an impulse for ethics – 3 kinds of ethics

COVID-19 is a ethics impulse for 2 out of 20 businesses, based on their Internet domain, and for another 4 out of 20 businesses, based on a general Internet search. Table 6, below, summarizes the involved ethics type, i.e. indicates appropriate kinds of ethics. A clear prevalence goes to the Bentham utilitarian ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”).

Table 6: COVID-19 as an impulse for ethics (3 kinds of ethics)

Business	COVID-19 related action	
E Daniely	Masks without profit	Bentham utilitarian ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”);

Evona	Masks for free (Chrudim)	Kantian deontological ethics based on science of duty focusing rather on good intention than consequences (“good intention”)
Koutný Prostějov	Masks for saving corps	Bentham utilitarian ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”);
Pleas	Massive production of masks	Bentham utilitarian ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”);
Tonak	Overcharging for face masks	Bentham utilitarian ethics based on “felicific calculus” focusing rather on good consequences (“good consequences”)
Triola	Special nano face masks (patent)	Aristotelian ethics how to life the good life (“good sense of human life”).

Source: own processing of the Author based on the business domains (Evona and Triola) and generally Internet.

Manifestly, COVID-19 represents only an extremely weak impulse for the ethics for the Czech luxury fashion businesses. Naturally, businesses facing insolvency and bankruptcy could hardly be expected to engage in massive endeavors motivated by ethical “duties”. However, the large majority of the observed businesses are not in such a disastrous financial situation and could/should do much more in the sphere of ethics. In addition, even if they get into it, they seldom report about it on their Internet pages and they are more inclined for the utilitarian attitude.

4. Conclusion

Arguably, COVID-19 is a unique impulse for a deeper engagement in sustainability, CSR and generally more ethical behavior by businesses, especially if these businesses build their strategies on shared values. However, it does not seem to be the case of Czech luxury fashion businesses, at least based on their non-official presentation regarding their non-financial performance. The involved case study has its limitations – a rather small sample, no longitudinal aspect, no double checking by official statements, interviews and businesses patters, no cross-jurisdictional comparison. Nevertheless, even before further studies are performed and published in order to address these concerns, three worrisome propositions, aka semi-conclusions, have emerged and clearly call for more explanation.

Firstly, these businesses appear not to perceive COVID-19 as an impulse for sustainability, CSR and ethics and so they do not display information in this respect on their Internet pages placed on their Internet domains. Hence, they do not perceive COVID-19 as such an impulse. Secondly, a few of these businesses engage in behavior at least reflecting certain SDGs, certain CSR categories and/or certain kinds of ethics, but this information is not posted by them. Hence, they do not perceive the potential of the COVID-19 measures and events to contribute to their values and general stakeholder reach. Thirdly, those few businesses going the extra mile (Evona with free masks, Triola with nano patent) do not earn a great deal of publicity in this respect and so most customers don’t get even a chance to learn about their endeavor and cannot positively reward it.

In sum, COVID-19 is generally perceived only as a threat and Czech luxury fashion businesses do not see any opportunity linked to it. Considering the public attitude and social trends, this is regrettable, because it would be definitely worthy to at least try to develop certain sustainability, CSR or ethical aspects and inform about it on their own Internet pages. Perhaps businesses are way too involved in their day-to-day problems, including just surviving financially, and they do not lift up their eyes and are unable to see the opportunity to be reached. Perhaps all should start with the enhancement of confidence and awareness while closely following roots – basically all Czech luxury fashion businesses succeed because of some strong personal stories and pushed values. COVID-19 is all about strong personal stories and values which have created our civilization. Blessed are they that have not seen, and yet have believed (John 20:29).

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ANALYSIS OF SUPPLY CHAIN AGILITY FOR CREATING SUSTAINABLE COMPETITIVE ADVANTAGE IN EDUCATIONAL ENVIRONMENTS

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Abstract

Educational environments need to use agile supply chains in order to maintain their survival, achieve better performance, gain sustainable competitive advantage, and help improve service and performance. Therefore, supply chain agility is offered as a strategic tool to create a competitive advantage and superior performance. The purpose of this study is to explain the role of supply chain agility in creating sustainable competitive advantage in educational environments. In this paper, a purposeful random sampling was utilized as its methodology, so that, during numerous examinations on the selection of respondents and the distribution of questionnaires among them, the necessary data and information that are of high reliability and validity were obtained. This research is applied in terms of objective and descriptive-survey in terms of data collection. The statistical population in this research is consisted of 1250 people from staff members, experts, master and doctoral students and professors working in Bushehr branch of Islamic Azad University, which by using Morgan table sample size of 192 was calculated. The instruments have been used in research were both questionnaires of Agility of Supply Chain and Competitive Advantage, which their reliability and validity have been confirmed. The results suggest that the four components of strategic cooperation, communications, information sharing and the quality of information sharing will result in competitive advantage in educational environments.

Keywords: agility, educational environments, supply chain, supply chain agility, sustainable competitive advantage

JEL codes: M11, M29

1. Introduction

Businesses operating in today's turbulent environments face different demands and needs from customers. In order to cope with the current situation, organizations have no choice but to gain a sustainable competitive advantage in order to stay safe from extreme environmental waves and to adapt to competitive requirements. Obviously, achieving this goal requires designing a very smart competitive path that is scientifically vague and socially and administratively complex. Competitive advantage is the result of a dynamic and continuous process that originates from the resources of the organization, taking into account the external and internal position of the organization (Pazooki, 2017). The main goal of this chain is to reduce costs, increase effectiveness and efficiency, and generally increase profits for all its stakeholders. Therefore, with scientific and logical management of the supply chain as one of the important components of strategic management, we can achieve a competitive advantage (Chkanikova, 2016).

Effective information processing should allow individuals and products to be coordinated in a supply chain. However, organizations are still trying to translate large data and real-time information processing into products on shelves. In fact, companies are trying to transform information processing into supply chain agility. This is because companies cannot identify old-time processes with retired technology, and, in fact, new processes must be introduced along with the changing technology paradigms (Russell and Swanson, 2019).

Educational environments need to utilize supply chains and make them more competitive in order to maintain their survival and to help improve service and performance and achieve a competitive advantage over competitors, therefore, exploring and explaining the role of supply chain agility in creating sustainable competitive advantage in educational environments is a relatively new issue that has been less studied and its results can help managers in these organizations to improve the performance of their organization.

2. Problem statement

Today's organizations operate in an environment where rapid change requires adaptive strategies. In fact, the problem of how organizations can succeed in a dynamic and unpredictable environment is one of the most important challenges in today's world. In the unpredictable and changing environment of the current era, excellence in competition is the main goal of any organization. In fact, in areas where change is unpredictable and the necessary response cannot be predetermined, flexibility should be institutionalized in the organization's processes and IT systems and brought to a new level of flexibility which is called agility (Talarpashti et al., 2017).

Supply chain agility is a type of operational capability that is used to meet the needs of an organization to carry out operational activities and channel partners to adapt or respond to market changes in a timely manner. Related activities such as the production, design, and presentation of products or services among channel members are typically included in the supply chain. Chain agility facilitates efficient and effective responses to operational changes such as market promotion, procurement, delivery and production (Aghapour-Arani and Eidi, 2019). Supply chain agility is presented as a strategic tool for generating competitive advantages and superior performance (Li et al., 2019). According to Barney (1991) a firm gains competitive advantage when its activities in the industry or market create economic value, and few firms engage in similar activities. . Barney relates competitive advantage to firm performance and argues that firms see higher-than-normal performance when they create more value than the expected value of available resources (Baraskova, 2010). Achieving competitive advantage and enhancing the organization's performance against rivals is the main goal of all the organizations that are working to achieve it (Raduan et al., 2009). Saloner et al. (2001) argue that Competitive advantage mainly means that the firm can produce services or goods that customers consider more valuable than the goods or services produced by other competitors. An organization gains a competitive advantage when it creates more value for its customers than competitors, so that customers know the organization's products and services better than other organizations (Ambe and Badenhorst-Weiss, 2010). The main goal of the supply chain is the survival of the organization in the long run in line with the main goals of the business. However, it simultaneously targets medium-high profits. So the primary goal of the supply chain is to earn profits in the organization. In other words, the focal point of the supply chain is the sustainable competitive advantage or continuity of the organization's success. In a competitive perspective, supply chain issues are increasingly becoming the focus of business and academic attention. Supply chain agility is a major issue facing organizations, especially educational organizations, in the 21st century, therefore, the purpose of this study is to explain the role of supply chain agility in creating sustainable competitive advantage in educational environments.

3. Theoretical background

3.1 Sustainable competitive advantage

In a dynamic competitive environment, an organization faces a variety of challenges. Therefore, the first objective of the organization is to create competitive advantages through the design of appropriate strategies to improve its operational performance (Deljoy-shahir, 2019).

In recent years, competitive advantage has been at the center of the discussion of competitive strategies and there has been much discussion about competitive advantage. Petraf (1993) defines competitive advantage as maintaining a higher-than-normal income. If the firm achieves a higher economic profit rate in the same market compared to the average economic profit rate, it has a competitive advantage (Hanson et al., 2016). On the other hand, Porter (2011) considers competitive

advantage within the framework of competitive strategy. He sees competitive strategy as determining the position of the firm in a competitive environment. The goal of competitive strategy is to manage the market by understanding and predicting economic factors, especially the behavior of other competitors (Jiajia, 2017). The competitive advantage is recognized as the main factor explaining the high organizational performance and is a core objective of academic management strategic studies. The link between competitive advantages is determined not only by external factors, but also by internal resources that are considered by successful organizations (Gomes and Romao, 2019).

It is clearly recognized that most organizations will need to realize competitive advantage across departments, and in the new century, it is one of their most challenging goals. According to researchers, high profits in the organization are usually the result of competitive advantage. Sustainable competitive advantage is a dynamic process that can meet current competitive demands, while not risking the organization's ability to meet its competitive needs in the future.

3.2 Agility

The word agile in the dictionary means fast, active, the ability to move fast and easy and the ability to think boldly and in a smart way, but in the current context, agility means effective response to changing and Unpredictable environment and using those changes as opportunities for organizational progress. Christopher (2008) defines agility as: the ability of an organization to respond quickly to changes in demand, in both volume and variety. Existing definitions of agility focus more on the agility of production and the agility of the supply chain, and suggest that agility is a local capability that focuses on internal processes and policies, and has the essence of reaction to change. Vernadat (1999) believes that agility can be defined as the organization's alignment with variable job needs in order to gain competitive advantage. In such an organization, the goals of the employees are in line with the goals of the organization and the two together try to respond appropriately to the changing needs of customers. The concept of agility in organizations refers to productive function and the concept of flexible production systems, and can be attributed to features such as rationality, standardization and the elimination of uncertainties (White et al., 2005).

The agility involves the use of functions such as high quality, short delivery time, flexibility, responsiveness to innovation, adaptability to change, and low cost in order to benefit in a competitive environment. Therefore, it can generally be said that the broad definition of agility in any organization is unique. The common theme is the definition of agility in organizations, the regulation and implementation of business strategies in the organization, and the ability of the organization to adapt to new developments. Therefore, agility is the ability to make timely, effective and sustainable organizational change (Chan et al., 2019).

With regard to agile organizations, it should be said that agile organizations can make changes in a timely manner because they feel or anticipate environmental changes better than their counterparts. Agile organizations make more effective changes because they better select and implement environmental needs for improvement. Agile organizations bring about more sustainable change. Any change is meaningless unless the intended problem is resolved. However, changes in agile organizations are not permanent or institutionalized; they are always subject to change and reform.

3.3 Supply chain

The term supply chain was introduced in the early 1990s. The expansion of corporate resources on a global scale requires the trust and commitment of supply chain partners, whose building and maintenance is supported by the progress of information and communication technology. In particular, the Internet plays an important role in helping companies share information alongside the supply chain to respond to changing supply and demand conditions and make informed decisions based on existing perspectives. The supply chain is a network of distribution facilities and options that perform the following functions: supplying materials, turning these materials into intermediate and final products, distributing these final products to customers. Supply chain management is a strategy through which the integration of these various functions can be achieved. The concise and comprehensive definition that can be drawn from the supply chain and supply chain management is: The supply chain consists of all activities related to the flow and conversion of commodities from the raw material stage to the

final consumer delivery as well as related information flows, and consists of components that are: supply chain and downstream supply chain (Deljoy-shahir, 2019).

Supply chain management is the coordination of production, inventory, location, and transportation between participants in a supply chain to achieve the best combination of accountability and efficiency for market success (Barzegar and Hamidian, 2018).

3.4 Supply chain agility

In today's complex and turbulent market places, the organizations and supply chains in which they operate must respond to demand instability, resources, and other factors. Definitions of agility have also evolved in recent years. To meet the challenges of market competitive advantage, a considerable amount of research on supply chain practices has been conducted to improve supply chain performance and ultimately achieve supply chain agility (Braunscheidel and Suresh, 2019). Agility is a concept that comes from the needs of new organizations and seeks to evolve past approaches such as manual production, mass production, and lean production. For this reason, the existence of an agile supply chain becomes more significant, because such a chain can react quickly and effectively to market changes (Jamali and Fallah, 2018). In order to survive in a modern business environment, companies have developed innovative technologies and business strategies to maintain a competitive advantage as well as strive to build strong relationships with suppliers and customers. Linking to suppliers depends more on the supply chain, especially when product production is complex and highly dependent on supply chains. Therefore, the competition unit is transferred from different companies to the supply chain, and supply chain agility plays an important and effective role in this regard (Wu, 2019). Lee (2004) argues that organizations are increasingly investing in agility in supply chains to respond to sudden and unexpected changes in the market. Sawford et al. (2006) argue that the agile supply chain is effective on the ability of an organization to produce and deliver innovative products to its customers in a timely manner at a cost-effective manner. Mahdi and Almsafir (2014) conducted a study titled "The Role of Strategic Leaders in Creating Sustainable Competitive Advantage in a Scientific Environment," and stated that strategic leadership abilities are needed in the new competitive landscape expected for the 21st Century. Human and social capital is the source of sustainable competitive advantage for the organization and should therefore be carefully grown and developed. The study population included all universities in Malaysia and the data collection tool was a questionnaire. The results of this research have shown that strategic leadership is effective in building sustainable competitive advantage (Mahdi and Almsafir, 2014).

3.5 Sustainable competitive advantage in educational environments

Educational environments and universities are among the dynamic institutions. They are accountable to the people, and also they are subject to the regulatory restraints imposed by their host countries. Moreover, the educational environments and the graduates they produce also act as political and economic agents, and exert influence on the government, culture and business, and on what is progressively an international political economy, the educational environment that has roles in cultural diplomacy and world trade as well as education system (Pietsch, 2019).

Educational environments, and especially universities, as one of the service organizations that take on important duties of education and promotion of the scientific and cultural level of the country, in addition to these challenging duties, they must improve the quality level of their services, and secure and improve their position in the scientific community of the country. It should be noted that the provision of desirable educational services cannot provide the possibility of achieving the objectives of these environments by its own, rather this will be achievable by providing appropriate administrative services by the educational environment as a staff sector (Gorji et al., 2010).

Paying attention to competitive advantages in the educational environment is an essential matter. Accordingly, assessment of competitive advantage should be an integral part of quality management programs in these environments. Every educational environment as a dynamic and purposeful system has two dimensions: quantitative and qualitative. The well-adjusted, proportionate and balanced growth of this system also requires the parallel growth of both quantitative and qualitative dimensions. The length of the radius of this growth depends on conducting novel educational missions (Nazari Shadkam et al., 2015).

Educational environments, as a complex cultural entity and a norm-oriented hub, help in the moral and social discipline making the society, and take on their responsibility for improving the quality of life and achieving sustainable competitive advantage and maintaining dynamism and vitality in society. These large social entities also act as the vanguard core of transitions, and through monitoring social and cultural changes, especially in the field of science and technology, empower and prepare society to dominate important future events (Mohsenpour et al., 2017).

So as to achieve a sustainable competitive advantage, educational environments always are of international dimensions in their research, teaching and serving their society, but in general, these dimensions have been more temporary, more fragmented and more implicit rather than being explicit and comprehensive. Over the past decade, the increasing globalization and regionalization of economies and societies, along with the requirements of the knowledge economy and the end of the Cold War, have established a context for a more strategic approach, and internationalization in the educational environment. International organizations such as the Organization for Economic Co-operation and Development (OECD), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the World Bank, national governments, the European Union and higher education organizations such as the International Association of Universities (IAU) have placed on top priority achieving to quality education and sustainable competitive advantage using such components as agility, innovation, knowledge management, so on. The program of internationalization reform is an important factor in changing the higher education, not only in the developed world but also in emerging and developing societies (De Wit, 2020).

Educational damages can create challenges and obstacles to learners' academic achievements. The issue of cultural differences plays an essential role in addressing the damages of educational environments, especially with the progressive globalization of schools. The complexity of this issue creates an ideal situation for a multidisciplinary approach by precisely defining the role of each effective member in improving comprehensive services for faculty, college students, families, and educational institutes. The key members of this multidisciplinary team include college management, faculty members, family members, counseling staff, college counselors, and community resources who can coordinate with the college to create individual programs to optimize student achievement that ultimately lead to competitive advantage in this globalization era (Branson, 2020).

In the 21st century, many educators of a society are call for new ideas and changes in educational environments. Since 1980's, the attention of educational experts focused on teaching and learning in educational environments. Accordingly, in the years prior to the beginning of the new century, the chairmen of 50 important universities in the United States came together to improve the quality of educational environments and curriculum planning in these environments. Because each environment had its own definition of agility and competitive advantage and the ways to achieve them, or they focused on different aspects of quality, their involvement in relating topics together often led to failure. On the other hand, the curriculum planning committees of educational environments and the managers of those environments have not had much confidence in various aspects of their responsibilities over these years, so a plan called a scientific plan was proposed. Scientific design is a new definition of achieving agility in the educational environment and has a great potential for formulating and achieving a sustainable competitive advantage, whereby achieving superior quality. The scientific plan includes why and how students learn and what they learn or do not learn. It is within a platform and context where includes not only the organization, program, mission, and discipline, but also the goals of the learner's specific characteristics. For this reason, neither the elements nor the process of competitive advantage are similar and synonymous to the scientific plan (Azadmanesh, 2005).

One of the major challenges in today's world which is effective on competitive advantage is quality assessment in the educational environment. Because with regard to the progressive growth of science and technology in the world and the dependence of many of these developments on educational environments and scientific centers, and the issue of globalization on the one hand, and increasing population growth and, consequently, increasing interest in education among various stakeholders of society, on the other hand, has created a competition in all fields, including technology, economics, etc., which led decision-maker agents at the macro level of societies to improve the situation, consider tricks to succeed in this competition such as establishing knowledge-based centers, all of which will be better accomplished only by controlling and increasing the quality in educational environments, resulting in a more constructive and more stable competition.

As Lankarad (1997) has put it forward, on the last decade, concepts such as comprehensive quality, agility, competitive advantage, comprehensive quality management and strategic management and planning have gone beyond the industrial and commercial sectors and have gained the interests in the field of education entitled continuous improvement of education quality. A “Universities at 21st Century” International Conference on Quality Control and Guarantee recommends that member states proceed to establish national accreditation bodies and institutions to control and ensure the quality of all educational institutions, involving both private and public ones. UNESCO (2000) also recommends that quality assurance processes should use both processes of self-assessment and external assessment. Considering the vital role of the educational system, which actually is to adopt effective strategies for training specialized human resources, producing new knowledge and providing specialized services and modern technology, quantitative development alone will not be enough, but, along with which paying more attention to the quality of educational environments due to limited resources, will be increasingly necessary to achieve maximum efficiency and effectiveness and to facilitate the achievement to a more sustainable competitive advantage (Khodabakhshi, 2016).

It seems that quality has a special importance and standing in the educational system. Because in the global arenas and trying to not drop behind the scene of competition in various fields, educational environments can demonstrate their effectiveness as much as possible by increasing the quality of three different phases of attracting the right forces for training through high-quality predefined input routes; training of recruited forces as a process appropriate to purposes, objectives and educational principles, involving philosophical, social and psychological ones; and finally, providing a suitable product that is the same effective and efficient workforce to society, whereby improve their productivity.

Undoubtedly, quality and sustainable competition are today the main characteristics of educational environments and "education quality" is a key factor in the hidden competition between countries, because the quality of products and services in each country is based on the way of thinking, acting, and decisions are made by educators and other educated and social groups. In the education domains, due to the greater role of human factors, increasing quality in the first way requires the participation and cooperation of all people. Nevertheless, it seems that, in practice, this principle have received little attention. According to the principle of continuous improvement in educational environments, there are always ways to increase quality, and therefore it is the duty of all members of the environment to identify and use them, in order to establish more productive competition and to achieve pre-determined objectives for that environment (Ghazavi et al., 2016).

4. Methodology

This research seeks to examine four hypotheses:

- Strategic cooperation is effective in gaining competitive advantage in educational environments.
- Communication is effective in gaining competitive advantage in educational environments.
- The level of information sharing is effective in gaining competitive advantage in educational environments.
- The quality of information sharing is effective in gaining competitive advantage in educational environments.

The statistical population of the present research is consisted of 1250 employees, experts, students studying for master and doctorate degrees, and professors working in the Islamic Azad University of Bushehr. With use of Morgan table, a sample with $n=192$ people was obtained. In this paper, a purposeful random sampling was utilized, so that, during numerous examinations on the selection of respondents and the distribution of questionnaires among them, the necessary data and information that are of high reliability and validity were obtained. This research is applied in terms of objective and descriptive-survey in terms of data collection, and with instruments such as questionnaires considering the Likert scale and interviews, the existing conditions were described, since the research was based on collected 192-person sample, it helps to test hypotheses. Cronbach's alpha test was utilized to assess the reliability of this study. The obtained Cronbach's alpha is as described in Table (1). Above values indicate that the reliability of the questionnaire is acceptable for conducting research. To analyze the data

for confirming or rejecting the hypotheses, a single sample t-test was applied; and in order to rank the variables, the Friedman ranking test was calculated and evaluated using SPSS software.

5. Findings

The analysis of the data collected in this research during two tests has been conducted in three stages. First, the collected data were examined for the normality of the research variables. Afterwards, in order to confirm and reject the hypotheses, the Pearson's correlation coefficient test was evaluated, and finally, at the third stage, the Friedman test for ranking and prioritizing research variables, was used to determine the most important and least important variables from the staff, managers and experts, graduate and doctoral students and professors viewpoint.

5.1 Testing hypotheses

Firstly, the normality test of the obtained data is examined, see table 1.

Table 1: Normality test of data

		Competitive Advantage	Agile supply chain
N		192	192
Normal Parameters ^{a,b}	Mean	95.7344	50.3542
	Std. Deviation	10.87565	5.70841
Asymp. Sig. (2-tailed)		.166	.193

Source: authors' own

Since the significance level of the research independent variable, that is agility of supply chain and the research dependent variable, that is gaining a competitive advantage are greater than 0.05, the claim of normality of the distribution for these variables is supported.

5.1.1 Strategic cooperation is effective in gaining competitive advantage in educational environments

Table 2: The relationship between strategic cooperation and competitive advantage

		Competitive Advantage	Strategic cooperation
Competitive Advantage	Pearson Correlation	1	.239**
	Sig. (2-tailed)		.001
	N	192	192

** . Correlation is significant at the 0.01 level (2-tailed).

Source: authors' own

According to the obtained result, with 95% confidence it can be stated that the first sub-hypothesis of the present study is supported, it means that, strategic cooperation is effective in gaining competitive advantage in educational environments.

5.1.2 Communication is effective in gaining competitive advantage in educational environments

According to the obtained result, with 95% confidence it can be stated that the second sub-hypothesis of the present study is supported, it means that, communication is effective in gaining competitive advantage in educational environments.

Table 3: The relationship between communication and competitive advantage

		Competitive Advantage	connections
Competitive Advantage	Pearson Correlation	1	.327**
	Sig. (2-tailed)		.000
	N	192	192

** . Correlation is significant at the 0.01 level (2-tailed).

Source: authors' own

5.1.3 *The level of information sharing is effective in gaining competitive advantage in educational environments*

Table 4: The relationship between information sharing and competitive advantage

		Competitive Advantage	Information sharing
Competitive Advantage	Pearson Correlation	1	.265**
	Sig. (2-tailed)		.000
	N	192	192

** . Correlation is significant at the 0.01 level (2-tailed).

Source: authors' own

According to the obtained result, with 95% confidence, it can be stated that the third sub-hypothesis of the present study is supported; it means that, the level of information sharing is effective in gaining competitive advantage in educational environments.

5.1.4 *The quality of information sharing is effective in gaining competitive advantage in educational environments*

Table 5: The relationship between the quality of information sharing and competitive advantage

		Competitive Advantage	Information sharing quality
Competitive Advantage	Pearson Correlation	1	.213**
	Sig. (2-tailed)		.003
	N	192	192

** . Correlation is significant at the 0.01 level (2-tailed).

Source: authors' own

According to the obtained result, with 95% confidence it can be stated that the fourth sub-hypothesis of the present study is supported, it means that, the quality of information sharing is effective in gaining competitive advantage in educational environments.

5.2 *Friedman rank test*

With the help of this test it is determined that whether the study sample groups are selected from a single population, and they are ranked based on the mean relative to each other

Table 6: The ranks of components

	Mean Rank
strategic cooperation	3.99
communications	1.37
information sharing	2.60
information sharing quality	2.03

Source: authors' own

The obtained results suggest that strategic cooperation is the most important component and has the greatest impact on gaining competitive advantage. The component of information sharing is placed in the second rank. At the lowest rank, the component of communications is placed.

The results of Friedman test showed that due to the significance level being less than 0.05, it could be said that the sample groups were selected from a single population.

Table 7: Friedman test

N	192
Chi-Square	449.546
df	3
Asymp. Sig.	.000
a. Friedman Test	

Source: authors' own

6. Discussion and conclusion

Educational environments, in terms of its work nature and internal and external processes, always needs a dynamic cycle of processes for creating, distributing, describing, and implementing strategic knowledge. Dynamics and transformation are an inseparable part of the nature of those environments. Realizing this can be achieved by boosting the capabilities and competencies of the supply chain, or at least accelerating. Therefore, it is believed that agility is a necessary attribute for future competitive pressures of educational environments and gaining competitive advantage. According to the results obtained from the four hypotheses examined here, it can be concluded that based on the value of the correlation coefficient obtained in each test between the two variables (independent and dependent) for each hypothesis, and also the obtained significance level ($p < 0.05$), it can be accepted that the agility of supply chain is effective in gaining competitive advantage in educational environments. Further, the four dimensions of supply chain agility will each have a direct significant relationship with gaining a competitive advantage in educational environments. As seen in this study, supply chain agility has had a significant impact on competitive advantage in the educational environment.

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PERCEPTIONS OF SMES FINANCING CHALLENGES: A CROSS-EUROPEAN PERSPECTIVE

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Abstract

This paper addresses the problem of financing small and medium enterprises (SMEs), approaching various aspects of financing decisions affecting the initiation, development and survival of SMEs. The present study analyses the financing opportunities available for SMEs and their importance, by categorizing European countries into three clusters, and explores the extent to which poor financing inhibits the development of SMEs by means of fixed effects panel linear regression models. Also, such models were developed to examine the factors that impact the opportunities of financing, both through the internationalization of the economy (FDI) and by facilitating financing through non-refundable grants or other innovative financing tools. The results of the study highlight the differences in countries' perceptions of the relevance of different sources of funding for solving financial problems and providing the means for the development of SMEs. They also confirm the importance of the internationalization of the economy and of the access to grant financing for the initiation and development of SMEs, with an impact on financing decisions and implicitly on the development and survival of SMEs.

Keywords: cluster analysis, cross-European perspective, financing programs, SMEs financing
JEL codes: M13, O16

1. Introduction

In the current economic context, SMEs play a particular role in the economy and social life of a country. These firms largely drive economic growth and development, contribute to poverty reduction, are responsible for solving employment problems and promoting urbanization, aspects in which they cannot be replaced by large enterprises (Duan et al., 2009). Their importance is also reflected in the statistical data: SMEs have a large share in the total number of enterprises and are responsible for a large part of the total employment in most countries (Beck, 2007). The specialized literature offers a unitary vision on the fact that the aspects related to financing represent the biggest challenges in the activity of SMEs (Beck, 2007; Cant et al., 2014; Boskov and Kokaroski, 2014; Abe et al., 2015), which are subject to these constraints to a much greater extent than large enterprises (Hollenstein, 2005). For SMEs, the attraction of external financing for internal projects is already a challenge (De Maeseneire and Claeys, 2012). Depending on the specifics of the research, the constraints include the lack of financial resources (Bourletidis and Triantafyllopoulos, 2014), lack of financial support or funding (Cant et al., 2014), cost of capital and access to funding (Beck, 2007), the inability to accumulate the necessary funds in time (De Maeseneire and Claeys, 2012), medium and long-term financing (Boskov and Kokaroski, 2014) or the ability to access and manage finance (Abe et al., 2015).

These obstacles arise at two different levels: the first includes shortcomings in the micro- and

macroeconomic environment (it refers to underdeveloped countries and, to some extent, to those in transition and developing countries), and the second comprises weaknesses of organizational capacity, specific to countries where entrepreneurial services markets (accounting, auditing, financial management etc.) are so poorly developed that SMEs cannot afford them (Boskov and Kokaroski, 2014). The dominance of banks in most financial systems of developing countries is associated with limited access to financial services for SMEs. Positive effects may occur in case of diversification and increased competition within the financial system, including effects from modern financial institutions and specialized creditors. However, smaller financial institutions are not necessarily better equipped to improve access to financial services for SMEs (Beck et al., 2013).

Funding constraints influence the innovative process in SMEs (Melane-Lavado et al., 2018) and their potential to survive and grow (Beck, 2007; Bannò et al., 2014), to develop and strengthen (Abe et al., 2015). The nature of SMEs' financial difficulties is reflected in the inability of the owners to manage working capital efficiently, underdeveloped capital markets (Abe et al., 2015) and volatile returns (De Maeseneire and Claeys, 2012).

2. Financing decisions – internal and external determinants

Decisions about what resources are needed, when they are needed and how they can be accessed are strategic decisions and elements of the driving force of entrepreneurship (Timmons and Spinelli, 2007). One of the most complex decisions a firm can make concerns the structure of capital; poor decisions in this regard lead to a high cost of capital and low profitability (Fatoki, 2014). As a result of financial constraints, small and medium-sized enterprises tend to rely more on self-financing, have low liquidity and leverage, rely more on short-term bank financing and trade credit (Cassar and Holmes, 2003). Thus, the managers of these enterprises prefer internal sources of financing to the detriment of external ones, and when the situation requires accessing the latter, they choose the least risky and demanding options (Fatoki, 2014). But the preference for equity is also determined by economic and non-economic factors. Interpersonal trust and institutional trust can play a key role; while the former is the result of cultural, inertial factors, the latter can be increased by increasing the quality of services provided by formal institutions (Dowling et al., 2019).

Empirical evidence emphasizes the importance of developing the ability to access external financial resources, which is a distinct essential skill of SMEs (Bannò et al., 2014). But, as a rule, SMEs' managers have limited knowledge of financing options, while some options are not considered acceptable, since they could lead to loss of control over management decisions (Cassar and Holmes, 2003). There was also a higher probability of discouraging SMEs in their attempts to apply for loans in case of a refusal by the bank, compared to large companies (Chakravarty and Xiang, 2013). Better information management would facilitate not only access to credit, but also to more favorable financing conditions (Abe et al., 2015).

The main impediments to accessing external capital sources are the following: information asymmetries (Beck, 2007; Duan et al., 2009; De Maeseneire and Claeys, 2012), transaction costs (Cassar and Holmes, 2003), lack of guarantees due to limitations regarding fixed investments (Bannò et al., 2014; Cant et al., 2014), lack of financial reports (Cant et al., 2014) and deficient accounting system (Abe et al., 2015). Financing decisions and, consequently, the structure of capital are also determined by aspects, such as asset structure, profitability and growth, but also firm size and risk, to a lesser extent (Cassar and Holmes, 2003). The lack of financial information can be partially replaced by the high score that banks give to customers in terms of trust and its components (Moro and Fink, 2013), or by the social ties between SMEs' managers and bank officials (Jackowicz and Kozłowski, 2019). Banks prefer to use the two main lending technologies (transactional and relationship) in a complementary way in relation to SMEs (Bartoli et al., 2013). The managers of SMEs consider it costly to resolve information asymmetries, a fact that results in a decrease of the accessible capital and an increase of its cost (Cassar and Holmes, 2003), and consequently, in a decrease of the share of external sources in total capital. The provision of better quality information (in particular, accounting information) would also remove the unpleasant effects of information asymmetry (Abe et al., 2015). A change in the situation regarding financing could occur if decisions (both of SMEs and public bodies) were aimed at maximizing working capital, reducing information asymmetries, developing capital markets and improving relations between banks and SMEs (Abe et al., 2015), so that the financing of this category of enterprises would

be no longer characterized by the words “small, frequent and fast” (Duan et al., 2009).

2.1. SMEs’ financing in conditions of macroeconomic instability

The activity of SMEs in conditions of macroeconomic instability is of particular interest, given that companies within this category are the main victims of the economic crisis. The disproportionate impact of the crisis on them occurs mainly due to financing constraints: limited financial resources, dependence on bank loans, high interest rates, etc. (Bourletidis and Triantafyllopoulos, 2014). Risk aversion restricts these firms' access to traditional sources of financing, increases the number of rejected credit applications, as well as the number of bankruptcies (Naradda Gamage et al., 2020).

There is also evidence to the contrary: the smaller the companies, the more flexible they are in terms of adapting (including financially) to the new crisis conditions compared to large companies. SMEs are more able to ensure their own sustainability and overcome the negative effects (Bourletidis and Triantafyllopoulos, 2014), possibly due to the fact that risk management is an elementary aspect of their activity (McMahon, 1998 apud Naradda Gamage et al., 2020). Other empirical evidence demonstrates the high capacity of SMEs, particularly export-oriented ones, to adapt to crisis conditions (Bourletidis and Triantafyllopoulos, 2014). The more prudent policy of banks in times of crisis, even in developed countries, is offset by the lower demand for loans from SMEs, as a result of reduced activity and investment projects (Kremp and Sevestre, 2013).

In general, mainstream economic theory suggests the need for government intervention in the economy in times of crisis, with a punctual impact on aggregate demand through the application of fiscal and monetary policy instruments (Naradda Gamage et al., 2020), an aspect that is confirmed in the context of the current crisis caused by the COVID-19 pandemic.

2.2. Government programs for improving SMEs’ financing

Recent financial crises have influenced the development of the instruments of financing SMEs in addition to the conventional method based on bank lending. Therefore, various strategies have been implemented in order to reduce the negative impact of crises on the SMEs sector (Duan et al., 2009). Facilitating access to finance and reducing financial pressures on SMEs through governmental instruments must be part of the policy not just in times of crisis. The existence of market imperfections is a strong argument for the need of government support to finance the SMEs sector (Fatoki, 2014).

If there are no relevant programs on financing SMEs, they address informal sources to cover financial needs (Abe et al., 2015), and financial constraints that appear this way affect the survival and development of firms (Bannò et al., 2014). For this reason, many public bodies at different levels, through different instruments, use to facilitate the financing of SMEs (Fatoki, 2014), in particular through credit guarantee programs, subsidies, tax exemptions (Man and Macris, 2014; Abe et al., 2015), grants for R&D expenditures and start-ups (Man and Macris, 2014), stimulating SMEs’ orientation towards sustainability (Manolescu et al., 2019). Thanks to government aid, SMEs have access to funds at a low cost and without the need for guarantees, thus not only improving profitability, but also contributing to the initiation of larger and more complex projects (Bannò et al., 2014). There is empirical evidence that such a government program is more likely to succeed in a country with sound banking institutions and a competitive financial sector (Abe et al., 2015).

But there are also sceptical opinions on government policies regarding SMEs’ financing. On the one hand, it is considered that the role of government in the interventions through these policies (in particular, through credit guarantee programs) is not clear (Beck, 2007), while some authors suggest that government institutions should not provide direct funding (Abe et al., 2015). However, the role of governmental actions in the success of SMEs cannot be neglected (Cant et al., 2014), and given the importance of this sector for the economic and social life of a country, the development of policies and programs in this regard can be considered necessary and even vital.

2.3. Launch, survival and government aid: the case of newly established SMEs

Small, new and local enterprises (compared to foreign ones) signal a higher level of obstacles related to financing, even when other firms’ characteristics are taken into account (Beck, 2007).

As a result, start-ups are even more financially challenged than companies with minimal market experience. The start-ups' need for financing results from the need for capital investments, the provision of working capital and the need for product development (Fatoki, 2014). For the establishment, survival and success of SMEs, the key objectives refer to decisions on financial development and fundraising strategies, knowledge of available alternatives and obtaining funding (Timmons and Spinelli, 2007).

Even if market imperfections, in particular information asymmetry, prevent new SMEs from accessing formal capital markets, bank credit remains the most important source of financing for this category of firms, a source that is vital for their survival (Deloof and Vanacker, 2018). Generally, banks are considered the main partner of new SMEs in financing decisions, as they provide services related to term loans, overdraft, factoring, leasing, import and export financing and even government credit guarantee programs (Fatoki, 2014). The overdraft facility is considered the economic variable with the greatest impact on the export capacity of SMEs (Jinjarak and Wignaraja, 2013) and, consequently, their development.

Given the vital importance of financing capacity and, particularly, of external funds for new SMEs, the government programs aimed at facilitating access to funds and ensuring favorable conditions can have a decisive impact on the survival, development and success of these firms (Deloof and Vanacker, 2018).

2.4. SMEs' financing and FDI

In a globalized world, where international economic interaction is vital, foreign direct investment (FDI) is a mean of stimulating growth and job creation (Lembcke and Wildnerova, 2020), providing considerable benefits for both parties of the exchange (Tocar, 2017). FDI also has a direct impact on the activity of enterprises in the host country, particularly SMEs. It is recognized that for both developing and transition countries, FDI is a potential means of growth and diversification of the SME sector and its integration into international economic networks (Boskov and Kokaroski, 2014). There is also evidence of the impact of FDI on issues related to SME financing. FDI itself is a stable source of external financing (Edrak et al., 2014; Melane-Lavado et al., 2018), but also provides access to financial resources and intensifies the formation of internal capital (Lehmann, 2002).

An interesting aspect is related to the effects of FDI on SMEs in transition economies. On the one hand, there is evidence of the negative effects of FDI on local firms or the lack of any effects in the case of countries within this category and, on the other hand, the regulatory environment in these countries should improve the effects of the presence of FDI (Tülüce and Doğan, 2014). As for the financial assistance through grants and other financing instruments in the context of FDI, they may be targeted at those firms that are able to benefit from the transfer of knowledge from foreign firms, considering the potential for their future connection with other SMEs within the technology transfer process (Lembcke and Wildnerova, 2020).

3. Methodology

The analysis was performed on the basis of secondary data sets. For data collection, the authors used online databases of international institutions: the UNCTAD (2021) database for FDI values, the Doing Business (2021) database of the World Bank for the values of "Starting a business" scores; and the Survey on the access to finance of enterprises database (European Commission, 2021) for SMEs' financing data. Being adapted to the availability of the mentioned sources in terms of territorial and temporal coverage, the resulting dataset comprises 34 European countries and a period of nine years (2011-2019).

The investigation of the importance of different sources of funding for SMEs' financing was performed through the means of cluster analysis, within which all European countries were divided into three clusters: Western European countries (EU and non-EU), Eastern European countries (EU members) and Eastern European non-EU countries. The analysis of variance (ANOVA) was used to identify the significant difference between the countries belonging to the three clusters in terms of the use of different financing sources. The analysis of the dynamics of the importance of different sources of funding was performed for the indicators that demonstrated a high statistical significance of the differences between the clusters (indicated by the significance of the F test). The variables used in the

regression analysis, together with their description and data sources, are presented in Table 1.

Table 1. Variables used in the regression models

No.	Variable	Description	Source of data
1.	Acces2fin	Poor financing; perception of financing as the biggest problem for SMEs, % of the total number of SMEs	European Commission (2021)
2.	BankLoanRel	Relevance of bank loans for SMEs' financing, % of the total number of SMEs	European Commission (2021)
3.	GrantsRel	Relevance of grants and subsidised loans for SMEs' financing, % of the total number of SMEs	European Commission (2021)
4.	InternRel	Relevance of internal sources for SMEs' financing, % of the total number of SMEs	European Commission (2021)
5.	LeasFactRel	Relevance of leasing and factoring for SMEs' financing, % of the total number of SMEs	European Commission (2021)
6.	NofinLimit	Solving SMEs' financial problems; perception of the absence of limitations in obtaining necessary financing, % of the total number of SMEs	European Commission (2021)
7.	OverdraftRel	Relevance of credit lines and overdraft for SMEs' financing, % of the total number of SMEs	European Commission (2021)
8.	StartSME	Initiation of SMEs; the score of the "Starting a business" indicator	Doing Business (2021)
9.	TradeCreditRel	Relevance of trade credit for SMEs' financing, % of the total number of SMEs	European Commission (2021)
10.	Turnover20gr	SMEs' development; SMEs that registered an increase of the turnover over 20% in the last period, % of the total number of SMEs	European Commission (2021)
11.	ZFDIpc	Internalization of the economy; standardized amount of FDI per capita	UNCTAD (2021)

Source: author's calculations

In order to analyse the impact of different sources of financing on SMEs' development and solving financial problems, and the impact of poor financing, the internationalization of the economy and the facilitation of financing possibilities through government grants on the initiation and development of SMEs, fixed effects panel linear regression models were developed. The least squares dummy variables (LSDV) method was used for the regression analysis.

4. Results

In order to investigate the importance of each of the main sources of SMEs' financing and its dynamics, the division of European countries into three clusters was undertaken: Western European countries (EU and non-EU), Eastern European EU countries and Eastern European non-EU countries. In order to estimate the significance of the differences between the clusters regarding the relevance of different sources of SMEs' financing, the analysis of the variance (ANOVA) was performed, based on the values for 2019 (Table 2).

This analysis demonstrates concrete patterns for country clusters in terms of two sources of financing: bank loans and financing through government grants. The significance of the F test confirms the existence of significant differences between countries belonging to the three clusters regarding the relevance of the two sources of funding, which were further investigated.

A downward trend in the importance of bank loans (average values for the clusters) can be observed for the countries within all three clusters. The values of the cluster of Western European countries and those of Eastern European countries (EU members) have a similar evolution, but maintain a relatively constant distance between them, of about 10%, SMEs in Western countries giving bank loans higher importance. Non-EU Eastern European countries have a different approach in this respect: the relevance of the bank loan for this category of countries ends up being, at the end of the analyzed period, well above the average of the countries within the other clusters (Figure 1).

Regarding the financing of small and medium-sized businesses through government grants, a different trend is highlighted here (Figure 2). On the one hand, the clusters of Western and Eastern

European countries - EU members reflect a downward trend, with a gradual uniformity of data at the end of the analysed period, which reflects a unified approach regarding the regulation of SMEs' access to grants, in particular non-refundable ones, within the EU. The upward trend in the importance of grants for SMEs in non-EU Eastern European countries reflects an increase in the possibilities of accessing such funds, which characterizes an explicit policy of supporting this sector of companies.

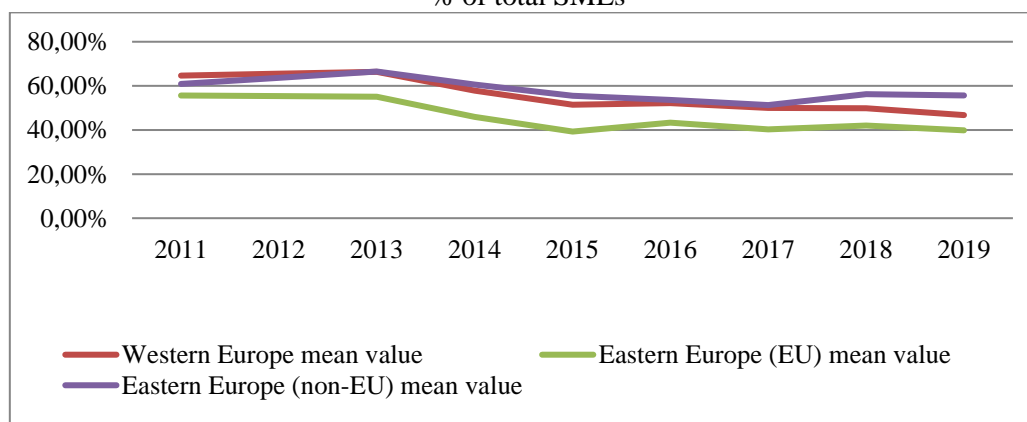
Table 2. ANOVA for the main sources of SMEs' financing, separated in clusters of countries, based on data for 2019

		Sum of Squares	df	Mean Square	F	Sig.
LeasFactRel	Between Groups	.036	2	.018	.917	.410
	Within Groups	.602	31	.019		
	Total	.638	33			
TradeCreditRel	Between Groups	.054	2	.027	.983	.385
	Within Groups	.845	31	.027		
	Total	.898	33			
BankLoanRel	Between Groups	.101	2	.051	6.575	.004
	Within Groups	.238	31	.008		
	Total	.339	33			
OverdraftRel	Between Groups	.031	2	.016	1.974	.156
	Within Groups	.247	31	.008		
	Total	.278	33			
InternRel	Between Groups	.007	2	.003	.393	.678
	Within Groups	.275	31	.009		
	Total	.282	33			
GrantsRel	Between Groups	.102	2	.051	4.318	.022
	Within Groups	.367	31	.012		
	Total	.469	33			

Source: author's calculations

For the analysis of the influences between different aspects related to SMEs' financing, a panel dataset was formed and, based on it, fixed effects linear regression models with were developed. Depending on the variables that make up these models, they can be divided into two categories: models that estimate the impact of different sources of financing on the development and solving financial problems of SMEs (Table 3; Table 4), and models that estimate the impact of economy's internationalization and of facilitating access to grants (and, eventually, poor financing) on issues related to the initiation, development and financing of SMEs (Table 5; Table 6; Table 7).

Figure 1. The dynamics of the relevance of bank loans for financing over the 2011-2019 period, % of total SMEs

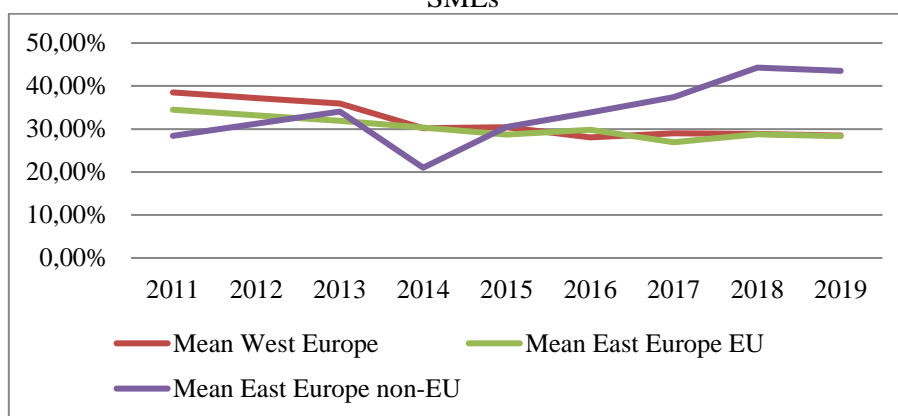


Source: author's calculations

Table 3 includes the values resulting from the regression analysis that aimed to estimate the influence of different sources of financing (internal financing, overdraft, bank loan, trade credit, leasing

and factoring, grants) on SMEs' development, reflected in the share of firms with an annual growth rate of turnover of over 20%.

Figure 2. The dynamics of the relevance of grants for financing over the 2011-2019 period, % of total SMEs



Source: author's calculations

The regression results affirm the consistency of the model in determining the evolution of the dependent variable, although the adjusted R square value is below 0.7 (moderate effect), while the R square is equal to 0.726 (strong effect). It is important that the influence of only two of the predictors proved to be significant: overdraft and bank loan, which is in line with the reports in the literature.

Table 3. Regression model for the impact of various sources of financing on the development of SMEs

Model	R Squared	Adjusted R Squared	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.726	0.685	1.271	39	0,033	17,733	,000
Parameter	B		Std. Error	t	Sig.		
(Constant)	.422	.030	13.857	.000			
InternRel	.023	.043	.526	.599			
OverdraftRel	.084	.038	2.234	.026			
BankLoanRel	-.109	.047	-2.318	.021			
TradeCreditRel	.060	.043	1.391	.165			
LeasFactRel	-.065	.041	-1.604	.110			
GrantsRel	.069	.049	1.398	.163			

Source: author's calculations. Note. Dependent variable: Turnover20gr.

Subsequently, the authors used the same set of dependent variables to determine the influence of the relevance of different sources of financing for SMEs on solving financial problems, reflected in the percentage of firms that do not notice limitations in accessing necessary funds (Table 4). The model is of a better quality than the previous one, as the value of the adjusted R square demonstrates a strong effect, as 76% of the variance of the dependent variable is explained by the predictors. Of these, however, only the influence of two proved to be significant; internal funds and bank loans truly determine solving financial problems of SMEs.

An interesting aspect is worth mentioning: bank loans have a significant negative impact both on the development of SMEs and on solving financial problems (it was expected, as bank loans are associated with limitations on accessing funds).

The influence of internationalization, access to non-refundable grants and poor financing on starting a business is reflected in the model with the highest predictive power among those developed: according to the adjusted value of R square, 80% of the variance of the country score related to starting a business is explained by the influence of independent variables (Table 5). The amount of FDI per capita has a significant positive impact on starting a SME, while poor financing (significantly) negatively influences this process.

Table 4. Regression model for the impact of various sources of financing on solving SMEs' financial problems

Model	R Squared	Adjusted R Squared	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.791	0.760	5.076	39	0,130	25,156	,000
Parameter	B		Std. Error	t	Sig.		
(Constant)	.609		.051	11.905	.000		
InternRel	.282		.073	3.867	.000		
BankLoanRel	-.517		.080	-6.506	.000		
LeasFactRel	-.014		.069	-.203	.840		
TradeCreditRel	.057		.073	.790	.431		
GrantsRel	-.133		.083	-1.597	.112		
OverdraftRel	.096		.063	1.512	.132		

Source: author's calculations. Note. Dependent variable: NofinLimit

Regarding the relationship between the mentioned factors and the development of SMEs, the situation is slightly different (Table 6). The regression analysis confirms the strong effect of the predictors on the dependent variable, the adjusted square R having a value of 0.707.

Table 5. Regression model for the impact of poor financing, the internationalization of the economy and grant financing on the initiation of SMEs

Model	R Squared	Adjusted R Squared	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.824	0.800	6393.340	36	177.593	34.226	.000
Parameter	B		Std. Error	t	Sig.		
(Constant)	85.927		1.218	70.530	.000		
ZFDIpc	2.184		.767	2.846	.005		
GrantsRel	-1.291		2.022	-.638	.524		
Acces2fin	-14.620		2.918	-5.009	.000		

Source: author's calculations. Note. Dependent variable: StartSME

The difference from the previous model is that all factors have a significant impact on SMEs' development, and the direction of the relationship corresponds to the logic of things and the arguments in the literature: internationalization and access to grants stimulates the development of SMEs, while poor financing slows it down.

Table 6. Regression model for the impact of poor financing, the internationalization of the economy and grant financing on the development of SMEs

Model	R Squared	Adjusted R Squared	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.742	0.707	1.299	36	0.036089	21.10107	.000
Parameter	B		Std. Error	t	Sig.		
(Constant)	.440		.022	19.946	.000		
Acces2fin	-.223		.053	-4.226	.000		
ZFDIpc	.040		.014	2.940	.004		
GrantsRel	.100		.037	2.734	.007		

Source: author's calculations. Note. Dependent variable: Turnover20gr

The last model investigates the relationship between internationalization and the relevance of grants on the one hand, and solving the financial problems of SMEs, on the other hand (Table 7).

The predictive power of the model is confirmed by the results of the regression analysis (the effect of the predictors on the dependent variable is strong). The estimation of the regression parameters suggests the statistical significance only of the negative impact of the importance of financing through grants on the perception of no limitations related to accessing necessary funds, the positive influence of FDI not being significant. This result can be explained by the perception of SMEs related to the limitations associated with accessing non-refundable grants.

Table 7. Regression model for the impact of the internationalization of the economy and grant financing on solving SMEs' financial problems

Model	R Squared	Adjusted R Squared	Sum of Squares	df	Mean Square	F	Sig.
Regression	0,751	0,718	4,818	35	0,138	22,660	,000
Parameter	B		Std. Error	t	Sig.		
(Constant)	,459		,041	11,218	,000		
ZFDIpc	,017		,025	,652	,515		
GrantsRel	-,228		,066	-3,470	,001		

Source: author's calculations. Note. Dependent variable: NofinLimit

3. Conclusion

The results of the analysis confirm the existence of a unitary policy at the EU level on the provision of grants to SMEs and the increasing importance of government support within the cluster of non-EU Eastern European countries (by more than 15%). The importance of bank loan for the activity of SMEs is confirmed (however, the trend is towards diminishing its importance – by about 15% for Western and Eastern Europe EU countries, and only by 5% for Eastern Europe non-EU countries), but its impact on both development and solving financial problems is negative. Overdraft, due to its role in ensuring the level of working capital and access to liquid financial resources, demonstrates a positive impact (B=0,084) on the development of SMEs, and access to internal sources of financing has a positive effect (B=0,282) on solving financial problems. The positive impact (B=2,184) of the internationalization of the economy (reflected in FDI) and the negative impact (B=-14,62) of poor financing on both the initiation and development of SMEs are confirmed. The analysis also demonstrates the positive effect of the access to government grants on the development of SMEs (B=0,069), but also its negative influence (B=-0,133) on solving financial problems, due to the conditions and limitations imposed.

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EXAMINING UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) OF E-COMMERCE USAGE BY FARMERS IN WHEAT-ORIENTED FARMS OF KAZAKHSTAN

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Abstract

There have been several empirical research efforts concerning technology acceptance in the North American and European context, but not within the Central Asian context, and more particularly in Kazakhstan. Many researchers have studied and proposed theories and models of technology acceptance with different sets of determinants and moderators to predict users' behavioural beliefs. Therefore, it is questioned whether one of the prominent technology acceptance theories/models play a significant role in prediction of e-commerce technologies and applications adoption by farmers in the Central Asian context. The aim of this study is to create the e-commerce acceptance model that can demonstrate behavioural intention and usage behaviour of the farmers in wheat-oriented farms in adopting e-commerce technologies and applications in Kazakhstan.

Keywords: e-commerce, technology acceptance model, wheat-oriented farm

JEL codes: O33, O38, Q16

1. Introduction

Kazakhstan was transitioned from a nomadic herders' country into an agricultural, industrial republic during Soviet regime. Before World War II, regulations for nomads and semi-nomads were established contributing to the improvement of the agriculture. The 50% of Kazakhstan's territory is embraced with semi-deserts and deserts, the 25% is covered with steppe lands, and the remaining quarter of the territory is covered with foothills. The 80% of the country's territory is characterized by as agricultural land, which is more than 200M hectares. However, from this territory, only 40% or 96M hectares are used for agricultural purposes. Kazakhstan is an agro-industrial country where the climate and soil of the country's north-central and southern regions are best suited for raising cattle and growing grain, however agricultural land in Kazakhstan was depleted in its nutrients during a campaign to develop virgin lands in Soviet times. This continues to affect production nowadays. Kazakhstan is one of the largest grain-oriented countries in the world, especially in wheat cultivation (Sikos and Meirmanova, 2020). Mainly hard varieties of wheat with a high gluten are cultivated in grain-oriented regions, and this sort of wheat is in a great demand in the world market. Some crops including barley, cotton, sugarbeets, sunflowers, flax and rice are cultivated in a fewer amounts.

Digitalization of all sectors of Kazakhstan, including agriculture, is the main vector of the country's development over the past few years. The trend will continue in the future. To implement the strategy for the long-term development of the agrarian sector, the Ministry of Agriculture of the Republic of Kazakhstan has developed a specialized program of strategic tasks called e-AIC. The main goal of

the e-AIC program is the introduction of the most effective and affordable tools for digitalization of agriculture to increase labor productivity by 2.5 times by 2022 compared with the level of 2017 (AKORDA, 2018). The strategy provides for a similar increase in exports of processed agricultural products. In quantitative terms, by digitalizing the country's agricultural sector, it is planned to cover the maximum number of farms in the country and create 4000 advanced-level farms, 20 digital farms (AKORDA, 2018). Also, digitalization will cover business processes of providing public services for the agricultural sector. There are a number of problems in the marketing process of finished agricultural products: poorly developed logistics, lack of granaries, lack of information on packing and sorting technologies, a long and unregulated process of searching for buyers of agricultural products. For all identified problems, experts have developed measures to improve the efficiency of business processes. These measures formed the basis of e-AIC digital development program.

The absolute value of the e-commerce market is increasing in small and medium-sized, large farms around the world. Nowadays the digital technologies of the Fourth Industrial Revolution, including AI, blockchain, cloud computing, the IoT and autonomous delivery devices (e.g. drones and robots) are shaping new business models in the e-marketplace ecosystem. Moreover, the Covid-19 crisis has accelerated the societal and economic changes by transferring and improving business conditions into e-commerce worldwide. E-marketplaces in the agriculture offer farmers a greater reach and provide them large-scale alternatives from different suppliers.

Generally, there are some quantitative and qualitative studies on the adoption of information communication technologies (ICT) by farmers (Uematsu and Mishra, 2011; Machfud and Kartiwi, 2013). At the beginning farmers were frightened by the role of ICT, however, many farmers overcome scepticism and ICT related issues, became at ease with the ICTs due to government policy frameworks in the form of education and funded technology purchases (Machfud and Kartiwi, 2013). Cecchini and Raina (2002) identified the key strategies for successful realization of government incentives: 1) the government should distinguish the needs of farmers; 2) the implementation procedure should comprise permanent participation and response from the farmers; 3) the incentives should take into consideration to the necessities of farmers of lower socioeconomic status; 4) the abovementioned measurements are productive from a community perspective. These policies can be helpful in the realization of e-commerce incentives also. On the other hand, there are some factors that can perform an impediment to realization of e-commerce strategies from farmers' side, such as: low internet connectivity, low access to hardware and software, etc.

By 2050, the e-commerce will embrace all engagements in commerce and the majority of business deals will be carried out online (Laudon and Traver, 2004). There are a number of researches aimed on perceiving and defining the determinants that impact on the acceptance and usage of information technologies, representing the significance of recognizing and identifying the main determinants that impact on the behavioural intention in e-commerce technologies usage (Venkatesh and Davis, 2000; Moon and Kim, 2001).

There is much hopefulness about the growth of e-commerce in the agricultural sector of the USA (Leroux et al., 2001). At the same, there is more optimism about German farmers' intentions to use the e-commerce for business purposes in the future. Around 70% of German farmers are willing to sell and purchase electronically (RENTENBANK, 2015). E-Choupal encourages Indian farmers to create a direct marketing channel, eliminate wasteful intermediation, thus reducing transaction costs and making logistics efficient. According to Sikos and Meirmanova (2020), different network graphs represent "how the wheat trade network is polarized around the United States of America, Canada, Russia, Ukraine, France, Australia, Argentina, Poland, Germany, Romania, India, the United Kingdom, Latvia, Lithuania, Kazakhstan, Turkey, Moldova, Bulgaria, Italy, the Netherlands, Hungary, Czech Republic, Slovakia, Austria, China, Switzerland, Belgium, Serbia, Greece, Spain, Sweden, Estonia, Finland, Denmark. In this case, e-commerce may help to meet diverse retailer and consumer preferences from different agro-climatic zones".

The agricultural market has always have been one of the free markets due to the fact that agricultural production is strongly influenced by the external environment. To better cope with external fluctuations, the agricultural market must adhere to the principles of a free market, and therefore, the principles of self-organization. Thus, the market can become a favorable environment for the introduction of an e-commerce of the commodity market. Using the e-commerce of the commodity market will help make the agricultural market more adaptive and self-organizing. Researches on the

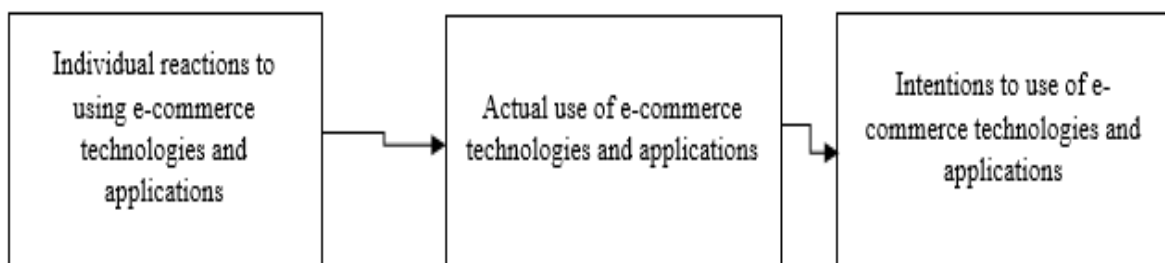
adoption of technologies in agriculture and on the innovative farmers' behaviour, their perception and knowledge have been common in western countries, but less is known about farmers' adoption behaviour, perception and knowledge regarding technologies in the non-western world (Opare, 1980).

Moreover, the literature shows some facts that the adoption of the e-commerce by farmers are based on the composition of rational, social deterministic, and behavioral reasons. From a rational point of approach, e-commerce incentives are rooted in business that leads to farmers' adoption of e-commerce strategies. From a social deterministic point of view, farmers from small and medium-sized farms rely on social reasons for making decisions on adoption of e-commerce strategies. Social determinism includes social constructs that plays a substantial role in their decision-making. From the theory of behaviorism point of view, farmers' decision on acceptance of e-commerce technologies related to their environment based on farmers' knowledge and experiences from farming. Researches show that e-commerce penetration on small-sized and medium farms was rare due to farmers' irrational reasons such as as busyness or intimidation (Machfud and Kartiwi, 2013). In the past, the Theory of Reasoned Action was used in revealing causes of the avoidance in the acceptance of e-commerce by farmers (Grandón et al., 2011). Madden et al. (1992) claim that "behavioral intentions, which are the immediate antecedents to behavior, are a function of salient information or beliefs about the likelihood that performing a particular behavior will lead to a specific outcome". The behavioral factors are the main determinants in defining farmers' perceptions on acceptance of e-commerce technologies and applications. Based on previous researches this study was triggered to investigate the behavioural beliefs of the farmers of wheat-oriented farms in e-commerce usage through UTAUT.

The unified theory of acceptance and use of technology (UTAUT) was adapted and modified as the theoretical background of this research. This model was selected due to its comprehensiveness and a strong background in explaining the various adoption factors and use of electronic commerce technologies and applications. Generally, intention or/and usage were the main dependent variables in the previous studies, which were focused on adoption of the information technologies and applications. Apparently, the technology acceptance models/theories could be focused either on usage behaviour or on behavioural intention or on both depending on whether the research conducts a cross-sectional study or a longitudinal study.

The "behavioural intention" was the main variable in the cross-sectional studies due to the technologies had never been or had just been presented; and users had no experience or at the early stage of experience in using the certain technology. One of the decisive factors determining the development of electronic commerce is access to information and communication technologies and the Internet capabilities. Today, the number of Kazakhstani internet users has reached 81% of the country's population. The infrastructure for the implementation of all types of e-commerce areas has been created. According to the UN assessment on the development of "electronic government", Kazakhstan is positioned in 28th place among 190 countries. The next stage of development is expected actively promote e-commerce services. The results of activities in this area are evidenced by the fact that the e-commerce turnover in Kazakhstan amounted to be about 700 million dollars, and from year to year it is growing at a fairly high pace, namely more than double (Kuzhukееva, 2018).

Figure 1: Basic concept of underlying user acceptance models

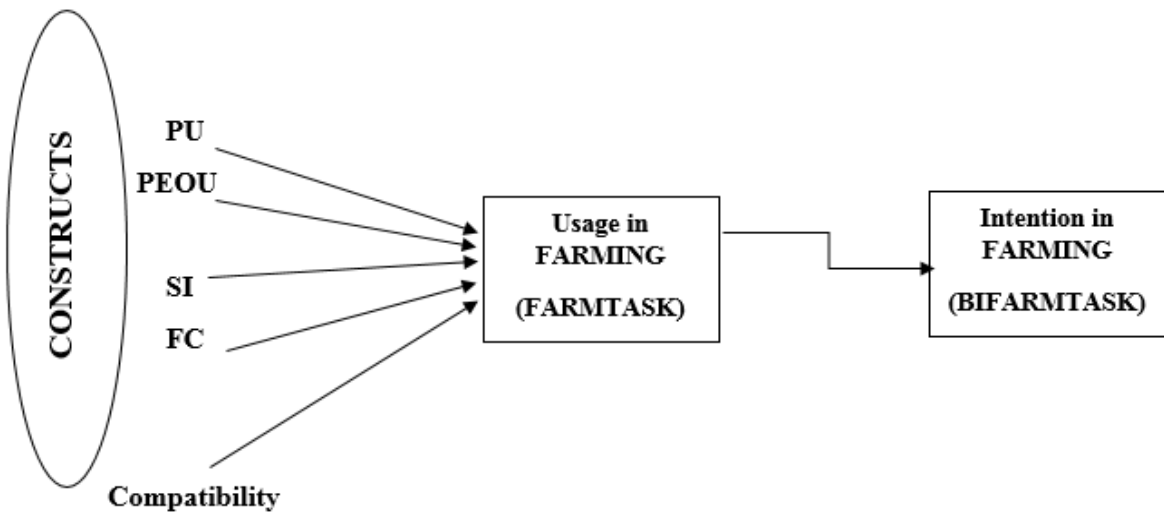


Source: Adapted from Venkatesh et al. (2003)

The conclusion from the abovementioned information that generally the Kazakhstani farmers has access to Internet and has experience in using some e-commerce technologies and applications. This research is a cross-sectional study, because the data was collected over a short period of time and "usage

behaviour" is measured as a main dependent variable due to the farmers have an experience in using e-commerce technologies and applications at a certain level. Behavioural intention is one of the main dependent variables to predict "usage behaviour" in the future. Moreover, farmers' experience in using the e-commerce technologies and applications will impact on their intention to use the extended version of e-commerce technologies more or less in the future as shown in Figure 1. The aim of this study is to create the e-commerce acceptance model that can demonstrate behavioural intention and usage behaviour of the farmers in wheat-oriented farms in adopting e-commerce technologies and applications in Kazakhstan.

Figure 2: Proposed research model



Source: author's edition

*Note: PU-Perceived Usefulness, PEOU-Perceived Ease of Use, SI-Social Influence, FC-Facilitating Conditions

The theoretical framework incorporated two main categories of variables as shown in Figure 2.

1. There are five exogenous variables (independent variables) are perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI), facilitating conditions (FC), and Compatibility. These exogenous variables are expected to impact on usage behaviour in farming (FARMTASK).
2. There are two endogenous variables (dependent variables), such as usage behaviour in farming (FARMTASK) and behavioural intention in farming (BIFARMTASK). Usage behaviour in farming is expected to impact on behavioural intention in farming.

The below-mentioned hypotheses will be tested based on the research model:

- H1: Perceived Usefulness has a positive effect on usage behaviour (FARMTASK).
- H2: Perceived Ease of Use has a positive effect on usage behaviour (FARMTASK).
- H3: Social Influence has a positive effect on usage behaviour (FARMTASK).
- H4: Facilitating Conditions have a positive effect on usage behaviour (FARMTASK).
- H5: Compatibility has a positive effect on usage behaviour (FARMTASK).
- H6: Usage behaviour in farming (FARMTASK) has a positive effect on behavioural intention in farming (BIFARMTASK).

2. Materials and methods

The total number of farms in Kazakhstan approximately is 190000 units, where wheat-oriented farms consists of 14813 units. It would be too expensive and unpractical to use all of the population in the present research. In the present study the population (N) = 14813 individuals who work in wheat-oriented farms and who has experience in using e-commerce technologies. Krejcie and Morgan (1970) state that "if the given population (N)=15,000 then sample (S) is required to be=375". Therefore, for the

present study $N=14813 \approx 15000$, then $S=375$. In this research the sample size $S=384$, where 384 individuals (farmers) were considered as the representatives of the population for generalisability.

The characteristics of farmers within wheat-oriented farms were based on gender, age, regroup of age, education level, and farm position as shown in Table 1. Demographic characteristics shows that the tally of male farmers was twice the tally of female farmers (male farmers = 66.1% and female farmers = 33.9%). The men hold primary power and predominate in agriculture in Kazakhstan due to its patriarchal society.

Table 1: Demographic characteristics of farmers

Characteristics	Group	Cases	Percentage (%)
Gender	Male	254	66.1
	Female	130	33.9
Age	18-29	80	20.8
	30-39	126	32.8
	40-49	109	28.4
	50 and above	69	18.0
Regroup of age	18-39	190	49.5
	40 and above	194	50.5
Educational level	Higher secondary school	166	43.2
	Bachelor's degree/Specialist degree	164	42.7
	Other	54	14.1
Farm position	Farm Worker	129	33.6
	Agronomist	89	23.2
	Farm Manager	94	24.5
	Other	72	18.8

Source: author's calculations

The majority tally of farmers was in the age range 30-39 years (32.8%), 40-49 years (28.4%), 18-29 years (20.8%), and 50 years up (18%). They were categorized into younger (18-39 years) and older subjects (40 years and above) to detect any differences between younger subjects and older subjects according to the study of Venkatesh et al. (2003). It reveals that older subjects was the larger group (50.5%) compared to younger subjects (49.5%) showing that the ratio of older to younger farmers is almost 1:1.

The number of farmers who graduated at Higher secondary schools (such as initial training schools, lycees, colleges – 43.2%), at Bachelor's degree/Specialist degree (42.7%), at Other (who has Master's degree/Doctoral degree – 14.1%). The lack of Master's degree or Doctoral degree among farmers is clear. The highest percentage of farm positions were farm workers (in this case, farm workers perform daily tasks that involve wheat cultivation - 33.6%) compared to agronomists (in this case, scientists who specialize in wheat production, soil control and management - 23.2%), farm managers (in this case who manages duties associated with the daily and long-term management tasks - 24.5%) and other farm positions (18.8%) as shown Table 1.

According to Hair et al. (2010), Confirmatory Factor analysis (further CFA) is considered as "a way of testing how well the measured variables represent a smaller number of constructs". CFA is applied to test the measurement model and to assess the reliability/validity of the proposed conceptual model, which consists of seven latent constructs. Latent constructs cannot be observed and measured directly. However latent constructs are measured by one or more specific items that is retrieved from the responses to questions. These measured (observed) variables are used to measure latent constructs. In the current study, seven latent constructs include five exogenous latent variables (independent variables) and two endogenous latent variables (dependent variables). The exogenous latent variables are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Facilitating Conditions (FC), Compatibility (COMP) and the endogenous latent variables are Usage Behaviour (BU), Behavioural Intention (BI). The seven constructs are measured by 28 items (20 items for exogenous variables and 8 items for endogenous variables), which are based on literature.

The first run of the model revealed the following results: $\chi^2 = 293.21$; $df = 157$; $\chi^2/df = 1.8675$; $GFI = .900$; $AGFI = .875$; $CFI = .921$; $RMSEA = .046$; $TLI = .929$. Based on the SMC (Squared Multiple Correlations) 10 measured variables were eliminated to improve the measurement model. Hair et al.

(2010) state that "the developed model validity can be improved by removing any measured variable with a low communality value (lower than 0.5)". After the 10 items were removed, the refined model gave better results over all of the goodness of fit measures: $\chi^2=107.14$; $df=68$; $\chi^2/df=1.5755$; $GFI=.970$; $AGFI=.945$; $CFI=.988$; $RMSEA=.034$; $TLI=.981$.

The assessment of the construct validity is an important phase before testing the hypotheses in the proposed model due to it may affect the results of the study (Hair et al., 2010). According to Cramer and Howitt (2004), the construct validity is considered as "the extent to which a measure assesses the construct that it is intended or supposed to measure". In the current research, Confirmatory Factor analysis (CFA) was applied to evaluate convergent and discriminant validity. The assessment of the construct validity was done using AMOS Version 21.0 (Analysis of Moment Structures). The convergent validity refers "to the extent to which measures of a specific construct should converge or share a high proportion of variance in common" (Hair et al., 2010). The discriminant validity (also known as divergent validity) refers to "the extent to which a constructor concepts is not unduly related to other similar, yet distinct, constructs" (Hair et al., 2010). The convergent validity is evaluated by using the average variance extracted (AVE). AVE refers to the amount of variance extracted by a construct as compared to its measurement error. To be more precise, AVE of a construct is the average amount of variance extracted by a construct through its indicators. Indicators and error terms are competing with each other for extracting more variance. If the construct is powerful, it will extract more than 50% of the variance ($AVE>.5$). The discriminant validity is supported by maximum square variance (MSV). On an average a construct to be valid, it should explain more variance (AVE) than the maximum variance shared by it with any other constructs ($AVE>MSV$) as shown in Table 2.

Table 2: Constructs' validity

Constructs	Cronbach's α	AVE	MSV
perceived usefulness	0.891	0.735	0.424
perceived ease of use	0.915	0.778	0.436
social influence	0.728	0.697	0.516
facilitating conditions	0.749	0.564	0.342
compatibility	0.864	0.756	0.512
behavioural intention	0.956	0.702	0.404
usage behaviour	0.785	0.504	0.360

Source: author's calculations

Internal consistency of the measurement items is crucial to maintain the quality of the study results (Sekaran, 2003). Homogeneity of the measurement items is indicated by the internal consistency of measures. Reliability which measures the consistency of the measured variables were assessed by Cronbach's Alpha. Respectively, Cronbach's alpha values were calculated for each determinant of the proposed model and alpha values as shown in Table 2 are acceptable with the threshold value 0.7 (Hair et al., 2006).

After the assessment of the measurement model and having established convergent validity, discriminant validity, reliability of constructs, the next step is to evaluate the structural model to test hypotheses (Hair et al., 2010). According to Hair et al. (2010), the Structural Equation Modelling defined as "multivariate technique combining aspects of factor analysis and multiple regressions that enables the researcher to simultaneously examine a series of interrelated dependence relationships among the measured variables and the latent constructs".

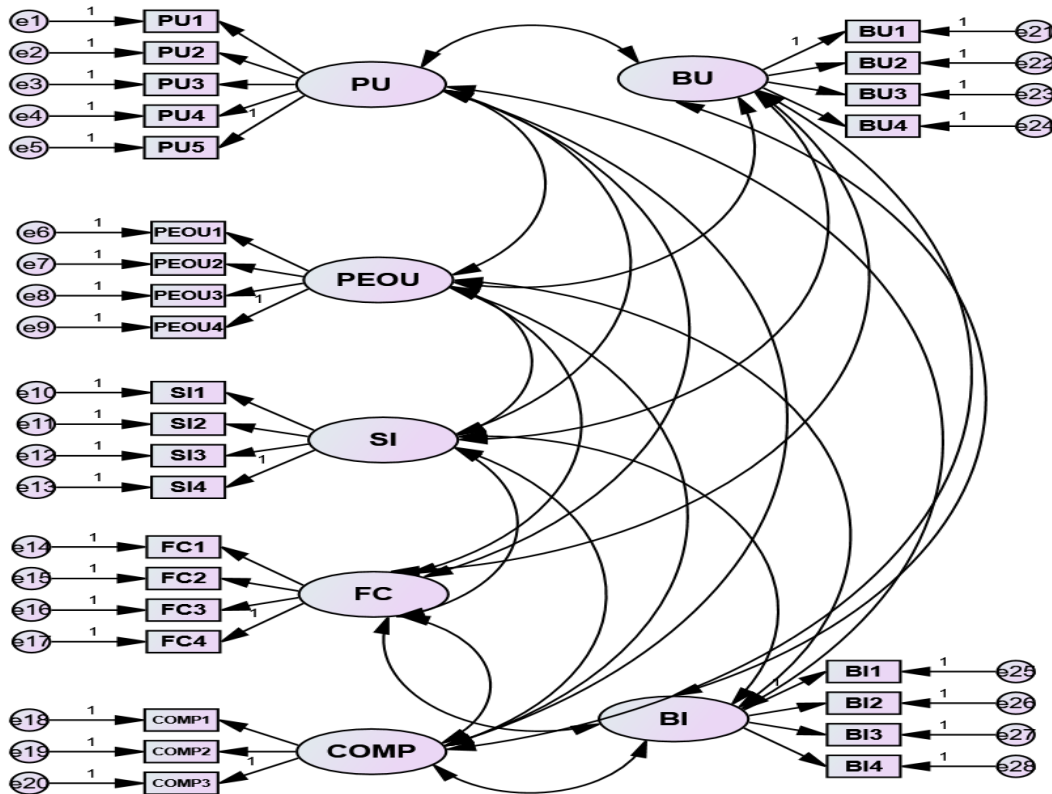
Table 3: Regression weights

Paths	Estimate	S.E. (standard error)	C.R. (critical ratio)	p value
FARMTASK <---PU	.334	.095	3.535	***
FARMTASK <---PEOU	.217	.052	3.294	***
FARMTASK <---SI	.082	.032	1.365	.143
FARMTASK <---FC	.205	.054	3.654	***
FARMTASK <---COMP	.214	.044	5.145	***
BIFARMTASK<---FARMTASK	.634	.059	9.209	***

Source: author's calculations

Byrne (2001) defined the structural model as "the relations among the unobserved variables. Accordingly, it specifies how particular latent variables directly or indirectly influence (i.e., "cause") changes in the values of certain other latent variables in the model". The structural model was represented in IBM AMOS as shown in Figure 3.

Figure 3: The measurement model representation in IBM AMOS



Source: author's edition

The chi-square goodness-of-fit test shows $\chi^2=107.14$; $df=68$, thus indicating that the model fits the data very well. The baseline comparisons fit indices of χ^2/df , GFI, AGFI, CFI, RMSEA and TLI are close to or exceed 0.9 (range: .034 to 0.988): $\chi^2/df=1.5755$; GFI = .970; AGFI = .945; CFI = .988; RMSEA = .034; TLI = .981.

Regression weights are the unstandardized coefficient estimates generated from maximum likelihood procedure (see Table 3). Ho (2006) explained, "the standard error (S.E.) of the coefficients represents the expected variation of the estimated coefficients, and is an index of the "efficiency" of the predictor variables in predicting the endogenous variable; the smaller the S.E. the more efficient the predictor variable is. The critical ratio (C.R.) is a test of the significance of the path coefficients. Each C.R. value is obtained by dividing that parameter estimate by its respective standard error, and it is distributed approximately as z. As such, a critical ratio that is more extreme than ± 1.96 indicates a significant path ($p < .05$)". Based on this criterion, four paths between independent variables and usage behaviour are statistically significant, the path between usage behaviour and behavioural intention is also statistically significant (see Table 3). Standardized regression weights (β) are standardized coefficient estimates and are independent of the units in which all variables are measured. These standardized coefficients allow the researcher to compare directly the relative relationship between each independent variable and the dependent variable. As can be shown in Table 4, the research hypotheses between exogenous variables and usage behaviour (H1, H2, H4, H5, except H3) were supported in the model. The standardized regression weights between factors and usage behaviour demonstrate statistically significant paths between PU and FARMTASK (0.257), PEOU and FARMTASK (0.314), FC and FARMTASK (0.211), COMP and FARMTASK (0.189). Thus, it can be concluded that the higher the level of perceived usefulness, perceived ease of use, facilitating conditions, compatibility

towards using e-commerce technologies and applications by farmers, the greater the extent of the e-commerce usage in farming.

Table 4: Standardized regression weights

Research Hypotheses	Paths	Estimate
H1: Perceived Usefulness has a positive effect on usage behaviour (FARMTASK).	FARMTASK <---PU	.257
H2: Perceived Ease of Use has a positive effect on usage behaviour(FARMTASK).	FARMTASK <---PEOU	.314
H3: Social Influence has a positive effect on usage behaviour (FARMTASK).	FARMTASK <---SI	.075
H4: Facilitating Conditions have a positive effect on usage behaviour (FARMTASK).	FARMTASK <---FC	.211
H5: Compatibility has a positive effect on usage behaviour (FARMTASK).	FARMTASK <---COMP	.189
H6: Usage behaviour in farming (FARMTASK) has a positive effect on behaviour intention in farming (BIFARMTASK).	BIFARMTASK <---FARMTASK	.654

Source: author's calculations

The hypothesis H6 between usage behaviour and behavioural intention was accepted, the standardized regression weight shows a stronger path between FARMTASK and BIFARMTASK (0.654). These may suggest that the higher the level of e-commerce usage, the higher the level of intention to use e-commerce in the future.

3. Conclusion

The findings of this study suggest that social environment and social norms (Social Influence) do not affect on the farmers' usage of e-commerce technologies and applications which means that farmers' views, thoughts, beliefs do not conform to the social customs and trends. In contrary, Perceived Usefulness, Perceived Ease of Use, Facilitating Conditions, Compatibility were the significant determinants on the e-commerce technologies and applications usage which means that easy-to-use, useful, reliable, flexible, user-friendly technologies and applications conform to the farmers' expectations. The generated model was well capable of explaining variances in the behavioural intention - 56.6% and usage behaviour - 41.2% without moderators.

The current research has a significant theoretical, methodological and practical contributions. From the theoretical point of view, the developed model provides a better understanding of the relationships between the core constructs and usage behaviour, as well as between the usage behaviour and behavioural intention. The first contribution, the current study is empirically confirmed by incorporating UTAUT model to the e-commerce technologies and applications acceptance by farmers in wheat-oriented farms of Kazakhstan due to UTAUT has not been widely tested outside of the North American and European context, especially in the Central Asian country context. The second contribution, the current study was tested in a new organizational scenario: in wheat-oriented farms by contradicting Venkatesh, Thong and Xu (2012) statement that "UTAUT model has served as a baseline model and has been applied to the study of a variety of technologies in both organizational and non-organizational settings". The third contribution, the main predictors examined in the current research are influenced by the perception of the farmers and farm-related tasks. Thus, examining farmers working in the farm context contributes to the IT adoption literature in the agricultural field. In terms of methodology, the objectives of the present study were achieved through the verification of the developed model by quantitative methods. The first methodological contribution, the email questionnaires were distributed to wheat-oriented farms which are scattered within Kazakhstan. The cutting-edge technologies, such as Gmail, Whatsapp, Telegram and Messenger were used to collect information from farmers in a short time due to Kazakhstan is the ninth largest territory in the world, it would be costly to distribute questionnaires through the conventional type of mail services, e.g. letters. The second methodological contribution, the measurement items of the key predictors were rigorously purified and

checked through statistically testing their reliability and validity in the context of the Central Asian country. Previously the core constructs were elaborated in the North American and the European context, where the environment of organizations are different from the Central Asian country context. The third methodological contribution is the examination of the developed model using Structural Equation Modelling (SEM) as a method of analysis due to there is a lack of researches within the Central Asian context with employing SEM. This technique enables to create a single precise model of e-commerce technologies acceptance by farmers. The present study may play the role of guidance to other researchers on how AMOS and SEM can be used in agricultural field researches as a technique of analysis. The practical contribution is the farmers' perceptions and attitudes related to the new technology acceptance may play the role of indicators in creating the technology adoption frameworks by research institutions. The findings of the present study carry significant limitations which are relevant for future research. The first limitation is that the findings can not be generalized for the entire population of farmers in Kazakhstan due to the cluster sampling was applied in the study. For the present study, the chosen sample was targeted on the farmers who work only in wheat-oriented farms. The second limitation is that the findings should be generalized with caution in the context of other countries. The unified theory of acceptance and use of technology (UTAUT) may not produce satisfying results in other country dimensions. This study suggests several recommendations for future researches related to the adoption of e-commerce technologies and applications. The first suggestion is that the individual context, technological context, cultural context, organizational context dimensions should be considered in e-commerce technologies adoption. The second suggestion is that the developed model can be replicated for different geographical countries, especially in the Central Asian countries. The third suggestion is that the present study is only limited to e-commerce technologies and applications, therefore the future studies may replicate the developed model using different e-tools and platforms.

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REGIONAL BRANDING IN SMALL AND MEDIUM-SIZED BUSINESSES IN E-COMMERCE

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Abstract

The aim of the article is to evaluate the current situation in the field of regional branding and regional brands in the conditions of the current market based on the frequency of occurrence of the subject of research in the scientific literature. The emphasis is mainly on small and medium-sized businesses in e-commerce. The starting point is a theoretical debate focusing on regional brands and regional products. The focus of the article is bibliometric analysis. The VOS viewer method was applied in the article to analyse specific terms contained in the titles and abstracts of publications and authors dealing with this issue. Using this analysis, research on brands, regional brands, and regional branding with respect to SMEs in traditional and online trade was mapped.

Keywords: e-commerce, regional branding, SMEs, VOSviewer method

JEL codes: M15, M31, R00, R50

1. Introduction

Each region in the Czech Republic has its own unique character, given the natural wealth, culture and centuries-old traditions of its inhabitants. We can read this introductory sentence on the website of the Association of Regional Brands in the Czech Republic. The products produced in the regions are the result of the work of local people who imprint their souls on them.

Interesting products that are created in the regions can get a regional brand, of which there are dozens in the Czech Republic. Most of them are associated in the already mentioned Association of Regional Brands. Brands have a unified visual style. They are awarded under the same rules, which, in addition to the origin of the product, also emphasize the ecological characteristics of the product and regional uniqueness.

Materials related to regional labeling mention as official points of sale of regional products mainly tourist information centers, shops in museums, hotels, smaller shops or manufacturers' shops and stalls at fairs, markets, and pilgrimages. Regional brands in e-commerce are rather perceived as visions of the future. So far, these brands have been very well used in the development of tourism. However, in the current pandemic situation, this is not the case due to travel restrictions. However, the COVID 19 pandemic has accelerated the digitization of sales and increased consumer interest in e-shop offerings.

Small and medium-sized enterprises are also often characterized by their unique products, although they are not always regional brands. They often have their own special relationship with the customer. How SMEs behave in the online environment and how they participate in the offer of regional brands is the focus of our research. At the beginning of the research activity, it is necessary to evaluate the current state of knowledge of this issue. The aim of the article is to evaluate the situation in the field

of regional labeling and regional brands in the current market. Based on the frequency of occurrence of the subject of research in the scientific literature. Research questions related to the researched issue were formulated:

Q1 "What is the connection between regional brand and the brand?"

Q2 "What is the connection between regional brands and e-commerce?"

The starting point is a brief theoretical discussion focusing on regional brands, small and medium-sized enterprises, and e-commerce. The VOSviewer method was applied to specify selected terms that are included in the publications. The use of the method made it possible to find out what attention has been paid to this issue in professional publications included in the WoS database.

2. Literature review

The theoretical discussion was divided into two parts. The first part is devoted to regional brands. The second part focuses on e-commerce and its connection with regional brands.

2.1 Theoretical background of regional brand

There are several brand definitions. According to the American Marketing Association (AMA), a brand is "a name, term, designation, symbol, or design, or a combination of these terms, used to identify the products and services of one or more resellers and to differentiate them competitively." Keller (2007) points out that practitioners believe that the brand is something more. They define it as something that has already penetrated human consciousness and has its important position in the commercial sphere. The AMA definition is associated with a lowercase "z" and the managers definition with an upper case "Z." The key to creating a brand according to AMA are various elements of the brand, packaging and other features of the product or service. The brand has its value. Kotler and Keller (2013) emphasize that one of the company's most valuable intangible assets is its brands. A strong brand affects customer loyalty. Therefore, companies must master the strategic management of the brand. In practice, this means planning and implementing marketing activities that would maximize brand value. The focus of this process is brand positioning. Brand value is the value that a brand adds to its products and services. It can also represent the way the consumer thinks, his relationship to the brand, as well as price, market share and profitability that the brand brings (Kotler, Keller, 2013). Looking at the brand through the eyes of consumers is linked to their reaction to the brand and their brand awareness. The relationship to the brand is reflected in the perception of the brand and in the preferences.

According to Kotler and Keller (2007), a brand differs in its characteristics from other products or services that are intended to satisfy the same needs of customers. In the globalizing market, the opposite trend can be observed, namely the increase of regional brands (Vysekalová, Mikeš, 2010). These regional brands are intended to represent a certain quality, given the place of origin of their origin. These brands are created by local manufacturers. It serves to support local companies, which are mainly small farmers, craftsmen, and micro-enterprises. Regional brands contribute to various forms of cooperation between entrepreneurs in the region and between public authorities or nature conservation. From the environmental point of view, local production and consumption are supported and opportunities for the sustainability of tourism are expanded (Stoklasa, Starzyczna, Matušinská, 2014). According to research by Stoklasa and Starzyczna (2016), companies were not extremely optimistic about the real benefits gained by the regional brand. On the contrary, there was some disappointment, especially with the increase in demand and cooperation with other companies or gaining a competitive advantage. The best evaluations were effects related to personal recognition, increasing the prestige of the company and promotion.

Regional brands and regional labeling are addressed by researchers around the world and in various parts of them in their studies. Here are some examples. Cassinger and Eksel (2017) are involved in the development of regional brands in Scandinavia. Based on qualitative research, the authors arrived at certain changes in the planning of regional brands, namely its development in the overlapping phases of the process instead of its planning step by step. Coe (2019) deals with regional brands, especially in southern Africa and Southeast Asia. It points out its importance in terms of the region's influence on the international scene and the region's ability to obtain resources from investors and donors, or to cooperate with each other.

The effectiveness of the brand in the Russian regions is examined by Illarionov and Makarov (2018). The authors linked the development of brands with the quality of governance of regional authorities. The result was the possibility of applying a project approach to the management of regional brands and designing a model of the structural role of a regional project. Their conceptual research framework assumes a division of marketing and managerial aspects of regional branding, which according to their evaluation allows to explain the observed discrepancy between high methodological support and numerous failures in brand development in Russian regions, and thus define the direction of further development of methodology. The development of regional brands from the point of view of public administration was also discussed by Lu et al (2020) in the conditions of China, where a regional brand is sometimes the result of public authorities rather than a consequence of historical development associated with the experiences of citizens in the place.

There are studies dealing with customers' attitudes towards regional brands. The results of the studies also cover longer periods, which is useful for assessing the development trend. E.g., the Pícha and Skořepa's study (2011) presents the results from 2003-2010 and shows the growing consumer preferences for regional products in the Czech Republic and the feeling of better quality associated with local and regional products. A significant part of consumers preferred regional brands, they were interested in the composition of products, quality and impacts on their health. Margarisová et al (2018), for example, dealt with the evaluation of selected indicators associated with the purchase of regional products in the Czech Republic. The study was focused on a specific region of Český Ráj. Brand awareness of the surveyed region was 46%. The brand was most often associated with tangible products, especially food and agricultural products with a certain tradition.

On the contrary, some studies point to a lower degree of identification of regional brands in agricultural products and consumer perception, which makes it difficult to establish a brand. Models of building regional brands are being sought. Various factors that influence brand development are examined. Historical aspects, geological characteristics are verified, and households are examined. The possibilities of developing regional brands of agricultural products on the background of the Internet are being considered (Yu et al, 2018).

2.2 E-commerce and SMEs

We can consider e-commerce as a phenomenon of the time, and this can be said regardless of the current pandemic, which has further accelerated the processes of digitalization of sales and services. In Marketing 4.0, Kotler, Kartajaya and Setiawan (2016) emphasize increasing productivity in the digital world. Digital marketing thus becomes the basic concept of marketing 4.0. It is accompanied by the humanization of sales, the humanization of the brand and the use of omnichannel strategy.

E-commerce allows the use of new and advanced business models and thus becomes an integral part of the digital economy. For entrepreneurs, especially small and medium-sized enterprises, it brings new opportunities to access new markets within the domestic and international environment.

However, a study in the V4 countries confirmed that digitization is not an option but an irreversible process. Although SMEs expect positive discrimination, they know relatively little about national strategies in this area in their own countries within Industry 4.0. Clearly, the study has shown that digitization and technological progress are important opportunities for SMEs. They can reach customers they have not been able to reach before. They can better identify these customers and determine their economic potential. They can also better address the young generation, which is close to the technological aspects of the time.

Technological advances in logistics and distribution give almost every company a chance to buy, sell and collaborate on a global scale. This also applies to smaller and locally oriented companies. Case studies confirm that small and medium-sized enterprises are implementing e-commerce to find new ways to create added value. However, SMEs state that their biggest problem and limitation, apart from financial barriers, is their range, which is not always suitable for electronic commerce (Savrul, Incekara, Sener, 2014). This may also apply to regional products and their suitability for e-shops. Further research studies should also address this issue.

Researchers are studying the benefits that businesses can gain from e-commerce. At the same time, they identify barriers affecting the application in e-commerce, especially concerning small and medium-sized enterprises. If brands in the regions are important, companies can invest in sales. SMEs

therefore have a good chance of success in this area. A study of East Asian SMEs confirmed that the brand and image of companies are the most important advantage of e-commerce (Jahanshahi et al, 2013). On the contrary, security concerns are a barrier to e-commerce. This is finally mentioned in the study by Savrul, Incekara and Sener (2014), but this is a barrier that applies in general.

However, e-commerce may not only be the domain of the global market but may also benefit local businesses in a "more limited space." There is not much literature on the issue of regional brands in e-commerce. It is possible to say that this issue is less explored. Nevertheless, examples from this area of research can be given. A study was carried out in Germany (Hildenbrandt, 2015), which focused on the use of local e-commerce in the sale of bakery goods. Local e-commerce can bring several benefits for consumers and bakeries, which may not directly sell certified regional brands, but local products do. The study pointed to optimized revenue growth, higher efficiency, customer satisfaction and brand loyalty. Physical and digital channels complement each other in a way that allows consumers and producers to take advantage of local deliveries of fresh bakery wares. Researchers have tried to understand the location of e-commerce solutions, believing that trading solutions can be extended to another range or to other electronic areas. Chen (2012) and Liu (2019) are specified to Chinese regions and more attention is paid to their papers in the sections below.

The vision of subsequent research should go in this way, including the identification of cultural differences in consumer behavior, which is linked to certain traditions and customs of specific regions and local living conditions. These findings corresponded with the work of other researchers (Zhang et al. 2011, Heinemann et al. 2013; Niranjanamurthy et al. 2013).

3. Methodology

The issue of regional brands is in the center of attention of academics. A number of researches are carried out. As mentioned in the introduction, the aim of the article is to evaluate the current situation in the field of regional branding and regional brands in the current market based on the frequency of occurrence of the subject of research in the scientific literature in SMEs in e-commerce. To fulfill this goal, a bibliographic method based on VOSviewer software (hereinafter VOS) was applied, which enabled the creation of 5 scientific bibliographic maps.

VOS software is suitable for maps that contain at least a medium number of items (e.g., at least 100 items). Most programs used for bibliographic mapping do not display such maps sufficiently (Van Eck & Waltman, 2010). Because the authors of this article worked with a file larger than 100 items, they considered the VOS software to be appropriate. The mentioned software provides possibilities of visualization of objects located at a certain distance from each other. Maps in VOS are based on a cluster of documents. The distance between the individual terms indicates the strength of the bond between them. A small distance between terms means a strong link between these terms. VOS software only works with documents that are in English (Van Eck & Waltman, 2011). As mentioned above, 5 scientific bibliographic maps were created within the researched issues. Two maps were created for each of the examined areas (brand and regional brand). Maps working with the term regionalbranding were not created, as it was a collection of the same scientific literature as for the term regional sign. Furthermore, a map was created for the connection between SMEs and e-commerce.

As part of the study of the term brand, 356 articles from the Web of Science database were used for VOSviewer analysis. Articles were found by using the keyword "brand". In the area of regional brands, 356 articles were also used for the analysis. The articles were again from the Web of Science and were searched using the keywords "regional brand". The authors of the article worked with 356 articles since in the selected period (2011-2021) exactly 356 articles with the keyword "regional brand" were found via the Web of Science. The third map related to SMEs was created with the help of 137 publications, which were searched by using keywords: SMEs and e-commerce. The articles for the researched terms were selected from the years 2011–2021. The last two maps were dedicated to the authors dealing with the brand and the regional brand.

4. Results and discussion

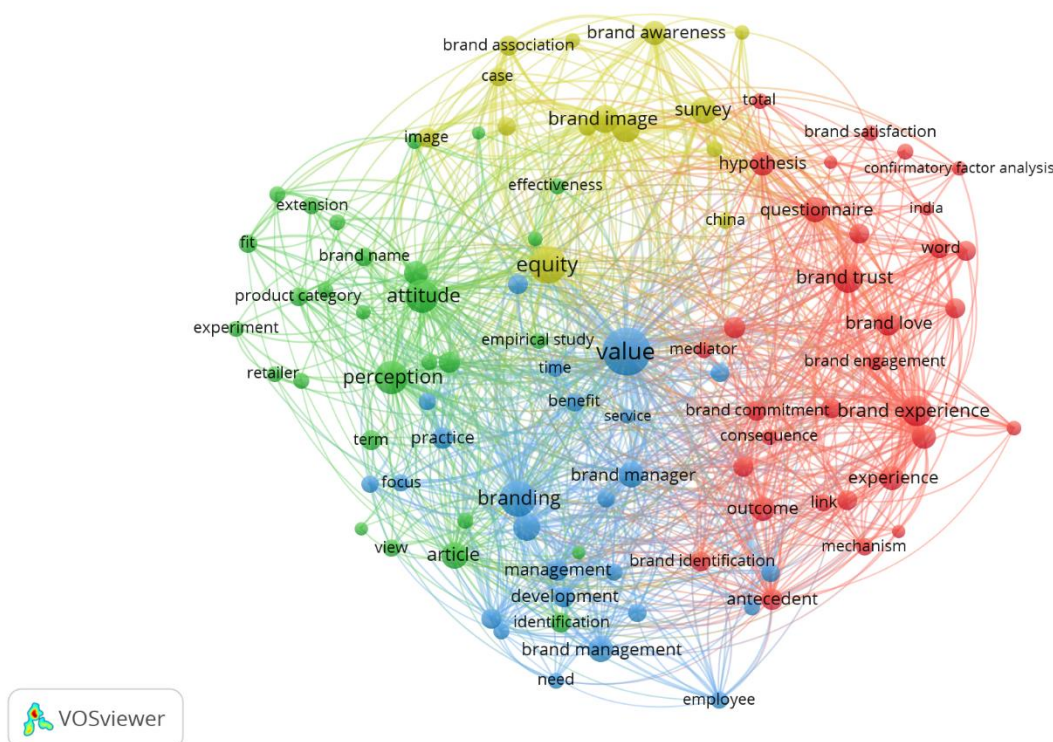
As a first step, a co-word analysis of two areas was performed (Fig. No. 1 and 2) and subsequently maps were created from the analysis, which were based on publications from the Web of Science database in the period 2011 - 2021. Cluster size indicates the number of occurrences words. The color shows the average effect of the publications. The color scale is from blue showing the lowest citation impact to red, which shows the highest citation impact.

4.1 Map of key concept brand

The map in Figure 1 is realized from 5,830 phrases occurring in at least 10 publications. Displays terms from publications that were searched in the Web of Science database using the keyword "brand". The main keywords are displayed in eight clusters: **value, brand experience, brand trust, brand image, equity, attitude, perception, and branding**. It can be seen from the figure that the term value is in the center of the map and is connected to many other terms. The brand has its value. As already mentioned in the theoretical part, according to Kotler and Keller (2013), it is one of the most valuable intangible assets of the company.

In addition to all those already mentioned, the term value is also associated with, for example: time, benefit, service, experience, management, development, brand image, etc. The other terms also have their place in the literature. Value has the strongest links with equity, brand image, brand trust, survey, brand manager, brand personality and perception, which confirms what has already been written above in the article. Another term that is most intricately connected with other terms is equity, which is confirmed by the previously mentioned Kotler's and Keller's statements.

Figure 1: Map of concepts of brand



Source: Custom processing using VOSviewer software

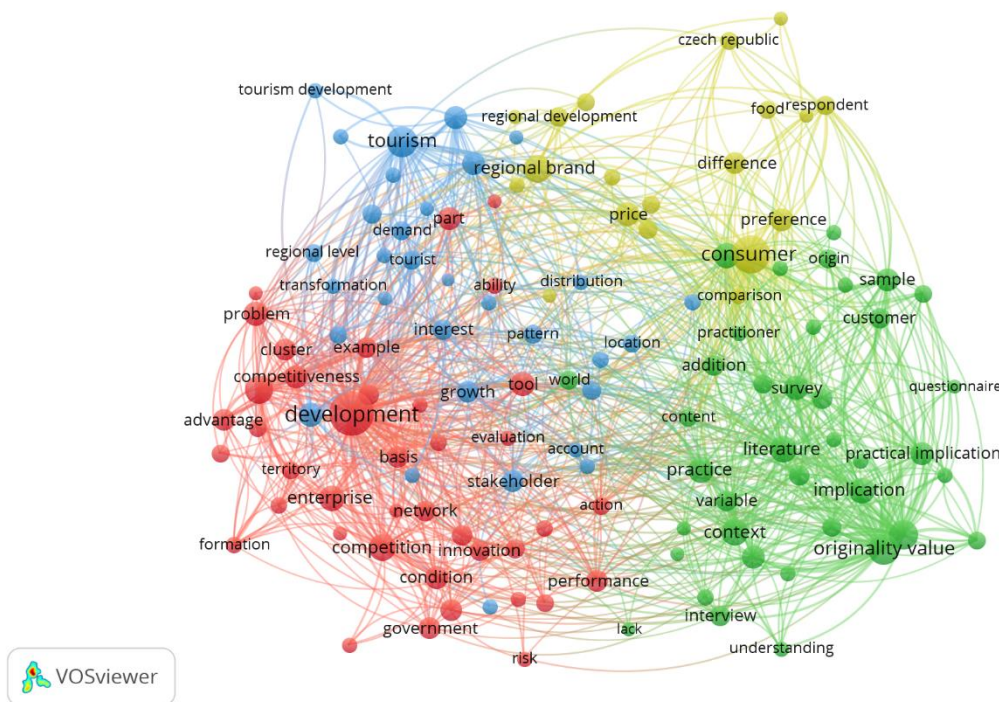
There is no term on the map that does not combine with other terms. There is less interconnection in the connection between the terms brand experience and brand trust with the terms attitude and perception. The lower connection between brand experience and perception is quite surprising. The customer's perception is associated with his experience with the brand and experience

with it. Especially in the digital world, customers can be provided with great experiences through various communication channels (Siebert et al, 2020).

4.2 Map of the terms regional brand and regional labelling

The map shown in Figure 2 is made up of 9,389 phrases appearing in at least 10 publications in the field of regional labeling. Publications that have been used to create the map include, for example, those from the following authors: Bjork, Kauppinen-Raisanen (2016), Liu et. al (2016) or Ohe, Kurihana (2013). In addition to the authors mentioned, there were also other publications in the database for creating the map. The total number of publications in the database was 356 scientific works. The most important keywords are shown in four clusters, which are: **development, originality value, consumer, and tourism.** Development relates to all other clusters and in addition is associated with concepts such as: growth, interest, enterprise, network, economy, advantage, and the like. The concept of originality value is most associated with implication, practical implication, context, and practice. On the contrary, this concept is not associated at all with, for example: economy and price. The term consumer is most strongly associated with the following terms: preference, origin, difference, price, and sample. The latter, tourism, is most associated with regional brand, destination, demand, sustainable development, culture, local community, and form. Development has the strongest ties with tourism, economy, consumer, resource, example, price, regional brand, and regional development. The concept of consumer has the strongest links with design methodology approach, development, regional brand, condition, and preference.

Figure 2: Map of terms of regional brand



Source: Custom processing using VOSviewer software

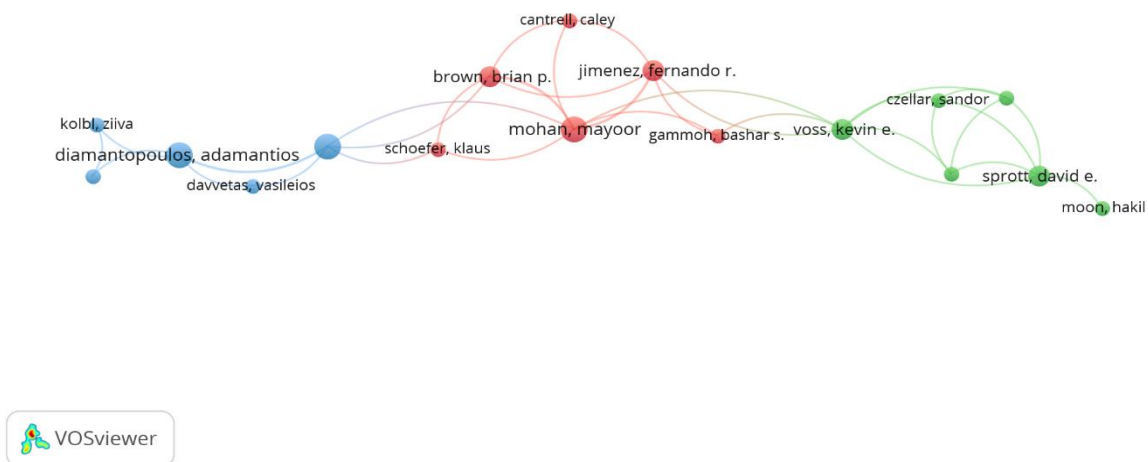
It can be said that both maps are connected by the term value. The difference, however, is that the term value is more specific in the presentation of a regional brand. The specification lies in the fact that in connection with the regional brand it is an originality value. This corresponds to what has already been written in the introductory part of the article, where the authors dealt with the definition of the term regional brand. Regional products using regional designations tend to be something original and therefore bring original value to consumers. These can be, for example, regional foods made from purely

agricultural can be considered also as SMEs, and it relates to regional brands. E-commerce could help with the knowledge of regional brands. Using the example of Fujian Province, Chen (2012) shows, among other things, the continuous building within the regional e-commerce platform and the government's support measures to enable SMEs to benefit from e-commerce. However, Chen (2012) also focuses on problems such as the insufficient logistics system or shortcomings in the electronic payment system.

4.4 Maps of authors dealing with the brand

The map of the authors dealing with the brand was created based on 356 publications. The map shows 17 authors, but it is possible to identify three main authors. It can be seen in Figure 4 that the main cluster is Mohan, who belongs to the frequently cited authors. Mohan focuses on the brand, more precisely on brand strategy and, among other things, also on B2B strategy, innovation strategy and the like. Mohan cooperates, for example, with Sichtmann, which focuses mainly on international marketing. As another co-author, Mohan can be assigned Kevin E. Voss, who focuses on the relationship of brands and research methods.

Figure 4: Map of authors dealing with the brand



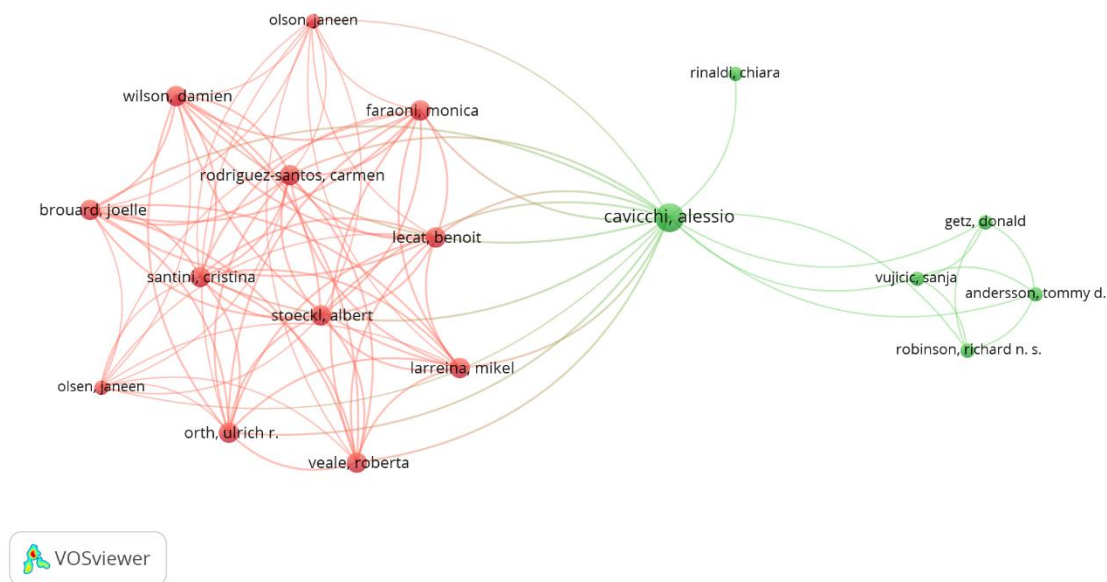
Source: Custom processing using VOSviewer software

In addition to these three main authors, it is possible to rank among other important authors that appear on the map, such as Brown, who, like Mohan, focuses on the B2B market and brand strategy. This also includes Sprott, who in his publications focuses on marketing, user psychology and the like. An important author is also Diamantopoulos, who writes similarly to Sichtmann about international marketing.

4.5 Authors dealing with the regional brand

Figure 5 shows a map of co-authors dealing with the regional brand. The map was created based on 356 publications from the Web of Science database. The map contains 18 authors in two clusters. Cavicchi can be considered the main author collaborating with everyone else. The strongest links are between Cavicchi and ten other authors, such as Lecat, who deals with luxury goods, wine marketing, etc.; Stoeckl dealing with, among other things, tourism, gastronomy, or customer satisfaction; Faraoni whose publishing area can include E-business or tourism. Among other things, she wrote several scientific papers in which she dealt with organic products and, like the authors already mentioned, wine belongs to the field of her research. Santini is involved in sustainable development, entrepreneurship and, like previous co-authors, wine. In some of his contributions, he combines tourism with gastronomy.

Figure 5: VOSviewer map of authors dealing with regional brand



Source: Custom processing using VOSviewer software

The last co-author to be mentioned is Orth, who deals with, for example, customer psychology, consumer behavior and, among other things, retail. Many of these authors also share the direction of their publications in the field of wine and wine marketing.

5. Conclusion

From the analysis of maps, which were created using VOSviewer software and scientific work, it was found that the investigated areas have a connection in the term value. However, this term is much more specific in the field of regional branding. It can be stated that researchers who deal with the brand, in their work, according to the analysis, focus on the context and terms associated with this concept, such as trust in the brand, value, brand experience, brand awareness and the like. In contrast, researchers researching regional brands are more likely to work with concepts such as: distribution, location, competition, innovation, conditions, problems, benefits, and so on. Based on the analysis, it is also clear that in the field of research of regional brands, the concept of tourism is also especially important, which is often associated with regional brands. Tourism is also one of the disciplines that brings together some of the mentioned researchers dealing with regional brands. The analysis of the co-authors also revealed that in addition to tourism, there is also a common concept of gastronomy for the area of regional brands. It was possible to notice that many of the presented co-authors also deal with this concept in their works.

This is nothing special, a significant part of products using regional brands fall into the category of food.¹

The connection between the terms in the field of regional labeling with the terms in the field of SMEs and e-commerce was also examined. This analysis revealed that regional brands / labeling has more in common with SMEs and e-commerce than with the brand. Common concepts include originality value, enterprise, customer and lack. The original value is associated with the regional brand, which is influenced by traditions and place of origin. As already mentioned, this issue is not yet in the center of researchers' attention. It can be stated that there is room for further research that could bring new knowledge about regional brands in the current market and especially the online environment.

The conducted secondary research is the first probe into the researched issues. It provided the authors with important information regarding the connection of individual terms in the field of brand and regional brand. The subsequent specific direction of research will be specified on the basis of qualitative research, which will have the nature of pre-research for quantitative research of small and medium-sized enterprises operating in e-commerce offering regional brands as well as for research of consumer behavior when purchasing regional brands.

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EVALUATION OF ENTREPRENEURIAL EDUCATION PRIORITIES IN THE CASE OF INTERNATIONAL PROJECT

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Abstract

The paper deals with entrepreneurial education by the example of the international project Entrepreneurship and Communication in Multicultural Teams (ECMT+). This project involved School of Business Administration in Karviná and further universities from six European countries. The key parts of the project were Intensive Programmes (IP) that took place once a year at a selected partner university. Each of the participating universities chose six students, who took part in thematic workshops and prepared their own business plans in international teams. Participants of the IP reflected their learning experiences in the self-reflection essays. The students evaluated chosen aspects of entrepreneurial education in the international environment. The aim of this contribution is to evaluate the importance of aforementioned aspects from the perspectives of several Czech participants using the method called analytic hierarchy process (AHP). This method enables to derive priorities of entrepreneurial education aspects viewed from students' perspective and to aggregate them. Results of this evaluation can help focus more exactly on students' needs and expectations within entrepreneurial education.

Keywords: analytic hierarchy process, entrepreneurial education, evaluation, international cooperation, priority

JEL codes: C44, I20

1. Introduction

Development of the small and medium-sized enterprises (SME) can be positively influenced by the entrepreneurship education. Modern entrepreneurship education began developing in the 70's of the 20th century in the U.S. (Kuratko, 2005). Entrepreneurship education has received various faces. Educational institutions use wide spectre of examples of learning tools: traditional lectures and seminars, students' business start-ups, consultations with entrepreneurs or behavioural simulations. Linton and Klinton (2019) showed different approaches to entrepreneurship education in the comparison of the traditional teaching with innovative methods. How Lackéus (2015) reminded, differences in the entrepreneurship education are connected with a various perception of the entrepreneurship. According to the narrow definition the entrepreneurship focuses on opportunity identification, business development, venture creation and growth etc. The wide definition emphasizes personal development, creativity, initiative taking and action orientation. Different views of entrepreneurship also influence the educational process, its aims, course content or teaching methods. Teaching based on the narrow definition of entrepreneurship leads the students to becoming entrepreneurs. The wider approach

supports students to becoming entrepreneurial. Holienka et al. (2015) showed challenges connected with wider perception of entrepreneurship education. Mentioned authors examined entrepreneurial potentials of students in different disciplines (public administration, applied informatics, pedagogy, psychology) in Slovakia. Their analysis revealed the medium and lower enterprising tendency in all analysed fields of study. Various authors dealt with students' and teachers' reflections. For example, Mason and Arshed (2013) presented experimental learning of entrepreneurship from students' viewpoint. Hannon (2018) presented an original perception of educators' perspective based on the autobiographical methods.

Central European countries have different tradition of entrepreneurship, which influences the level of education, teaching methods and students' expectations. The Czech Republic belongs to the countries with no official definition of entrepreneurship education (Eurydice Report, 2016). Procházková (2015) argued, that entrepreneurial education in the Czech Republic is still characterised by strong position of the traditional teaching methods. Cooperation on the European level opens new perspectives for the development of the entrepreneurship education. The European Commission (EC) focuses on the entrepreneurship education as one of the basic pillars of support to the entrepreneurship in Europe (Entrepreneurship Action Plan 2020, 2013). European emphasis on the education for future entrepreneurs is also connected with the support of SME. Connection between the support of SME and the entrepreneurship education on an international level is represented by various European programmes – for example Erasmus+ or Erasmus for Young Entrepreneurs. EC in the area of the entrepreneurship education recommended „*experiential learning and breaking down the more traditional hierarchies between teachers and students so that the teacher becomes more of coach and/or moderator.*” (Building Entrepreneurial Mindsets and Skills in the EU, 2012). The success rate related to enforcing of the new methods in entrepreneurial education as part of the European educational policy can be demonstrated on the example of a particular international project.

2. International Project Entrepreneurship and Communication in Multicultural Teams

The following paper focuses on the views of students who participated in the International Project Entrepreneurship and Communication in Multicultural Teams (ECMT+) within Erasmus+. Partners in the project were Karelia University of Applied Sciences, Joensuu (Finland), Technische Hochschule, Wildau (Germany), Institute of Technology Roanne, Jean Monnet University, Saint Etienne (France), University of the West of Scotland, Paisley (UK), VIVES University College, Kortrijk (Belgium), Politechnika Poznańska, Poznań (Poland), and Silesian University, School of Business Administration in Karvina (Czech Republic). Aim of the ECMT+ was the development of European entrepreneurial mind-set and international cooperation in the area of entrepreneurship education. Typical characteristic of the project was emphasis on the multicultural communication. The results of project include joint blended module and resource package for entrepreneurship education, international intensive course curriculum, research publication and teacher training workshops. Key part of the project were two-week intensive programs that took place once a year at a selected partner university. First intensive program (IP) took place in Finland in 2017. Students participated in thematic workshops and prepared their own business plans in international teams. The second IP was held in Germany. The structure and the content of this IP was very similar in the comparison with first programme. The last IP took place in France – the programme remained without significant changes. One significant change concerned the formation of student teams. Before the first IP lecturers divided students to teams according to their skills and experiences. In next years, students chose their teams during the first day of the IP and then they could develop their business ideas. The second and third IP also offered them an opportunity to get feedback for their ideas from potential customers in Berlin and Lyon.

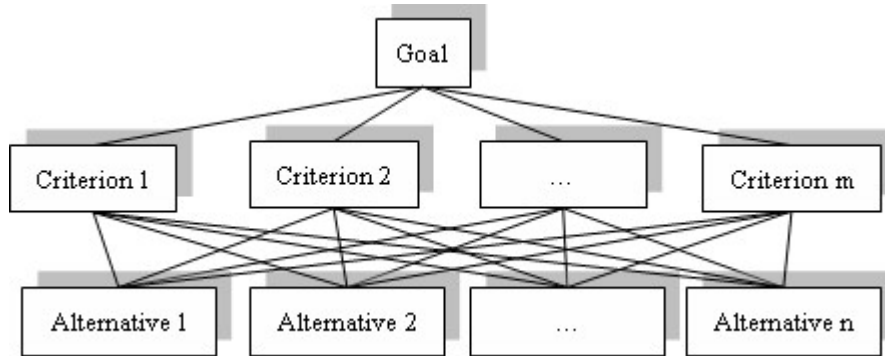
Reflections of the intensive programs were also topic of another papers. Badzińska (2017) dealt in more details with the multicultural aspects of students' teamwork. Dziamska and Grzegorzcyk (2018) analysed connection between entrepreneurship education and multicultural cooperation using the example of ECMT+ project. Badzińska and Tiimonen (2019) introduced main goals and benefits of the project with connection with educational policy of the European Union. Heinz and Chylková (2017) compared views of Czech and Finnish participants of first IP in Finland. Their paper was based on the students' self-reflective essays. Heinz and Chylková (2020) continued in their analysis of the project reflections by the comparison of views of German and Polish students who participated in second and third intensive programs. The German respondents were selected as the students with the most critical

attitudes and the hosts of the IP in 2018, the Polish team represents students from post-communist country characterized by different experiences with entrepreneurship education. The interviews with Czech participants were further source of data in their paper. The interviews were held at least after one year from active involvement of students in the IP activities. The interviews show another perspective, because some of students finished their studies and their experiences from project could be tested in a real-life and career. This paper offers different approach using the method of the analytic hierarchy process. Application of this method enables to aggregate meanings of IP participants regarding to their preference intensities.

3. Analytic hierarchy process

Analytic hierarchy process is multicriteria decision-making method. The problem is structured in a hierarchy of three (or more) levels. The goal of the problem represents the highest level, the second one belongs to criteria, i.e. substantial factors influencing the decision (or evaluation), and alternatives to be assessed are on the last level of hierarchy (see Figure 1). The criteria may be quantitative and qualitative, too. Quantitative criteria are of minimizing or maximizing character.

Figure 1: Hierarchy structure of the decision-making problem



Source: According to Saaty (1994, p. 95)

The pairwise comparisons method is used to derive unknown/undetermined weights (priorities) of objects on each hierarchy level. All objects are compared to each other by couples. If there are numerical characteristics of object, these are pair-compared. If the characteristics of objects are qualitative, the nine-point scale is applied to express the difference of preferences in couple of objects. Number one means equality, number nine represents extreme difference between objects, see Saaty (1994). See Table 1.

Table 1: The nine-point scale

Intensity of importance	Definition
1	Equal importance
2	Weak
3	Moderate Importance
4	Moderate plus
5	Strong Importance
6	Strong plus
7	Very strong Importance
8	Very, very strong
9	Extreme importance

Source: According to Saaty (1994), p. 73

Values of the pairwise comparisons represent estimation of weight ratio of two compared elements of the same hierarchic level:

$$a_{ij} = \frac{w_i}{w_j}, \quad (1)$$

where a_{ij} is value of pairwise comparison between the i -th and j -th object, w_i is weight of the i -th object, w_j is weight of the j -th object. The i -th object is equal to itself, therefore the corresponding value is 1.

There is multiplicative reciprocity between pair-compared objects:

$$a_{ji} = \frac{1}{a_{ij}} \text{ or} \\ a_{ij} \cdot a_{ji} = 1. \quad (2)$$

Other types of pairwise comparisons were suggested. For example, concepts of additive or fuzzy pairwise comparisons were researched and developed e.g. by Barzilai and Golany (1990), Chiclana et al. (2001), Gavalec et al. (2015) or Fedrizzi et al. (2020).

Values of pairwise comparisons are inserted in the pairwise comparison matrix \mathbf{A} (see Figure 2). Maximal eigenvalue λ_{\max} and corresponding eigenvector \mathbf{w} are to be calculated according to the characteristic equation:

$$\mathbf{A}\mathbf{w} = \lambda_{\max}\mathbf{w}. \quad (3)$$

Some special attributes of this matrix ensure relatively simple calculation of its maximal eigenvalue λ_{\max} and corresponding eigenvector \mathbf{w} . When normalized, i.e. $\sum_{i=1}^n w_i = 1$, element w_i of vector \mathbf{w} represents the relative importance of the i -th object.

Figure 2: General pairwise comparison matrix

$$\begin{array}{c} \text{element } x_1 \\ \text{element } x_2 \\ \vdots \\ \text{element } x_q \end{array} \begin{bmatrix} \text{element } x_1 & \text{element } x_2 & \dots & \text{element } x_q \\ 1 & a_{12} & \dots & a_{1q} \\ a_{21} & 1 & \dots & a_{2q} \\ \vdots & \vdots & \ddots & \vdots \\ a_{q1} & a_{q2} & \dots & 1 \end{bmatrix}$$

Source: Own elaboration

The pairwise comparison matrix is *square*. All n objects of given hierarchical level are compared to each other and the $n \times n$ matrix is created. It is enough to execute $(n^2 - n)/2$ pairwise comparisons with respect to the reciprocity.

The matrix is *nonnegative*, too. If pairwise comparisons are expressed by the nine-point scale, the possible values are $\{\frac{1}{9}; \frac{1}{8}; \dots; \frac{1}{2}; 1; 2; \dots; 8; 9\}$. If pairwise comparisons are expressed by real number ratio, the value may be negative. Sufficiently large positive number has to be added to all pair-compared entry values to get nonnegative matrix.

The pairwise comparison matrix is *irreducible*. That means it is not possible to rearrange the columns and rows to get zero submatrix. This attribute is ensured when expressing pairwise comparisons by the nine-point scale. If the pairwise comparison value got by the real number ratio is zero, it is necessary to add sufficiently large positive number to all entry values.

The Perron-Frobenius theorem ensures existence of the maximal eigenvalue and corresponding eigenvector including positive components for such matrix (see Meyer 2000, p. 673). The Wieland theorem is applied to derive the eigenvector, see e.g. Gavalec et al., 2015:

$$\mathbf{w} = \lim_{k \rightarrow \infty} \frac{\mathbf{A}^k \mathbf{e}}{\mathbf{e}^T \mathbf{A}^k \mathbf{e}}, \quad (4)$$

where \mathbf{A}^k is the k -th power of matrix \mathbf{A} , \mathbf{e} is vector of ones, i.e. $\mathbf{e}^T = (1; 1; 1; \dots; 1)$.

Some inconsistency may appear in pairwise comparisons. It means the following consistency condition is not satisfied:

$$a_{ij} \cdot a_{jk} = a_{ik} \text{ for all } i, j, k = 1, 2, \dots, n. \quad (5)$$

Inconsistency is measured by inconsistency index I_c . This index is calculated for $n \times n$ matrix as follows:

$$I_c = \frac{\lambda_{\max} - n}{n - 1}. \quad (6)$$

The inconsistency index must not exceed the threshold of 10 % (Saaty, 1994). In such a case the matrix is considered to be sufficiently consistent. Otherwise the pairwise comparisons have to be reassessed. Inconsistent matrices and inconsistency indices were researched e.g. by Koczkodaj et al. (2017), Mazurek (2018) or Mazurek and Ramík (2019).

Weighted sum is calculated when weights of all criteria and weights of all alternatives according to all criteria are derived:

$$w_i = \sum_{k=1}^m u_i^k \cdot v^k, i = 1, 2, \dots, n, \quad (7)$$

where u_i^k is priority of the i -th alternative with regard to the k -th criterion and v^k is priority of the k -th criterion with regard to the goal. The result is overall weights of alternatives with regard to the goal. This result gives final ranking of alternatives.

Software support for decision making is developed and commercialized. There are some free software tools. For example, Perzina and Ramík (2012) introduces DAME – Decision Analysis Module for Excel as a Microsoft Excel add-in. Online and free tool called FDA – Fuzzy Decision Analyzer for multicriteria decision making situations with uncertain data was developed and it was presented by Perzina et al. (2018).

4. Application

Research of entrepreneurial education priorities in point of students' view was provided. Participants of intensive programmes evaluated the significance and beneficial effect of chosen aspects of their workshop attendance. These aspects were based on work of Heinz and Chylková (2017).

Participants of all intensive programmes were approached about this study. The evaluation was executed by seven respondents denoted as A, B, C, ..., G. Group of Czech students participated in the project included twelve men and five women, that means 70.6 % of men and 29.4 % of women. Five men and two women from this group took part in the research, that means 71.4 % of men and 28.6 % of women. Every realized IP was represented. This sample is considered to be representative.

Respondents evaluated following seven aspects of intensive programmes:

- *Acquired knowledge about yourself* (I): What has the IP course taught you and how has it changed you as a person, a student, and a potential entrepreneur or an employee.
- *Relationship with others* (II): How did you interact with other teammates and what was your role in the team.
- *Personal development* (III): How has the IP experience stimulated your personal growth; what skills have been strengthened by the IP experience.
- *Innovative pedagogical methods* (IV): What new teaching methods have you experienced in entrepreneurial approaches.
- *Culture issues* (V): Improvement of knowledge about various cultures.
- *Impact on the future life* (VI): Perception of the impact of IP experience on your future career.
- *Language proficiency* (VII): Improvement of your language skills.

Structure of this evaluation problem is as follows: the goal is to denote the significance and beneficial effect of aspects. Second level of this structure is held by respondents – the participants of intensive programmes. The third level belongs to the evaluated aspects.

Microsoft Office Excel was used for calculations.

Respondents provided pairwise comparisons of aspects with regard to their importance. Saaty's nine-point scale was used and pairwise comparison matrices were formed. Pairwise comparison matrices of aspects and corresponding inconsistency indices are in Table 2. Original pairwise comparisons provided by person E was moderately inconsistent with the inconsistency index of 10.15 %. Respondent E was asked to reassess his/her judgements. Thus, any inconsistency index does not exceed the threshold of 10 %, therefore pairwise comparisons are considered to be sufficiently consistent.

Table 2: Pairwise comparison matrices of aspects and inconsistency indices

A $I_c = 2.26\%$

	I	II	III	IV	V	VI	VII
I	1	5	1/3	1	4	1/5	2
II	1/5	1	1/9	1/5	1	1/9	1/2
III	3	9	1	3	9	1/2	6
IV	1	5	1/3	1	4	1/5	2
V	1/4	1	1/9	1/4	1	1/9	1/2
VI	5	9	2	5	9	1	9
VII	1/2	2	1/6	1/2	2	1/9	1

B $I_c = 3.41\%$

	I	II	III	IV	V	VI	VII
I	1	3	7	7	3	3	7
II	1/3	1	2	2	1	1	3
III	1/7	1/2	1	1	1/2	1/2	1
IV	1/7	1/2	1	1	1/2	1/2	2
V	1/3	1	2	2	1	3	2
VI	1/3	1	2	2	1/3	1	3
VII	1/7	1/3	1	1/2	1/2	1/3	1

C $I_c = 4.11\%$

	I	II	III	IV	V	VI	VII
I	1	5	1	8	1/4	1	1/3
II	1/5	1	1/5	2	1/9	1/5	1/9
III	1	5	1	8	1/4	1	1/3
IV	1/8	1/2	1/8	1	1/9	1/8	1/9
V	4	9	4	9	1	4	1
VI	1	5	1	8	1/4	1	1/3
VII	3	9	3	9	1	3	1

D $I_c = 5.47\%$

	I	II	III	IV	V	VI	VII
I	1	1/5	1/5	1/7	1/3	1	1/8
II	5	1	1	1	2	5	1/4
III	5	1	1	1	2	5	1/5
IV	7	1	1	1	2	7	1
V	3	1/2	1/2	1/2	1	3	1/3
VI	1	1/5	1/5	1/7	1/3	1	1/5
VII	8	4	5	1	3	5	1

E $I_c = 9.57\%$

	I	II	III	IV	V	VI	VII
I	1	1/6	6	6	1/8	8	1/8
II	6	1	9	9	1	9	1
III	1/6	1/9	1	1	1/9	1	1/9
IV	1/6	1/9	1	1	1/9	1	1/9
V	8	1	9	9	1	9	1
VI	1/8	1/9	1	1	1/9	1	1/9
VII	8	1	9	9	1	9	1

F $I_c = 1.65\%$

	I	II	III	IV	V	VI	VII
I	1	1	1/3	4	1/6	1	1
II	1	1	1/3	4	1/6	1	1
III	3	3	1	9	1/2	3	3
IV	1/4	1/4	1/9	1	1/9	1/4	1/4
V	6	6	2	9	1	6	6
VI	1	1	1/3	4	1/6	1	1
VII	1	1	1/3	4	1/6	1	1

G $I_c = 2.80\%$

	I	II	III	IV	V	VI	VII
I	1	3	1/6	1/5	4	1/3	1/2
II	1/3	1	1/9	1/9	1	1/9	1/6
III	6	9	1	1	9	2	3
IV	5	9	1	1	9	2	3
V	1/4	1	1/9	1/9	1	1/9	1/8
VI	3	9	1/2	1/2	9	1	2
VII	2	6	1/3	1/3	8	1/2	1

Source: Own elaboration

Weights of aspects with regard to respondents were derived by Saaty's method. Results are presented in Table 3. Importance of all respondents was identical, therefore weight of every evaluator equals to 0.143 (that means 1/7).

Table 3: Weights of aspects with regard to respondents

	A	B	C	D	E	F	G
I	0.104	0.405	0.112	0.031	0.089	0.080	0.064
II	0.028	0.134	0.028	0.148	0.265	0.080	0.024
III	0.269	0.062	0.112	0.146	0.024	0.229	0.296
IV	0.104	0.069	0.020	0.202	0.024	0.025	0.287
V	0.030	0.160	0.331	0.089	0.288	0.426	0.023
VI	0.415	0.119	0.112	0.034	0.023	0.080	0.186
VII	0.051	0.051	0.284	0.349	0.288	0.080	0.120

Source: Own elaboration

Overall weights of aspects I – VII with regard to the goal are in Table 4. As we can see, the most beneficial aspect is Culture issue with the overall weight of 0.192. Language proficiency with is considered as the second most important. Personal development follows.

Table 4: Overall weight and ranking of aspects

Aspect	Weight	Ranking
Acquired knowledge about yourself	0.126	5
Relationship with others	0.101	7
Personal development	0.163	3
Innovative pedagogical methods	0.104	6
Culture issues	0.192	1
Impact on the future life	0.139	4
Language proficiency	0.175	2

Source: Own elaboration

Relationship with others lies on the opposite side of the spectrum with priority of 0.101 and takes the last place. Second least important aspect are Innovative pedagogical methods with weight of 0.104. Let's notice that two smallest weights are very close.

5. Conclusion

Project Entrepreneurship and Communication in Multicultural Teams represents new trends of the entrepreneurship education supported on the European level. The project developed international cooperation involving intensive programs, common curriculum, resource package or teacher workshops. Intensive programs for students offered the opportunity to prepare own business plan in international team. Reflections of the IP participants were examined in several articles which analysed views of chosen national groups using their self-reflective essays. This paper shows other perspective by application of the method of the analytic hierarchy process. Czech respondents evaluated the significance of seven chosen aspects of this international cooperation. Compared to earlier students' self-reflective essays respondents brought new quantitative information thanks to the nine-point scale in this study. They provided pairwise comparisons of evaluated aspects. This information was transformed by the analytic hierarchy process into aggregated evaluation. The most important triple of aspects contains culture issues, language proficiency and personal development. On the contrary, the least significant one is relationship with others.

Students compared the significance of chosen aspects of their participation in the project after longer period. This fact could influence their evaluations in the comparison with self-reflective essays written immediately after IP. Current students' reflections indicate change in the perception of project benefits.

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EUROPEAN CITIZENS ARE BECOMING MORE AWARE OF ENVIRONMENTAL ISSUES – EVIDENCE FROM TWO SPECIAL EUROBAROMETER STUDIES

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Abstract

In a Special Eurobarometer study from 2007, European citizens were less informed and worried about environmental issues than expected considering the widespread media coverage of global warming and other environmental issues and the development of sustainability. However, a replication of the study in 2019 revealed that the level of concern and information towards the environment has increased in Europe. The aim of this study is to provide a comparative analysis regarding the evolution of the attitudes, opinions and behaviour of European citizens towards the environment between 2007 and 2019. The data analysed is collected from Special Eurobarometer 68.2 (2007) and 92.4 (2019) reports, carried out by the European Commission. By applying a cluster analysis, the main differences and similarities between the two surveys are identified. The general attitudes towards the environment, personal relationship with environment, acceptability of sustainable development approaches and information on the environment are being compared across countries and on socio-demographic variables. Finally, the results show that at least in some areas, European citizens are becoming more aware of environmental problems. Considering the lack of comparative studies about the attitudes of citizens towards the environment in European Union countries, this research has important implications for decision making in Small and Medium-Sized Enterprises, especially sustainability entrepreneurs, who want to strengthen their competitive advantage.

Keywords: environmental issues, European citizens, European Union, sustainability, sustainable development,

JEL codes: M30, M31, M39

1. Introduction

Consumer behaviour around the world has undergone profound changes in recent years, and the increasing purchasing and consumption power of individuals has had a significant impact on the environment. As a result, the world is currently facing unprecedented environmental challenges which are threatening mankind and life on Earth. Current environmental issues such as global warming, depletion of natural resources and excessive pollution are highly debated topics by the media, researchers and the general public. At the same time, the COVID-19 pandemic, post-Brexit challenges and on-going changes in corporate social responsibility have brought to the fore the importance of sustainable development. Consumer studies have revealed that the responsibility of citizens towards the environment has increased, highlighting their orientation towards a healthier lifestyle and more sustainable products and services (Mintel, 2019). It has become evident that embracing sustainability is no longer a choice, but a necessity.

At the same time, European studies on green consumption have increased substantially in the past few years and continue to be of importance considering that „these markets account for most of the future economic growth” (Festila et al., 2014). However, the research to date has tended to focus on studying individual countries rather than cross-country examinations. As a result, considering that environmental knowledge, attitudes and behaviour are constantly changing (Diamantopoulos et al., 2003) and that different socio-economic and cultural factors can restrict the generalization of past papers and results (Festila et al., 2014), more studies are needed on this topic. The purpose of this paper is to

analyze the evolution of European citizens' attitudes, concerns and behaviour towards the environment. The main results and trends are examined and compared between different countries, regions and demographic characteristics by comparing two Special Eurobarometer studies from two different periods (2007 and 2019). In the context of worsening environmental issues and changing consumer habits, understanding green consumption among European citizens is becoming increasingly relevant in today's society, being the right time to further understand this topic.

The present paper is structured in the following way. It first presents a review of the current studies on green consumption behaviour and ecological marketing in Europe. The study then presents the method and procedures used as well as a discussion of the key findings. At the end of the paper, main implications of the study and summary of findings are provided. This research might be of importance for decision making in Small and Medium-Sized Enterprises (next SME), especially sustainability entrepreneurs, who want to strengthen their competitive advantage and develop efficient green marketing strategies at both local and European level.

2. Literature review

Since the beginning of the 1990s, a major debate has arisen about the relationship between marketing and the environment and the current literature on green consumption behaviour has developed significantly, „moving from an early stage of identification and exploration to a more advanced phase characterized by greater maturity and rigour” (Leonidou and Leonidou, 2011). Considering the global concern around environmental issues and changing consumer habits, most of these studies have focused on the environmental attitudes and behaviours of European consumers. Thus, contemporary consumer behaviour has been studied in various countries and regions, including Portugal (do Valle et al., 2004), Hungary (Zsoka et al., 2013), Lithuania (Pileliene and Tamuliene, 2019), Poland (Witek, 2019) or Finland (Niinimäki, 2010). For instance, by applying the Theory of Planned Behavior, Liobikiene et al. have analyzed the main factors that influence green purchasing behaviour in Europe (2016). According to the authors, Bulgarians, Italians, Lithuanians and Romanians are the European citizens least likely to buy and consume green products (Liobikiene et al., 2016). The study also confirmed that there are significant differences between European Union (next EU) countries in terms of purchase and consumption of green products. Many other European multicultural studies have supported this hypothesis. For example, in a research on 1175 consumers from England, Germany, Portugal and Spain, do Paco et al. found that “there are different realities of green consumption in terms of economic development, social context and cultural issues between these countries” (do Paco et al., 2013). Following the same pattern, Kalafatis et al. (1999) compared consumers' intention to buy environmentally friendly products in two different market conditions (England and Greece), while Gurău and Ranchhod (2005) examined the international marketing strategies of ecological companies in England and Romania. All these studies have demonstrated that “the degree of green marketing varies considerably between countries, and demand and attitudes for green products is likely to be uneven across different market segments and cultures” (Kalafatis et al., 1999).

Other European studies have addressed the characteristics of organic agriculture and the level of environmental awareness of citizens. For instance, specialists have suggested that the organic food market is growing stronger especially in countries such as Germany or France, where consumers are more concerned about food safety and product ingredients (Owens, 2019). The popularity of organic food consumption in recent years is mainly due to higher consumer spending, information and education of consumers, increased availability of environmentally-friendly products and most importantly the growing public awareness and discussion on ecological topics. When it comes to Eastern European countries, Dabija et al. (2018) highlighted that „there is a growing awareness of green aspects among Eastern Europeans, even if they have been challenged with sustainability issues and the need to adopt green behaviours more recently than their Western European counterparts”. It will be interesting to find out if these trends can be confirmed by the data analysis of the two European consumer studies. As a conclusion, it can be argued that cross-cultural examinations between different European countries are necessary given the fact that the level of environmental concern and green consumption behaviour may vary across countries and regions, depending on various cultural, economic or social settings.

3. Methodology

The data is extracted from the 2007 and 2019 Special Eurobarometer reports entitled „Attitudes of European citizens towards the environment”. Special Eurobarometer studies represent comprehensive thematical analyses carried out by the European Commission or other EU organizations on various social topics in EU member states. At the moment, 28 states participate in these studies, and a national representative sample of the adult population aged 15 and over was drawn following a multi-stage random sampling technique. Overall, the sample from 2007 involves data from 26,730 respondents from 27 EU member states (without Croatia), while the sample from 2019 includes 27,498 respondents from 28 EU member states (including United Kingdom). All study participants were interviewed face-to-face in their own homes and native languages. Interestingly, Leonidou and Leonidou’s biographical analysis of environmental marketing and management research from 1969-2008 revealed that personal interviews are “one of the most popular methods for collecting research data on environmental issues” (2011).

Regarding the gender of respondents, in the 2007 study 44.2% are male and 55.8% are female while in the 2019 study 45.9% are male while the rest of 54.1% are female. When it comes to the average age of respondents, almost 40% of the total respondents are aged 55 years or older in 2007 report (M=48.28), while almost half of all respondents in the 2019 study are aged 55 years or older (M=51.83). The main variables analysed and compared are the general attitudes of Europeans towards environmental protection, actual ecological behaviour of European citizens, level of environmental concern and most efficient ways of tackling environmental issues. To evaluate these variables, the data sets were processed with SPSS software, based on descriptive statistics (comparisons between frequencies and percentages were performed in order to understand evolution across time periods and countries). This method is considered suitable for the study as one of the most important variables analysed, related to environmental attitude, is ordinal (Likert Scale). One-way Anova and clusterization analysis were also performed for further comparisons.

4. Results and Discussion

The next section is structured in the following way. Firstly, it discusses the evolution of environmental attitudes of European citizens between 2007 and 2019. Secondly, the evolution of actual ecological behaviour and environmental concern of European citizens between the 12-year gap is discussed next. Thirdly, the section presents the main findings regarding the Europeans’ view on the most effective ways of tackling environmental problems. Last but not least, the paper offers a useful comparative analysis between the largest countries by population in West and East Europe.

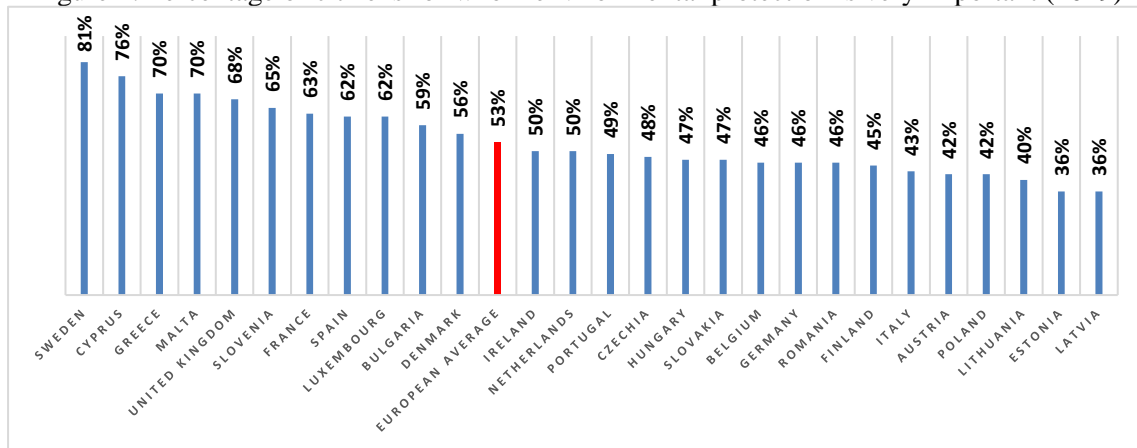
4.1 *The evolution of environmental attitudes of European citizens (2007-2019)*

The attitudes of European citizens towards the environment was measured using a 5-point Likert scale with the labels *very important*, *fairly important*, *not very important*, *not at all important* and *don’t know*. This variable is important for assessing the evolution of environmental attitudes of European citizens. The European level of environmental awareness appears fairly stable during the 12-year period gap but with a small tendency to decrease. The people claiming environmental protection is “very important” to them declined from 64% in 2007 to 53% in 2019. However, those claiming it is “fairly important” increased with 9% from 32% in 2007 to 41% in 2019. When adding these two together, it seems that environmental protection was less important for European citizens in 2019, decreasing from 96% in 2007 to 94% in 2019. Sweden continues to be the country where most people ranked environmental issues as “very important” (81%). These findings further support previous studies, confirming that, at least at declarative level, environmental protection continues to be of high importance in the lives of almost all European citizens (Zsoka et al., 2013).

As seen in Figure 1 above, the intensity of environmental attitudes of European citizens varies across countries. For example, there are 11 European countries where the majority of respondents declared that protecting the environment is very important to them. At the same time, it can be observed that Swedes are more than twice as likely than citizens from the Baltic states to declare that environmental protection is very important to them personally. It would be useful to have this type of

consumer study replicated in the current context of COVID-19 pandemic in order to check how these attitudes have shifted as a consequence of this global crisis. Interestingly, a recent consumer study has found that “in the wake of the pandemic people are more concerned than ever about addressing environmental challenges and are more committed to changing their own behavior to advance sustainability” (Kachaner et al., 2020).

Figure 1: Percentage of citizens for whom environmental protection is very important (2019)



Source: author’s calculations

All in all, it can be concluded that Europeans strongly believe they care about environmental protection. Nonetheless, it is widely recognized that attitudes do not always translate into actions, especially when it comes to green consumption behaviour. This attitude-behaviour gap is what Peattie referred to as “the Green Consumer Mystery” (Peattie, 2001). Many studies have found inconsistencies regarding the link between environmental attitudes and environmental behaviour, as “people’s actions sometimes contradict their stated attitudes and values” (Power and Mont, 2010). Moreover, some authors have reported that in reality individuals who care the most about the environment tend to do the most harm to it, for example when it comes to the frequency and duration of air travel (Barr et al., 2010). Taking into consideration these concerns, researchers began to “move their focus towards measuring concrete actions rather than reported or imagined future scenarios” when studying green consumption behaviour (McDonald et al., 2012). As a result, the next variable analysed is the actual ecological behaviour of European citizens.

4.2 The evolution of actual ecological behaviour of European citizens (2007-2019)

From a list of pro-environmental behaviours, respondents were asked to pick which actions they have taken during the past month for environmental reasons in order to analyze the actual performance of a number of environmentally-friendly consumer behaviour. In 2007 most Europeans recycled (59%), cut down energy (47%) and water consumption (37%) and reduced the use of plastics (30%) for environmental reasons. In 2019 most Europeans have recycled (66%), reduced the use of plastics (45%), bought local products (42%) and cut down energy consumption (37%) for environmental reasons. As seen in Table 1 below, the number of Europeans who have chosen local products for environmental reasons doubled in 12 years, from 21% in 2007 to 42% in 2019. This finding is in line with previous studies which confirmed that consumers’ preference for locally produced organic food has increased in the past few years (Bojnec et al., 2019).

Since the 2007 study, those who have chosen an environmentally friendly way of travelling decreased a little from 28% in 2007 to 27% in 2019. Bar et al. (2010) have demonstrated that “even those who appear to be very committed to environmental action find it difficult to transfer these behaviours into more problematic contexts, for example reducing their flying habits”. The authors added that “such reasoning may mask a wider, more embedded issue, which is the ability of individuals to view their choices about the environment in a wider, holistic context” (2010).

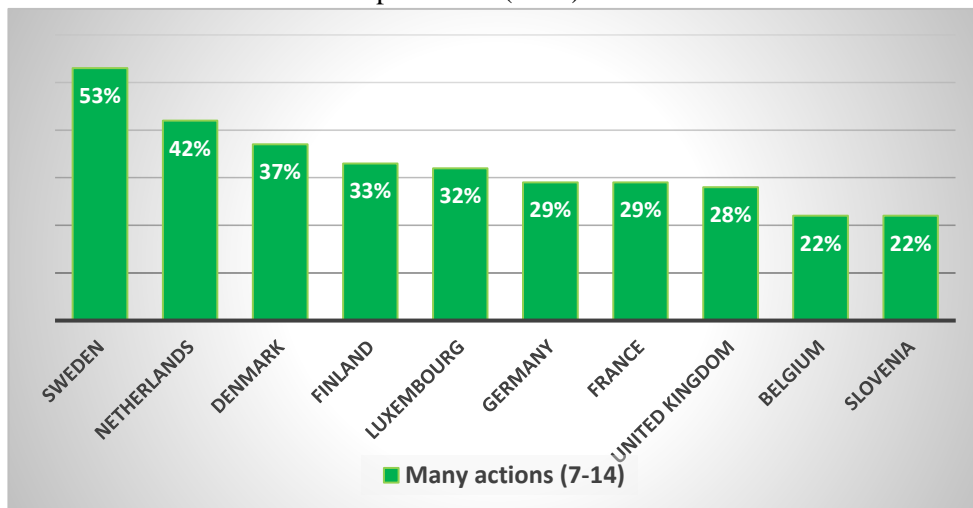
Table 1: Percentage of European citizens engaging in different environment-friendly behaviours, comparison between 2007 and 2019

Action	2007	2019	Differences
Recycling	59%	66%	7%
Cut down energy consumption	47%	37%	-10%
Cut down water consumption	37%	29%	-8%
Reduced use of plastics	30%	45%	15%
Chosen an environmentally friendly way of traveling	28%	27%	-1%
Bought local products	21%	42%	21%
Bought products marked with an environmental label	17%	22%	5%
Used personal car less	17%	21%	4%

Source: author's calculations

Moreover, in 2007 Europeans have taken an average of 2.6 actions for environmental reasons. To compare, in 2019 the European average increased to 5.6 actions, and more than 2 out of 10 Europeans claiming they have taken between 7 and 14 actions for environmental reasons in the past month. It is worth mentioning that the number of those who have not engage in any type of environmental action in the past month decreased from 9% in 2007 to 4% in 2019. It can be concluded that European citizens were doing more to protect the environment in 2019 compared to 12 years ago, becoming more aware of their everyday impact on the environment.

Figure 2: Top 10 European countries where respondents have taken most actions for environmental protection (2019)



Source: Author's calculations

The number of actions taken for environmental reasons were grouped into 4 different categories depending on the number of actions picked by respondents: many actions (7-14 actions), some actions (4-6 actions), a few actions (1-3) and at least one action. When analysing “the many actions” variable by country, it can be noticed from Figure 2 above that ecological behaviour is the highest in Sweden, the Netherlands, Denmark, Finland and Luxembourg, where most people have taken 7-14 actions. These are some of the most developed states in Europe and some of the early adopters of environmental measures. To contrast, Romanians and Bulgarians are the most likely to say they have done none of the listed activities in the past month in 2019 (both 12%). One possible explanation for these discrepancies between countries might be the level of public awareness and debate on environmental issues (Kalafatis et al., 1999), wider societal and cultural influences (Faiers et al., 2007) or limited financial resources to prioritize pro-environmental behaviour (Groening et al., 2017). For example, with regards to Romania, Dinu et al. (2012) pointed out that the country is going through “a period of economic and cultural transition, when most of Romanian consumers are more concerned about the next day: how to feed and shelter their families, how to survive and how to have a decent life, how to find a job, how to maintain their dignity and basic human rights” compared to concern for environmental issues.

4.3 The evolution of environmental concern of European citizens (2007-2019)

From a list of global environmental problems, participants were asked to pick the top five issues they are most worried about. In 2007, European citizens declared that they are most worried about climate change (57%), water pollution (42%) and air pollution (40%). Answering the same question in 2019, respondents declared that they are most concerned about climate change (53%), air pollution (46%) and growing amount of waste (46%). Although in 2019 people were less worried about climate change and water pollution, the number of those who were worried about air pollution increased by 6% compared to 2007. The most striking result to emerge from the data is that the number of Europeans concerned about growing waste almost doubled since 2007, increasing from 24% in 2007 to 46% in 2019. Noise pollution continues to be the least important environmental problem for European citizens, remaining at under 10%. Interestingly, in 22 countries out of 27 people were less likely to be concerned about climate change in 2019 compared to 2007. On the other hand, citizens from all EU member states declared that they are more concerned about growing amount of waste in 2019 compared to 12 years ago.

Furthermore, significant differences can also be observed at country-level. For instance, citizens from the Western part of Europe (United Kingdom, Denmark, Sweden, Finland, Ireland, Germany and the Netherlands) continue to be the most worried about climate change, above the European average. On the other hand, air pollution is the biggest environmental concern for citizens living in the Eastern side of Europe. For example, the percentage of Polish people concerned about air pollution increased from 41% in 2007 to 58% in 2019. Poland is ranked 8th in Europe for total pollution deaths according to Global Alliance on Health and Pollution Report from 2019 (GAHP, 2019) and according to the Air Quality Life Index (AQLI), the country has the most polluted air in Europe, which poses a real threat to human health and the environment (Wilczek, 2020). To continue, while growing waste seems to be the biggest concern for Baltic countries (Estonia, Latvia and Lithuania ranked it as their highest concern) in 2019, Germany is the only country where people are most concerned about marine pollution according to 2019 study.

4.4 Most effective ways of tackling environmental problems

From a list of items, respondents were asked to pick which actions they think would be the most effective ways of tackling environmental problems. In 2007 most Europeans considered that introducing heavier fines for offenders (37%), ensuring better enforcement of existing environmental legislation (33%) and providing more information on environmental issues (30%) are the most effective ways of tackling environmental problems. To compare, in 2019 the most effective ways of tackling environmental problems for Europeans were changing the way we consume (33%), changing the way we produce (31%) and investing in research and development to find technological developments (26%). Less people considered providing more information on environmental issues (24%) and introducing heavier fines for breaches of environmental legislation (23%) in 2019 compared to the study in 2007.

It is worth highlighting that in 2007 only 11% of European citizens were worried about their consumption habits. In 2019, it seems that most Europeans considered that changing the way we consume and produce is essential and necessary for tackling environmental problems. It can be argued that citizens have started to finally realize the negative impact of current consumption and production patterns on society and on the environment (Kachaner, 2020). To add more, in 2019 more than 2 in 10 European citizens considered that encouraging businesses to engage in sustainable activities is an efficient way of coping with environmental issues. This finding might be of importance for SME companies.

All in all, when looking at different age groups and socio-demographic categories, findings are quite homogenous between 2007 and 2019, with little variation. However, women are slightly more likely than men to engage in pro-environmental behaviour. The same trend can be observed in both 2007 and 2019. Furthermore, the study from 2019 revealed that women are more likely than men to declare that changing the way we consume is problematic (35% vs. 31%) and that environmental protection is very important to them individually (56% vs. 51%). These findings are in line with previous studies which confirmed that women tend to care more about the environment compared to men (Diamantopoulos et al., 2003). According to Role Theory, “women are more nurturing, which aligns

with their greater concern for the environment and willingness-to-pay more for green products” (Groening et al., 2017). On the other hand, some authors have concluded that the impact of demographic characteristics on ecological attitudes and behaviour is “either contradictory or non-significant” (Laroche et al., 2002).

4.5 Key findings – West vs. East

In order to draw some comparisons between European countries, a cluster analysis was developed between 5 countries from West Europe (United Kingdom, Netherlands, Belgium, France and Germany) and 5 countries from East Europe (Poland, Hungary, Romania, Bulgaria and Czech Republic). The Western cluster was chosen according to the EuroVoc classification of the sub-group Western Europe (EuroVoc, 2021). There are 12 countries in the EuroVoc sub-group, but only the 5 largest countries by population in the region were chosen (World Meters, 2021). For Eastern cluster, a different classification was used because the EuroVoc groups Central and Eastern Europe together. Therefore, the World Atlas classification for Eastern European countries was used (World Atlas, 2021). From the list of 10 countries, Belarus, Russia, Ukraine and Moldova were excluded because they were not included in the Eurobarometer studies. By excluding these countries, the same criterion was applied and the 5 largest countries by population in the region were chosen (World Meters, 2021).

As seen in Table 2 below, it can be concluded that citizens from Western countries tend to be more aware about environmental problems and more concerned about climate change compared to Eastern Europeans. At the same, citizens from Eastern Europe tend to be more concerned about air pollution and large amounts of waste. Furthermore, it can be observed that Western Europeans are almost twice as likely to recycle compared to the countries in the East. They are also more likely to reduce plastic use and buy local products for environmental reasons.

Finally, it is evident from the data analysis that citizens from Western Europe are more likely to engage in pro-environmental behaviour, in terms of both frequency and number of actions taken. They are also more likely to realize that changing their consumption habits is an efficient way of tackling environmental problems. These findings emphasize that Europeans’ attitudes, concerns and behaviour towards the environment differ depending on region and that “cultural conditions highly contribute to the shaping of individuals’ actions vis-à-vis environmental issues” (Oreg and Katz-Gerro, 2006).

Table 2: Differences between Western and Eastern Europeans (2019)

	Cluster 1 Western Europe (N = 5618)	Cluster 2 Eastern Europe (N = 5217)	Differences
Environmental awareness	95%	91%	4%
Climate change concern	56%	39%	17%
Waste amount concern	47%	50%	-3%
Air pollution concern	48%	50%	-2%
Recycling behaviour	74%	45%	29%
Reduced plastic use	50%	38%	12%
Bought local products	46%	31%	15%
Actions taken (7-14)	30%	7%	23%
Average of actions taken	7.0%	2.1%	4.9%
Changing the way we consume	36%	26%	10%

Source: author’s calculations

5. Conclusion

This project provides an important opportunity to advance the understanding of European citizens’ attitudes, concerns and behaviour towards the environment and the evolution of these variables between 2007 and 2019. It can be argued that European citizens are more worried and aware about environmental issues in 2019 compared to 2007. Furthermore, they are doing more to protect the environment and are starting to realize the negative impact of their consumption habits. Overall, it can be concluded that Europeans are now in a more advanced stage of green awakening compared to 2007. However, it is worth mentioning that the frequency of these variables varies considerably across

countries and regions. We hope these findings can be of interest for SME, especially sustainability entrepreneurs, who want to strengthen their competitive advantage, develop efficient green marketing strategies at both local and European level and enhance their environmental management projects and operations (Gadenne et al., 2009). To ensure long-term sustainability and the well-being of society, a threefold joint effort between governments, companies and consumers is mandatory.

Finally, a number of important limitations need to be acknowledged. Studying consumer behaviour is a very dynamic phenomenon. The fact that at a given time individuals have a certain level of environmental knowledge or concern or have engaged in environmentally-friendly behaviour does not offer any guarantee about the evolution of these variables in the future. Therefore, this paper calls for more international studies on this topic in different socio-economic markets. Secondly, the highly specific nature of pro-environmental behaviour is very varied across citizens, cultures and nationality (Groening et al., 2017), being very difficult to generalize the main findings of this study. More research is also required to understand, for example, the influence of social norms on green behaviour among Europeans. Finally, considering the limitation of the research method used and the likelihood for biased responses in consumer studies, future studies should focus on examining consumer behaviour in reality in order to obtain a true picture of the actions taken by individuals to protect the environment.

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THE ROLE OF ORGANIZATIONAL EXTERNAL ENVIRONMENT IN MOTIVATING OFFICE AND CONSTRUCTION SITE EMPLOYEES

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Abstract

The purpose of this study is to discern the similarities and differences in sources of motivation between employees in construction sites versus office employees using the Herzberg Two-Factor Theory. The study further analyzes the effects of motivation factors, considering variables such as job position, gender and nationality. The present research analyzes the responses of 326 office and construction site employees of various specialties. The results indicate that workplace physical environment plays an important role in employees' motivation. Office employees and construction site employees are affected differently by the items in Herzberg's two-factor theory. The findings of the study are expected to help managers make better use of their incentive repertoire, in accordance with the specific group needs, whether they are office employees or field workers. Research limitations include the need for a larger sample size since the present study does not allow for generalizable conclusions, partly due to the difficulty in conducting survey studies in the highly complex construction work environment.

Keywords: construction, employee, Greece, Herzberg, motivation

JEL codes: M12, M54

1. Introduction

Employee motivation is a pivotal topic for leaders, managers and people who manage human resources. In recent decades, several theories concerning employee motivation, have been proposed and hundreds of surveys, based on these theories, have been conducted, on a global scale. In general, however, there is a dearth of studies on employee motivation for people who work in the construction industry and especially on employees at the construction site particularly in Greece (Glinia, 2005; Panas and Pantouvakis, 2018; Ruthankoon and Ongulana, 2003; Nave, 1968; Schrader, 1972; Laufer and Jenkins, 1982; Barg et al, 2014). Construction industry workers are frequently working under difficult and high-risk conditions. However, many people are willing to work in this industry, because there are opportunities that do not require special knowledge or training. Many migrants choose to work in this

industry as unskilled workers. Frequently, they do not understand the language of the country in which they work, making communicating with supervisors and peers difficult. The major qualifications needed for these job positions are endurance and muscle strength. The Construction industry workforce except for unskilled workers includes, several categories of specialized personnel, such as machinery operators, vehicle drivers, engineers, foremen, etc. Another key characteristic of the construction industry is that the work environment is male-dominated.

Herzberg's two-factor motivation theory (Herzberg, 2003; Herzberg et al., 1959), has been tested in a large number of studies, involving various occupations, with reported findings rather inconsistent, leading to the need for further and more specific work environment research, to overcome some of the confounding factors associated with the previously reported results inconsistencies (Ruthankoon and Ongulana, 2003). Comparisons across industries are tenuous and as Mace (1950) points out, the range of variation in the measurable characteristics of the construction industry is greater than other industries. Construction industry unique characteristics comprise of strict attention to cost and schedule, numerous conflicts, labor-intensity, customized work, on-site work and short-term employment (Nave, 1968; Schrader, 1972; Laufer and Jenkins, 1982). An important element concerning construction industry is the management of foreign workers because they may have different sources of motivation as there are several cultural differences (Kim et al., 2015). As a result, managers in the construction industry have to cope with various challenges, adopting different leadership styles appropriate for the cultural background of the multiethnic workforce sub-groups.

The diversity of employees working together at the construction site, to deliver an outcome within specific deadlines, is necessitated by the nature of the industry. The present research could provide some useful insight to management in the construction industry in employee motivation, given the specific constraints the industry managers are facing.

Various surveys have been conducted with the purpose of examining what motivates workers in the construction industry. However, most of these studies have been held in a variety of countries but none to our knowledge in Greece. This implies different working, economic and social conditions, as well as different cultural backgrounds, and potentially different motivating factors. The present research attempts to contribute to existing literature by examining the interaction of employees in the working, economic and social, conditions in Greece, in the context of Greek culture. This connotes different ways of interaction between local and foreign workers, which could also suggest different motivating factors.

The aim of this research is to identify the motivators of the workers in the construction industry in Greece and the differences and similarities between office employees and construction site employees.

2. Literature Review

The construction industry has unique characteristics, which have implications on employee motivation that might be unique and diverge from the majority of the other industries. Borcharding and Oglesby (1974) concluded that the important elements for foremen and superintendents were the challenges of running work, good management support, enough information feedback, pride of workmanship, successful work and good crew relations. In another study (Hague, 1985) the author reports that factors such as achievement, responsibility, advancement and low wages and payments are not classified as motivators. Ruthankoon and Ongulana (2003) proposed that achievement is the most frequently mentioned motivator, for engineers and foremen. Possibility for growth, responsibility and advancement are elements which could be categorized as motivation factors in the construction industry. On the contrary, recognition does not appear to be an important motivating factor. The sample in this research focused on different factors. Hygiene factors, salary, company policy, administration relations with peers, supervisors and subordinates are really important and they can be associated with job dissatisfaction. Also, safety from the perspective of work accidents influences job satisfaction, but it depends on the category of employee specialty and the responsibilities arising from it (Ruthankoon and Ongulana, 2003). Chileshe and Haupt (2010) extended Ruthankoon's and Ongulana's (2003) work, reporting that relations with co-workers were poor but without significant effects on job satisfaction in their study. Venkatesan et al. (2009) suggested that, motivation factors were different among employees. Achievement and interest in work were the most important factors that influence engineers and

employees at higher levels in the organizational hierarchy (Sahinidis et al., 2021). The de-motivators were poor work conditions and poor administration policy.

Another issue addressed in a few studies is employee management style. Notably, management styles differ depending on culture among other factors and in many cases, there are conflicts and communication gaps because of the different languages and cultures at the construction site. An important issue is that a downward stream of productivity, more accidents and inferior construction quality appear due to language barriers and cultural differences (Go et al., 2009). Kim et al. (2015) in their research found that motivators vary and depend on the nationality of each worker. These findings could be used for the purpose of stimulating social awareness, to create an appropriate systematic policy and develop a more efficient management plan for foreign workers, suitable to addressing cultural differences.

In the construction industry, the projects are constantly changing and the responsibilities and requirements arising from them adjust to the new settings. In conclusion, “construction process, is described as a people management business” (Smithers and Walker, 2000) and the main resource of productivity is workers (Panas and Pantouvakis, 2018).

Based on the discussion above we propose the following hypotheses:

H0.A: Hygiene factors do not differ between office employees and construction site employees.

H1.A: Hygiene factors differ between office employees and construction site employees.

H0.B: Motivator factors do not differ between office employees and construction site employees.

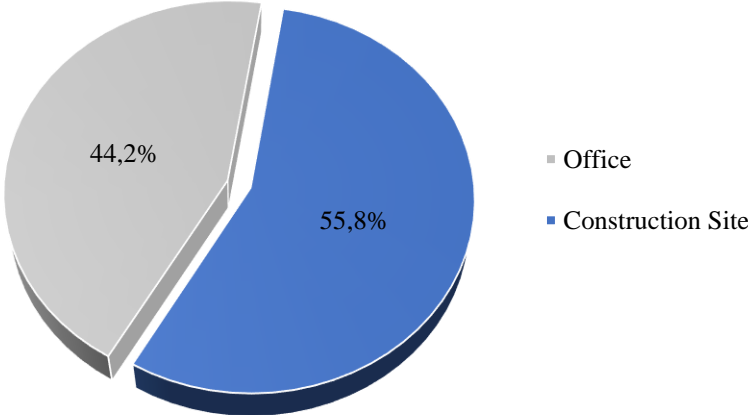
H1.B: Motivator factors differ between office employees and construction site employees.

3. Methodology

There were overall 326 questionnaires answered by employees from 8 construction companies in Greece. The sample was a convenient one given that the resources available were limited, but the size of it allows us to proceed with reliable statistical analyses and produce valid conclusions (Sahinidis et al., 2020, Sahinidis and Tsaknis, 2020; Tsaknis and Sahinidis, 2020). An attempt was made to compare, employees from various categories in the construction site with office employees also from various occupations.

The sample was divided into two main categories: office employees and employees in construction sites. The age of participants was divided into five categories, 18-25, 26-35, 36-45, 46-55 and >55. Figure 1 shows the percentage of office employees versus those employed at the construction site.

Figure 1: Work Environment



Source: own research

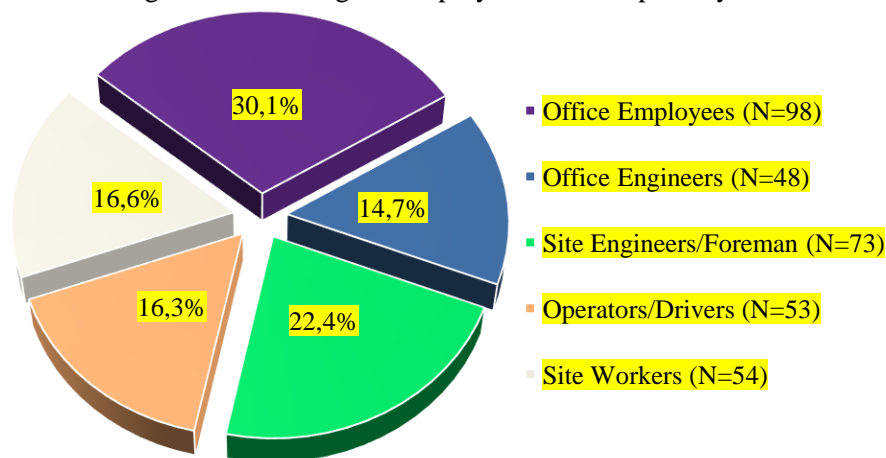
The education level of participants was examined, by separating them into, primary school graduates, high school graduates, University/Technological Institute graduates, postgraduates and

doctoral graduates. The participants were mostly Greek, Albanian and workers from 8 other countries with a rather small representation. The employees, were divided in the following categories:

- Office Employees of various specialties
- Office Engineers
- Site Engineers and Foremen
- Operators and Drivers
- Workers of all specialties

Engineers were separated into office engineers and site engineers because the working conditions and the nature of their work, differ. Site engineers are categorized in the same group with foremen, because both are engineers and the responsibilities arising from these job positions do not have meaningful differences. Figure 2 shows in detail the percentage of employees in each specialty of the sample used in this study.

Figure 2: Percentage of employees in each specialty



Source: own research

The construction industry is a male-dominated workplace. Thus, it was decided to separate participants into two categories, male and female. Moreover, as mentioned above, the construction site is a workplace in which many foreign workers are employed. For this reason, this survey also compares locals versus foreign workers.

The research was conducted by using Herzberg's questionnaire (2003) that measures employee motivation (Table 1). The questionnaire was modified in order to meet the needs of the present research. It consists of 15 questions of a 5-point Likert scale (1 = not at all important, 5 = very important). Questions about hygiene factors are Q1, Q2, Q4, Q5, Q6, Q7, Q10, Q12, and the motivators Q3, Q8, Q9, Q11, Q13, Q14, and Q15. Previous research (Sahinidis and Kolia, 2014) has confirmed both the validity and the reliability of the questionnaire in a number of different professions.

Table 1: Questionnaire

Code	Question
Q1	Employer's prestige in the workplace.
Q2	Social Orientation in the workplace.
Q3	To be interested in my work.
Q4	To have high salary.
Q5	To provide me with extra financial benefits (bonuses, commissions).
Q6	To provide me with extra non-financial benefits (health insurance, accommodation, car, mobile).
Q7	Having a work environment without stress.
Q8	To acquire a job position of responsibility.
Q9	To be involved in the decision making concerning my work.
Q10	Good relations with my supervisor.
Q11	To have opportunities for promotion.
Q12	To provide me with job security.

Q13	Equal opportunities for men and women.
Q14	To have an opportunity for personal growth.
Q15	Meeting challenges in my work.

Source: own research

The comparison groups are listed below:

- Office Employees - Construction Site Employees (CG1)
- Office Engineers - Site Engineers (CG2)
- Office Employees - Office Engineers (CG3)
- Office Employees - Site Engineers/Foremen (CG4)
- Office Employees - Operators/Drivers (CG5)
- Office Employees - Site Workers (CG6)
- Men - Women (CG7)
- All Greeks -All Foreign Personnel (CG8)
- Greek Workers Only - Foreign Workers Only (CG9)

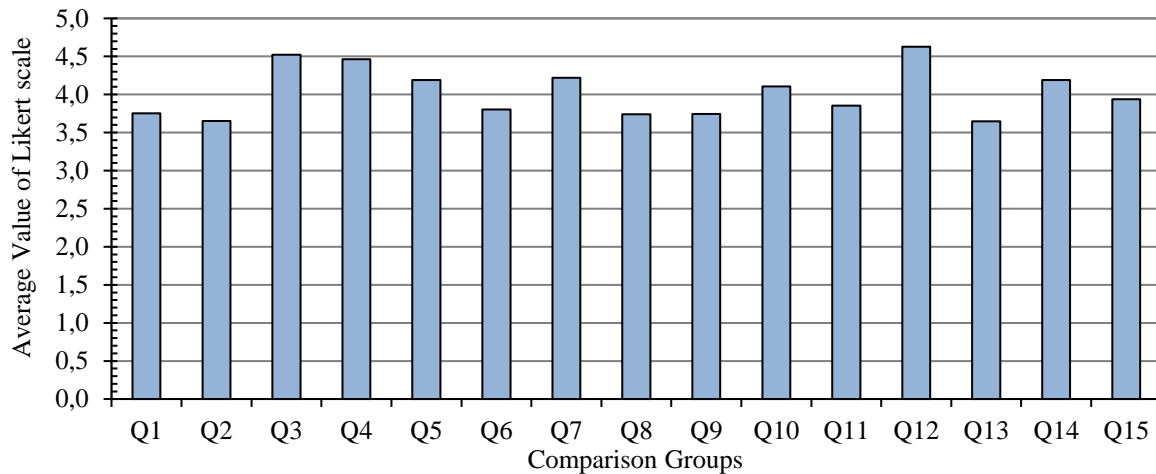
It is important to note that, because many of the Albanian workers in the construction industry in Greece do not speak Greek, the questionnaires were translated into Albanian.

In order to analyze the data, the statistical program SPSS was used. The t-test method was selected for the comparison of means.

4. Results and Discussion

The statistical analyses we used showed the questionnaire Reliability Cronbach $\alpha = 0.893$. Figure 3 presents the average value of Likert scale for each question from all the sample. Thus, as it is shown most of the sample answers over 3.5 of the Likert scale which was used.

Figure 3: Average value of Likert scale for each question from all the sample



Source: own research

Table 2 shows all the p_{value} results of all the comparison groups (CG1 to CG9) that emerged from the t-tests, according to each question (Q1 to Q15) and each motivation factor. The results, lent partial support to the Hypothesis that Office Employees differ from Construction Site Employees (CG1), namely in the case of questions 4,5,9, 11, 12 and 13. The remaining questions suggest that the hypothesis H_0 is rejected and that there is no difference between the two groups of employees. In the second group comparison we attempted comparing Office Engineers to Site Engineers (CG2), again we notice support for the alternative hypothesis only in two questions, Q 5 and Q 6, while the remaining questions support the null hypothesis, indicating no difference between the two groups. The third comparison entails Office Employees and Office Engineers (CG3), whereby the Null hypothesis is supported and there is no difference between the two groups, in all but one question (Q15). In comparing Office Employees and Site Engineers/Foremen (CG4), the alternative hypotheses is supported in four questions

(4, 5, 6, 15), while for the remaining questions there is no difference between two two groups. The comparison of Office Employees and Operators/Drivers (CG5) yielded support for the alternative hypotheses in five questions (4, 6, 9, 11, 13), while no significant difference was found between the two groups in the remaining questions. Office Employees and Site Workers (CG6) were found to differ in seven questions (1, 4, 5, 9, 11, 12, 13), partially supporting the alternative hypotheses. Comparing Men and Women (CG7), we found no significant differences in all but four questions (4,5,7,13). Our comparison of Greek Personnel with Foreign Personnel (CG8), produced significant differences in seven questions, lending partial support to the alternative hypotheses. Finally, when comparing Greek Workers Only with Foreign Workers Only (CG9), we found no differences between the two groups with the exception of questions 4,11, 13, 15.

Table 2. Results of p_{value} per Question and per Comparison Group

	CG1	CG2	CG3	CG4	CG5	CG6	CG7	CG8	CG9
Q1	0.573	0.731	0.479	0.238	0.923	0.050	0.613	0.002	0.155
Q2	0.117	0.847	0.659	0.809	0.029	0.623	0.152	0.735	0.872
Q3	0.954	0.437	0.409	0.050	0.379	0.622	0.304	0.039	0.215
Q4	0.001	0.134	0.474	0.015	0.026	0.000	0.001	0.000	0.007
Q5	0.003	0.048	0.866	0.015	0.244	0.004	0.043	0.048	0.454
Q6	0.579	0.050	0.687	0.046	0.050	0.406	0.593	0.477	0.608
Q7	0.710	0.242	0.195	0.928	0.553	0.195	0.050	0.466	0.464
Q8	0.509	0.390	0.468	0.078	0.100	0.318	0.511	0.079	0.250
Q9	0.001	0.910	0.620	0.516	0.000	0.004	0.117	0.050	0.762
Q10	0.372	0.981	0.809	0.752	0.510	0.308	0.211	0.838	0.900
Q11	0.050	0.531	0.998	0.506	0.029	0.028	0.522	0.110	0.042
Q12	0.050	0.142	0.435	0.536	0.588	0.050	0.632	0.123	0.888
Q13	0.000	0.350	0.604	0.097	0.000	0.000	0.000	0.000	0.002
Q14	0.855	0.461	0.365	0.808	0.684	0.815	0.853	0.654	0.976
Q15	0.986	0.733	0.027	0.005	0.369	0.993	0.539	0.184	0.050

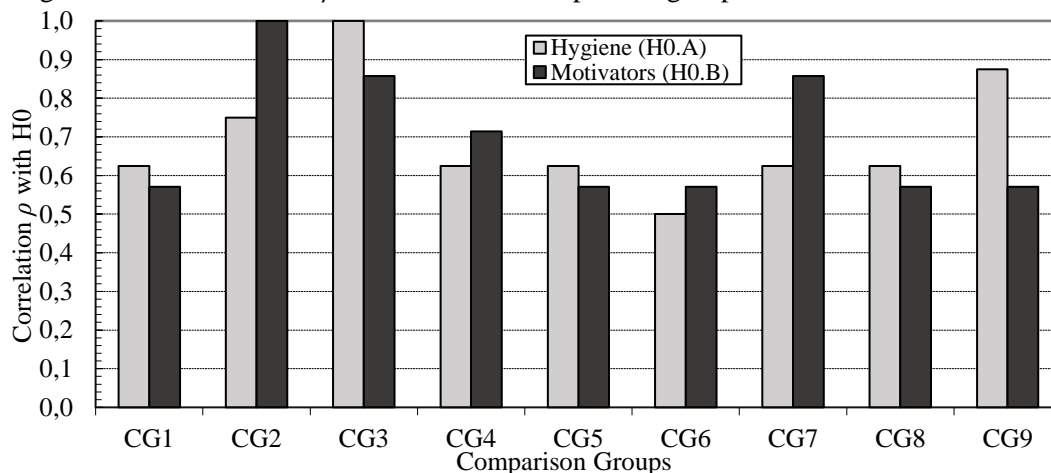
Source: own research

Subsequently, Figure 4 shows the correlations for each comparison group with each motivation factor. Namely, to what extent both of the two hypotheses H_0 are accepted for each comparison group. The correlation (ρ) of the t-tests' results with the hypothesis H_0 of each of the 2 motivation factors and Figure 4 are resulted from the following equation:

$$\rho = \frac{\sum(Q) - \sum(Q_d)}{\sum(Q)} \quad (1)$$

Where $\sum(Q)$ is the number of questions for each motivation factor and $\sum(Q_d)$ is the number of questions for this motivation factor, which do not support the H_0 ($p_{value} \leq 0.05$).

Figure 4: The Correlation ρ of H_0 for each comparison group and each motivation factor.



Source: own research

The primary aim of this study is the examining of the first comparison group, CG1. The results have shown that almost half of the questions relating both motivators (Q4, Q5, Q12) and hygiene factors (Q9, Q11, Q13) do not support H0. The ρ correlation of H0 is 0.63 for hygiene factors and 0.57 for motivators. Hence, the goal of this study was achieved because it was proved that employees' motivation factors are differentiated according to their external organizational environment, office or construction site.

As far as CG2 is concerned, there are only two differentiations regarding hygiene factors (Q4, Q5). The ρ for this group is 0.75 for hygiene factors and 1.0 for motivators. This was expected because site engineers are often required to move where the construction project takes place. Thus, salary and extra financial benefits are considered to be their main priority.

Furthermore, the CG3 analysis shows that H0 is supported, corroborating previous research (Loiseau, 2011). The only difference concerns question Q15. The ρ is 1.0 for hygiene factors and 0.86 for motivators. Engineers like to face challenges. Besides, it is part of their work.

The ρ as far as CG4 is concerned, is 0.63 for hygiene factors and 0.71 for motivators. The results were in line with our expectations. Some differences in the results were found, in questions concerning hygiene factors (Q4, Q5, Q6) and in some relating motivators (Q3, Q15).

Analyzing CG5, the results show that H0 was not supported in almost half of the questions: in hygiene factors (Q2, Q4, Q6) and in motivators (Q9, Q11, Q13). The ρ is 0.63 and 0.57 for motivators. Operators/drivers do not expect any further professional development. They do not care about challenges and extra responsibilities and they are mainly interested in salary and other financial benefits.

Similar results are observed in CG6. In this case the divergence of employees' and workers' needs is apparent to a larger extent. The results do not support H0 neither concerning hygiene factors (Q1, Q4, Q5, Q12) nor concerning motivators (Q9, Q11, Q13). The ρ is 0.50 for hygiene factors and 0.57 for motivators. Workers are mainly interested in salary and job security.

The construction site is mainly male-dominated and thus, it was expected there would be differences concerning the support for H0, especially as far as hygiene factors are concerned. The results, after studying CG7, provide evidence for that. The ρ is 0.63 for hygiene factors and 0.86 for motivators. Disagreements were observed in questions Q4, Q5, Q7. On the other side, among the motivators, the only disagreement concerns the question relating to men-women equal opportunities (Q13) and it is according to our expectations.

One of this study's findings concerns the nature of the demographics in the construction industry (subject to the limitations of our sample) whereby the industry employs more foreign workers in construction sites than Greeks in comparison with those working in offices. Examining CG8, the ρ is 0.63 for hygiene factors and 0.57 for motivators. The aforementioned results showed that almost half of the questions concerning hygiene factors (Q1, Q4, Q5) and motivators (Q3, Q9, Q13) fail to support H0.

As far as group CG9 is concerned, results indicated that the only disagreements with H0 were found in Questions Q4, Q11, Q13 and Q15. The ρ for hygiene factors is 0.88 and 0.57 for motivators. The above findings agree with the researchers' earlier work. The majority of foreign workers are mainly interested in having the minimum amount of stamps per month to maintain their residence permit without extra requirements or interest in challenges. One reason is that a large percentage of foreign workers do not understand the Greek language adequately so as to seek other type of employment. This sub-group tend to be indifferent to the issue concerning gender equality and representation in salary, promotions or other relevant considerations.

5. Conclusion

Workplace environment plays an important role in employee motivation. Based on the results presented in this study, corroborating earlier findings, office employees and construction site employees differ when examined in terms of Herzberg's two-factors theory. Construction managers need to be cognizant of the diverging needs and motivators of the various employee groups they supervise. The differences between the groups of employees proposed in this study, in terms of the importance attributed to each of the items in Herzberg's scale by each group was an outcome for construction industry managers. Highly educated personnel appear to respond more favorably to motivators compared to employees with low education levels. Office employees and office engineers (CG3) are motivated in the same way according to Herzberg's two-factor theory. Office employees compared to

site engineers are motivated by different factors, while Operators/drivers differ from office employees, concerning the effect of two-factor theory. Workers were motivated in a distinctly different way compared to office employees and men and women differ in their views of Hygiene, although they agree about the importance of motivators. Culture has been shown to play an important role in motivation, as local personnel and foreign employees, place different value to various motivation and hygiene items. A final conclusion of the present research is that the construction industry environment affects significantly employees' motivation factors. This field has a large variety of requirements regardless of job position. After all, as mentioned earlier, the projects, in the construction industry, are constantly changing and the responsibilities and requirements arising from them adjust to the new settings. Also, the interaction between foreign workers and Greek workers, because of their cultural differences, may differ, when compared to the findings of other studies on this subject. The findings of this study add to the big picture of employees' motivation at the construction sites in Greece.

In spite of the contribution of this study's findings in understanding motivation in the workplace and specifically in the construction industry, future research may delve deeper into the subject, testing other motivation theories and tool effectiveness being practiced by companies in the field. Especially the subject of motivating a diverse workforce as is the case with the multi-ethnic multilingual and multi-cultural corporation nowadays, is highly challenging for managers who need to identify the priorities the interests and the needs of employees and then develop motivation strategies and act upon them. Future studies could look at different approaches also in motivating employees in extraordinary circumstances, such as the pandemic of 2020, which may have a lasting impact on the way people work, at the site, the office, or at home.

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BALANCE SHEET RULES AND THEIR ABILITY TO INFLUENCE BUSINESS PERFORMANCE

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Abstract

In the Czech Republic, balance sheet rules represent well known theory that is recommended to enterprises to follow in order to achieve long-term financial balance and stability. Aim of this paper is to analyze, what impact the compliance with the rules has on businesses in terms of their performance. For this purpose, indicators describing individual balance sheet rules and business performance were proposed and filled with data from 2017, representing micro and small businesses in the Czech Republic. Next, businesses were divided into groups, according to their ability to fulfill the rules. Groups of these data were analyzed using non-parametrical statistical test (Mann-Whitney U-test) in order to find out, if there is any difference in the indicators of their business performance. According to the results it cannot be confirmed that the compliance with the balance sheet rules has the ability to affect business performance.

Keywords: balance sheet rules, business performance, impact

JEL codes: M21, L25, L20

1. Introduction

In the Czech Republic balance sheet rules represent well-known theory, that consists of four (sometimes more) basic rules which purpose is to recommend businesses, how to manage balance and stability in terms of financing. The premise is, that when the rules are followed, businesses should achieve long-term financial stability due to specific structure of assets and total liabilities. The origin of these rules comes from German speaking countries (Scholleová, 2017, Wöhe, 1979).

Balance sheet rules are considered as one of the tools of financial analysis. The main aim of financial analysis is to provide information about financial management of company and to support stabilization of company's financial health. Activities within financial management can be considered as a part of company's performance management. In fact, from historically perspectives financial indicators have been always a building stone of performance management (e.g. Kotane, 2012; Ausloos et al., 2018), however, other indicators and perspectives got attention in last decades too (e.g. Morard et al., 2013, Sánchez-Márquez, 2018; or Weber et al., 2008).

Despite the fact that balance sheet rules are based on relatively old literature (e.g. Wöhe, 1979), they are still presented nowadays in many Czech literary sources (Kislingerová, 2001; Scholleová, 2017; Taušl Procházková and Jelínková, 2018; or Vochozka et al., 2012) without any updated empirical evidence. In fact, authors of this paper did not succeed to find any major empirical evidence based on research paper. Only one paper in English language was found in research database Web of Science (Legowik-Malolepsza, 2019). This finding led authors of this paper to the idea of opening a question if

the balance sheet rules are still up-to-date in current businesses financial and performance management and if their use can have real impact on business performance, or it is only theoretical recommendation that has no empirical justification at all.

Thus, this research was conducted in order to provide such empirical evidence. The aim of this paper is to analyze possible impact of compliance with the balance sheet rules on business performance using empirical data for micro and small businesses in the Czech Republic.

2. Theory background

There are four main balance sheet rules, each of them focused on different aspects:

- First rule (1R): so called “*golden balance sheet rule*” is understood as a basic recommendation for financial and capital structure. According to this rule long-term assets should be financed with a balanced ratio of equity and long-term debt, and short-term assets should be financed with short-term available capital (e.g. Hoffsummer, 2016). In case of this rule, it is clear that the attention is paid to the maturity of liabilities, not to the types of financing (equity or debt) (Reisetbauer and Schlattl, 2004).
- Second rule (2R): so called “*risk equalization rule*” is dealing with risk position of business (Reisetbauer and Schlattl, 2004). The principle is about balancing equity and debt (as two categories of total liabilities) and taking into account stability and sustainability of business. The idea is to balance the profitability of business due to higher involvement of debt and at the same time to balance increased bankruptcy risk. Generally, it is recommended that debt should not be higher than equity (Kislingerová, 2001).
- Third rule (3R): so called “*pari rule*” recommends to maintain the amount of fixed assets according to the level of equity. Specifically, this rule recommends to keep equity on the same level as fixed assets, ideally less, in order to provide space for long-term debt financing (e.g. Wöhe, 1979; Scholleová, 2017).
- Fourth rule (4R): so called “*investment rule*” forms the idea that the growth rate of investments should be higher than the growth rate of sales. The idea is simple, previously provided investments should firstly generate adequate sources to be able to provide further investments (e.g. Scholleová, 2017, or Vochozka et al., 2012).

Further, another balance sheet rule can be mentioned, and that is so called “*golden financing rule or golden banking rule*.” This rule is based not on the total assets of company, as the golden balance sheet rule, but on the individual investments. Following this rule can help to ensure avoiding of payment difficulties (more e.g. Reisetbauer and Schlattl, 2004).

As stated before, the main aim of the above presented balance sheet rules is to recommend businesses how to keep their financial health and maintain adequate financial structure. Thus, to support in this way positively business performance. Especially in micro and small businesses sector these rules are recommended to follow, based on the literature (e.g. Wöhe, 1979; Taušl Procházková and Jelínková, 2018). However, very few researchers can be identified with relation to empirical evidence of applying balance sheet rules. The exception is research focused on the working capital and its effects on business performance (eg. Aktas et al., 2015, Boisjoly et al., 2020, Deloof, 2003, Howorth & Westhead, 2003), which relates to the first rule.

As for business performance, it is wide subject managed by the performance management (which should not be confused with its traditional focus solely on employees, but “as enterprise-wide performance management of an organization as a whole”) (Cookins, 2009, p. 7). Its measuring has been subject of research for many decades. Nowadays, it can be done in different ways. The most traditional is using financial indicators, whether in absolute form (Ausloos et al., 2018), in relative forms such as for example using ROA (return on assets), ROE (return on equity), or ROS (return on sales) (Williams, 2018), or even using more complex indicators such as for example IN99 (Švárová and Vrchota, 2013). However, also more sophisticated models have been developed in order to measure other areas of business interests such as the first and the most famous one, Balanced Scorecard by Kaplan and Norton (1996). As stated by Williams (2018), who performed extensive research of family businesses studies, the most frequently used indicators of business performance in these studies are ROA, Sales, Profit, Tobins’Q, ROE, ROI and ROS.

In order to provide empirical evidence, the research question is following: *Does following the balance sheet rules affect positively business performance?*

3. Data and methodology

For this study, data downloaded from Database Albertina – Gold edition (Bisnode, 2018) were analyzed. It was decided in advance to include only small and microbusinesses, because of the worries, that middle and large businesses use cash pool financing more often, which would not be possible to find out and exclude them from the analysis. Also, the original aim was to use the data for the whole Czech Republic, however these types of businesses was found to many to analyze (circa 10 000 entities), thus data for only one region (Pilsen region) was used. Therefore, the analyzed data represent whole population of small and microbusinesses in Pilsen region in 2017, however they are considered as a random sample for the whole population of small and microbusinesses in Czech Republic. The analyzed year in this study was 2017, because for this year were more data available than for 2018 or 2019.

In order to prove the possible effect of balance sheet rules compliance on business performance, the indicators evaluating the ability of enterprise to follow these rules had to be developed.

The first, golden rule (1R), is measured as:

$$1R = \frac{(\text{equity} + \text{longterm debt})}{\text{fixed assets}} \quad (1)$$

For the purpose of evaluation, the rule was considered fulfilled, if the indicator had a value between 0.8 and 1.2.

The second rule (2R) is measured as:

$$2R = \frac{\text{equity}}{\text{total liabilities}} \quad (2)$$

The rule was considered fulfilled, if the indicator had a value between 0,4 and 0,6.

The third rule (3R) is measured as:

$$3R = \frac{\text{fixed assets}}{\text{equity}} \quad (3)$$

The rule was considered fulfilled if the indicator had a value higher than 1.

The fourth rule was not included into analysis, because it was visible from the data, that not all businesses invest (measured by changes in fixed assets) and its processing was almost impossible in terms of time it would take.

Due to the proposed indicators (respectively the rules itself) the research question cannot be answered by designing correlation model, because the recommended values are not always the highest/lowest one, but those within some range. Thus, different approach had to be used. It was decided to divide business into categories according to their success in following the rules and then to study the values of indicator of business performance. As this indicator, ROE, as the ratio of the enterprise's net profit and capital invested by the owner (EBT/Equity), was selected. There are many proposed ways to measure business performance (see Williams, 2018), however the indicators of return seem the most appropriate for this study, because their values can be indirectly influenced by the decisions of management, who is also responsible for following the balance sheet rules. Specifically, ROE was selected because the appreciation of owner's capital should be the main goal especially for micro and small businesses.

Further businesses were divided into four categories:

- Category A: Enterprises that follow all three rules.
- Category B: Enterprises that follow at least two rules.
- Category C: Enterprises that follow at least one rule.
- Category D: Enterprises that follow just one rule.

To assess the business performance of enterprises in this category, basic descriptive statistics were calculated. Then, by using Shapiro-Wilk test it was found, that analyzed data were not normally

distributed (p-values were lower than 0,05 for most indicators), which could be omitted because sample size is large enough not to distort the results (Ghasemi & Zahediasl, 2012). However, when the t-test was performed, also the assumption of homogeneity of variance was not met (using Levene’s test, p-values were lower than 0,05 for most indicators). Thus non-parametric Mann-Whitney U test was used. The significance level for this test was selected as $\alpha = 0,05$. This test is used as equivalent of unpaired two sample t-test, and can verify that the distributions of both populations are equal. Thus from its results it can be derived, whether the business performance is different in groups of businesses that follow and do not follow the rules.

Data for 3 208 business fulfilled set conditions, however some had to be deleted due to error values of ROE, and zero value of fixed assets (which would make impossible to calculate values of 1R and 3R. Eventually, data of 2 549 entities were analyzed. STATISTICA 12 StatSoft CR, s. r. o. was used for all the calculations.

4. Results and discussion

Descriptive statistics of ROE, 1R, 2R and 3R indicators as well as the recommended values of last three, are shown in the tab. 1. Interesting fact is, that only the median of 2R falls within the recommended interval.

Table 1: Descriptive statistics (n =2 549, small and micro businesses in Pilsen region, 2017)

	max	min	median	recommended
ROE	67,943.770	-364,500.000	18.100	
1R	14,828.000	-3,324.000	1.741	0.8-1.2
2R	2.642	-35.040	0.433	0.4-0.6
3R	56,894.000	-2,351.000	0.425	>1

Source: own research based on Bisnode (2018)

Tab. 2 shows, how successful (or rather unsuccessful) are the businesses in complying the rules. In the first category (“follow all rules”), are only 50 businesses out of 2 549 enterprises, which is very little. Interesting fact is, that median of ROE in this category is half the value of those, who do not follow the rules. It can be objected, that this sample is too small to have statistical significance, however, the difference is too big to ignore. In the second category (“follow at least two rules”) still very little part of sample follow the rules (only 12%) and the median of ROE is again higher in the group that do not follow the rules. Yet, in the third category (“follow at least one rule”) the number of those who follow the rules is approaching to half of the population (43%). In this category median of ROE is higher in the group of business that follow the rules, which could indicate possible influence of balanced sheet rules on the business performance. Yet, these results must be supported further in order to answer the research question.

Table 2: Descriptive statistics of ROE divided into categories A, B, C (n=2 549, small and micro businesses in Pilsen region, 2017)

	A		B		C		
	Follow	Do Not Follow	Follow	Do Not Follow	Follow	Do Not Follow	
n	50	2,499	312	2,237	1,097	1,452	
median	9.02	18.35	15.44	18.77	19.37	17.4	
min	-133.02	-364,500.00	-364,500.00	-25,466.67	-364,500	-22,100	
ROE	max	109.83	67,943.77	2,388.89	67,943.77	2,388.89	67,943.77

Source: own research based on Bisnode (2018)

As to D category, tab. 3 shows the numbers of businesses that comply individual rules, together with descriptive statistics of ROE of these businesses. It is clear, that the rules are not followed as often, as it would be expected by theory (that is well grounded in the Czech Republic). The rule, that is mostly

followed is the third one, however, it is followed only in 22% of cases (555 businesses). The first one (which is usually stated as the most important) is followed in only 13% of cases (329 businesses). In terms of ROE, the biggest median has the group of businesses, that follow the third rule.

Table 3: Descriptive statistics of ROE for businesses that comply the rules (n=2 549, small and micro businesses in Pilsen region, 2017)

		1R	2R	3R
	n	329	421	555
ROE	median	14.74	17.02	20.23
	min	-364,500.00	-966.67	-364,500.00
	max	2388.89	671.75	2388.89

Source: own research based on Bisnode (2018)

Further, the Mann-Whitney U test was used in order to answer research question. Its results are shown in tab. 4.

The null hypothesis of Mann-Whitney U test, which assumes equal distributions of both populations, was confirmed only in the category C (on the significance level $\alpha = 0,05$). It indicates, that there is no statistically significant difference between performances of these two groups of businesses (“follow and do not follow the rules”). Unfortunately, this is it only group where the values of median of ROE were higher in the group of businesses that follow the rules than the businesses that do not follow them. Thus although the median value was different, statistically these two groups of businesses are similar.

As for the other two categories (A, B), null hypothesis was rejected (distributions are not equal), which could prove the possible positive effect of balanced sheet rules, however, from the tab. 2 resulted, that median values of ROE of the businesses that do not follow the rules are higher of those that follow. Thus also in these categories cannot be proven positive effect of balanced sheet rules, actually, the results suggest the opposite.

Table 4: Mann-Whitney U test results (n=2 549, small and micro businesses in Pilsen region, 2017)

Var.	Rank Sum (F)	Rank Sum (DF)	U	Z	p-value	Valid N (F)	Valid N (DF)
A	49,004.50	3,200,971	47729.50	-2.86152	0.004216	50	2499
B	367,341.50	2,882,634	318513.50	-2.50099	0.012385	312	2237
C	1,414,699.00	1,835,277	780398.50	0.87092	0.383799	1097	1452

Source: own research based on Bisnode (2018)

As the results show especially tab. 2 and 4., there is only little evidence that would support the presumption that balanced sheet rules have positive effect on business performance. Firstly, little positive effect was found when studying the businesses that fit into category C (businesses that follow at least one rule), where median of ROE was slightly higher in the group of businesses that follow the rules, however results of Mann-Whitney U test rejected the statistical difference. Secondly, it was found, that the companies, that follow the third rule, have slightly higher median of ROE (20.23) than is the median of the whole examined population (18.10).

Further, although the results revealed significant difference of ROE in categories A and B, it was in opposite nature than expected: higher values of ROEs have the businesses that do not follow the rules.

In the light of these facts, the answer to stated research question has to be, that there is no proved positive effect of balance sheet rules on business performance of micro and small businesses.

5. Conclusion

This paper focuses on empirical evidence that would support the positive effect of balance sheet rules on business performance. One of the assumptions of this paper is that financial stability should

logically lead to higher business performance, thus authors do not assume that there is essential difference between long term financial balance/stability and business performance.

To follow the aim of this paper, indicators measuring how successfully each business follow the rules, were developed. Also, as the indicator measuring business performance ROE was selected. Then the dataset of 2 549 small and micro businesses were analyzed using mainly Mann-Whitney U test and median values of ROE.

The results indicate, that there is no positive effect of balance sheet rules' compliance on business performance in case of micro and small businesses. Such result opens a question for future research: *Could be the balance sheet rules considered as outdated? Should they be updated?*

Also, limitation of this research lies in the limited sample of enterprises as well as the selected indicator of business performance. As for the sample, it would be interesting to compare this result with larger businesses or businesses across different industries. As for the business performance indicator, few other indicators were included in preliminary research (such as ROA or IN99), however the results were similar. Also it is necessary to point out the problem accompanying all these types of researches, that correlation does not mean causation. Thus, even if the result indicated that ROE is higher in the category of businesses that follow the rules, there could be many other factors that influence this ROE (amongst the logic ones such as employees, marketing, or management of the company, also the less expected ones as for example coincidence). And it is impossible to control all of them. However, we believe, that if there would be significant influence of balanced sheet rules on ROE, the results should at least indicate it. Nevertheless, the results indicate otherwise.

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ORGANIZATIONAL CULTURE AND INTERCULTURAL MANAGEMENT OF FOREIGN NGOS WORKING IN DEVELOPING COUNTRIES

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Abstract

The text presented below aims to explore the organizational culture of foreign NGOs operating in developing countries. The aim is to identify the factors that are considered the organizational culture, being a contemporary theme of current interest, is regarded as a sine qua non of a successful company, no less of NGOs and their pursuits. The cultural dimension of the pursuits adds value to such organizations, improves their management and boosts their performance. Our research concentrated on areas wherein the cultural differences are felt most keenly. With this in mind, we have conducted a qualitative research and applied the technique of focus groups. The groups comprised representatives selected from the managing bodies of foreign NGOs working in developing countries, whose teams included also the local people. The research results can be used to draw conclusions and develop recommendations beneficial for NGOs generally. Our results have indicated that a sophisticated organizational culture capable of processing cultural differences can distinguish a specific NGO from all others and can bring benefits for the local communities and societies.

Keywords: Culture, Developing countries, Differences, NGO, Organizational culture

JEL codes: J53, M12, O15

1. Introduction

This paper examines the organizational culture of foreign NGOs that operate in developing countries, specifically in the African equatorial countries of Rwanda, Uganda and Malawi. In so doing, the text tries to appraise the intercultural elements of the NGOs' organizational culture as they are encountered and managed by the NGOs' executives. With this aim in mind, we have carried out a qualitative research and applied the techniques of focus group and structured interviews.

Being a contemporary theme of current interest, the organizational culture of an NGO and the added value of its cultural competence are beneficial for the organization's performance and for its effective management. An NGO's culture, appreciated by all its staff members irrespective of their nationality, shall then be the result of proper intercultural management. Such management is of key importance for the organization's overall success in international operations.

Research into the organizational culture of companies has recently become attractive not only for theoretical science but also for routine management. A well developed organizational culture will help the company to be easily distinguishable from competitors, to provide better in-house environment for its employees and to be more environment friendly. Ethical values that the company derives from its organizational culture enhance the company's credibility in the eyes of its clients; make the company more attractive for potential investors; increase loyalty of employees; and build a strong position among other NGOs.

2. Levels of cultural phenomena

Factors affecting our perception and behavior can be designated as "cultural levels". Hofstede (2007) defined four such levels, namely "symbols", "heroes", "rituals" and "values". These levels can be likened to the layers of an onion, where the symbols represent the outer layer which is most

conspicuous when observed from outside. As regards the innermost layer, i.e. values, a person wishing to define them will need to be long-term involved in the relevant culture and thoroughly oriented in it.

- Symbols - are instruments of communication between individuals of a given culture; they cover a variety of signs, words and gestures, but also external aspects such as clothes, hairdo and other symbols of social status;
- Heroes - are persons held in high esteem within in a given culture and considered to be exemplary; such persons can also be purely fictitious;
- Rituals - (like forms of greetings, civil and religious ceremonies, etc.) are not an essential prerequisite for achieving the desired result, but the society deems them important;
- Values - are tendencies indirectly regulating a range of different situations; they are applied to prioritize the situations, to distinguish good from evil, the beautiful from the ugly, the natural from the unnatural.

These cultural values, defined as indicated above, have been embraced by Nový (1996), who enriched them with the level of specific behavior and elaborated the level of rituals by adding general tendencies like customs and traditions. Customs are thus understood to be the standards of behavior rooted in the past, espoused by people and, consequently, generally observed. Traditions can more aptly be described as kinds of experience preserved by their long history of existence. They represent a system of norms, customs and attitudes whose historical pedigree is consciously appreciated. Author Polačko (2018) comments the mentioned phenomena as they are linked to the culture and values and can be very important on an individual level for defining the meaning of human life.

2.1 National culture and its role

National culture is a crucial part of culture per se, affecting also the corporate culture. The corporate culture is thus subsumed under the higher national culture. The largest area is then covered by religious cultures as they gradually emerged throughout history - Muslim, Jewish, Christian, Hinduistic, Buddhist and others.

Thus described, culture is interpreted as historically cultivated relationships among people bequeathed to us by previous generations. The national culture may or may not be placed under the religious culture, the reason being that people of the same nationality can be believers of different religions. The smallest cultures are those embraced by different social groups.

Currently, the boundaries of national cultures can be observed to disappear, which is a consequence of globalization. The disappearance of national boundaries is facilitated, inter alia, by the development of communication technologies, first and foremost by the Internet. Complemented by social networks, the Internet exerts a heavy influence on culture, thanks particularly to its speed of information conveyance.

Another tendency currently noticeable rests in the fact that in many countries even well educated people are unable to land a job where their skills and expertise could be applied and would be adequately remunerated. Such people are then prone to migrate in pursuit of more prosperous economies. The author believes that this phenomenon further encourages the disappearance of cultural boundaries.

2.2 National culture and its impact on behavior

Since the 1970s scientists have been researching the national culture and the many ways through which its multiple functions shape human behavior. Let us mention the approach adopted by two anthropologists, Kluckhohn and Strodtbeck (Piepenburg, p. 25), whose scholarly enquiry concentrated on culture as such, on culture generally. The views presented by these authors were premised on three assertions: (1) the number of problems to be solved is limited; (2) the number of available solutions is limited; and (3) different cultures solve the same problems differently.

Pursuing this approach, Kluckhohn and Strodtbeck sectioned the individual cultures into these five dimensions: human essence / relation to nature / relation to time / relations with other people / grounds for human activities (Lukášová, 2010).

Later on, to better suit to practical applications, Fons Trompenaars reduced the five dimensions of this approach to only three: relation to nature, relation to time and the relations with other people. Then the three remaining dimensions were elaborated into five parts: universalism versus particularism;

collectivism versus individualism; neutrality versus emotionality; specificity versus diffuseness; and ascription versus achievement (Lukášová, 2010).

The tendency towards collectivism manifests itself in the popular preference of working in groups and facing in groups to any consequences (be they beneficial or harmful). A point in case can be seen in the process of remunerating people - whether the benefits should go to each individual separately or be given to the entire group. The author (Monika Nová) found the collectivism to be typical of developing countries generally, and she attributes this tendency to the lifelong community coexistence of the people.

Another factor of major cultural importance lies in the orientation towards the past, the present and/or the future. Cultures turned to the past measure the worth of a person primarily in view of his / her origin - this approach prevails particularly in the countries of Asia and Africa. Relying on her practice in Africa, Nová believes that the fact can be partially ascribed to the legacy of colonial times (Nová, 2019).

Intercultural management

The basic prerequisites for intercultural management have been presented by Nováková and Vaškovič (2009, pp 34) as follows:

- to include interculturality into the day-to-day workings of society;
- to assign tasks and to include social and cultural aspects into planning;
- to bridge cultural and personal gaps between employees; to build a close-knit team; and to implement effective career policy which will motivate the staff and fully tap their resources;
- to make the most of intercultural differences among employees in new departments and new areas of activity; to share experience and personal growth;
- to create own culture and to utilize the multinational character of the organization;
- to apply customized approaches to employees and to respect them as individualities with specific properties and potential.

Mateiciuc describes intercultural competencies as a set of personal properties, capabilities, traits, skills and items of experience & knowledge that will assist a manager in effectively coping with a range of intercultural situations. The personal properties then cover empathy, open-mindedness, self-confidence, self-reflection, cultural sensitivity, resistance to anxiety, tolerance of otherness and the absence of xenophobia and prejudices. Ranked among other competencies can be knowledge, understanding, intelligence and territory-related experience. The intercultural competencies can also rest in the ability to recognize cultural differences, to exploit them, to learn from them, to respect them and to treat them with open mind (Mateiciuc, 2003, p. 62). Foreign cultures may be understood through learning and/or intercultural training focused on their values and standards, on finding ways in a variety of social situations and on their specifics generally. Intercultural learning is a step-by-step inquiry into an alien culture and its standards (e.g. norms, values and patterns of behavior). The process requires accepting different cultural influences and devising strategies of communication with other cultures.

3. Research and Result

To prepare qualitative research planned for January and February 2020, we organized three focus groups (one in each country - Uganda, Rwanda and Malawi). The groups comprised representatives of foreign NGOs who were personally engaged in managing local employees and foreign volunteers (USA, Australia and Germany). Specific opinions expressed by their members were then used to identify prevailing opinion on the issues of our research interest.

The intercultural communication is not hindered only by the language and terminology barriers. Our focus group members believed that it was mostly cultural background and cultural attributes specific to each individual which were decisive for the entire process of communication and cooperation and therefore had to be well understood. Since NGOs address professional problems in conjunction with people of different cultures, it is essential that the NGO's staff understand the unique character of each person - only then their joint effort may succeed. The focus group participants agreed that the intercultural management was not supposed to reject or remove traditional stereotypes and prejudices. but it should rather attempt to illuminate their cultural roots and to find ways of handling culturally

sensitive situations. To comprehend what is typical of a person, we must be thoroughly familiarized with his or her culture. Such comprehension cannot be taken for granted - it will require a length of time spent in the relevant country and community.

Using the lessons learned and reported by managers of foreign NGOs gathered in our focus groups and working with the local people, we have compiled a list of characteristics specific for intercultural communication.

Intercultural differences have been found in these areas:

1. Job satisfaction, motivation and performance.
2. Worker evaluation and work performance appraisal.
3. Communication - nonverbal, sometimes felt differently: the locals often do not grasp irony and perceive it as aggression; some subjects tabooed in our culture are perfectly acceptable for them while others we would consider innocuous are not.

4. Methods, ways and organization of work.

5. Conflicts and how they are handled.

6. Reliability and responsibility.

7. Time - its perception and management.

8. Relationship between work and private domain.

9. Personality and position in the process of working.

10. Power, authority and the ways of their exertion.

Cultural differences can be depicted using two methodological & theoretical approaches applied by Hofstede (2001, 2010): (1) Concept of cultural dimensions; and (2) Concept of cultural standards.

These concepts were discussed by our focus group participants in view of their practice as follows:

- 1 Cultural dimension - this approach represents generally applicable cultural differences that help people become aware of cultural relativity. Such differences are easily identifiable in working or in (even brief) private contacts with foreigners. Knowledgeable about the differences, we'll have no problems in anticipating what behavior can be expected and we'll be able to formulate recommendations for proper understanding, communicating and cooperating with each other.

Its noteworthy, however, that the focus groups have not established any specific principles of everyday cooperation. Such principles stem from the other approach mentioned above, i.e. from the cultural standards.

- 2 Cultural standards - this approach relies on specific social standards shared and respected by people with different cultural backgrounds. The standards cover broad areas of thinking and acting while greatly affecting mutual evaluations, expectations and behavioral patterns. The standards depict what the individual cultures consider normal, common, typical and acceptable.

The focus group results lead us to believe that the cultural standards are integral parts of people's personalities and become obvious only in confrontations with persons from different cultures. They follow from comparisons between different cultures in the process of their confrontation. Cultural standards are very promising methodological tools capable of revealing special ways of thinking, occupational habits and social behavior of culturally diversified populations.

Effects of culture on company management

Results obtained from our focus groups reflected some ways in which culture affected the management of companies. The groups' participants coincided in opinion that national culture influenced social culture as regards motivation; leadership and management; tolerance of otherness; approach to changes and the process of perception and decision-making. Molded by upbringing and social environment, individuals learn to distinguish good from evil and to discriminate between proper and improper conduct. In the future this ability can help them foresee behavior of other people and guide their own. In case a person lives in a community where a different perception of social standards prevails, misunderstandings and even conflicts may easily ensue. Provided the person is capable of empathy for others, his or her decisions will be affected by the capability. The management of business affairs can then be affected by the absence of specifications and the inadequacy of problem definitions.

A prominent feature highlighted by our research participants was collective esprit. Cultures encountered in the regions we researched were typical of intense interest that people took in both their

nuclear and extended families and communities, in contrast to cultures with a stronger individualistic bias.

Tolerance capability

The capability of tolerating strange ways of behavior, deportment and/or thinking not only follows from cultural upbringing, but it is also affected by currently experienced political and economic situation of each person. People's motivations are clearly influenced by their national cultures and their individualistic or collectivistic orientations; by their family life; feelings of security; or (in contrast) by their need of self-realization. The approach to changes can also be rooted in the history of the countries. Nationals of countries having a history of frequent upheavals and stressful political situations (governed by dictators / military; with a record of human rights abuse) may tend to fear any changes in their employment arrangements.

Management of human resources will require monitoring and evaluating four basic aspects of cultural diversity:

- occupational diversity of employees in view of demographic and geographic aspects;
- idiosyncrasies of workers observed in their behavior and thinking; in faiths, values, expectations, attitudes and ways of communication;
- variances in social fabric, namely in communication and cooperation within the company and its departments; in relations among workers and between teams; in different hierarchies;
- commercial diversity with attention paid to clients, products and services.

4. Discussion

Effects of national and corporate culture on HR management

Corporate culture is considered an autonomous type of culture which, apart from reflecting national culture, fosters its own values, sets patterns of behavior and establishes standards whose impact may go well beyond that of the national culture. The national culture and the corporate culture compete with each other, but their relative influences cannot be quantified and, therefore, neither can be called dominant with any certainty.

Considering the national culture, Nový (1996, pp 74 &75) identified these factors affecting professional behavior: religion; leisure time activities; political, economic and educational systems; relationships with relatives and within families; system of social organizations; and healthcare system. Supported by our own findings, we have extended the Nový's work by two additional levels of NGO's corporate culture: objective and subjective.

The objective level covers company's policy; organizational structure; decision-making processes; methods of remuneration; in-house communication; surveillance mechanisms; and available careers. The subjective level covers management of human resources; social values; style of corporate management; social norms and work positions of individuals.

Put otherwise, the national culture differs from the corporate culture like social values differ from social practices. Social values, representing the national culture, are a product of individual value orientation resulting from the process of socialization - such values then become a permanent feature of an individual. Social practices, in contrast, are tools of motivating and remunerating workers and honoring corporate hierarchy; methods of internal communication, etc. - such practices then constitute a specific corporate culture.

Our research results coincided with those reported by Kubátová (2014, p. 41) who split HR management into collectivistic culture (typical of intense communication and focused on people) and individualistic culture (typical of less intense communication and focused on results). With our findings in mind we assert that a worker's indigenous culture heavily impacts on suitable ways of leading people and on carrying out tasks and assignments.

Our focus groups indicated quite clearly that people are inclined to resort to their indigenous culture and to resurrect their entrenched patterns of behavior, particularly in tense or otherwise awkward situations. Familiarity with cultures of their colleagues allows them to foresee the colleagues' behavior and thus to avoid misunderstandings.

Conduct observed in workers and managers coming from people-oriented cultures is characteristic of emphasis placed on mutual relationships; fusion of work and family affairs; and feelings of trust and collective responsibility - these are more important than work performance proper. A manager from this cultural background specifies requirements and defines tasks precisely. Workers and managers coming from the performance-oriented cultures are focused on accomplishing tasks and building trust based on occupational reliability - the work and private life are separated. Such managers assign tasks just once and in only general terms; they mostly do not keep an eye on their progress and merely expect the tasks to be fulfilled properly and in good time.

Our research results correspond also with what was published by Dvořáková (2012, p. 80), who describes the management of diversity as a negotiation taking place across culturally diversified groups and intended to maintain good relationships among people with culturally different backgrounds. Just respecting the Convention on the Protection of Human Rights and Fundamental Freedoms in practical life as the most important human rights conventions agreed within the Council of Europe (1992) can be a way of achieving understanding, respecting culture and coexistence at present (Pavelková, Mojtová, 2018).

5. Conclusion

Culture and economy affect each other and the same is true of national culture and corporate culture. Companies (NGOs not excluded) have to choose the extent to which they wish to establish their own unified standards, or to which they would prefer to design their organizational culture and their managerial practices along the lines of the host country. The national culture is felt in activities like choosing suitable organizational structure; the style of managerial decision-making and communicating; competencies given to different staff positions; expectations and career prospects in a company or an NGO; and motivation generated in workers. These aspects testify to the gradual emergence of links between the national culture and the organizational culture. Provided the staff of an organization share values and behavioral characteristics, the organization operates smoothly. Mostly, however, people coming from different cultures and subcultures, be they national or organizational, have to work together. Then they have to be guided by foreign executives and managers in a culturally sensitive manner in consideration of local specifics.

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HOTEL RECOVERY STRATEGIES FOR THE COVID-19 PANDEMIC CRISIS

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Abstract

Since the dawn of the 2020s, the hotel industry across the globe has been hit hard by the COVID-19 disease. The novel coronavirus firstly reported in China back in December 2019, has been declared a pandemic by the World Health Organization (March 2020). This pandemic crisis has posed unprecedented health, social, and economic restraints, affecting every sector of the economy including the hotel industry as well. Amid the pandemic, numerous countries all over the world have steered to adopt restrictive measures, including inter alia closure of national borders (airports, and ports), national lockdowns, and stay-at-home orders to curb the spread of the COVID-19 disease. However, the implementation of such stringent government measures has incurred negative effects on the overall performance of the hotel industry (e.g., rapid reduction of reservations, significant profitability losses, job losses, high fixed costs). The scope of this study is to critically assess the existing literature strategies targeted at the recovery process of the hotel industry. The methodology applied in this study is based on the generic 4Ps Marketing Model developed in Borden (1964). Moreover, it offers sophisticated business strategies that the travel sector can adopt to cope with this new reality. Lastly, the results of this study could be useful for policymakers and hotel managers in their effort to enhance the sustainability of the hotel industry.

Keywords: 4Ps marketing model, COVID-19, hotel industry, recovery strategies, tourism
JEL codes: L10, L80, M31

1. Introduction

The Severe Acute Respiratory Syndrome (SARS-COV-2), caused by the novel coronavirus firstly reported in Wuhan the capital of Hubei province in December 2019, has hit hard the tourism sector let alone the hotel industry. This pandemic crisis generated by the COVID-19 disease has posed unprecedented health, social, and economic restraints, affecting every sector of the economy including the hotel industry as well. Amid the pandemic, numerous countries all over the world have steered to adopt restrictive measures, including inter alia closure of national borders (airports, and ports), national lockdowns, and stay-at-home orders to curb the spread of the COVID-19 disease.

The present ongoing crisis, as a consequence of the unprecedented spread of the COVID-19 disease across the globe, represents one of the most dangerous threats the hotel industry must cope with, in its effort to return to normality and safety. However, this is not an easy task for policymakers and stakeholders (hotel managers, market participants, other related professionals, etc) due to the dynamic “*profile*” of the pandemic that requires tailor-made measures (e.g., mask-wearing, hygiene measures, temperature testing, limitations on gathering size, etc) to curb its penetration considering the third imminent pandemic wave. Therefore, the need for adopting hotel recovery measures is timely leaving no room for further delay since the hotel industry constitutes one of the most important pillars of the tourism sector, contributing to the overall economic growth of the economy.

The scope of this study is to critically assess the proposed existing literature strategies targeted at the recovery process of the hotel industry. Moreover, it offers sophisticated business strategies that the travel sector can adopt to tackle this new reality. The findings of this paper could be useful for policymakers and hotel managers in their effort to enhance the sustainability of the hotel industry.

The rest of this paper proceeds as follows. Section 2 briefly discusses the related literature. Section 3 describes the tourism sector focusing on the hotel industry. Section 4 exemplifies the hotel recovery strategies by employing the well-established 4Ps marketing model, while Section 5 concludes the study.

2. Literature review

Since the outbreak of the SARS-COV-2, many studies are attempting to analyze the impact of the novel coronavirus disease on the performance of the hotel industry. Some of the related studies are devoted to the needed recovery strategies that can be implemented by the policymakers and the industry to mitigate the disruptive effects of the pandemic.

The most related study to our paper is the recent work by Assaf and Scuderi (2020). The latter focuses on the necessary strategies that the tourism industry can adopt to adjust to the new “*status quo*” amid the pandemic. Specifically, they propose several strategies targeted at the regulators (governments, policymakers) and the hotel managers such as financial aid, lifting regulatory barriers of the hotel industry, taxation, health, and hygiene safety protocols, while the recovery process for the tourism industry suggests a continued presence of limitations to international and domestic travel. Their argument that is very close to our proposals, refers to the short term, when flexible prices, terms, and conditions can reduce financial risks, while non-pricing strategies can be helpful to change customers’ perception of the hotels.

In a similar vein, Farzanegan et al (2020), argue that more controls are needed on the health aspects of the tourism industry and accountability of the main players of this industry, concerning health and safety standards. Moreover, they propose that stringent health and sanitary requirements on travelers are needed to face the pandemic crisis. Lastly, more effective coordination between health and immigration authorities, political will, and surveillance of the international borders are also required.

Zenker and Kock (2020), assess the impact of the coronavirus pandemic on the image of several tourist destinations. (e.g., Austria, Italy, Spain, the New York, and China regions) that have been hit hard by the COVID-19. They propose the avoidance of overcrowded and mass-tourism destinations in the favor of more remote and less populated destinations.

Furthermore, WHO (2020) provides specific precautions guests should take when visiting an accommodation establishment (health and hygiene measures, proper space ventilation, social distancing measures, etc).

Chen et al (2020), argue that policymakers should pay attention to the short-term economic consequences of the restrictive measures of the pandemic. They claim that governments should be cautious while implementing stringent regulations to avoid inflicting an unnecessary economic downturn. They are in favor of implementing targeted regional lockdowns.

In an interesting study, Tsionas (2020), examines the feasibility of hotel openings with limited capacity. He argues that gradually reopening results in nonnegative profits while reopening at a capacity near 33% brings the same level of profit as in the pre-COVID-19 period. To this extend, he claims that lower capacities would require governmental subsidies, which could vary considerably from hotel to hotel.

Likewise, in a recent paper, Kaczmarek et al (2021) employ quantitative techniques to investigate the financial effects of the pandemic crisis on the tourism sector including the hotel industry as well. Specifically, they argue that differences in regime type and national governance are the key determinants of economic reaction to the pandemic and the vulnerability of travel and leisure companies to COVID-19. Moreover, they claim that travel and leisure companies from countries with a higher quality healthcare system, perform better during a pandemic than those with healthcare resource shortfalls. They also assume that demographic characteristics such as population density and migration patterns may have a significant impact on the intensity of the coronavirus disease. Consequently, like other related studies (Hale et al, 2020; Correira et al., 2020; Heyden and Heyden, 2020; Huo and Qiu, 2020; Shanaev et al., 2020), acknowledge the appropriate strategies which will lead to the recovery of the travel sector. Their basic argument contains the closure of public life (e.g., schools, workplaces, and public transport), restrictions on gatherings and local or international movement and travel, and stay-at-home orders, health system action (i.e., public information campaigns, testing policy, and contact tracing), and economic stimuli such as income support and debt relief for households and companies.

Lastly, subsequent work by Polemis (2021), highlights the importance of the role of infrastructure investments such as cleaning and sanitizing systems, hard flooring, and air handling systems to safeguard a secure environment for the hotel guests and personnel as well, correlated with the appropriate pricing strategies. According to the writer's argument, hotels that have been hit by the pandemic crisis must come up with multiple offers and discounts to appeal to customers, including inter alia lower rates for midweek bookings, shorter minimum night stays, long-term discounts, and vouchers for their restaurants.

3. Tourism sector and hotel industry

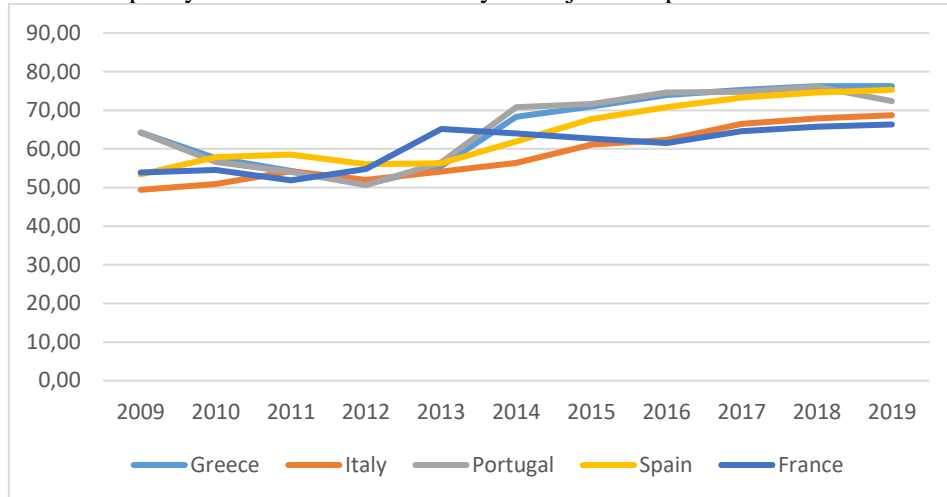
The tourism sector represents one of the most important parts of the globalized economy. Most people are traveling to satisfy their need for education, collection, and art (Robinson et al., 2011). But today, the main purpose of travel may have changed, and modern tourism is more about the exploration and the discovery of the self. Robinson et al. (2011), have proposed different types of tourism depending on tourist's motivations and behaviors, such as alternative tourism, rural tourism, cultural tourism, sport and adventure tourism, dark tourism, gastronomy tourism, religious tourism, health and medical tourism, and cruise tourism.

Despite the economic crisis, the overall global demand for international tourism remained growing. For the past ten years, the tourism growth in Europe has been sustainable and growing. Undoubtedly, Europe constitutes one of the most visited regions of the world, representing 50% of global tourist arrivals and 37% of global tourism receipts for the year 2016, according to World Tourism Organization (UNWTO). While for the years 2017 and 2018, Europe recorded a record of international arrivals, a growth equal to +7% and +6% respectively (UNWTO, 2020). The demand for international tourism arrivals in Europe continued for the year 2019, but at a slower pace, equal to +4%.

More specifically, Southern and Mediterranean Europe have seen a growth in international arrivals equal to +8% and an increase in international receipts equal to +7% for the year 2018. Also, Central Eastern Europe for the same year has enjoyed a +5% growth in international arrivals and a +9% growth in international receipts. As for Western European destinations, there is also a positive performance with a +4% growth in international arrivals and a +3% growth in international receipts. Finally, Northern Europe has recorded a flat growth equal to +1% for both international arrivals and receipts (UNWTO, 2019).

As argued by Schubert et al. (2011), the economy seems to be positively affected by international tourism. The latter has several advantages in the economy in many ways. First, tourism as an important foreign exchange earner promotes the import of capital goods or essential inputs utilized in the procedure of production. Second, tourism can be considered a considerable element in the development of investments. Moreover, tourism promotes the creation of new jobs and an increase in income. Third, tourism contributes to the dissemination of technical knowledge, the accumulation of human capital, and the continuation of development and research.

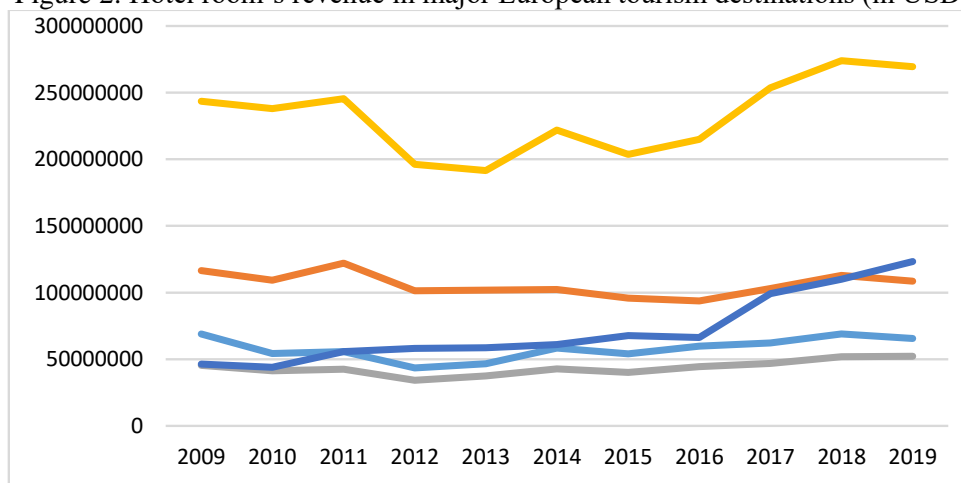
Figure 1: Occupancy rate of the hotel industry in major European tourism destinations (%)



Source: STR database (2020)

Figure 2 illustrates the total room revenues generated by the hotel industry for five major European tourism destinations (Greece, Italy, Spain, Portugal, and France). It is obvious that the hotel rooms' revenue also depicts a positive and growing trend over the examined period (2009-2019) confirming the profitability and growth of the tourism sector.

Figure 2: Hotel room's revenue in major European tourism destinations (in USD)



Notes: See Figure 1 for countries' names

Source: STR database (2020)

Lastly, the hotel industry, which has strong ties to the tourism and travel industry, contributed 7 USD trillion to the global economy in 2013, making it a profitable industry (Titu et al., 2016). Travelers visiting a city for a day or more need a place to rest and sleep and there are different types of accommodation around the world to meet this need. As it is evident, the occupancy rate seems to have a positive and increasing trend over the period 2009-2019, which shows that there is growth in the tourism industry (see Figure 1).¹

4. Methodology

This section develops the 4P's marketing methodological tool to analyze in-depth the recovery strategies for the hotel industry to reverse the negative effects of the pandemic crisis. Borden (1964)

¹ The occupancy rate is a primary hotel sector performance indicator measuring the percentage of available beds or rooms sold over a while (see among others Polemis, 2021).

popularized the idea of the marketing mix—and the concepts that would later be known primarily as the four Ps—in the 1950s. The framework of 4Ps consists of the following four components: Product – Place – Price – Promotion.

The product component includes mainly branding, packaging, and other related services. It depicts what does the customer wants from the product, related to the characteristics of the product that enable it to meet the customer’s needs. In the hotel industry, we examine a combination of tangible products and intangible services, since all products can be touched or seen, while the services can be felt or experienced. According to this perspective, as a hotel industry product, we examine the parameters of rooms, food, amenities, conference halls, ATMs, souvenir, modes of transportation, while as hotel industry service, we consider the behavior and courtesy of the staff, hospitality services, instant response, butler, etc. The parameter of Price represents the perceived value the product/ service gives to the customer and includes offers and discounts and related credit policy. The component of place contains the focused market and selection of the appropriate distribution channel. Finally, promotion depicts advertising, publicity, and sales promotion. To summarize, the tool of 4P’s has been widely used by hotel managers, as part of the overall marketing strategy, to support the understanding of the market and supporting customer’s needs in the best way.

To apply the 4P’s marketing tool to the hotel industry, the hotel marketing mix is one of the most essential steps of its business plan. The first driving force of the model (product) is related to the specific characteristics of the hotel services that satisfy customer needs. The second one refers to the pricing strategy of the hotel services (e.g. room rate, breakfast, and minibar pricing, etc). The third sub-component of the 4P’s model place describes the main tool travelers use, to search for rooms to the destination they prefer, includes a comparison of offers and eventually finalization of their booking. Lastly, during promotion social media platforms are utilized for the manager to build an upper brand name for their hotel and focus on those customers interested in it. After setting up a powerful Marketing Strategy, the upper management should know which travelers to target, and if competition analysis is followed, the described business strategy will enable the business into upper performance and finally higher profits.

In our proposed methodology, we categorize each of the above-mentioned recovery strategies, by using the 4 Ps of the marketing tool, to exemplify the needed policy implications for managers and hotel marketers (see Table 1).

Table 1: Recovery strategies based on the 4Ps Marketing Model

PRODUCT/SERVICE	PRICE	PLACE	PROMOTION
1. Health - Safety - Distance measures	1. Short term measures	1. Location	1. Short term measures
<u>Tailor-made measures:</u> - mask-wearing, - hygiene measures, - temperature testing, - limitations on gathering size Assaf and Scuderi (2020)	Flexible prices, terms and conditions can reduce financial risks Tsionas (2020)	Image of tourist destination in which the hotel is located in Kaczmarek et al (2021)	Change customers’ perception of the hotels after the coronavirus period Tsionas (2020)
<u>Restrictions of access to hotel facilities:</u> - fixed numbers of guests gatherings - room service instead of buffets or breakfast bars - maintenance of activities that take place in open-air settings Assaf and Scuderi (2020)	In combination with price, additional offers, and discounts to appeal to customers, including inter alia lower rates for midweek bookings, shorter minimum night stays, and vouchers for their restaurants Polemis (2021)	Demographic characteristics: age, gender, income, that influence the choice of the hotel destination	The promotion tools depend on the demographic characteristics: age, gender, income
<u>Cooperation with government:</u> Agreements with public institutions to provide their facilities for people affected by the quarantine Assaf and Scuderi (2020)	2. Long term measures	2. Advertising channel	Additional offers and discounts to appeal to customers that the competitors

			do not provide Polemis (2021)
Health and hygiene safety protocols Farzanegan et al (2020a)	Be proactive and implement a dynamic pricing strategy	A personalized tool to meet customers' needs	2. Long term measures
<u>Secure environment:</u> - cleaning and sanitizing systems, -hard flooring - air handling systems Australian Government Department of Health	Take under consideration the long-term impact of demographic characteristics like age, gender, income	A well-known webpage - No commission fee to intermediaries	Confidence in traveling and risk perception - Tourism will most likely return to pre-crisis patterns - Tourists may place a higher value on hygiene Assaf and Scuderi (2020)
Combination of recirculation and outdoor air exchange by opening windows WHO (2020) Properly cleaning, disinfection and ventilation of the rooms WHO (2020)	Adjust pricing strategies to the extra cost generated by the implementation of health and safety measures Australian Government Department of Health	Set up a smart e-distribution strategy - a user-friendly webpage	The more word-of-mouth it will receive, making it establishment a familiar name
Special guidance about which should be the actions of a guest who develops symptoms of COVID-19 WHO (2020) Placement of signs-labels with special instructions: -maintain at least a 1-meter distance from others, -avoid hugging, kissing, shaking hands, -wear a mask WHO (2020) Placement of many hand sanitizer stations in different points, so as visitors can use before going into dining halls, restaurants, or bars WHO (2020)	Adoption of the Revenue management strategy (yielding) This strategy concerns the adjustment of the hotel room rates on a daily or weekly basis, like the airline sector		
Certain restrictions for the use of hotel facilities (gym, beach, swimming pool, spa, sauna, and steam bath facilities): - maximum number of people and physical distancing, - handwashing stations, - single use of towels, - individual use of bottles of water, - many waste containers, - systematic disinfection of high touch areas WHO (2020)			
2. Contactless Technology measures			
Limitation of contact by the gradual shift from personal interactions to technologies Assaf and Scuderi (2020)			
<u>Automation technologies</u> , robots, and artificial intelligence: - Reduction of fixed costs, - Liquidity improvement			

Direct control of room inventory rather than relying on third parties Assaf and Scuderi (2020)			
3. Non-pricing strategies			
Hotel opening with limited capacity (33%) Tsionas (2020)			
Market diversification - reduce the dependence on limited markets Outsourcing - limit risk Insurance services - In case of sudden-unexpected risks Assaf and Scuderi (2020)			

Source: own edition

More specifically, the first parameter of the 4Ps Model, Product consists of three distinct sub-categories (Health - Safety - Distance measures, Contactless technology measures, and Non-pricing strategies). The second and the fourth factor (Price and Promotion) can be distinguished into two generic categories capturing the short-term and long-term strategies, respectively. Lastly, the third driving factor (Place) based on the related recovery strategies of the ongoing literature, can be split into two categories (location and advertising channel).

Based on the related table, it is evident that most of the proposed recovery strategies focus on the basic characteristics of the hotel “*product*” in tandem with the ancillary services (e.g., dining, entertainment, sports, etc). In line with this finding, we argue that one of the most effective non-pricing policies that hoteliers may pursue is a flexible cancelation policy. By implementing this strategy, hotels can reassure guests and give them an incentive to book, while combatting Online Travel Agencies (OTAs) that often make it difficult to cancel. After all, having a flexible cancellation policy on the hotel website will be critical in ensuring direct bookings ensuring inter alia a strong brand loyalty, and enforce confidence to rebook.

Moreover, the related research reveals that pricing strategies must be customized to the special needs of the hotel “*product*” alongside the short-term and long-run recovery measures (price flexibility, diversification, etc).

Finally, given the rapid penetration of technological improvements (i.e., e-commerce, digital platforms, online services, mobile applications) there is a substantial need for the hotel managers to exploit these capabilities to satisfy the customers’ needs as they have been formulated by the new ongoing-pandemic conditions. To give but an example of the important use of digital technologies in the recovery of the hotel industry, it is stressed that the hotel’s website could serve as a source of truth for potential guests and allow them to easily find the information they need to make a booking. In such a way a proper strategy for the guest is to reassure them that the hotel is still taking proper precautions on the property and will continue to do so to ensure the safety of staff and guests. Moreover, the website of the hotels could be used as a channel to promote special offers and packages that are tailored to the needs of the specific target group (e.g., sports tourism, culture tourism, religious tourism, etc) at this turbulent time due to the pandemic crisis.

Based on the above, we conclude that as the novel coronavirus disease continues to impact travel globally, the proposed 4Ps Marketing Model can help the hoteliers to observe industry forecasts and trends that will ultimately shape the necessary recovery strategies as hotels begin to plan for the initial rebound in travel demand after the recession of the third pandemic wave.

5. Conclusions

The COVID-19 pandemic has severely stressed health systems all over the world in an unforeseen way, potentially leading to increases in morbidity and mortality rate. At the onset of the SARS-COV-2, every country must cope with unprecedented health and financial conditions. The novel coronavirus disease has jeopardized international markets, posing significant financial restraints even to the most prosperous economies. Amid the pandemic (from 11.03.2020), numerous countries all

over the world have steered to adopt social distancing and isolation efforts (e.g., molecular COVID-19 testing, health checks, etc) to mitigate the negative effects of the COVID-19 in all the socioeconomic aspects. To give but an example of the rapid penetration of the pandemic to humanity, it is estimated that over 121 million COVID-19 cases have been reported globally, leading to more than 2,6 million deaths one year after the pandemic (March 2021). However, the fierce impact of this unprecedented situation on public health would have been even worse by the absence of restrictive measures to curb the spread of the pandemic (e.g. lockdowns, physical distancing, compulsory masking, flight cancellation, etc).

The hotel industry is one of the four main pillars of the tourism sector (airline industry, cruise lines, and car rental) that has been hit hard by the pandemic crisis. This outcome has plunged the economies across the globe into a severe economic crisis. As a result, the stakeholders and the policymakers have stressed their attention on drafting initial economic recovery plans alongside the adoption of mitigation and containment measures such as stay-at-home orders. This means that hoteliers need to take the necessary steps to adequately prepare for recovery, while also setting proper expectations.

The scope of this work is to critically assess the existing literature strategies targeted at the recovery process of the hotel industry. Our study is one of the first attempts employing the well-established 4Ps Marketing Model to highlight the role of hotel recovery strategies to tackle the ongoing COVID-19 pandemic crisis. In this way, this paper offers sophisticated business strategies that the travel sector can adopt to cope with this new “reality” in light of the imminent gradual re-opening of the hotel industry.

Based on our model, we argue that the hotel industry can adopt various pricing and non-pricing strategies fully customized to the special needs of the “product” including *inter alia* price adjustment, diversification of the hotel services, and special discounts. Moreover, this study pays attention to the main technological advances targeted at the increasing use of e-commerce, and other digital services (e.g., mobile applications) that a hotel may offer to better diversify its services and attract customers. Besides, there is a consensus in the related literature regarding the important need for hotel managers to take advantage of these technological capabilities to satisfy the customers’ needs increasing the overall hotel performance.

Lastly, the results of this study could be useful for policymakers and hotel managers in their effort to enhance the sustainability of the hotel industry. Future research may cast light on the application of empirical modeling to quantify the effects of the proposed strategies on the overall efficiency of the hotel industry.

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INNOVATIVE DNA OF SHOE MANUFACTURING COMPANIES

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Abstract

Highly competitive business environment in footwear leads owners and management of companies to a strategic focus on innovation, which is essential for their survival and gaining a significant position in the domestic and foreign markets. There is growing pressure to develop new materials in the field of 3D technologies, hi-tech materials, and smart innovations. The success of implemented innovations depends primarily on people, processes, and philosophy, respectively on the innovative company DNA. The aim of the paper is to evaluate the DNA, the intensity of innovations and the type of innovations implemented in a selected sample of innovative shoe manufacturing companies. The aim is also to find answers to the following questions in these companies: How to create an innovative shoe manufacturing company? How to manage the innovation process and evaluate its effectiveness? The evaluation will be carried out on the basis of a structured interview with the owners and top managers of shoe manufacturing companies. The structured interview will be based on the concept defining innovative DNA, which allows to assess company innovativeness. The determination of the achieved level of innovative DNA in selected shoe manufacturing companies will represent output of the paper.

*Keywords: innovation activities, innovative DNA, shoe manufacturing companies, structured interview
JEL codes: O3, O31, M1*

1. Introduction

In a highly competitive business environment for footwear companies, the ability to learn, change and innovate plays an important role. The basis of success is finding own way to implement innovations and create own innovative DNA. The company's innovative DNA is based on its philosophy, people and processes.

Based on the CZ-NACE classification of economic activities, footwear companies are included in CZ-NACE division 15 in group 15.2 - manufacture of footwear together with firms in group 15.1 - tanning and dressing of leather, processing and dyeing of fur, manufacture of luggage, handbags and the like, saddlery and harness. Based on data from the Ministry of Industry and Trade and the Czech Statistical Office (2018), companies in Section 15 are characterized by a high share of manual work on the product, lower technological complexity and pro-export orientation. Companies are significantly affected by the import of cheap goods from China and other Asian countries. Companies invest in modernization of machinery and technological innovations. An eco-friendly lifestyle reduces the demand for leather goods and leads to an increase in the demand for eco-leather (COKA,2019). There is still a shortage of skilled workers. Based on data from the Ministry of Industry and Trade (2019), it follows that Section 15 accounts for 0.07% of total R&D expenditures in the manufacturing industry, while these expenditures are exclusively from business sources. The share of researchers in the total number of researchers in the manufacturing industry was 0.11%.

Although footwear companies are aware of the importance of innovation, there is sometimes a lack of a sophisticated mechanism to support creative and innovative activities in the production and sale of footwear. The aim of the paper is to evaluate the selected sample of five Czech innovative companies producing footwear and their innovative DNA, intensity and type of implemented innovations. The aim is also to find answers to the following questions within surveyed companies: How to create an innovative shoe company? How to manage the innovation process and evaluate its effectiveness? The evaluation will be based on the concept defining innovative DNA according to Dyer et al. (2011), which allows to assess the innovation profile of the company. The evaluation of innovative DNA in selected companies will be carried out on the basis of a structured interview with the owners and top managers in each shoe company separately. In determining the intensity and type of innovations, the analyzed data will be processed by the Ministry of Industry and Trade and the Czech Statistical Office.

2. Theoretical background

To create innovations in the company, it is necessary to create an appropriate creative environment. This means (Košturiak and Chál', 2008; Gupta and Trusko, 2014; Veber, 2016) to create a work environment where employees will not be afraid of risks. Instead, time and money will be devoted to experimentation. At the same time, diversity in thinking and acting should be encouraged. It is necessary to connect technicians with economists and managers. When transforming ideas into innovations, it is important to apply creativity and combine the creative efforts of individuals (Peterková, 2018; Peterková and Ludvík, 2015; Krasnicka et al., 2018).

A functioning innovation process is needed to implement innovation activities. Herzog (2011) points out that while innovation is defined as the commercial exploitation of a new idea or invention, the innovation process refers to the timing of events that occur when people develop and implement their innovative ideas together in an institutional context. The innovation process begins with the generation of new ideas and ends with their commercial use. The innovation process consists of three main phases: preparation of innovations, implementation of ideas and placing on the market. The innovation preparation phase includes all efforts to create and select new ideas as well as an assessment of their feasibility with regard to technology and the market. The idea implementation phase is focused on the implementation and development of ideas. Part of this phase is the testing and evaluation of various alternatives to product functions and designs. In the last phase of placing on the market, the use of outputs is planned and implemented and disseminated to the market. Similarly, the innovation process is defined by Kassay (2013), who specifies three phases, namely the creation of invention, the creation of innovation and the dissemination of innovation.

According to Bessant and Tidd (2014), internal and external factors contribute to the creation of a creative enterprise. They give more weight to the factors of the internal environment, which include mission and strategy, corporate leadership, corporate culture, structure and size, resources and technologies, procedures and management, task requirements, systems, policies and procedures, individual needs, styles and individual abilities and skills. These are factors that support or limit the implementation of innovation in the company. It is not possible to clearly define the form of the corporate environment for innovation. It is always necessary to build on the conditions that exist in the company. Dyer et al. (2011) tried, based on a research survey on a sample of world-famous innovative companies (e.g., Amazon, Apple, Google, etc.) and innovative companies that are not so well known (e.g., Salesforce.com, Hindustan lever, Reckitt Benckiser, etc.) find answers to the following questions: What makes your business so innovative? What happens inside the company while realizing business activities?

The authors conclude that every company has its own innovative DNA. The DNA of innovative companies is based on the concept of 3P: people, processes, philosophies (Dyer et al., 2011):

- **People.** Innovative companies are run by entrepreneurs, leaders who are good at discovery and have innovative ideas. At the same time, the DNA of innovative organizations reflects not only the DNA of the founder, the leader, but also depends on the people around him. It is important to be able to surround yourself with the same innovative people and to be able to convince and inspire them for your ideas, projects and subsequently to promote their implementation.

- Processes. Just as resourceful people systematically engage in questioning, observation, networking, and experimentation, which leads to the support of the ability to generate new ideas, so an innovative company develops processes that support these skills in other employees. The most innovative companies have created a culture that reflects the personality and behavior of the leader.
- Philosophy. The created processes are supported by the created philosophy, which reflects four aspects: innovation is the task of each employee, disruptive innovations are part of the innovation portfolio, multiple innovations are implemented at once and the risk associated with innovation is accepted. The basis of the philosophy is to constantly question the status quo and not be afraid to realize a change.

The approach of Dyer et al. (2011) to the innovative DNA is developed into a test framework, which is focused on three areas, including established questions to determine the innovation profile of the company.

At the same time, Dyer et al. (2009) specified the skills of the most successful innovators, resp. differences between innovators and other top managers and entrepreneurs. They found that in most companies, top managers do not feel responsible for presenting strategic innovations but see their responsibility in facilitating the innovation process. In contrast, managers of the most innovative companies do not delegate creative work but do it themselves. Innovators differ in their creative intelligence. Dyer et al. (2009) they point to the identified discovery skills that the most creative managers have. They consider these discovery skills: association, questioning, observation, experimentation and networking. These discovery skills form the genetic code of great innovators.

Hamel (2006) also assessed the assessment of innovative companies and compiled 50 questions arranged in nine blocks. To ensure an objective view in the evaluation of the company, the author recommends that the answers to the questions be processed by a group of key managers and executives. He also points out that not all issues will be equally important in all companies. The aim of the questions presented is not to obtain an absolute number, but to obtain results that point out weaknesses and will serve for further discussion in the company.

3. Research methodology

The evaluation of innovative DNA is carried out at five footwear companies operating in the Zlín Region. Business owners do not wish to publish the name of the company, so companies are referred to for research purposes company A, company B, company C, company D, company E. The evaluation is based on the approach to innovative DNA according to Dyer et al. (2011), which is elaborated into the 3P test framework (people, processes, philosophy), in which the questions are defined, see Table 1. Based on the obtained score, the achieved level of the company's innovation profile is defined.

Table 1: 3P test framework

I. People
1. Our company or team has a capable leader who is able to generate new ideas for new processes, products, services or business.
2. Our company or team actively monitors creative and innovative skills in the recruitment process.
3. Evaluating the creative and innovative abilities of employees is an important part of the performance evaluation process within our team or company.
II. Processes
4. Our company or team often engages in brainstorming to generate wild or different ideas to draw analogies from other products, companies or industries.
5. Our company or team supports team members, asks questions that challenge the status quo or conventional ideas on how to do things.
6. Our company or team develops new ideas by often giving people opportunities to observe the activities of customers, competitors or suppliers.
7. Our company or team has established formal processes for networking outside the company to find new ideas for processes and products.

8. Our company or team has adopted processes for frequent experiments with new ideas in search of new innovations.
III. Philosophy
9. Our company or team expects everyone to offer creative ideas on how the company should change products, processes, etc.
10. People in our company and team are not afraid to take risks and are not afraid of failure, because top management supports and rewards risk-taking.

Source: Dyer et al. (2011)

The analysis of the intensity and types of innovations implemented in selected footwear companies is based on data processed by the Ministry of Industry and Trade and CZSO in the form of the document Panorama of the Manufacturing Industry of the Czech Republic 2018 issued in 2019. The document describes individual branches of the Czech manufacturing industry, their development and achieved results. By that the document brings results of the industrial companies operating in the Czech Republic and it is processed according to CZ-NACE classification of activities.

The research sample consists of 5 companies owned by the Czech owners operating in the Zlín Region.

Company A. The main scope of business is the production of footwear, namely haberdashery leather and sports textiles, both in men's, women's and children's designs. The "Urban style" is evident in the offered product line, it focuses on everyday shoes - daily wear. It uses, partly retro elements, such as the classic division of size circumferential groups, it uses the classic metric size assortment. The company does not use extravagant colors even for shoes for 15+. The company relies on the quality and innovation of existing model lines. However, production is limited by a relatively narrow range of shoe hoof models. The company has been presenting itself on the market mainly in the last 5 years, it was one of the first companies realizing sales through e-shops, but it is also expanding its business plans by building physical stores in the Czech Republic. It operates abroad, in Slovakia and partly in Austria. The financial results for the last three years can be characterized as balanced and the company achieves positive financial results.

Company B. The main business activity is the production of shoe components, namely soles, both pressed and unit, production of shoe insoles based on leather, poromer and hardened cardboard. These insoles are manufactured on the basis of sophisticated innovative technology, on the platform of tensioning and inserting insoles. The company has a patent for the production of a special rubber sole and, together with the Italian company Rieger, is the exclusive supplier for the world market. Within the Czech Republic, the company can be characterized as a leader in the production of shoe components. Economic results for the last three years (2018, 2019, 2020) are not in line with the planned value, but still represent positive economic results.

Company C. The main scope of business activities is the mixing of mixtures of both black for the automotive industry and colored for the footwear industry, it also specializes in components made of natural and synthetic rubber. Most of the production is focused on automotive industry (65%), both cars and commercial vehicles. However, the company does not have a drive. The company is very dependent on three large customers, which, after all, was reflected in the results for 2020, when after a decade of good results (2018, 2019) they achieved a negative economic result. At present, the company does not have any patent-protected product, although in the past it had.

Company D. The main scope of business is primarily sale of children's footwear and production of shoe components such as laces and orthopedic insoles. The company operates on the Czech market, using the "Czech boot" certification carnet "Giraffe". However, a number of ongoing innovations do not bring significant sales, moreover strong competition in children's footwear from Asian manufacturers, caused negative economic results for two years in a row (2019, 2020). The company has a well-developed e-shop.

Company E. The main scope of business is production of work and special-purpose footwear, the company participates in a number of tenders, mainly in Europe, in the Scandinavian countries, as well as the USA and Canada. It has a patent-protected Goretex lining material, which guarantees uniqueness and significant competitive advantage. The company also realizes production of medical footwear using specific antibacterial lining materials. The company has advanced know-how. The economic results for the last 3 years are positive; however, it does not live up the expectations of the

owners. The company invests heavily in the development of new recipes, a new design for work footwear and in an environmental approach to the production of key commodities for footwear.

4. Results

The results were obtained on the one hand on the basis of the analysis of Ministry of Industry and Trade data and a structured interview based on the test framework of the 3P concept.

4.1 MIT data analysis (2019)

Footwear companies export 70-80 % of their production, mainly to the German, Austrian, Slovak and United Kingdom markets. The footwear is mainly manufactured by smaller family companies, which are focused on specialized products for which there is a high demand on the Czech market. Footwear manufacturers focus on the production of footwear and clothing accessories with higher added value, especially in the segments of work footwear, protective and safety footwear, but also orthopedic, medical, prophylactic and quality children's footwear. The trend in the production of footwear is tailor-made footwear from leading Czech designers, using modern raw materials and preparations at a higher price, as well as "barefoot" footwear, which began to be produced by smaller companies. Barefoot shoes are characterized by low weight, straight, thin and very flexible sole and a shape corresponding to the shape of the foot. Own e-shops of footwear manufacturers represent current trend. Czech footwear companies cooperate with foreign partners and produce structurally more complex products, products with higher utility value and modern design, but the sale is realized mainly on foreign markets.

4.2 Types and intensity of implemented innovations in companies A-E

During the interview with the owners and managers of A-E companies, innovations in business processes and product innovations in the dominant work sections in the production of footwear for the period from 1 January 2019 to 31 December 2020 were defined, see Table 2.

Table 2: Types of implemented innovations in companies A-E

Dominant working sections in the footwear production	Implemented innovations in companies A-E	
	Innovation of business processes	Product innovations
marketing and design	A	A, D, E
design, development, modeling	A, D	B, E
Technology creation	B, E	B, C
tool production	A, C, E	B
mixing of mixtures	B, C	B
Mill	C	C
Press	C	B
textile gluing	E	D
manipulation (top + bottom)	A, E	D, E
sewing section	D	D, E
clothing section	A, E	A, D, E
product finalization	D, E	A, B, D

Source: data obtained from realized interview

It was found that in the given period, A-E companies implemented a total of 20 business process innovations and 21 product innovations. Company E and company D innovated the most, followed by company A, B and finally company C. The results are given in Table 3.

Table 3: Summary of implemented innovations in companies A-E

Summarization - companies A-E	Implemented innovations in companies A-E		
	innovation of business processes	Product innovations	Total
Company A	5	3	8
Company B	2	5	7
Company C	4	2	6
Company D	3	6	9
Company E	6	5	11

Source: own elaboration

4.3 Evaluation of innovative DNA

Based on interviews with owners and managers of each company separately, answers to questions within the 3P test framework were obtained and then evaluated using a scoring scale: 1 = strongly disagree, 2 = rather disagree, 3 = neither agree nor disagree, 4 = rather agree, 5 = strongly agree. The company could achieve a maximum of 50 points. The result is the determined score of innovative DNA of the company A, B, C, D, E see Table 4. The highest score was achieved by company A (46 points) and the lowest score by company C (29 points). Company A is therefore the largest DNA innovator of the evaluated companies.

Table 4: Innovative DNA in companies A, B, C, D, E

I. People	Companies				
	A	B	C	D	E
1. Our company or team has a capable leader who is able to generate new ideas for new processes, products, services or business.	4	5	4	3	4
2. Our company or team actively monitors creative and innovative skills in the recruitment process.	5	5	3	5	4
3. Evaluating the creative and innovative abilities of employees is an important part of the performance evaluation process within our team or company.	5	3	3	2	5
II. Processes					
4. Our company or team often engages in brainstorming to generate wild or different ideas to draw analogies from other products, companies or industries.	5	4	2	3	5
5. Our company or team supports team members, asks questions that challenge the status quo or conventional ideas on how to do things.	5	2	2	3	4
6. Our company or team develops new ideas by often giving people opportunities to observe the activities of customers, competitors or suppliers.	5	4	2	5	5
7. Our company or team has established formal processes for networking outside the company to find new ideas for processes and products.	4	1	4	3	4
8. Our company or team has adopted processes for frequent experiments with new ideas in search of new innovations.	4	3	4	4	4
III. Philosophy					
9. Our company or team expects everyone to offer creative ideas on how the company should change products, processes, etc.	4	2	4	3	3
10. People in our company and team are not afraid to take risks and are not afraid of failure, because top management supports and rewards risk-taking.	5	1	1	2	2
Total number of points	46	30	29	33	40

Source: own elaboration according to Dyer et al. (2011)

Company A is one of the medium-sized companies (85 employees). Business owner is company leader capable to generate new ideas. The owner of the company has established a system of daily production meetings, which are carried out by the production director in the length of 10 minutes. At the same time, there are meetings on a weekly basis focused on development activities, in which top management participates (production director, development director, owner and sales director). Motivation for creative and innovative activities of employees is realized through the created wage system, which is based on basic and motivational wages (premium component on the monthly basis linked to the quality of footwear produced and the quarterly basis, which cannot be demanded). Employees have the highest wages of all companies surveyed and at the same time employees represent

the youngest staff. Operation is one shift. A belt conveyor is used to automate production. To evaluate ideas or unconventional conceptions, a system of controlled documentation was introduced and its owner is production manager who leads weekly meetings and evaluates ideas. Monthly sales are monitored and analyzed in detail. The owner of the company is in daily contact with employees, he monitors their opinions on new improvements in the production of footwear. Ideas from foreign competitors are monitored through international trade fairs, especially in Italy and Germany. Ideas are currently being discussed through an online platform. Customer satisfaction is determined through a check list, which is part of the invoice. The company responds to the customer's dissatisfaction with the product by corrective measures, but with a certain delay. Implemented changes are documented by photographs, which are placed on the company's website. The company has a system for measuring the effectiveness of innovation activities on the basis of determined savings from implemented innovations.

The second largest number of points was obtained by company E, which belongs to large companies (301 employees). The innovation leader is the manager, not the owner. He is able to motivate employees to innovative and creative activities. Innovative ideas from employees are collected through a survey, based on pre-prepared questions by the head of production. Surveys are conducted once a month. He also gets ideas from foreign competitors and by finding out customer satisfaction through a checklist. In case of customer dissatisfaction, company responds with appropriate corrective measures the fastest way of all surveyed companies. Although company has own wage system, it does not sufficiently motivate employees to innovate. Together with company C both pay the lowest wages, which is influenced by the location where the company operates. There is a high unemployment rate. The success of a company is determined by the patents it owns. The effectiveness of implemented innovation activities is measured through the percentage share of sales from innovative products in total sales.

Despite the fact that company C implements successful innovations, it is one of the worst DNA innovators of all the evaluated companies. It belongs to the medium-sized companies (215 employees). The owner is a capable leader generating new ideas but does not have significant communication skills. He is not able to inspire all employees to be creative and innovative. He does not look for ideas in foreign competitors and does not even compare himself with domestic competition. Even if the company has a system for collecting ideas "Vox populi", employees are not sufficiently motivated by the created wage system. Once a quarter, the owner answers questions from "Vox populi" and describes the direction of the company. Compared to companies A, D, E, the lowest wages are paid to employees. There are mainly employees in the older age category. Experimentation and risk-taking in innovation are not encouraged. It does not monitor customer satisfaction through a checklist. The effectiveness of innovation activities is determined twice a year through the percentage share of sales from innovated products in total sales.

Company B is a medium-sized company (186 employees) and company D a small company (46 employees). Both companies are among the worse DNA innovators. They are a bit better than company C. In both companies, the innovation leader is the manager. Owners of companies B, D are not so interested in the company and leave everything to top management. Although companies have a system for monitoring ideas from employees, competitors and customers, it is not so sophisticated and is not used. Also, the wage system does not sufficiently motivate employees to innovate. Both companies have older employees.

With regard to the results obtained from the interviews, it is possible to define the basic elements that influence the creation of an innovative company for the production of footwear in connection with the concept of DNA:

- People: the owner of the company is also an innovation leader, daily contact with employees, the existing motivation system supporting the innovative and creative activities of employees.
- Processes: a system of controlled documentation of innovation ideas from submission to their evaluation, including measuring the effectiveness of innovation activities.
- Philosophy: innovations are part of the company's philosophy and ensure a significant position of the footwear manufacturer in the market. At the same time, it turns out that a prerequisite for the creation of an innovative company for the production of footwear is a well-established corporate culture, motivated and well-trained staff and a functioning system for the effective evaluation of innovative ideas.

It was also found out how the individual phases of the innovation process are managed. In the preparation phase of the innovation process, the basis is the monitoring of trends in footwear production on foreign markets and the established system of submitting ideas, including its administration. In the implementation phase of ideas, emphasis is placed on elements of automation of production and use of new materials and development of new designs. In the phase of spreading the innovation to the market, customers are informed through social networks and the implemented changes in the manufactured footwear are documented by photographs, which are placed on the company's website. The effectiveness of implemented innovation activities is evaluated on the basis of selected economic indicators.

5. Conclusion

The evaluation of innovative DNA was carried out at five selected Czech companies A, B, C, D, which produce footwear. An interview with business owners and managers was realized. The interview was based on the 3P test framework, including a mapping of the intensity and type of innovations implemented. At the same time, the data processed by the Ministry of Industry and Trade and the Czech Statistical Office (2020) were analyzed, providing basic characteristics of footwear manufacturers and defining trends in footwear production and sales. It was found that despite the fact that the Czech Statistical Office monitors the innovation activities of companies throughout the Czech Republic in two annual cycles, it was not possible to use data from the last research for the period 2016-2018. This is because the sample for the collection of data on innovation activities of enterprises is created on the basis of a combination of CZ-NACE at the section level, i.e., at the level of NACE 15 - Manufacture of leather and related products, with the combination at CZ-NACE level at 3 places (15.1 and 15.2) is not representative and is not published.

The evaluation based on the 3P test framework according to the number of obtained points resulted in the order of DNA innovators producing footwear: 1st place company A, 2nd place company E, 3rd place company D, 4th place company B and 5th place company C. It shows that the best DNA innovator is company A, which has a sophisticated motivation system supporting creative and innovative activities, as well as a support system for the implementation of innovations at the level of employees and management. The owner is also an innovative leader. In contrast, the worst DNA innovator is company C, where again the owner is an innovation leader, but is not able to get employees for innovation, which is reflected in the insufficient motivation system. It does not monitor ideas from competitors and does not determine customer satisfaction.

Based on the result from the 3P test framework, it is possible to define elements that have a positive effect on innovative DNA in the examined sample of companies. The innovative DNA of the company is positively influenced by the position of a strong innovation leader, which belongs to the owner of the company not to an authorized manager, a wage system that motivates employees to implement innovations and a young employee team. Based on these findings, it is possible to determine an innovative footwear company.

At the same time, it turned out that the higher DNA score of the company corresponds to the positive economic results achieved in recent years (company A and company E). On the contrary, the lower achieved DNA score corresponds to the negative economic results achieved in recent years (company A, company B and company D).

It was also found that all companies, regardless of the level of achieved innovation DNA, measure the effectiveness of implemented innovation activities. Measurement is based on the percentage share of sales from innovated products to total sales predominates.

Companies with higher DNA scores are able to respond better to competition from Asian countries through innovative materials, design and quality footwear.

Further research activities will focus on a more detailed knowledge of the systems for measuring the innovation activities of companies producing shoes in order to design key indicators of innovation performance, including their integration into the company-wide system for measuring company performance.

Acknowledgement

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BRANDBUILDING IN TOURISM

SUBTITLE: HOW TO ESTABLISH A STRONG BRAND WHICH TOURISTS WILL LOVE?

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Abstract

Generally speaking, businessmen face dynamic changes in the business field. The professional community also face a number of changes in marketing communication. On the one hand there are nowadays circumstances due to COVID-19 restrictions. On the other hand, brandbuilding process is still needed regardless of the situation. Those brands that already are on the market need to survive against competition. But if there is a newcomer, brandmanager should carefully consider how to build this brand. Especially in tourism. This paper discusses examples of brand building in travel industry and also how the brand should be differentiated and original which is needed to beat the competition. Based on technical terms and specific example in the tourism field of the Czech Republic this paper explains establishing new brand itself. At the end of this paper there are some recommendations for building a so called lovebrand in tourism because every businessman, hotelier or the restaurant owner desires for people to love his brand.

Keywords: brand building, Czechia, lovebrand, tourism

JEL codes: M31

1. Introduction

However, brand building in destination management is relatively a new idea it is the key element in destination marketing (Adamus-Matuszynska, et al., 2021). Not only businessmen, companies, hotels, restaurants and other entrepreneurs has to build their brand. It is also managers activity of organization of destination management. Current situation during the COVID-19 crisis forces cities, regions and countries to compete more intensively in attracting visitors (Rehmet & Dinnie, 2013 in Asseraf and Shoham, 2016). It goes hand in hand with business activities in region. When some region has a well-known brand, positive attitude to providing services connecting with tourism and also wide scale of products offered, this region is memorable for tourists and they will probably come back. Of course, the attraction of region is not just about the brand or image but especially nowadays it is very important to take care of it. Destination visual components including some slogan or motto communicate potential tourists. Mix of these products (visual components, physical and natural characteristics) form the travel experience (Ruiz-Real et al., 2020). Brand building in tourism is not just about establishing the new one, but also about taking care of it, affecting potential tourist through this brand and finally about making a brand which tourists will love. This paper discusses how destination managers can manage to establish a strong brand, how to succeed in the competition field of other destinations and also states a good example of brand in tourism of the Czech Republic. Main goal is to recommend few steps to being one of these lovebrands. Partial goal of this paper is to verify hypothesis that people perceive the brand only as a visual (logo and name).

2. Theoretical background

In companies there are components of branding used as a part of marketing (Hýblová, 2017). She also mentions that first brands were owned by farmers as a symbol of quality. The important thing about brand is the fact that it is not only the logo, but also emotions of customers (Aaker, 2003). In case of this paper the customers are potential tourists. Establishing the new brand is very difficult discipline

which needs careful work, authenticity, originality and so on. It is not the task for a few moments. It needs very careful preparation, analysis, knowledge and it takes a lot of time. But if manager realize that he or she has to be focused on these factors, it is a good start to success.

As discussed by Perreira et al. (2012) establishing the new destination brand is correlated with the experience of the destination, preferred image of this destination and also differentiation between destinations. In the academic field there was the branding theory of David Aaker and Kevin Keller applied to tourism destination (Ruiz-Real et al., 2020). But – is it important to brand destination? Is it needed to have a logo, slogan, motto, story and image behind the one destination brand? Kemp et al. (2012) think so. They mention that also the destination can be branded. But it is necessary to differentiate destination branding and product or service branding. According to Chow, et al. (2017) basic function of strategy of branding is to provide added value to given product or services. Therefore, consumers brand loyalty could reduce losses to competitors.

Lovebrand is some kind of brand that people love, they want to use it, wear it, it is the brand the manager is proud of. What about tourism? Is it possible to have lovebrand in tourism? If the manager created the lovebrand in tourism it means that this destination is totally different from the others, raises expectation of tourists and knows how to satisfy their needs repeatedly.

According to *Travelbakers.cz*, which is the company focusing on learning lessons in tourism, lovebrand is about few factors. B (behaving), R (razor), A (audience), N (no name), D (deliver). Very important is the way the manager can introduce the brand, speak about it and also take care of it when it is already on market. Lovebrand should be like a ‘razor’ which means that seeing the brand, hearing about it or tourists own experience should be something that desire them (tourists) to go back, repeating this experience, learn more about this brand etc. Manager should carefully decide, which way is the best to introduce the brand within 30 seconds. In this time should the so called ‘razor’ come in managers words to catch attention of potential tourists. Next very important thing is the audience. It is really necessary to know exactly what our target group is. If the manager wants to create a strong lovebrand, first he has to do market research (target group, experiences, needs, desires,...). It is good to know what tourists expect from the brand. But more important is to realize what the brand (represented e. g. by DMO manager) expects from tourists. It doesn’t always have to be their visit in region. Next step in brand creation process is so called ‘No name technique’. It means that customers / tourists can recognize the brand without a title, name or slogan. This is very important to know that it works. Travelbakers company realized research of city brands in the Czech Republic. The brand respondents could mostly recognize without the name/title was the brand of Ostrava city. (Travelbakers, 2019)

Figure 1: The logo of Ostrava city



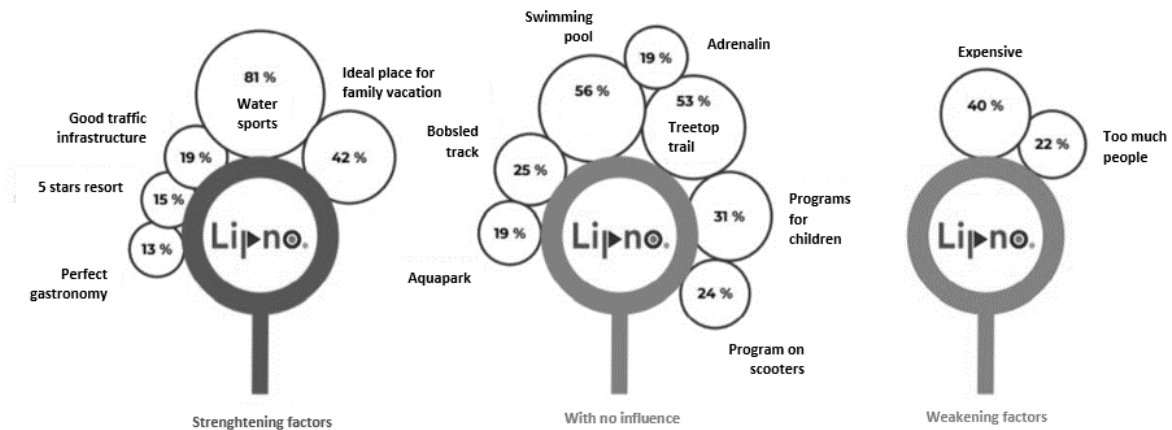
OSTRAVA!!!

Source: Ostrava.cz (2021). LOGP OVA. Available from: <https://www.ostrava.cz/cs/o-meste/aktualne/v-sobotu-se-otevrou-dve-rekonstruovane-hasicske-zbrojnice/logoova1.png/view>

Another important thing is what destination should deliver by the brand. According to Travelbakers it is not the information that our brand exists. It is also not about delivering information that in our region there are nice fields and forests, mountains, sights, lakes etc. It should be focused on delivery of emotions from the whole beginning. For example - Snickers company. In advertisement they don’t deliver the information about the sweet stick. They deliver emotions aimed on the taste of this stick and association with hunger. The motto ‘*You’re not you when you’re hungry. Next time, eat a SNICKERS.*’ really works. It is the same in tourism. No only the information about region is the important thing, but also evoking potential tourists desire to come to that region – based on emotions we start to flow in tourists mind by our advertisement. Also, according to Keller (1993), brand image means that customers (tourists) keep the brand in their mind. Really important factor is association with the brand. People mostly create association through their own experience with the brand. That’s why manager should consider (during establishing the brand) few of associations he wants people to connect with. Then it is easier to do brand marketing. When the brand is already on the market it is necessary to

take care and evaluate it. There could be e. g. association maps created. There are criteria which are divided into: *good for strengthen the brand, with no influence and weakening the brand.*

Figure 2: Association Map (Lipno destination)



Source: adjusted on the basis of the Travelbakers.cz (2020)

Findings from research by Van and Hieu (2020) show that success of branding process is hidden behind reaching a large number of customers in one or more different markets with personalization of the brand. The success in branding is when customers can say where they saw the brand and what is the difference from competition.

Very important discipline during establishing a strong and successful brand is also creating of mission and vision. For example, mission of Nike company is ‘to bring inspiration and innovation to every worlds sportsman’ followed by slogan ‘*You ARE the sportsman if you have body*’. It sounds motivational, leads people to action, especially to buy running shoes. And it really works. That also applies to tourism. Correctly set mission, vision and slogan which is for tourist some kind of challenge are key factors to have a strong brand. The strong brand in tourism is, according to Van and Hieu (2020), based on stories. That mentions also Hýblová (2017). She discusses differences between branding of New Zealand, which is based on the ‘100%’ topic (100% Pure New Zealand) and branding of Catalonia which is branded as a set of sub brands for each smaller destination in this region. This is the good way to show that every little destination can be very different.

Nice example is Ústí nad Labem region too. There is one main marketing brand (Gate to Bohemia). The logo is conducted by four particular symbols of four very different destinations.

Figure 3: Logo of Gate to Bohemia



Source: Website of Gate to Bohemia (2021)

As shows the figure above, there are four stones representing destinations. Each one is different. There are waves on the blue background for the Lower Egerland (Dolní Poohří in Czech language) trees

on the green background for Krušné Hory Mountains, Pravčice Gate on the orange background for the Bohemian Switzerland and hills on the red background for the Central Bohemian Highlands (České Středohoří in Czech language). This brand was created about 10 years ago. People from Ústí nad Labem region relatively know this brand, but people from other regions don't know it very well. On the other hand, people are mostly not able to assign this brand geographically to a region in the Czech Republic. In my opinion that's one of reasons, why this brand can't be a good prototype of the lovebrand in tourism. So, is there some manual for being the lovebrand? What managers are expected to do if they would like to be tourism lovebrand?

According to Mark and Pearson (2001) there is another factor, which can tell something about the brand especially through advertising activities. These factors are called archetypes. They are divided into few categories based on characteristics and resemble the brand to a human nature.

First three archetypes are 'connected with others'. It brings belonging and enjoyment. First one is the **Everyman**. The main feature is independence. These brands are popular in society thanks to their friendliness and modesty. Sometimes they set themselves to the role of destiny victim because of unhappy past. This type could represent companies like IKEA or Volkswagen. The next type in this category is the **Jester**. Advertisement is all about laugh, enjoying the moment but also sarcasm and critics. Jester archetypes live in the moment with full enjoyment. These brands are playful. In worldwide market there is e. g. Fanta or Old Spice represented in this category. The last one is the **Lover**. These brands find intimacy, friendliness, emotions. These brands form relationship and try to be more attractive by showing the mood and belonging. Especially these are brands of perfumes or some fragrances. In tourism there is South Bohemia region with spots of 'Real love' serial represented.

Next category with other three archetypes provides structure to the world. These brands are for strict stability and control. The first one is the **Creator**. When this paper has briefly spoken about the vision and mission, these are the brands which give real form to that. These brands are really innovative. Huge desire of these brands is to create something new and unique. There are many activities, ideas and thoughts. The biggest fear of these brands is mediocrity or mundaneness. A good example is LEGO or Apple. Another one is the **Ruler**. The main goal of these brands is to be a good example for the others, be something more and when it is not successful, it's easy for these brands to be have arrogant behaving. Distinctive element of this type is luxury. Worldwide known brands like Rolex or Louis Vitton could be divided into this type of brands. The third one is the **Caregiver**. These brands specialize in doing things for others, helping others and protecting people from harm. They suffer from not being able to say 'NO'. Speaking of advertising videos, the good example is Brno city with their invitation for special ice-cream. It's something unusual but really kind and consumer has a feeling they care about him very well. It is good for tourism in the city and also it supports the entrepreneurs, because it is focused on gastronomy. Another good example is video ad connected with spa in Karlovy Vary. (Living Land, 2013).

Then there is a category of three types evoking yearning for paradise. There is **Explorer**. The main sense is in journey, escape from boredom, exploring the world. These brands are for people who need to find freedom, enjoy the adventure and explore something new. The good example is the National Geographic TV channel but it is not quite good for Czech tourism. In the Czech Republic there is advertisement for discovering Znojmo city while floating on the Dyje river. This is good example of this type. But it is made by local television channel not by an organization of destination management. Also **Sage** is the discovering brand. These brands are focused on new knowledge, truthful information and teaching others. It is Google or CNN. This archetype is not so much used in branding in tourism. On the other hand there is an **Innocent** which finds happiness. This type provides really positive attitude, enjoys every single moment and finds harmony. Representatives are companies like Bonami or Coca-Cola.

The last category focuses on leaving mark on the world. This strategy is also risky and about mastery. The brand which is shocking the other, destroying everything what doesn't work is the **Outlaw**. These brands have high self-confidence. They are willing to take risks. But they are located on the edge of society (Harley-Davidson, Captain Morgan). The last but one is the **Magician**. They desire to make dreams come true, have visionary strategy, understand fundamental laws but also are fascinated by magic. This archetype tries to make things unusual way and perceives that the line between good and evil is very thin. The last archetype is the **Hero**. These brands follow their goal – whatever it takes. They

are proud of success they managed to reach and want to improve the world. Hero brands are afraid of failure, so they prove worthiness through courage.

These nine archetypes mentioned are good to know when manager decides what brand strategy will be, what is the goal of the brand and also what kind of acting the ad should have. Obviously, not all of these archetypes can be used in the tourism field. Some regions use strategy of Explorer, Creator, Jester, Everyman, Magician, sometimes Outlaw but mostly is strategy of the Lover and Caregiver. In my opinion this is the most emotional way how region can attract potential tourists and convince them to visit.

3. Good example – Brno city

In the field of tourism of the Czech Republic there is one nice example how to become a lovebrand. It is Brno city. There were many kinds of promotional materials, prospects, brochures etc. Every printed material has its own form, color or format. This isn't good for identify the region (or in this case – city) very well. When tourists come to information center, they would like to have comprehensive overview. When they see many kinds of brochures it's kind of mess for them to orientate. That's the reason why these types of promotional material should have one structure, it can have more colors. For example, brochure of city tower could be blue colored, sport activities green colored, hiking trail orange colored etc. But the template of these brochures should be the same. It is easier for people to find out the information when they already know the form.

According to Travelbakers (2021), Brno city started to change marketing activities in 2016. They've set priorities in marketing and add the importance of each priority (in %). These were: Brand marketing (70 %), Cooperation (20 %) and Development conditions (10 %). Brand marketing aimed to define one comprehensive strategy in case of city marketing. Also, there is one important thing and it is taking care of the brand. Cooperation is about mutual communication among Brno marketing department, tourist destinations in the city and also private sector, entrepreneurs and services connected with tourism. Conditions of development should maintain the built infrastructure to support tourism and control the effectiveness of established activities. It was very long journey to reach all of these targets. But in Brno city it worked.

Nowadays is Brno city considered a young city with health soul, authentic atmosphere, unique architecture and rich cultural life by tourists both from the Czech Republic and from abroad. Brno city is the 'entrance gate' to South Moravian region (Travelbakers, 2021). According to Travelbakers (2021) there are few of key words characterizing Brno. These are *Young city, Living culture, Unique architecture, Students, Enjoyment, Living center of the city*.

Brno city also created good questions to know (so called Brand essence). When they were deciding about the right way of promotion, they have set five questions.

- Is it intended primarily to young people?
- Do tourist explain Brno authentically?
- Are tourists really motivated to visit Brno?
- Do we 'speak' funny way?
- Do I desire to come back?

In my opinion Brno brand is about honesty, says thing as they really are, also there is a sense of humor, the storytelling works, it seems not to be in hurry in this city. And this is the good way to succeed.

4. Methodology

The next part of this paper is own pilot survey. It summarizes the facts about people awareness of brands in tourism of the Czech Republic. For purpose of this paper were desk research and questionnaire survey conducted. The desk research gave the theoretical background to this paper. Questionnaire survey aimed to find out information about people awareness of the brand in tourism. There are also four brands of Czech cities and five brands of Czech regions all over the Czech Republic chosen. All chosen cities are the capitals of region and each chosen region has very different characteristics, nature and also community habits and festivities. This part of survey was focused on finding out people knowledge about the logotype of region itself.

Questionnaire survey was conducted as an electronic survey (CAWI) with use of *Survio.com* platform. In the end we should be able to say which of selected brands has the right potential to be the lovebrand and what are the key factors that strengthen the brand in the eyes of tourists. These should be also factors which is good to follow during establishing the new brand.

There were especially questions with multiple possible answers used. Main goal of whole survey was to be able to say what is generally the view of the brand. To earn relevant results of this survey should help questions about what people consider as a brand in tourism, what concept or strategy document should managers follow while establishing a new brand, how important is the connection between destination characteristics and the brand (semantic differential with 5-point scale) or what is the key elements of the brand which help you to memorize it (just one possible answer). The content of the questionnaire follows research by Janeček and Ovesleová (2017).

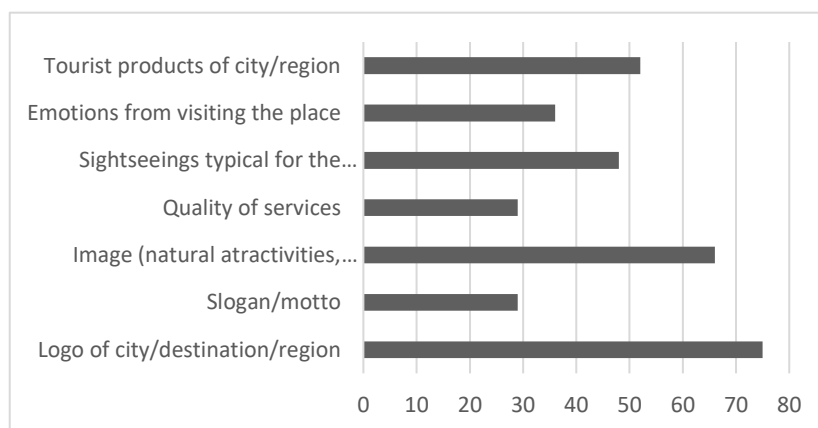
There are also some limitations of this research. The questionnaire was conducted only on-line. It was placed into some interest groups of tourism in the Czech Republic. It explains the structure of respondents.

5. Results

Conducted pilot survey was based on answers from relatively small group of respondents (151) by non-probability sampling. Most of respondents were women (116; 76,8 %) aged between 26 and 45 years old (97; 64,2 %). Most of respondents are living in the Ústí nad Labem region (86; 57 %). In the survey there are represented also people from Central Bohemia region (15; 9,9 %), Hradec Králové region and Liberec region (both 9; 6 %), Karlovy Vary region and Moravian-Silesian region (both 7; 4,6 %), Pilsen region (6; 4 %), Prague (4; 2,6 %), South Moravian region (3; 2 %), South Bohemia region (2; 1,3 %), Olomouc region, Vysočina region and Zlín region (all 1; 0,7 %). The only one not represented in this survey is Pardubice region.

If we take into account the results, we can say that almost one half of respondents (75; 49,7 %) consider that the brand in tourism is only the logotype of region / city followed by the opinion of image of region (66; 43,7 %). Then very important regarding to perceiving the brand are also tourist products of the city or region (52; 34,4 %). In respondent's opinions the least important element of perceiving the brand is the quality of services and slogan or motto of region (both 29; 19,2 %).

Figure 4: What does brand in tourism mean for you? (Question 1)



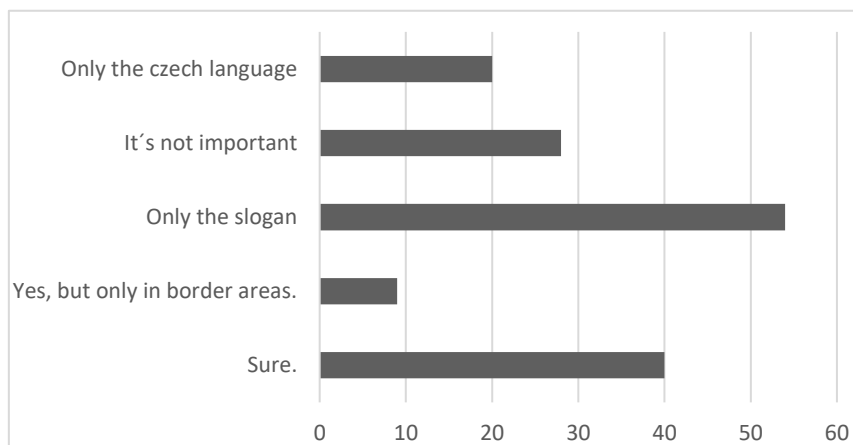
Source: own research (2021)

According to 106 (70,2 %) respondents brand manager should follow sub-strategy of tourism of his organization of destination management (DMO). 33 (21,9 %) of them think that establishing the new brand should follow strategy of tourism of the regional bureau and only 12 (7,9 %) respondents think it should follow the strategy of CzechTourism agency. Next question aimed to find out how important is connection between region itself and it's brand. Answers were measured by 5 point semantical differential, while 1 point marks 'Absolutely unimportant' and 5 points mark 'Absolutely important'.

Average value measured was 3,8 points. It could confirm that respondents consider quite important when they can recall experiences and memories on region while only watching at the logo of this region.

Lovebrand would be memorable and next question targeted to know what elements is the most important when tourists want to memorize the brand. According to 109 of respondents (73,2 %) the most important is the typical element for city or region. For example, in Žatec town it is the hops, for Prague these are towers. 31 (20,8 %) respondents think that it is original work with painting and the name of the city or region. As shows the figure below, this pilot survey was also focused on foreign language equivalents. Name of the region or city shouldn't be translated into other languages, motto or slogan can be translated. This opinion is represented by 54 (35,8 %) respondents. 40 (26,5 %) respondents would like to translate both name and slogan. For almost one fifth (28; 18,5 %) of respondents it's not necessary to translate the brand and 20 (13,2 %) of them are for using the brand only in Czech language.

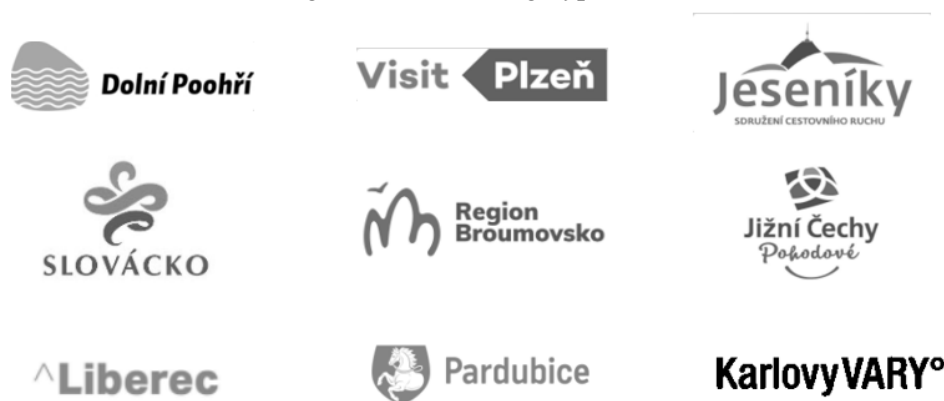
Figure 5: Do you think the brand should be translated? (Question 5)



Source: own research (2021)

Next four questions are connected with selected brands in tourism of the Czech Republic. These are destinations Lower Egerland (Dolní Poohří), Jeseníky Mountains, Slovácko region, Broumovsko region, South Bohemia region and cities Plzeň (Pilsen), Liberec, Pardubice and Karlovy Vary (Carlsbad).

Figure 6: Selected logotypes (2021)



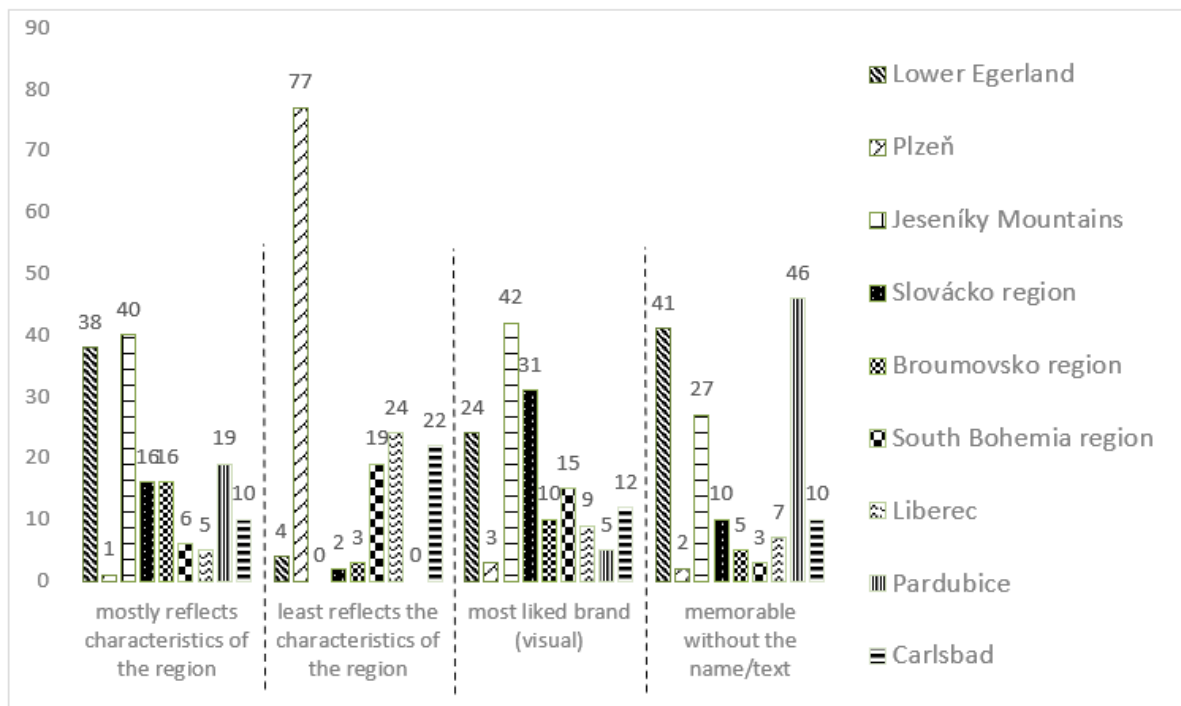
Source: own compilation (2021)

Summary figure below represents survey results regarding to logotypes mentioned. As figure shows Lower Egerland logotype reflects the characteristics of the region very well, it is the third most liked brand and for respondents it is very good memorable even if they will see it without the name or text. It should be added that most respondents were from the Ústí nad Labem region and Lower Egerland

is the part of it, people in this region know this brand and that's the reason why it is not so relevant value for our research.

Visit Plzeň (Pilsen city) reflects the characteristics least, it is not so much liked brand and also it is not memorable without the name. In our survey this was the brand with the worst results. On the other hand, Jeseníky Mountains brand mostly reflects the characteristics of region, it is also the most liked brand and it is quite good memorable without the name. According to respondents, Slovácko region, South Bohemia region and Liberec city don't reflect characteristics of the place very well but Slovácko region has the second most liked brand. The brand of South Bohemia region and Pilsen city is the least memorable without the name. On the other hand, the best memorable brand is the brand of Pardubice city.

Figure 7: Summary chart



Source: own research (2021)

6. Conclusion

According to literature sources and own pilot survey we can say, that people/tourist perceive the brand only as the logo. That confirms our hypothesis. But the practice should be completely different. While establishing a new brand, managers should really carefully consider each step. Very important factors are elements characterizing the city or region. We should involve them into the brand visual. But brand building is the long-time process, which should involve activities connected not only with the visuals of the brand. Also, we should focus on the characteristics of the region, sights, history, culture and also structure of residents. It is necessary to create a target group. That helps us to know our potential tourists. The mission and vision are also really important factors we need to set. Then theory distinguishes so called archetypes of brands. Not all of these archetypes can be used in the tourism field. Mostly used strategies are the Explorer, the Creator, the Jester, the Everyman, the Magician, the Lover and the Caregiver. According to our pilot survey we can say that from selected logotypes, the Jeseníky Mountains brand has real potential to be a Lovebrand in tourism. It reflects the characteristics of the region, it is good memorable even without the name or text and it was also the most liked brand. In marketing communication, they use strategy of the Caregiver, the Lover and the Explorer. On the other hand, the brand Visit Plzeň isn't reflecting the city very well. It's not good memorable without the name and also it was the least liked brand. The brand should be, according to most of survey respondents also translated into another languages – especially the slogan or motto. To translate the brand itself isn't so

important. Our pilot survey indicates that there are significant differences among tourism brands in the Czech Republic. The good example of lovebrand is Brno city. There is clear and understandable strategy of the brand, defined target group of potential tourists, authenticity in marketing communication. These are the key factors to succeed in the field of brand building in tourism and what more – to be the Lovebrand.

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TAILORING CYBERSECURITY EDUCATION AND SERVICES FOR CZECH SMES

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Abstract

Cyber-threats do not target just large corporation and public authorities but mean high risk also for the SMEs and smaller public administration agencies. Ensuring cybersecurity in a SME requires certain knowledge of the specific business domain to be able to assess the value and significant of the assets and estimate related risks. The Digital Europe initiative to establish European Digital Innovation Hubs should be an instrument to help securely digitalize European SMEs. The proposed Czech Cybersecurity Innovation Hub aiming at this will be presented, followed by cybersecurity qualification framework, as well as recent educational activities towards quick and targeted professional education for cybersecurity experts at Bachelor level.

Keywords: cybersecurity, cybersecurity education, Cybersecurity Innovation Hub, cybersecurity service, public administration, SMEs

1. Introduction to Cybersecurity for the SMEs

Cyber-threats do not target just large corporation and public authorities but mean high risk also for the SMEs. Due to small size, low budget, and lack of specialized personnel, coping with the risks presents a difficult task for small businesses. Moreover, the management may tend to underestimate the risks they have not seen in reality yet. However, since many SMEs such as small industrial companies, service companies such as travel agencies, HR agencies and similar have recently been target of serious cyberattacks including ransomware, data thefts, or DDoS, they need to react – and namely need to introduce preventive measures. The domain- and SME- specific cyber risks will be presented in Section 2.

Ensuring cybersecurity in a SME requires certain knowledge of the specific business domain to be able to assess the value and significant of the assets and estimate related risks. Therefore, to cope with such tasks, we need educated professionals and supporting structures that are able to quickly recognize both generic and specific cybersecurity problems in the organization, define policy, plan the implementation, put it into business as well as evaluate its impact. Efforts to systematically plan, design and implement appropriate carrier-oriented education for cybersecurity specialists will be presented in Section 3.

The *Digital Europe* initiative of the European Commission aims at establishing a network of (European) Digital Innovation Hubs that should serve as an instrument to help securely digitalize European SMEs. The proposed Czech Cybersecurity Innovation Hub aiming at this will be presented in Section 4.

Finally, we will discuss cybersecurity qualification frameworks including the Czech one, as well as concrete instantiations of carrier-oriented study programs on cybersecurity at Masaryk University.

2. Digital Innovation Hubs

European Digital Innovation Hubs (EDIHs) are central pillars in the *Digital Europe Programme (DEP)*, Rissola & Sörvik (2018). Their aim is to foster adoption of *Artificial Intelligence (AI)*, *High Performance Computing (HPC)* and *Cybersecurity (CS)* as well as other digital technologies by industry, in particular SMEs and public sector organizations in Europe. European Digital Innovation Hubs shall function as one-stop shops that help companies respond to these challenges and increase their competitiveness. By providing access to technical expertise and experimentation as well as the possibility to “test before invest”, EDIHs will help companies improve business/production processes, products, or services using digital technologies, see Crupi et al (2020). They will also provide innovation services, such as financing advice, training, and skills development that are needed for a successful digital transformation. Environmental issues are also taken into account, in particular with regard to energy consumption and low carbon emissions.

The first “generation” of EDIHs will be settled during 2021. The process primarily included nominations from EU members countries – EC gave frame indicators about the foreseen number of Digital Innovation Hubs to be supported by the EC as EDIHs. Therefore, the candidates must have submitted their applications to the national responsible body, such as Ministry of Industry in case of Czechia. Then the national body selected competent candidates and reported their list to the EC. Only the DIHs having been nominated by a member country are eligible to proceed to the EU selection level. In this level, the EC will specify EDIH program goals and selection criteria. A prospective EDIH must align with the goals and indicators in its application for financing. The foreseen model consists of 50 % EU and 50 % national & other resources.

3. Czech Cybersecurity Innovation Hub

3.1 CIH Goals and Structure

Cybersecurity innovation hub is a non-profit network organization which creates a multidisciplinary ecosystem of research institutions, governmental bodies, clusters and private companies focused on cooperation, information sharing, research and implementation of cutting-edge technologies in cybersecurity. It was successfully registered as fully functional Digital Innovation Hub in early 2018, see <https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool>.

The key features of the hub are its *multi-disciplinarity*, a *wide range of cooperating national and international, public and private institutions*, as well as the possibility of utilizing *unique infrastructures*, namely the KYPO Cyber Range Platform (KYPO CRP, see www.kypo.cz). Partners involved in the operation of the hub retain experts dealing with cybersecurity issues not only from a technical perspective but also from a procedural, organizational, legal, economic or sociological point of view.

The hub also cooperates with and provides support to the variety of national public authorities such as *National Cyber and Information Security Authority (NÚKIB)*, *Ministry of Justice, Police*, or *Data Protection Authority (ÚOOÚ)*, international institutions, particularly *ENISA*, *Europol* and *United Nations*, private clusters, trade organizations, scientific parks, and private corporations. As some of the partners of the hub are research organizations and innovative companies, the hub can utilize their research, development and production infrastructures, such as cyber ranges, training facilities, security operations centers, or testing infrastructures.

The hub is coordinated by the *Cybersecurity Hub, Registered Institute* established as a joint venture of Masaryk University, Czech Technical University in Prague and Brno University of Technology. As a forerunner aimed at strong academic-industrial cooperation, the *National Centre of Competence for Cybersecurity (NC3)* was founded in 2019. NC3 is governed by an Advisory Board which consists of representatives of key private and public stakeholders in cybersecurity in the Czech

Republic combining academia with leading Czech cybersecurity industry, critical infrastructure operators and suppliers, Industrial Cluster 4.0, and Regional Chamber of Commerce.

The main long-term tasks of NC3 are the following:

- *Applied Research.* The hub facilitates cooperation between research institutions and innovative companies focused on the application of results of basic research in practice.
- *Awareness raising.* For a long time, members of the hub have been involved in awareness-raising focused on issues related to cyber security. The hub is also a cybersecurity and cybercrime information center within EU cooperative networks and organizes regular events, conferences, and roundtables.
- *Education.* Members of the hub have long been involved in education and cybersecurity exercises. Education takes place in both accredited and commercial educational programs in collaboration with practice. In recent years, the hub has been involved in the implementation of comprehensive national and commercial cyber security exercises conducted using cyber range infrastructure.
- *Technology transfer.* The hub provides support for the transfer of technologies and solutions developed by research and development institutions and innovative companies.
- *Link to national or regional initiatives for digitizing industry.* The hub is a member of the national CEEINNO platform which focuses on support to the innovative companies, development of knowledge economy in the Czech Republic and implementation of innovations in companies. The hub has also signed various memoranda of cooperation with diverse stakeholders such as National Cyber- and Information Security Agency (NÚKIB), National Agency for Communication and Information Technologies (NAKIT).

NC3 should be seen as a technological pillar for the Cybersecurity Innovation Hub, based on academic-industrial collaboration of strong domestic industry, both large corporations such as UNIS, Unicorn, and EG.D and SMEs aimed at developing common solutions for current and future market in leading cybersecurity and critical infrastructure solutions for business operation, training, and new markets. Cybersecurity Innovation Hub will benefit from the solutions and collaborations among the NC3 members to facilitate digital competencies in SMEs and public administration bodies, early adoption of progressive technology, test-before-invest, and finding investors.

3.2 CIH Services for SMEs

If we go into more details, *Cybersecurity Innovation Hub* will provide SMEs as well as public administration bodies with the following services:

- *Networking, know-how, and capacities sharing* – as this is principally difficult for an SME to find the qualified personnel and services from own capacities, sharing and exchanging know-how is vital, namely for highly-advanced tasks such as implementation of security-related systems or products, see Moravec et al (2017).
- *Information and cybersecurity education:* training, learning, conferences, workshops – ranging from awareness-rising up to high-end unique trainings, CIH is ready to provide tailored educational activities for the SMEs and their staff.
- *Sharing information on current trends* in computer network security – creating and maintaining up-to-date knowledge is virtually impossible with limited resources each SME might have. So top-down or peer-to-peer sharing allows knowledge transfer on cutting-edge problems of cybersecurity such as advanced DDoS attacks, new types of cyberthreats as well as next generation mechanisms like quantum communication infrastructure.
- CIH will continue to assist public administration and policy makers as *one-stop-shop* for expertise and help to design proposals for adjusting *information security legislation*.
- *Communication with computer network security organizations and associations* such as ENISA, Network Security Monitoring Cluster, or AFCEA.

- *Creating information security education programs* targeted at various audience relevant for SMEs and public administration in cybersecurity ranging from cybersecurity professionals, management, to employees or even general public. The carrier-oriented Bachelor study program on Cybersecurity represents such joint effort.

3.3 Cooperation of CIH in Research

Cybersecurity innovation hub cooperates with varied research organizations focused on many domains.

- Joint projects in the field of the *technical infrastructure* of an innovative character where the *European Quantum Communication Infrastructure* (EQCI) vital for next decades of secure communication is just one example.
- Joint projects in applied research, development, and innovation – the experience in finding resources and investment in new technology provided by CIH can be a sparkplug for emerging ideas that would otherwise be lost due to lack of early feedback and joint effort of expertise in technology, relevant law & regulation as well as business advisory.
- *Technology transfer services* – consulting and implementation of technology transfer undertakings requires high qualification and experience that CIH is able to offer.

3.4 CIH Infrastructure

CERIT Science Park (CSP, <http://sciencepark.cz>) provides facilities for start-ups and established ICT companies. At CERIT Science Park, partners are within reach of mutual cooperation with top research institutes at the Faculty of Informatics of Masaryk University in the areas of computer science, large-scale distributed systems, networks, IT services, security and defense, large-scale system verification and testing, big data search, natural language processing, graphics and human-computer interaction, databases, information systems, and software project management. CERIT Science Park was established with the mission of providing:

- *IT companies*: space for the growth of their ideas and products, research background of a stable and established university, innovative environment using the know-how of scientists, students and other companies.
- *Students*: insight into the practice of companies actually operating in the market, opportunity to draw on the experience and diversity of cooperating companies, involvement in applied research solving specific tasks.
- *Researchers*: attractive cooperation on joint projects with companies, connection to current international business trends in IT, space for networking and consultation with another group of experts.
- *KYPO Cyber Range Platform* (KYPO CRP) is developed by Masaryk University since 2013, and it represents several years of experience with cyber ranges in education, cyber defense exercises, and trainings. KYPO CRP is entirely based on state-of-the-art approaches such as containers, infrastructures as code, microservices, and open-source software, including cloud provider technology. With practical applications in mind, the team emphasized repeatability, scalability, automation, and interoperability to minimize human tasks and make cyber trainings affordable and cost-efficient. KYPO CRP is available as open-source software offering great advantages for SMEs, startups, and public administration bodies to build their cybersecurity solutions, services, and trainings on this platform with the risks of vendor lock-in.
- *Emulated Virtual Environment*: Creating and providing an environment to simulate computer infrastructures in a controlled cloud environment to achieve high flexibility, scalability, isolation, and portability. The platform allows you to create virtual networks with a full-fledged operating system and network devices that emulate real-world systems.

- *Trainings:* Running simultaneous training sessions as cybersecurity games complemented by an assessment of participants. KYPO CRP enables instructors to create training phases (game levels) and learners to engage in the training sessions featuring an emulated virtual environment provided by KYPO CRP. Instructors can easily create multiple instances of the same training and the same virtual environment for tens and hundreds of participants via the web interface and monitor their progress at the dashboard. KYPO CRP is a unique infrastructure and training platform for building advanced cybersecurity services for the SMEs.

4. Educating Cybersecurity Experts for SMEs

4.1 Urgent Needs of Cybersecurity Experts

On the European scale, there is evidence of interest in hundreds of thousands of cyber security professionals – generally up to 800,000 vacancies in IT in general, of which up to 2022 according to the *EC Communication: Resistance, Deterrence and Defense... 450/2017* there is up to 350,000 vacancies in cybersecurity. Multidisciplinary professional education is explicitly needed by Czech authorities (NÚKIB) and economic associations. Specifically, small and medium enterprises are endangered due to high-tech nature of the skills required and lack of specialists in the field, see Kasl (2018).

4.2 Cybersecurity Qualification Frameworks

In order to provide a stable background and reference point for growing demand on cybersecurity expertise, many national- and international initiatives have been launched to define qualification frameworks describing profiles, expected knowledge, skills, and attitudes to fulfill specific professional roles of cybersecurity-related workforce, see Schaeffer et al (2017).

The U.S. National Initiative for Cybersecurity Education (NICE) has developed a comprehensive cybersecurity qualification framework called NICE being published by National Institute of Standards and Technology (NIST) under in NIST Special Publication 800-181. NICE is aimed at various audiences and purposes. Namely, the organizations and individuals should be able use the framework to (NIST, 2017) *map or assess their cybersecurity workforce and understand the strengths and gaps in Knowledge, Skills, and Abilities (KSA) and Tasks performed, identify training and qualification requirements, improve position descriptions selecting relevant KSAs and Tasks, identify the work roles and develop career paths to guide staff in gaining the requisite skills for those roles, establish a shared terminology between hiring managers and human resources (HR) staff for the recruiting, retention, and training of a highly-specialized workforce, provide a reference for educators to develop curriculum, certificate or degree programs, training programs, courses, seminars, and exercises or challenges that cover the KSAs and Tasks described and, finally, allow a technology provider to identify the cybersecurity work roles and the KSAs and Tasks associated with hardware and software products and services they provide.*

Analogically, there are many related or unrelated activities with the aim to develop similar frameworks, such as ACM et al (2017). Currently, all the pan-European H2020 Networks of Excellence in Cybersecurity (SPARTA, CyberSec4Europe, Concordia and ECHO) have cyber-qualifications and education as their tasks, leading to at least mapping of the current industrial and public sector demand as well as educational offer by universities and professional education providers.

4.3 Czech Cybersecurity Qualification Framework

The Czech National Cybersecurity Qualifications Framework being highly inspired and compatible with the European Qualification Framework, see CEDEFOP (2008). Due to its position among the e-skills, it is strongly influenced by European e-Qualifications Framework (CEN, 2016).

According to (Ministr et al, 2019) and (Ministr et al, 2018), it is to be developed in the following phases:

- *Creating a Taxonomy of Qualifications* – analysis of existing solutions and research results abroad, investigation of needs within the security forces in the Czech Republic

and identification of the character and structure of relevant entities in the Czech Republic. The necessary qualifications in both technical and non-technical fields at the level of both private organizations and the state will be offered in a structured manner.

- *Design of a Competency Model* – professional competencies will be assigned to the individual roles / qualifications – those should be concerned as prerequisite for performing the appropriate role in cybersecurity.
- *Cybersecurity Qualifications Framework* – the Qualifications Framework will include proposed taxonomy and competencies of individual qualifications, extended in the manner to identify the required training capacities based on the existing demand for qualifications.
- *Analysis of available education in the Czech Republic* – based on surveys and questionnaires, the current offer of available educational programs, courses and exercises in the field of cybersecurity will be identified, which can be used to build the necessary capacities described in the framework.
- *Gap analysis* – the training requirements described in the framework with the existing offer will be compared. Based on this comparison quantitative and qualitative gaps in terms of available cybersecurity education should be identified.
- *Action plan on building educational capacities* – in order to effectively implement the results of the project, the aim will also be to develop an action plan to inform users and target groups about the practical application of research results at the level of support and development of cybersecurity training, recruitment and evaluation.
- *Interactive Database for Qualifications Framework* – in order to effectively implement the Qualifications Framework, an interactive software tool will be created to provide knowledge database.

4.4 Carrier-oriented Cybersecurity Education

The novel and unique Bachelor carrier-oriented study program “*Cybersecurity*” recently launched at Masaryk University reacts on growing demand for experts and builds upon experience and model gained from the construction of Czech Cybersecurity Qualification Framework. It is specifically aimed students enjoying looking at computer systems “under the skin”, learning as much as possible about their nature, properties and behavior being motivated to study legal environment of IT and geopolitical background of cybersecurity as well as critical infrastructure protection, similarly to Oliver & Haney (2018).

Interdisciplinarity combining IT, legal, and social-science fundamentals and skills is an advantage in contrast to existing programs elsewhere. The program will meet the growing interest of both high school graduates and already employed jobseekers without formal education in the field who carry out professions where knowledge and skills in cybersecurity (system administrators, supervisory center operators, CSIRT team members, middle management of cyber security, eventually software engineers of security-relevant IT applications and systems, but also cyber security training staff, cyber security managers assistants).

The architecture of the program consists of a strong professional knowledge and skills fundament in computer science combined with law and social sciences, namely it contains obligatory courses on *foundations of computer systems and informatics, methodology, operating systems, computer networks, basics of IT security and applied cryptography, fundamentals of (secure) programming but also IT law and regulations, data protection law, geopolitical and systemic context of cybersecurity* among others.

The program belongs among so-called *carrier-oriented Bachelor-level programs* featuring in-depth connection with the practice including a 600-hours guided professional internship in a company (SME), healthcare, or public administration organization and prepares students to get as job right immediately after graduation while those interested can continue in the follow-up Master study.

Since Masaryk University features its own Cyber Range (KYPO CRP) platform and cooperates with top companies and leading institutions of the local, national and international level, studying the professional bachelor's program in Cybersecurity has another added value.

After successful completion of the studies the graduate will be able to:

- immediately get a job and continually adapt to changing processes and technologies.
- work in positions related to the deployment and operation of secure IT systems and infrastructures in companies and organizations of various sectors such as IT, public administration, services, industry, or healthcare.
- recognize, understand and recognize opportunities and risks of intelligent systems, as well as cybersecurity risks globally and in an organization.
- understand the basic elements of computer systems, both hardware and software, with focus to their reliable operation and cybersecurity incl. their vulnerabilities and manages to install, set up, manage and operate these systems.
- explain and use fundamental techniques and technologies to ensure cybersecurity of entrusted IT systems and infrastructures.
- understands ethical and legal principles of working with data, including commercially confidential, classified and personal data, and can apply them in specific procedures.
- describe the basic parameters of the legal environment in the cyberspace, identify legislative requirements for the organization's activities and for the relevant professional roles.
- explain and apply the basic principles of analysis, design, implementation and quality control of computer systems.

Graduates are expected to get a job as system or network administrator, operators of Security Operations Centers, members of CSIRTs, lower or middle management of cybersecurity, or software engineers of secure IT applications and systems, but also as training workers or assistants to cybersecurity managers. Due to multidisciplinary, the graduates should be able to quickly accommodate to particular business domains of organizations of various nature including healthcare, government- and public administration.

Facilities of the Faculty of Informatics and Masaryk University with important strategic partners at the national and international level such as the National Agency for Cyber and Information Security and in the region, companies in the CERIT Science Park, industrial partners of the faculty and NC3 and other entities.

As part of graduation process, students are required to write Bachelor thesis to demonstrate the ability to master selected security-relevant technology, secure a computer system or network, propose cyber-defense techniques, implement cybersecurity recommendations, deploy and configure a larger system, develop basic security analysis, describe risks in the organization and apply it in a particular organization.

Those interested can continue in the follow-up Master study program *Management of Software Systems, Services and Cybersecurity* at the Faculty of Informatics or other programs. This Master program fits well for those wanting to establish and conduct their own SMEs or startups.

5. Conclusion

SMEs are particularly weak and endangered subjects of cyberthreats due to lacking expertise and shortage of resources in general and the same applies to public administration. The Digital Europe Program of the European Commission establishes a network of European Digital Innovation Hubs that should serve as an instrument to help securely digitalize European SMEs and public bodies. The proposed Czech Cybersecurity Innovation Hub which is a candidate Czech EDIH was presented. However, the lack of experts cannot be overcome just by offering one-time services to SMEs. cybersecurity qualification frameworks including the Czech one, as well as concrete instantiations of carrier-oriented study programs on cybersecurity.

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DOES BEING PART OF THE FORMER HABSBURG EMPIRE MATTER TO CURRENT ENTREPRENEURIAL INTENTIONS? A CASE STUDY FROM THE NORTH-EASTERN REGION OF ROMANIA

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Abstract

In this paper, we aim to assess the role of being part of the former Habsburg Empire on current entrepreneurial intentions in a particular area. It is about the North-Eastern region of Romania. Further, we intend to evaluate the determinants of Romanians' inclination to become self-employed within the next five years. We have two samples: 285 individuals that belong to a former Habsburg territory, called Bukovina, and 1.772 who reside in counties that were never part of this former Empire. When applying binary logistic regressions, the features common to those two are related to marital status, the option that most of the current income results from the private sector, and the circumstance of already being engaged in self-employed activities. The model linked with the region of Bukovina has some peculiarities. It means that the intention to become an entrepreneur positively correlates to individual decision-making ability. This intention also has to do with the fact that the fathers were / still are business owners. It also negatively correlates with uncertain economic situations. The second model emphasizes the positive influence corresponding to having the opportunity to lead a group of people at the workplace. The same logic applies when it comes to the following: exercise high control of the business, have close friends who encourage them to start their businesses or find former or current entrepreneurs among them. Finally, the negative ones concern the trust in political parties and the fear of risks or unforeseen situations.

Keywords: Bukovina, environment, entrepreneur, research, Romania

JEL codes: L26, M10

1. Introduction

While the national and European strategies consider research, innovation, and sustainable growth very important, the entrepreneurial perspective is decisive. It gives a powerful pro-active approach in this direction, creating new jobs, engendering competition, and raising the overall level of societal wealth (Holmgren and From, 2005).

Entrepreneurial intentions are considered a proper proxy for analyzing this phenomenon. The research literature claims that people with powerful intentions to become entrepreneurs in the short term are most likely to put that desire into practice (Ozaralli and Rivenburgh, 2016). To understand the role of entrepreneurial intentions (Bird 1988; Shapero and Sokol, 1982 and Ajzen, 1991) in the entrepreneurship theory, we consider at least three previous models as core ones. More, we highly recommended the work of Krueger (2009). The latter is about the intent's influence on the actual decision-making behavior. Krueger said that the construct of intentions appears to be deeply fundamental to human decision-making. As such, it should afford us multiple fruitful opportunities to explore the connection between intent and a vast array of other theories and models that relate

to decision-making under risk and uncertainty. In the specific literature, we also found that mental and cognitive elements play a decisive role in influencing and forming the intentions, which further become effective decisions through automatic processing (Shinnar et al., 2012; Krueger and Day, 2010).

Therefore, our paper tries to answer the following core question: if the intentions are a good predictor for actual decisions in a short time horizon, which are their determinants in the context of considering the influence of the former border of the long-gone Habsburg Empire? Therefore, we have considered different factors that may affect these intentions. It is about personal ones (e.g., marital status), social factors (individual experiences and practices), and societal factors (e.g., assessment of the level of trust in political parties as institutions). But our focus is to assume and analyze all these potential considered determinants by taking into account the belonging to a particular geographical, cultural and historical environment. The intention is to provide clear evidence that the former institutions of a long-gone Empire (e.g., the Habsburg Empire) still have an active and lasting influence and legacy. And this through beliefs, values, and cultural norms, even after several generations have passed since its dissolution (Becker et al., 2016), to the current entrepreneurial intentions. We chose to analyze the attractive case of the Romanian North-Eastern part for a simple reason. In the historical region of Bukovina, once a part of the long-gone Habsburg Empire between 1775 and 1918, there is a recrudescence of entrepreneurial projects in recent years. We compare this model with one of those individuals residing most of their adult life in those Romanian counties that were not under the Habsburg Empire.

2. Literature review

We aim to give a deep insight into the factors influencing entrepreneurial intentions. For instance, the cultural environment seems to be a powerful influence on behavior. It motivates and stimulates certain traits through the mediating role of norms, beliefs, and practices (Flores et al. 2010). In this sense, numerous scholars emphasize the inhibitory role of collectivistic cultures of those with a high sense of pessimism on entrepreneurial intentions (Ozaralli and Rivenburgh, 2016). Moreover, the national culture is considered a powerful channel to transform intentions into actual actions (Bogatyreva et al., 2019).

Regarding the role of the public versus private sector in terms of the appetite to open a new business, prior research documented that those private-sector workers are more likely to develop entrepreneurial intentions when compared with their public-sector counterparts. It denotes a friendly local and social environment for such decisions in those areas with powerful private-sector companies and actors (Kibler, 2013; Cooke and Sheeran, 2004).

Marital status has a significant role in predicting entrepreneurial behaviors. The previous analysis documented that married individuals present higher entrepreneurial intentions than single ones (Pfeifer et al., 2014).

The parental treatment may offer valuable indications regarding their offspring's appetite for conducting their own business. The influence of self-employed mothers and self-employed fathers is a subject of analyzes in previous articles. It highlights that while the first has a positive but marginal significant role, the second one is positive but highly statistically relevant (Polin et al., 2016).

When it comes to the so-named circle of close friends, other scholars underlined the following. For instance, when it comes to Polish students, those who have self-employed close friends are more likely to intend to become entrepreneurs (Staniewski and Szopinski, 2013).

Further, we have considered one of the most significant latent factors of individualism. It is about the ability to make own decisions (Ostapenko, 2017). Prior research underlined its importance for entrepreneurial intentions. It states that they highly depend on the individual ability to act by his own decisions (Prabhu et al., 2012). Therefore, high levels of individualism are conducive to entrepreneurial intentions and entrepreneurship (Ferri et al., 2019).

Other articles highlight notable things related to cultures that posit high a emphasis on values and beliefs that are not detrimental to uncertainty. They create incentives for people to behave in a much more individualist manner. They negatively react to the hierarchy (Hofstede, 1984) and are much more risk accepting (Mihet, 2013). Therefore they are more likely to be equipped to become entrepreneurs. Also, Pattie, Parks, and Wales (2012) demonstrated that the levels of risk aversion have a consistent effect on firm performance, in the sense that low economic performance environments usually cannot

generate sufficient returns to cover the risks associated with this environment. Therefore a non-economic motivation must prevail (Stokes, 1974), namely the powerful entrepreneurial intentions. Zhao et al. (2010) found that the risk propensity manifests a positive influence on entrepreneurial intentions.

We considered a facet compatible with *perfectionism*, namely the ability to exercising high control over the business. The perception of it is positively linked with a growing appetite to start a new business (Potter, 2019). Still, it is often associated with a small one and the desire for financial independence (Katz and Green, 2011).

Uncertain economic situations may act as a barrier that would prevent a person from becoming an entrepreneur (Brinckmann et al., 2010). In particular, the individual desire for financial security under different levels of uncertainty limits the role of incentives for promoting the entrepreneurial process (Kaya et al., 2019).

We further analyze the variable related to trust in political parties. This because there is much evidence that it is impersonal, thus denoting interesting subtleties regarding the fact they could promote and guarantee the applicability of norms and regulations between the societal actors at any level. Also, the following are elements that weaken the confidence in these institutions among the citizens. It is first about political scandals and permanent instability. We can add corruption for political parties' members, further extortions among them for personal motives, and the so-named rent-seeking behaviors. Besides, they discredit their function. Therefore in this riskier situation, it dis-incentivizes any entrepreneurial initiatives (Eesley and Lee, 2019).

For *self-efficacy*, we propose a proper proxy, namely the variable linked with the idea about the ease or difficulty to become an entrepreneur or perceived behavioral control (Bandura, 1997). This perception could play a significant role in entrepreneurial intentions (Iakovleva et al., 2011; Karimi et al., 2014).

We continue by analyzing the variable that better explains the individual ability to lead a group of people within an organization (*leadership*). Prior research stresses that leadership experience, qualities, and skills are good predictors for entrepreneurial intentions (Lazarczyk-Bilal and Glinka, 2021).

Finally, encouragement from close people (e.g., family, friends) seems essential for the potential decision to start a new business or nascent entrepreneurs (Solórzano-García et al., 2020; Lopes et al., 2020).

2. Data and methods

We have conducted a questionnaire-based investigation (2119 distinct responses) in the North-Eastern region of Romania. In the absence of official and reliable statistics regarding the number of individuals who intend to become entrepreneurs, it was hard to assess their overall characteristics. Therefore we could not use probability representative sampling. Instead, we used convenience sampling with no previous selection, although this has certain limitations. Still, the gain is that of emphasizing informative elements needed for further investigations.

For reasons of space efficiency, we report in this paper only a part of the original questionnaire items (Table 1) and the corresponding list of explanatory variables (Tables 1 and 2).

For cleaning the data and performing other derivations, we have used: powerful auto-fill facilities, built-in filters, and spreadsheet functions. We have also made use of the “generate” and “replace” Stata commands for reconverting the initial derivations of scales (e.g., -2 to +2) into the final ones (e.g., 0 to 4) because of the need for correct processing, alignment, and ease of interpretation when generating Zlotnik prediction nomograms. When processing the data, great concern was for clear and trustful answers, mainly because of knowing the traditional treatment procedures for missing values and their effect on the classifier accuracy (Acuña and Rodriguez, 2004). Therefore, in the case of questions likely to be transformed into dummy variables, we have considered only the clear conviction (Yes: 1; No: 0; Other: Blanks). Other indicate here the DK/NA type (Don't Know / No Answer). For scales, we have also assimilated them to blanks.

From the very beginning, both opposite study sites (Table 2, inside vs. outside Bukovina) show noticeable differences in terms of the average intensity of both the outcome (work as an entrepreneur for the next five years – 0.45 vs. 0.62) and corresponding predictors.

In terms of statistical analysis, we performed, first of all, a T-test on the overall subset (inside / outside Bukovina). This test indicated statistically significant differences (significance level of 1%)

in the means of the two groups obtained when considering the variable that shows most of life spent in Bukovina (*life_in_Bukovina*). Similar T-tests have been performed on the overall dataset using dummy variables explained and described in Tables 1 and 2. They also indicated statistically significant differences in the means of the resulting groups. For them, we reported (Table 2) only the share of the affirmative values (yes / 1) as a percentage instead of the mean value.

Table 1: Questionnaire items

Variable	Question	Coding
work4entrep_next5y01 (OUTCOME)	Would you like to work as a self-employed person (entrepreneur / employer / self-employed) for the next 5 years?	0: no; 1: yes
married	Are you married?	0: no; 1: yes
priv_sect_income	Do most of your income come from the private or the state?	0: state; 1: private
own_business	Do you currently own a business?	0: no; 1: yes
dad_entrep	Does your father own or has he owned his own business?	0: no; 1: yes
cl_f_entrep	In your close circle (parents and siblings are excluded), do you have friends who have been or are entrepreneurs?	0: no; 1: yes
diff_entrep04	How difficult do you think it would be for you to become an entrepreneur?	0: total disagreement - 4: total agreement
to_decide_4yourself	How important is for you the ability to decide on your own when it comes to work?	0: not at all - 4: very much; DK/NA: blank
to_lead_group_indiv	How important is for you the opportunity to lead a group of people when it comes to work?	0: not at all - 4: very much; DK/NA: blank
control_entrep04	As an entrepreneur, do you think you would try to exercise high control over your business?	0: total disagreement - 4: total agreement
fear_risks_entrep04	To what extent do you think that the fear of unforeseen situations that would affect the company (high risks) are barriers would prevent you from becoming an entrepreneur?	0: definitely not - 4: definitely yes; DK/NA: blank
econ_uncertainty_entrep04	To what extent do you consider the uncertain economic situation as a barrier that would prevent you from becoming an entrepreneur?	0: definitely not - 4: definitely yes
f_encourage_busi04	To what extent would the people who are important to you encourage you to start your own business?	0: not at all - 4: very much
trust_pol_parties04	To what extent do you trust political parties as institutions?	0: total distrust - 4: total trust
life_in_Bukovina	Have you spent most of your life or just a part of it before your current residence in Bukovina?	0: no; 1: yes

Source: own edition

We analyzed the significant factors that influence the probability of becoming an entrepreneur over the next five years in the proposed models in terms of intention. We have used a well-known econometric model in Stata 16 MP. It is about the binary logistic regression model (Logit), as a particular case of the multinomial regression model - mLogit (Nagler, 1994). We have performed the logistic regressions for the overall dataset and those two subsets corresponding to the dominant residence of living (*life_in_Bukovina*). We have retained the resulting influences only if they met the selection rules, namely: lower p-values which indicate more statistical significance - it was additionally considered the level of 1%

starting from the fact that in large samples, p-values go quickly to zero (Lin et al., 2013); coefficients in the correlation matrix of predictors with values near or less than 0.3, indicating negligible or low correlation (Mukaka, 2012); higher scores for the Area Under the Curve of Receiver Operating Characteristic – AUC / AUCROC (Jiménez-Valverde, 2012), for more accurate models in terms of classification power; larger R-squared values (Miles, 2014) or, in other words, a higher coefficient of determination for a better explaining power of the models; smaller values of AIC-Akaike Information Criterion, and BIC-Bayesian Information Criterion (Dziak et al., 2018) for a better fit of the chosen model (Kéry and Royle, 2016), where the goodness of fit describes how well a statistical model fits a set of observations; larger ones for both χ^2 (contradiction of the H_0 hypothesis) in the case of GOF (Goodness of Fit) test and χ^2 for the same GOF as additional indications of a better fit of the model.

Table 2: General statistics

Dataset/Subset	Overall						Inside (Bukovina)						Outside					
	n	Yes (1) share / Mean	S.D.	Min	Mdn	Max	n	Yes (1) share / Mean	S.D.	Min	Mdn	Max	n	Yes (1) share / Mean	S.D.	Min	Mdn	Max
work4entrep_next5y01 (OUTCOME)	2119	59.27%					301	45.18%					1818	61.60%				
married	2119	14.02%					301	36.88%					1818	10.23%				
priv_sect_income	2119	68.10%					301	47.51%					1818	71.51%				
own_business	2119	5.85%					301	4.98%					1818	6%				
dad_entrep	2119	16.52%					301	11.96%					1818	17.27%				
cl_f_entrep	2119	47.19%					301	52.82%					1818	46.26%				
diff_entrep04	2119	1.85	1.11	0	2	4	301	1.83	1.08	0	2	4	1818	1.85	1.12	0	2	4
to_decide_4yourself	2052	3	0.82	0	3	4	285	2.86	0.82	0	3	4	1767	3.02	0.81	0	3	4
to_lead_group_indiv	2059	2.71	0.94	0	3	4	287	2.44	1	0	2	4	1772	2.76	0.92	0	3	4
control_entrep04	2119	3.09	0.89	0	3	4	301	3.08	0.89	0	3	4	1818	3.09	0.89	0	3	4
fear_risks_entrep04	2118	1.85	1.14	0	2	4	300	1.94	1.09	0	2	4	1818	1.84	1.15	0	2	4
econ_uncertainty_entrep04	2119	2.26	1.05	0	2	4	301	2.34	0.99	0	2	4	1818	2.25	1.06	0	2	4
f_encourage_busi04	2119	2.83	0.97	0	3	4	301	2.66	0.98	0	3	4	1818	2.86	0.97	0	3	4
trust_pol_parties04	2119	0.9	0.99	0	1	4	301	0.9	1	0	1	4	1818	0.9	0.99	0	1	4
life_in_Bukovina	2119	14.20%					301	100%					1818	0%				

Source: own calculations in Stata 16

Additionally (Zlotnik and Abraira, 2015), two binary logistic-based probability prediction nomograms have been generated. They usually ensure more visual support for comparability. And this because of an overall view of the magnitude of the effects. More, because they also support interpretations directly in probabilistic terms.

To correct for any form of heteroskedasticity, we also reported only robust standard errors in all regressions with the aid of the corresponding option in Stata, namely `<<vce(robust)>>`.

4. Results and discussion

When applying the Logistic regressions for the overall dataset and those two subsets corresponding to inside and outside Bukovina, we reported the results (Tables 3, 4, and 5) only after computing coefficients as average marginal effects (for comparability reasons when the focus is on magnitude).

When taking the overall dataset, the regressions in Table 3 (models 4 and 5) confirm the split variable (*life_in_Bukovina*). A T-test already validated it, and it also resists here, where it proves a persistent and unexpected negative influence.

In terms of intersecting influences for the overall dataset (Table 3) and those two subsets (Tables 4 and 5), we can mention three components. They correspond to the following: currently owning a business (*own_business* - positive influence), being married (*married* - negative one) and the predominantly private source of income (*priv_sect_income* - positive one), in the descending order of magnitude, also confirmed by those two Zlotnik prediction nomograms (Figures 3 and 5 – one-unit increase/decrease is equal to the overall impact). These three common influences suggest that the individuals who already own a business, the single ones, and those receiving their income, especially from the private sector, are also more likely to become entrepreneurs for the next five years in all those three categories of models above.

Table 3: Work as an entrepreneur for the next five years - Logit-based overall models

Variables/Models	(1)	(2)	(3)	(4)	(5)
married	-0.2104*** (0.0287)				-0.2146*** (0.0306)
priv_sect_income		0.1749*** (0.0209)			0.1177*** (0.0214)
own_business			0.4353*** (0.0681)		0.4553*** (0.0695)
life_in_Bukovina				-0.1586*** (0.0291)	-0.0728* (0.0290)
N	2119	2119	2119	2119	2119
chi^2	48.8424	61.9898	38.7413	28.1817	136.4260
p	0.0000	0.0000	0.0000	0.0000	0.0000
pseudo r2	0.0175	0.0218	0.0206	0.0099	0.0598
max.Abs.Val.of Correl.Coef.(Pred.Matrix)	0.0000	0.0000	0.0000	0.0000	0.2680
max VIF uncentered	1.0000	1.0000	1.0000	1.0000	1.2371
AUC	0.5548	0.5818	0.5367	0.5415	0.6301
pGOF	0.00	0.00	0.00	0.00	0.0064
chi^2GOF	0.00	0.00	0.00	0.00	24.48
AIC	2818.2501	2805.7515	2809.1008	2839.9042	2703.0527
BIC	2829.5675	2817.0689	2820.4182	2851.2216	2731.3462
maxPnomologBiggerThan	0.5000	0.5000	0.7000	0.5000	0.8000

Source: own calculations in Stata 16

Notes: Robust standard errors in parentheses. *, **, and *** indicate significance at 10%, 1% and 1%. Coefficients above parentheses are computed as average marginal effects.

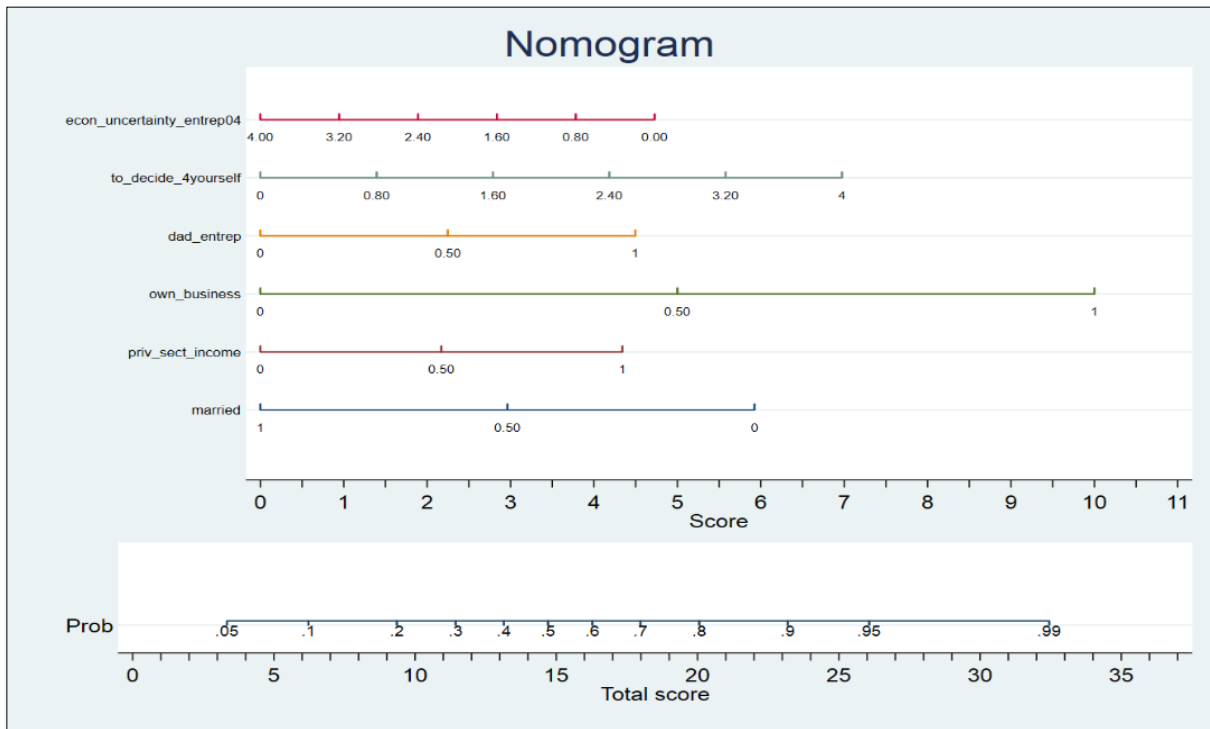
Table 4: Work as an entrepreneur for the next five years - Logit-based models inside Bukovina

Variables/Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)
married	-0.3307*** (0.0462)						-0.2688*** (0.0540)
priv_sect_income		0.3401*** (0.0372)					0.1969*** (0.0443)
own_business			0.5139** (0.1758)				0.4535*** (0.1210)
dad_entrep				0.3433*** (0.0875)			0.2039** (0.0735)
to_decide_4yourself					0.1326*** (0.0332)		0.0791** (0.0306)
econ_uncertainty_entrep04						-0.0950*** (0.0281)	-0.0536* (0.0263)
N	301	301	301	301	285	301	285
chi^2	31.3509	40.9104	7.8175	12.9244	13.1129	9.8749	64.9832
p	0.0000	0.0000	0.0052	0.0003	0.0003	0.0017	0.0000
pseudo r2	0.0844	0.1071	0.0285	0.0362	0.0355	0.0265	0.2402
max.Abs.Val.of Correl.Coef.(Pred.Matrix)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2654
max VIF uncentered	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	5.1448
AUC	0.6620	0.6904	0.5417	0.5720	0.6166	0.6104	0.8118
pGOF	0.00	0.00	0.00	0.00	0.3073	0.2207	0.3218
chi^2GOF	0.00	0.00	0.00	0.00	3.61	4.41	93.59
AIC	383.4832	374.0902	406.6476	403.4760	383.5772	407.4784	313.0130
BIC	390.8974	381.5044	414.0619	410.8902	390.8822	414.8926	338.5804
maxPnomologBiggerThan	0.4000	0.5000	0.7000	0.6000	0.5000	0.5000	0.9500

Source: own calculations in Stata 16

Notes: Robust standard errors in parentheses. *, **, and *** indicate significance at 10%, 1% and 1%. Coefficients above parentheses are computed as average marginal effects.

Figure 1: Prediction nomogram to support the intuitive computing of the probability of intending to work as an entrepreneur for the next five years in the most comprehensive model inside Bukovina (Table 4, model 7)



Source: own calculations using the “nomolog” command in Stata

When it comes to influences that are particular to the models built based on responses corresponding to Bukovina (Table 4), we can notice two positive ones. The one of the parental legacy (*dad_entrep*) and the ability to independently decide when it comes to work (*to_decide_4yourself*). Besides, a negative influence corresponding to the expected consequence of economic uncertainty on the decision to become an entrepreneur (*econ_uncertainty_entrep04*). In terms of their overall impact, the corresponding Zlotnik prediction nomogram in Figure 1 indicates the following descending order of importance for these three particular ones above: *to_decide_4yourself*, *econ_uncertainty_entrep04*, and *dad_entrep*. They suggest those individuals who are more likely to become entrepreneurs over the next five years. These are the ones more inclined to confirm the ability to lead a group of people as a future entrepreneur, the ones less likely to admit the uncertain economic situation as a barrier when thinking of becoming an entrepreneur, and finally those confirming the parental role models' legacy.

The influences identified as positive manifested for the paternal role models and the ability to decide for themselves (*individualism*). They are compatible with prior research (e.g., Polin et al., 2016; Ferri et al., 2019). The negative role played by the high levels of uncertainty generated by specific economic situations is in line with the research conducted by Brinckmann et al. (2010). Also, contrary to the existing research (e.g., Pfeifer et al., 2014), being married, identified in our paper to be significant for this particular geographical area, is not an incentive to become an entrepreneur.

In terms of influences that are particular to the models built on the responses from persons who live outside Bukovina (Table 5), we can notice the ones corresponding to some variables reported here in the descending order of their overall impact (according to the Zlotnik prediction nomogram in Figure 2). They are as follows: *to_lead_group_indiv* (positive influence), *diff_entrep04* (negative influence), *control_entrep04* (positive), *f_encourage_busi04* (positive), *fear_risks_entrep04* (negative), and *trust_pol_parties04* (negative). They suggest what kind of individuals are more likely to become entrepreneurs over the next five years. These are the following ones: those who are more inclined to have the opportunity to lead a group of people as a future entrepreneur, the ones who are less likely to foresee difficulties when trying to become an entrepreneur, those who declared themselves as more tempted

to exercise a high control over their businesses when needed, the ones more inclined to consider the support and encouragement of those close people to them, those less likely to admit the fear of high risks as a barrier when thinking of becoming an entrepreneur, and finally, the ones who have less confidence in political parties.

Table 5: Work as an entrepreneur for the next five years - Logit-based models outside Bukovina

Variables/Models	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
married	-0.119**										-0.13***
	(0.036)										(0.035)
priv_sect_income		0.118***									0.051*
		(0.024)									(0.023)
own_business			0.414***								0.303***
			(0.073)								(0.070)
cl_f_entrep				0.175***							0.096***
				(0.021)							(0.022)
diff_entrep04					0.101***						-0.064***
					(0.009)						(0.01)
to_lead_group_indiv						0.106***					0.064***
						(0.0112)					(0.012)
control_entrep04							0.101***				0.057***
							(0.012)				(0.012)
fear_risks_entrep04								-0.070***			-0.028**
								(0.009)			(0.01)
f_encourage_busi04									0.101***		0.047***
									(0.011)		(0.011)
trust_pol_parties04										-0.044***	-0.02*
										(0.011)	(0.011)
N	1818	1818	1818	1818	1818	1772	1818	1818	1818	1818	1772
chi^2	10.563	23.0280	30.923	58.791	98.119	68.879	62.937	50.802	74.474	14.716	228.96
p	0.001	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
pseudo r2	0.004	0.0095	0.019	0.025	0.042	0.032	0.027	0.021	0.032	0.006	0.13
max.Abs.Val.of Correl.Coeff. (Pred.Matrix)	0.000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225
max VIF uncentered	1.000	1.0000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	11.5746
AUC	0.524	0.553	0.536	0.593	0.636	0.620	0.603	0.594	0.611	0.551	0.737
pGOF	0.00	0.00	0.00	0.00	0.003	0.010	0.912	0.077	0.914	0.865	0.204
chi^2GOF	0.00	0.00	0.00	0.00	14.05	11.25	0.54	6.86	0.52	0.73	1527.78
AIC	2414.948	2402.482	2378.389	2365.032	2322.820	2279.601	2359.464	2374.407	2347.912	2410.714	2068.011
BIC	2425.959	2413.493	2389.400	2376.043	2333.831	2290.561	2370.475	2385.418	2358.923	2421.725	2128.29
maxPnomologBiggerThan	0.000	0.00	0.700	0.600	0.600	0.600	0.600	0.600	0.600	0.500	0.900

Source: own calculations in Stata 16

Notes: Robust standard errors in parentheses. *, **, and *** indicate significance at 10%, 1% and 1%. Coefficients above parentheses are computed as average marginal effects.

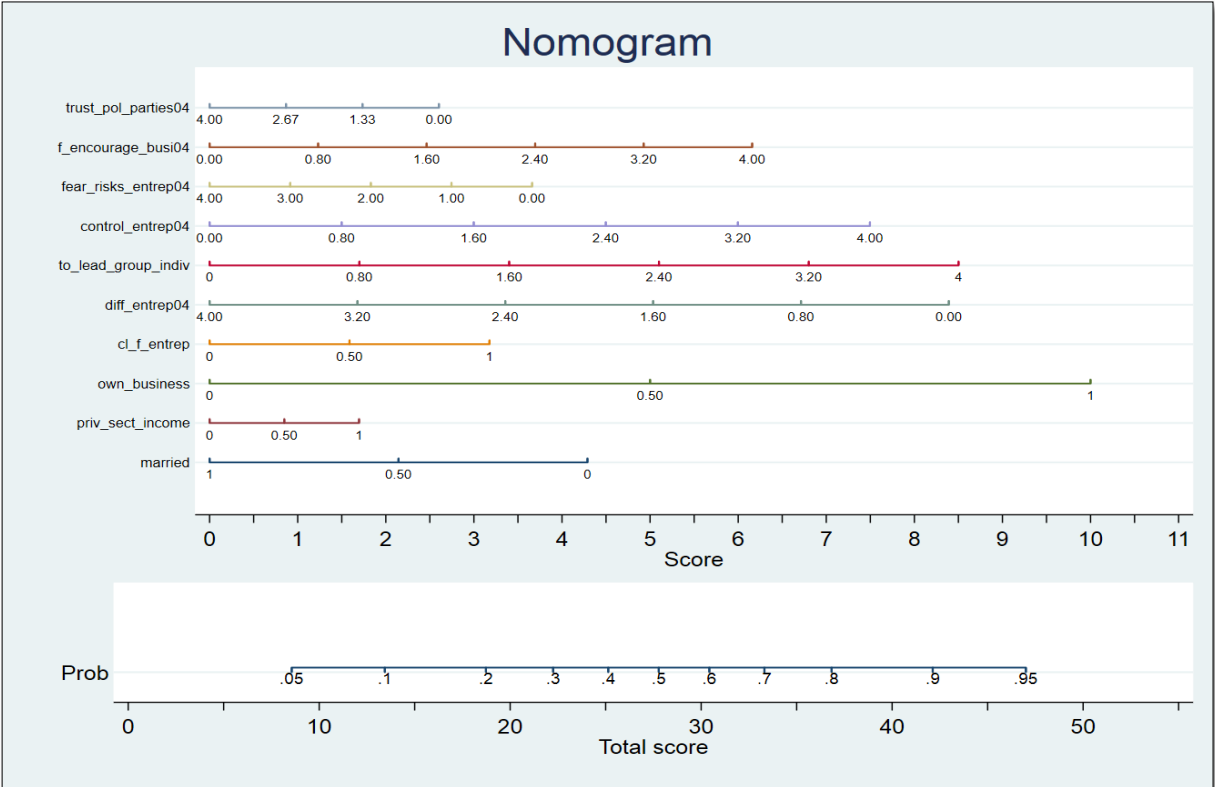
All coefficients above (Tables 3-5), both for intersecting and particular influences, are consistent as sign. It means that they do not change it when considered alone or together with the others.

These findings are partially in line with the existing literature. For instance, Segal et al. (2005) already pointed out that tolerance for risk, perceived feasibility, and net desirability significantly predicted the self-employment intentions of business students. We think the last three influences act rather as general categories, including some identified in our current research, namely the ones corresponding to the following variables: *fear_risks_entrep04*, *econ_uncertainty_entrep04*, *priv_sect_income*, *own_business*, *dad_entrep*, *f_encourage_busi04*, *to_decide_4yourself*, *to_lead_group_indiv*, and *control_entrep04*. Moreover, the common and powerful influence corresponding to *own_business* and the already existing idea of encouraging persistence for creating a business confirm if considering Shane (2009). This author even suggested removing incentives to create low-probability companies and focus on improving the average performance of new businesses with growth potential. The following influences have solid arguments in the literature (Staniewski and Szopinski, 2013; Lazarczyk-Bilal and Glinka, 2021; Lopes et al.; 2020, Potter, 2019). It is about: the identified relationship between the role models from close friends, their encouragement to become an entrepreneur, the ability to be the leader of a group of people at the workplace and to exercise high control over the business and entrepreneurial intentions are well documented. Finally, contrary to the literature presented above, the perception of a high level of trust in political parties acts inimical to the entrepreneurial intentions, denoting a lack of interest in this institutional approach. We will further study this finding in future analyzes.

The absolute values for the predictor correlation coefficients in each most comprehensive model (of those three categories above) are all below the threshold of 0.3. It means negligible correlation and demonstrates the lack of the issue of multicollinearity.

The values of AIC and BIC are the smallest for the most comprehensive models, while the ones for χ^2 for the Pearson GOF tests are the largest. It means a simple validation of the goodness of fit. Besides, the same Pearson GOF tests for those two specific and most comprehensive models (inside and outside Bukovina) return promising results (proofs of good calibration) for $\text{Prob} > \chi^2$. The latter have large enough values (0.3218 and 0.2043, respectively) to contradict the null hypothesis that the data is not following the corresponding Logit distribution.

Figure 2: Prediction nomogram to support the intuitive computing of the probability of intending to work as an entrepreneur for the next five years in the most comprehensive model outside Bukovina (Table 5, model 11)



Source: own calculations using the “nomolog” command in Stata

Moreover, the maximum resulting probabilities associated with the declared intention to work as an entrepreneur when considering the most favorable combination of values for the predictors in both particular and most comprehensive models are high (~99% as resulting from the nomogram in Figure 1, and ~95% - from the one in Figure 2, respectively). They correspond to models with reasonable values for the classification accuracy (AUC=0.8118 in Table 4 - model 7 shows good accuracy, while 0.7367 in Table 5 - model 11 suggests a fair one). The nomograms (Figures 1 and 2) confirm the results obtained using average marginal effects (Tables 4 and 5) in terms of magnitude. For instance, we considered a scenario keeping all other influences in the least advantageous state for the outcome. The one corresponding to already owning a business (yes / 1) generates a higher probability in terms of intention to work as an entrepreneur in the next five years (~22%) for the first particular model (inside Bukovina) than for the second (outside Bukovina, ~6%).

5. Conclusions

In this paper, we analyzed if being part of the former Habsburg Empire influences current entrepreneurial intentions in the North-Eastern region of Romania, inside and outside Bukovina region, once a part of the Habsburg Empire's territory.

The model for the persons who lived most of their life in Bukovina emphasizes common and specific elements. The same for the other one (outside this region).

The intersecting features include the following: the role of already being the owner of a business, not being married, and having as a source for most of the current income the results of activities in the private sector, in this particular order of importance. Already owning a business seems to be the most powerful influence in both models, even when considering the peculiarities. The latter exerts a mightier influence on the outcome in the case of the first particular model with respondents inside Bukovina, a fact confirmed both by the values of coefficients computed as average marginal effects and reported in tables, and the risk prediction nomograms if considering the rest of the influences in the least advantageous state. When compared with the role of already being the owner of a business, the last two common effects corresponding to the marital status and private source of income seem to count more for the intention to work as an entrepreneur in the next five years also in the case of this first particular model. The same idea confirms if directly comparing these two influences across the two specific models. The entrepreneurial intentions negatively correlate with married individuals. This marital status is about three times stronger than in the second model (for respondents outside the region of Bukovina). These intentions positively correlate with those persons who mainly receive revenues from the private sector. The influence of this latter variable is more than three times higher than in the second model.

In terms of peculiarities, for the first model, the entrepreneurial intentions are positively influenced by the ability to decide on one's own as a latent factor of individualism, and by the paternal role models, and negatively by the uncertainty related to economic conditions and situations. In the same terms, for the second model, the most important influences are associated with the following: leading a group of people at the workplace, being more optimistic when it comes to assessing the difficulty of becoming an entrepreneur, exercising an increased degree of control over the business, benefiting from the support of close friends and family who encourage the start of such thing, manifesting less fear when it comes to risks associated with entrepreneurship, and also less trust in political parties, in this particular order of importance.

We consider an issue of great importance in future researches. It would support a better assessment of the influence of being part of the former Habsburg Empire. It is about an additional analysis of the predominant location of respondents. It should be coupled with one of the distances to the former empire's border, as it was once.

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BEHAVIOUR CHANGE IN FINANCIAL DECISION MAKING UNDER UNCERTAINTY

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Abstract

It is necessary to carefully decide about three main points when to invest and which financial sources will be used in any crisis or uncertain situation. A profit reinvestment would be an effective and safe way of circulating money flows in a company. The first wave of COVID-19 has changed business conditions in the Czech Republic and influences the financial decisions of entrepreneurs on how to use financial resources in individual segments of the company. This paper's primary goal is to compare the company's reinvestment behaviour before the crisis and after this first wave, based on primary research data (at least 170 respondents in two rounds of surveys). The paper includes different preferences influenced by COVID-19 uncertainty in essential areas for investments, such as marketing, research and development, human resources and company equipment in the meaning of technological innovations.

Keywords: financial decisions, reinvestments, resource management

JEL codes: L26, D25, G31

1. Introduction

The financial management of the company contains many unique aspects. As the desired result of economic globalisation, there has in common been a rapid increase in international business transactions (Jormanainen and Koveshnikov 2012). The economic globalisation of continuous production and sustainable consumption has undoubtedly brought many vital challenges and unique opportunities for successful companies (Brenes, 2000; Paul et al., 2017). As economic growth in emerging markets accelerated, advanced economies have typically caused private companies to rethink their global strategies (Paul and Benito, 2018; Ramamurti, 2012). Lester et al. (2003) described that the corporate life cycle naturally includes five active phases: (i) existence, (ii) survival, (iii) success, (iv) recovery and (v) decline. Thanks to the economic openness, the competition gets closer to the customers. Therefore, it is necessary to overtake the competition and seize opportunities in the case of reinvestment.

The company's primary aim is the long-term maximisation of the market value, profit or other entrepreneurial goals. During its operation, the entrepreneur must develop options to support the business according to these business goals. An entrepreneur should be completely unpassionate about short-term financial decisions. When it comes to long-term financial decisions, they have to maintain several options for how and where to go (within resources). The long-term financial activities of the ambitious entrepreneur additionally include necessary investments. For many companies, the

investment is a necessary form of change, a way of incentive grows or a business renewal (Okanazu, 2018; Gawali and Gadekar, 2017).

In line with that, Wiklund (1998) focuses on a small business and proposes an appropriate opportunity strategy as a key to achieving growth. As can be seen from the literature, the growth is measured and defined in many alternative ways (Wiklund, 1998; Davidsson and Wiklund, 2000) have already defined. As the second meaning of the word, the authors mention improving quality due to the development process, specifically in increasing the size or improving the quality. Both can be supported by a suitable, planned and accurate investment or reinvestment. The distinction between size and growth has been addressed by Whetten (1987), whose view is that size represents an absolute measure, while growth obtains a relative measure of size over time. Whatever the opinion of expansion, it is noteworthy whether in the local competition, like the state or district or globally, mainly due to globalisation, business interconnection, or online shopping.

Nowadays, sustainability is one of the common trends today. This philosophy was developed within the idea of an open and interconnected market and includes adapting today's business model to the ever-changing economic, financial, social, political and demographic context, not least to increase the organisation's competitiveness. However, it is necessary to ensure that resources are used responsibly and efficiently, which today are more than ever considered limited, be they financial, material or human resources (Popescu and Popescu 2019). Sustainability is for many firms essential and helps them had a competitive advantage and when companies used to meet ISO standards.

1.1 Financial decisions about reinvestments

Small businesses may need higher one-off investments, but this requires access to internal and external finance (Cull and Xu 2005). These enterprises frequently have to utilise internal funds to demonstrate their “dedication” and reduce costs when requesting bank loans (Brau, 2002). Investment decision-making is a significant part of any company’s strategic decision-making because new investment projects fundamentally affect subsequent economic results and prosperity (Scholleová et al., 2010).

In line with a direct interpretation, not only based on the previous literature review, the reinvestment would be defined as “the net profit return from the initial investment.” It is, therefore, to a certain extent, a cyclical process. It also follows that the reinvestment process can only take place for at least some successful companies, as they must reasonably complete the first cycle of investment and then generate a profit from this process. This decision would be in the form of the payment of bonuses, dividends, or to invest this money back into the company, in the form of reinvestment in modern machines - production, science and research, marketing or human resources. Choosing the proper resources to invest in the environment can increase the value of an organisation’s brand, products, and services. According to Salancik and Pfeffer (1978), excessive dependence on external sources could be destructive due to uncertainties that the organisation cannot control. Human resource management performs a crucial role in managerial decision-making, as people fulfil a crucial role (Madmoli, 2016; Amabile, 1996).

Table 1: A comparison of different approach to reinvestment

Authors	Main focus
Johnson, McMillan and Woodruff, 2002	Reinvestments are influenced by type of ownership or shares
Froehlich, 1948	Reinvestments are evaluated from accounting point of view
Chakravarty and Xiang, 2011	Reinvestment affects the level of state administration, the form of government in a given country, political ties to companies, expropriation rates, enforcement of contracts through the courts, etc.
Lazonick, 2014	Financial evaluation - redemption of shares and payment of dividends.
Illés, 2016	Payback period of reinvestments
Nguyen, 2019	Use of reinvestments in terms of access to external sources of finance (bank or government loans).

Source: author’s review

As described from the table above (Table 1), there are several approaches to reinvestment. The amount of profit from (re) investment goes back to the company. Moreover, the question is to which segment, but none of the authors pays attention to. It is comprehensible each author makes out the issue from his specialisation.

Reinvestments are an essential part of management decisions for small businesses (Zhou, 2017). This decision making applies to every business across a branch. The question, who decides how much profit the company keeps or invest in, is in the owner or manager's hands. Many factors influence this decision. Internal and external resources can be used when funds are needed. (Nguyen, 2019). Reinvestment of profits can be replaced by external finance in loans or could be used as additional finance only. This behaviour is contradictory decision-making to balance external and internal finance. There are authors (Johnson et al., 2002) who suggest that access to bank loans does not affect reinvestment share. The authors focused specifically on companies operating in Eastern Europe. In contrast, McMillan and Woodruff (2002) found out a link between access to bank credit and the reinvestment process. These authors have found a connection in the countries of China, Russia, Poland and Vietnam.

To sum up previous studies' results, private firms in Vietnam reinvested a share corresponding to 15% of total capital per year during the study period, which ran from 2000 to 2015 (Nguyen, 2019). Following that, Walker et al. (2011) did not present the level of reinvestments in terms of company size, but they examined the literature across disciplines and focused on the sectors in which companies are to operate. The literature dealing with finances has the highest values in this area across the spectrum (even 64 %) has a counterpart in the engineering economy, where the values of the reinvestment rate are around 20 %. A detailed study could be found in Chakravarty and Xiang (2011), who reviewed the rate of reinvestment in various countries (precisely 36 countries), including the Czech Republic with an average of 13.33% and a median value of 0%, with 254 subjects surveyed. In contrast to that, South Africa had the highest average value with 85.91 %, and the most limited average value of reinvestments in the given examined spectrum had Kazakhstan, where the average of reinvestments was 9.78%. Countries with a median of 0% were: Azerbaijan, Czech Republic, Georgia, Kazakhstan and Uzbekistan. Those studies were provided in a relatively stable business environment.

The current pilot study from FAPI (2020) was used to characterise the change in reinvestment behaviour in uncertainty. FAPI research (2020), conducted on 90 sole proprietors and companies in the Czech Republic, has shown that due to the Covid-19 situation were "closed" their business de jure 28%, de facto others could use alternative ways, how to deliver their services and products to customers (via social media, e-shops). Their profits decreased to 60%. In line with that, those people tried to find some ways, how to survive in that situation as others. They used a costs reduction (38%), a close of establishments/offices (32%) and a reduction of business activities (29%). The main costs which they have to cover are rent, energies and lease payments. Opposite to that, we obtain pilot information about a sentiment of governmental support when almost half (49%) accept it relatively warmly ("it's better than nothing"), and almost 16% are sceptical.

Those entrepreneurs stated that they would have a reserve fund to cover the three-month cost (46%) in words of financial planning. In terms of plans, 39% of respondents plan to invest in gaining new customers, expanding activities or expanding into new markets. These results and existing support list were a starting point for finding a current research gap – to observe a change in behaviour in the area of financial planning and internal funds use in the context of existing public support, which is not covered in previous studies. Following that, this paper's primary goal is to discuss the sole proprietor's sentiment in finance reinvestment allocation and behavioural change within the Covid-19 crisis.

Companies' need to survive forces them to identify ways to maintain and increase the market share they hold. In current situations, a considerable number of approaches have been developed to improve companies' operational performance. The reason why it is so important to focus on three main areas of reinvestments, defined by Kannan and Tan (2005):

- an improvement of the essential quality of manufactured products,
- the level of flexibility that businesses have to catch up with the massive competition from the expanding market; and
- the reduction of production costs.

Finally, due to different and mixed definitions of reinvestments, the authors decide on the business's economic approach evaluation, i.e., examining whether companies (a) how much they

reinvest and (b) to which segment in the company from internally generated profits as the company's management or owner's decision, which presents research questions in that paper. As can be noted from the previous literature review, this approach is more different than is presented by the authors before. The paper intends to fill this research gap in how the company's leading personalities decide on the direction of profit to a certain extent by examining the decision-making process of these owners or managers. This gap cannot be filled by one study to reach the paper's goal than a change in reinvesting due to change in a business environment. As described from the table above (Table 1), there are several approaches to reinvestment. But in terms of how much profit from (re) investment goes back to the company and to which segment, none of the authors pay attention. It is comprehensible each author makes out the issue from his specialisation.

2. Methodology and data collection

A combination of primary and secondary research methods was needed to get relevant information about companies' field and their activity within an uncertain environment (Zott et al., 2011).

The primary research was conducted with the owners of companies. Firstly, we had asked for a first-round in 2019, and we obtained more than 258 respondents. This sample was stratified for the whole Czech Republic in value one per mile of companies per one region. The same panel of respondents was asked once again in summer 2020. Some of them did not agree to participate, so it had to be carried out with at least a total sample of 177 respondents in the Czech Republic in autumn 2020 for the second wave of the study. To describe differences in behaviour between samples, we used similar two groups of respondents (based on our respondent ID) in size of 170 respondents. Table 2 compares the values before the crisis (in 2019) and during the pandemic (at the end of 2020).

Unfortunately, the sample size was not representative of the Czech Republic's general business population (Cavana et al., 2001). However, it could help understand the more profoundly current situation in that business sector as a pilot study and a confirmation study of previous research (FAPI, 2020).

The study's limitations can be seen in the validation of results, where they describe each respondent's subjective opinion. This choice was appropriate for the chosen research problem, which was to identify different behavioural models for social groups support based on their socio-economic and socio-cultural backgrounds (Alaslani and Collins, 2017). A Cramer's V coefficient and Pearson correlation was used to confirming significance between variables at $\alpha = 0.05$. To acquire relevant information in the field of companies and their activity in a financial decision making within crisis situation, a combination of primary and secondary research was needed (Zott et al., 2011).

2.1 Data sample description

The findings presented here are founded on the authors' interpretation of in-depth interviews with social enterprises managers. In this study, the sample consists from 238 respondents, who dedicated their time for the interview, based on phone call. One call lasts 20 to 30 minutes in average. The main group of respondents were men (74.2 %). When we focused on their experience, the majority of them have an experience more than 20 years (30.9%), 11 to 20 years (19.5%), 4 to 10 years (21.4%) and the shortest experience – till 3 years (7.8 %). This sample represents people with long business experience, so they have competencies to evaluate precisely the current situation. Those descriptive variables were found as statistically significant for evaluation of overall situation, when Cramer V coefficient = 0.745 and Sig. = 0.001.

3. Results and Discussion

The data analysis was mated to answer two research questions – how much money companies reinvest back and secondly in which segments. According to the previous literature review, the main motive is the driver of reinvestment (Walker et al., 2011). Both samples were evaluated below (Table 2).

A significant change was found in two factors (1) tax reduction (+16.8%) and (2) financial ratios (+16.3%) when respondents indicated them as more important than before. With this fundamental first

motive, “extra benefits,” we extend a study of Illés (2016), who mainly examined the motive of payback period and financial ratios.

Table 2: Main motives for profit investments

Factor	During Covid-19 (2020)		Before Covid-19 (2019)		Change to positive sentiment
	A	B	C	D	B-D
	No	Yes	No	Yes	
Interest rate in bank	54.4%	45.6%	63.3%	36.7%	+8.9%
Payback period	17.5%	82.5%	16.4%	83.6%	-1.1%
Tax deductions	41.1%	58.9%	57.9%	42.1%	+16.8%
Extra benefits to yields	12.3%	87.7%	14.1%	85.9%	+1.8%
Competitive advantage	33.9%	66.1%	31.3%	68.7%	-2.6%
Financial ratios	29.8%	70.2%	46.1%	53.9%	+16.3%

Source: author’s calculations

In the following step, respondents answer the question about the amount of profit they reinvested in the examined period. To get more accessible information, they use a percentage share from their profit. As illustrated in Table 3, the leading group reinvests 60% and more to confirm that those companies prefer internal financial resources for their activities.

Table 3: Change in the investment share

Period	How much profit do you reinvest back to your enterprise? (in percentage share)						Evaluation	
	0%	20%	40%	60%	80%	100%	Cramer V	Sig.
B: During Covid-19	9.4%	1.6%	7.8%	18.8%	34.4%	28.1%	0.096	0.480
A: Before Covid-19	0.0%	10.5%	10.5%	26.3%	31.6%	21.1%	0.130	0.205
Difference B-A	+9.4%	-8.6%	-2.7%	-7.5%	+2.8%	+7%	0.132	0.832

Source: author’s calculations

As confirmed by statistical tests, the change before two periods and two nominal values are not significant at that moment. It is no surprise that the group of companies who reinvest more than 80% of their profit increased due to uncertain situation.

Finally, we observed a significant change in the reinvestment portfolio, as presented in Table 4.

Table 4: Investment behaviour of respondents – preference

Segment	Period	Percentage share of reinvestment					Respondents in total (%)	Spearman cor.	Sig.
		0%	20%	40%	60%	80+%			
New direction	B: During	0.2%	1.9%	3.3%	14.1%	80.6%	100	0.164*	0.037
	A: Before	57.8%	27.3%	9.4%	2.3%	3.1%			
Human resources	B: During	0.0%	2.4%	4.0%	13.6%	80.1%	100	-0.900*	0.037
	A: Before	39.9%	46.9%	10.2%	3.1%	0.0%			
Equipment	B: During	5.1%	12.8%	18.7%	28.9%	34.5%	100	-0.300	0.624
	A: Before	26.6%	14.8%	22.7%	16.40	19.5%			
Marketing	B: During	0.5%	1.2%	4.9%	13.4%	80.0%	100	-0.600	0.284
	A: Before	46.1%	39.1%	10.20	3.10	1.6%			

Source: author’s calculations, *significance at $\alpha = 0.05$.

We observed that many companies behave rationally in an uncertain period which continues. Those companies found their main weaknesses, and they have to solve the problems immediately. The first group (new direction) mentioned that they have to change strategy, solve problems as a crisis, so it was the reason why they invest in many cases 80% and more (and the rest to other segments). The second group, especially in services, was affected by governmental restrictions to provide their business, and in many cases, they do not use public support for employees, or this support was insufficient. These factors caused that the segment has also risen to 80% of reinvestment and more. The third group

mentioned that the Covid-19 situation ensured them that strategy was prepared well, so they focus on social media and marketing support of their business to be available for their customers during pandemic situation (other extremes). The fourth segment, such as equipment, in technical innovations, was affected the most because reinvestments in many segments decreased or arose very slowly. The statistical evaluation has shown a negative impact between periods within the human resources segment (is not used for development, but survival) and weak dependence on behaviour in the segment of “new direction”. Those results expand Lazonick (2014) results and Nguyen (2019) in the area of percentage share of reinvestments and a division of reinvestments into concrete company segments.

4. Conclusion

Financial behaviour within the uncertain situation as Covid-19 pandemic had shown the significant change in companies' financial behaviour when they prefer to trust internal resources and reinvest to segments, which could help them survive in that challenging situation. Some decisions are affected by public support (especially in the area of compensation bonuses for employees), but further research could confirm if those respondents combined internal resources to survive uncertainty or use public support. The research answered two main questions. Firstly, companies reinvest more than 50% of their profit back to the company, during the Covid-19 period it was more than 80%. Secondly, the most preferred segment for reinvestment before Covid-19 was impossible to evaluate when the amount between those four main groups was 20 to 30 %. Nowadays, most of them is solving a new strategic direction (80%). Unfortunately, the lack of internal resources stopped innovative activities.

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DECISION MAKING FOR SMALL AND MEDIUM-SIZED ENTERPRISES: SUSTAINABILITY AND RISK ASSESSMENT DURING THE COVID-19 PANDEMIC

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Abstract

Small and Medium-Sized Enterprises have become increasingly important these days in the international business environment, especially due to the unpredictable influences and overloading challenges brought by COVID-19 pandemic. In addition, intellectual capital has become a main driver for Small and Medium-Sized Enterprises, often contributing to the identity of the marketplace. This paper presents a novel approach on the decision making process specific to those Small and Medium-Sized Enterprises that have successfully managed to remain stable over time by having a knowledge-intensive perspective of their activities. In terms of research methods used to collect secondary data, performing a literature review proved to be absolutely necessary, in this way being able to evaluate the current trends within the research topic. In addition, the research methods used to collect primary data were surveys, interviews and focus groups with representatives and employees from Small and Medium-Sized Enterprises in Romania. Thus, this work shows the role played by Small and Medium-Sized Enterprises in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential.

Keywords: COVID-19 pandemic, intellectual capital, risk assessment, small and medium-sized enterprises, sustainability assessment

JEL codes: A10, D81, D83, O32, O34

1. Introduction

Nowadays, sustainable development (SD) has clearly become a very popular catchphrase for reputed country leaders and praised politicians, wise development planners, influential environmental activists, concerned governmental officials, responsible researchers and thoughtful scholars (Ukaga et al., 2011). In addition, SD has been regarded as a strong and omnipresent development paradigm, being gracefully tackled lately by specialists in almost all conferences' themes, specialized discourses and academic works (United Nations Sustainable Development Group (UNSDG), 2020). Moreover, dominant organizations worldwide have constantly managed to emphasize that the agenda for SD has to go beyond any other traditional sustainability and resilience discourses, since it should be mainly "dedicated to promoting innovation, leadership, human rights mainstreaming and cross-Charter coherence", while helping the advancement of "integrated and innovative solutions to development challenges, normative policy support and advice to national governments, and synergies" across all economic, political and social activities (United Nations Sustainable Development Group (UNSDG), 2020). Furthermore, even though, these days, the literature on SD is rather vast and most certainly overwhelming, there are still numerous aspects referring to the concept's definitions, characteristics, history, implications, importance, pillars, principles, and role that are still unclear to many individuals.

Apart from these, transparency, sustainability and risk assessment has successfully served as a convincing principle, dynamic procedure, and effective requirement, since it thoroughly focuses on the following key percepts: (a) facilitating citizens' "automatic access to all studies and information

submitted, by industry in the risk assessment process” without holding back unfavorable data and studies; (b) “strengthening the governance and the scientific cooperation”, by engaging and involving in activities and actions that promote the philosophy of good governance and corporate social responsibility; and (c) “developing comprehensive risk communication” by adopting and ensuring “a coherent risk communication strategy throughout the risk analysis process, combined with open dialogue amongst all interested parties” (European Commission, 2021).

Nevertheless, Popescu (2020) has argued that today, more than ever before, transparency, sustainability and risk assessment should be treated with great caution, in particular, due to the challenges and changes determined by the Covid-19 pandemic – which, according to the World Health Organization (WHO) interactive timeline, had its beginnings “at the close of 2019”, when “the WHO China Country Office was informed of a pneumonia of unknown cause, detected in the city of Wuhan in Hubei province, China” (World Health Organization (WHO), 2021).

In response to the sudden outburst of the SARS-COV-2 virus and overbearing evolution of Covid-19 pandemic at a global level, the United Nations (UN) Secretary-General António Guterres expressed his greatest concerns and worst fears in his compelling discourse “Remarks on Covid-19: A Call for Solidarity” (19 March 2020), when he stressed, on the one hand, that “a global recession – perhaps of record dimensions – is a near certainty”, and, on the other hand, that humanity is “facing a global health crisis unlike any in the 75-year history of the UN – one that is spreading human suffering, infecting the global economy and upending people’s lives” (United Nations (UN), 2020). What is more, the United Nations (UN) Secretary-General pointed out several cogent arguments, stating that “Covid-19 is killing people, as well as attacking the real economy at its core – trade, supply chains, businesses, jobs”, since the “entire countries and cities are in lockdown”, while “borders are closing”, and “companies are struggling to stay in business and families are simply struggling to stay afloat” (United Nations (UN), 2020). Notwithstanding, the United Nations (UN) Secretary-General also suggested that “a unique opportunity” does exist, in fact, “in managing this crisis”, since by addressing all its challenges in the right manner, the world’s leaders “can steer the recovery towards a more sustainable and inclusive path” (United Nations (UN), 2020).

On one hand, this paper reviews the theory on sustainable and responsible entrepreneurship seen as a focal point in achieving environmental and social success, decision making for Small and Medium-Sized Enterprises (SMEs), sustainability and risk assessment during challenging and turbulent times (such as, the Covid-19 pandemic), and on the other hand, this work focuses on the manner in which intangible business assets and intellectual capital enrich entities’ potential by accentuating the importance of information, knowledge, people’s skills and abilities in order to generate competitive advantages, and creative and innovative solutions capable to raise brand awareness and business value, during challenging and turbulent times (such as, the Covid-19 pandemic).

This multidisciplinary study, which highlights research results based on both quantitative and qualitative indicators, reports that the intellectual capital factor plays a dominant role in all organizations, not only at a national, but also at an international level, and in our society as a whole, since “intangible assets are at the heart of what makes firms competitive, (...) are vital for productivity and economic growth” and have a “(...) corresponding impact on productivity and Gross Value Added (GVA) growth” (European Union, 2017).

The central research question (RQ) in this paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic” asks which are the main decisions and prominent targets that SMEs will need to address during the Covid-19 pandemic, and what will sustainability and risk assessment results show for SMEs during the Covid-19 pandemic.

In particular, this scientific research paper, will also examine eight secondary research questions derived from the main aforementioned question: (RQ1) what do SMEs stand for? (RQ2) do SMEs support a sustainable environment and responsible entrepreneurship? (RQ3) what influences do SMEs have on today’s organizational landscape and which specifies do they have in the decision making processes? (RQ4) which are the opportunities, challenges and uncertainties brought by SMEs when addressing the need for a sustainable and responsible entrepreneurship during the current Covid-19 pandemic? (RQ5) what influence do tangible and intangible assets have and in which way are these assets able to influence the role, importance and implications of SMEs? (RQ6) which are the ways of increasing performance for SMEs through intellectual capital in challenging times? (RQ7) which are the

methods, tools and instruments for sustainability and risk assessment during the Covid-19 pandemic? (RQ8) which are the main solutions and recommendations due to be considered while addressing the need for sustainable and responsible SMEs, when focusing on the influence of intellectual capital?

This paper has been divided into five parts. The first part of this paper deals with the literature review and the general background, focusing on key concepts, such as, SMEs, sustainability, responsibility, environmental performance and environmental management system, social integration, corporate responsibility, social awareness and secure working environment, entrepreneurs and entrepreneurship, value-based cultures, economies and societies, performance, tangible and intangible assets, human resources and human resources management, intellectual capital and intellectual property, decision making, sustainability and risk assessment, and the influences of challenging times (such as, the current Covid-19 pandemic). The second part of this work targets the presentation of the research methodology, with the particular focus on the fact that, in terms of research methods used to collect secondary data, performing a literature review proved to be absolutely necessary, in this way being able to evaluate the current trends within the research topic. In addition, the research methods used to collect primary data were surveys, interviews and focus groups with representatives and employees from SMEs in Romania. Thus, in the third part of this work, the results and findings are thoroughly displayed, thus showing the role played by SMEs in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential. In continuation, the fourth part of this work refers to possible solutions and recommendations for SMEs development and growth, while analyzing the decision making process for SMEs, and while focusing on the specific sustainability and risk assessment methods, tools and instruments, during the Covid-19 pandemic. The last part of this work, namely the fifth part, addresses the conclusion, where the authors have successfully managed to show the importance and the role played by SMEs in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential, with a clear accent on the benefits and the influences derived from intangible assets (and, in particular, intellectual capital and intellectual property).

2. Literature review and background

This section presents the literature review and describes the general background for the paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic”. This section had the purpose of displaying the secondary data collected by performing a literature review proved to be absolutely necessary, in this way being able to evaluate the current trends within the research topic. In this particular section, the focus is on defining key concepts for this current work, such as, for instance: sustainability, SD, Sustainable Development Goals (SDG), SMEs, decision making processes, and sustainability and risk assessment. In like manner, this section targets the presentation of the main characteristics, role and importance of these dominant concepts.

According to the Organization for Economic Co-operation and Development (OECD) (2011), SD “seeks to balance the economic, environmental, and social dimensions of development in a long-term and global perspective”, and “implies a broad view of human welfare, a long term perspective about the consequences of today’s activities, and the full involvement of civil society to reach viable solutions”. In the same way, OECD (2011) has constantly managed to focus on a large spectrum of SD concerns, goals, principles and strategies, being able to provide “member countries with a unique forum to share challenges, solutions and best practices”, and also support “those activities with analytical research and expertise on economic, environmental and social issues, the OECD helps provide countries with practical approaches for achieving sustainable development”.

When trying to define SMEs it should be noted that there is not a unanimously accepted definition, which implicates that “SMEs are defined differently in the legislation across countries, in particular because the dimension “small” and “medium” of a firm are relative to the size of the domestic economy” (OECD, 2017). For example, “for statistical purposes, the OECD refers to SMEs as the firms employing up to 249 persons, with the following breakdown: micro (1 to 9), small (10 to 49) and medium (50-249)”, which “provides for the best comparability given the varying data collection practices across countries, noting that some countries use different conventions” (OECD, 2017). However, according to the European Commission’s “User guide to the SME Definition” (2020) the following arguments are

brought when describing SMEs: “In determining whether or not an enterprise is an SME, the enterprise’s size (employees, turnover and balance sheet total) is not the only factor that should be taken into account. In fact, an enterprise can be very small in these terms, but if it has access to significant additional resources (e.g. because it is owned by, linked to or partnered with a larger enterprise) it might not be eligible for SME status. For enterprises with a more complex structure, a case-by-case analysis may therefore be required to ensure that only those enterprises that fall within the ‘spirit’ of the SME Recommendation are considered SMEs.”

What is more, SD and SMEs are strongly interrelated, since specialists worldwide believe that SMEs contribute substantially “to economic and social well-being”, offering both paramount opportunities and tremendous challenges “in a globalized and digital economy”, since “SMEs are key players in the economy and the wider eco-system of firms”, which means that by “enabling them to adapt and thrive in a more open environment and participate more actively in the digital transformation is essential for boosting economic growth and delivering a more inclusive globalization” (OECD, 2017). Also, OECD (2017) document suggestively entitled “Enhancing the Contributions of SMEs in a Global and Digitalized Economy” has clearly emphasized that “across countries at all levels of development, SMEs have an important role to play in achieving the Sustainable Development Goals (SDGs), by promoting inclusive and sustainable economic growth, providing employment and decent work for all, promoting sustainable industrialization and fostering innovation, and reducing income inequalities”, thus stressing successfully the profound influences that exist between SD and SMEs (Table 1).

Table 1: Sustainable development (SD) and Small and Medium-Sized Enterprises (SMEs)

Sustainable development (SD)	Small and Medium-Sized Enterprises (SMEs)
+	Have the potential of becoming the foundation of solid democracies in terms of supporting the Sustainability Agenda and Sustainable Development Goals (SDG) at a global level.
+	Focus on successfully integrating sustainability principles, practices and strategies with the specificities of business cultures, striving to create new development opportunities, especially for emergent markets.
+	Contribute to a high rate employment and to a steady and sustainable economic growth.
+	Encourage competitiveness and competitiveness advantage in a volatile environment.
+	Accentuate the need for inclusive, sustainable, robust and resilient business principles and strategies, capable to emphasize the idea of business integration and prosperity to all.
+	Place on high positions awareness towards sustainability and sustainable goals, and the interference of sustainability targets and all their business initiatives for a bright future.
+	Address skills and management development practices in order to encourage sustainability implementation in all stages specific to business process management.
+	Confront themselves with a unique set of issues, unlike other entities on the marketplaces, which makes them more vulnerable than other organizations, but also offers them the advantage to operate on different types of markets and in different fields of activity.
+	Need and promote unique aims, objectives, values and targets, depending on the environment in which they operate, being more focused on sensible aspects such as, environment, finance, development, research, and innovation.
+	Depend on their capacity to access and use knowledge, information, innovation and research, and put a great value on development, research, and innovation, since intangible assets – such as, human capital, intellectual capital, intellectual property, might turn out to be more valuable for these entities in comparison to others.
+	Prove to be extremely sensible to any changes that might appear in the environment, since governmental official’s (legislative) decisions, laws, rules and regulations have a tremendous influence upon them.
+	Might benefit, depending on the governmental official’s (legislative) decisions, from specific legislative provisions, reduced fees, and financial support in order to be created and to be able to develop properly in the marketplace, given the fact that entrepreneurs and entrepreneurship represent, these days, the key to success for all societies.

Source: author’s ideas, based on European Commission (2020), OECD (2011, 2017) and Eurostat (2016)

When analyzing the decision making process for SMEs, as well as the sustainability and risk assessment process, especially during challenging times, such as, the Covid-19 pandemic the following rules should be taken into consideration:

- The European Commission (2020) stresses that “the average European enterprise employs no more than six people and, without delving further into the details of the enterprise’s situation, would be considered an SME”. Under these circumstances, the definition applied by the European Commission (2020), however, takes into account the following key elements:
 - Firstly, “possible relationships with other enterprises”, with the specific mention that, “in certain cases, those relationships, particularly if they create significant ownership links or give access to additional financial or other resources, imply that an enterprise is not an SME” (European Commission, 2020). Given the fact that relationships are highly important on the marketplace no matter the entities brought into light, when analyzing SMEs particularities, specialists should focus on the fact that, “compared with other enterprises, SMEs are confronted with a unique set of issues” and “SMEs require assistance that other enterprises do not” (European Commission, 2020).
 - Secondly, “an important notion in the SME definition is the concept of control – both legal and de facto”, with the specific mention that: “Control determines whether or not an enterprise is considered a partner or a linked enterprise. It is not only the capital or shareholdings, but also the control that one enterprise has over another that needs to be assessed (European Commission, 2020).
- The European Commission (2020) highlights that the most common challenges SMEs are facing in today’s context – including the Covid-19 pandemic, refer to the following distinctive aspects, namely:
 - Firstly, market failures represent the most common problem for SMEs, since “real SMEs often face market failures that make the environment in which they operate and compete with other players more challenging” (European Commission, 2020). It should be noted that “market failures may occur in areas such as finance (especially venture capital), research, innovation or environmental regulations; SMEs may be unable to access finance or invest in research and innovation or they may lack the resources to comply with environmental regulations” (European Commission, 2020). In this regard, receiving governmental support, for instance, might represent an optimum solution capable to encourage SMEs to adapt to the new environment and to the new requirements, in order to become more inclusive, resilient, robust and sustainable.
 - Secondly, structural barriers, “such as a lack of management and technical skills, rigidities in labor markets and a limited knowledge of opportunities for international expansion”, represent another most common problem for SMEs (European Commission, 2020). In this regard, access to information might prove crucial, since governmental authorities should facilitate entrepreneurs’ access to information concerning the stages and steps for applying for support, specific grants and loans specially destined for SMEs.

In continuation, when analyzing the decision making process for SMEs, as well as the sustainability and risk assessment process, especially during challenging times, such as, the Covid-19 pandemic the following rules should be taken into consideration (Table 2).

What is more, when analyzing the decision making process for SMEs, as well as the sustainability and risk assessment process, especially during challenging times, such as, the Covid-19 pandemic, it should be emphasized that intangible assets might prove to be far more useful in order to ensure and promote sustainable development, rather than any other tangible assets. Eurostat (2016) has pointed out that for achieving all the proposed SDG, countries worldwide will require “financial resources as well as knowledge-sharing and investments in human capital”. In addition, Eurostat (2016) has prompted that “economic inequalities exacerbate inequalities of opportunity – large disparities in access to education, health-care services and jobs as well as land and other productive assets – which

limit social mobility and realization of human capital”, while “high levels of inequality are believed to undermine democratic participation and the ability of people to work together to meet common challenges”.

Table 2: Small and Medium-Sized Enterprises (SMEs) and specific categories

Autonomous	Partner	Linked enterprise
This is the particular case in which “the enterprise is either completely independent or has one or more minority partnerships (each less than 25 %) with other enterprises”.	This is the particular case in which “holdings with other enterprises rise to at least 25 % but no more than 50 %, the relationship is deemed to be between partner enterprises”.	This is the particular case in which “holdings with other enterprises exceed the 50 % threshold”, “are considered linked enterprises”.
This type of enterprise may be totally independent, which means that it has no “participation in other enterprises” and also “no enterprise has a participation in it”.	This is the case of relationship that “describes the situation of enterprises that establish certain financial partnerships with other enterprises, without one exercising effective direct or indirect control over the other”, and where the “partners are enterprises that are neither autonomous nor linked to one another”.	Two or more enterprises are linked when “one enterprise holds a majority of the shareholders’ or members’ voting rights in another”.
Also, another characteristic of this enterprise might be that it “has a holding of less than 25 % of the capital or voting rights (whichever is higher) in one or more other enterprises; and/or any external parties have a stake of no more than 25 % of the capital or voting rights (whichever is higher) in the enterprise”.	A specific characteristic of partner is represented by “the enterprise has a holding equal to or greater than 25 % of the capital or voting rights in another enterprise and/or another enterprise has a holding equal to or greater than 25 % in the enterprise under SME assessment”.	Two or more enterprises are linked when “one enterprise is entitled to appoint or remove a majority of the administrative, management or supervisory body of another”.
In addition, this type of enterprise “is not linked to another enterprise through a natural person”, in the terms specific to linked enterprises given by the European Commission (2020).	Also, another aspects that needs to be taken into consideration here is that “the enterprise is not linked to another enterprise”, which “means, among other things, that the enterprise’s voting rights in the other enterprise (or vice versa) do not exceed 50 %”.	Two or more enterprises are linked when “a contract between the enterprises, or a provision in the memorandum or articles of association of one of the enterprises, enables one to exercise a dominant influence over the other”.
There are certain exceptions in this case, based on the European Commission’s regulations (2020), namely: (a) public investment corporations, venture capital companies and business angels; (b) universities and non-profit-making research centers; (c) institutional investors, including regional development funds; and (d) autonomous local authorities with an annual budget of less than EUR 10 million and fewer than 5 000 inhabitants.	It should be highlighted that “the enterprise under SME assessment must add a proportion of its partner’s staff headcount and financial data to its own when determining its eligibility for SME status” and “this proportion will reflect the percentage of shares or voting rights – whichever is higher – that are held”. In addition, it should be pointed out that the excepted types of investors “such as universities or autonomous local authorities, which have the status of a public body under national law, are not covered by this rule”. Also, “the total holding by such investors in an enterprise may add up to a maximum of 50 % of the enterprise’s voting rights” and “above 50 %, the enterprise cannot be considered an SME”.	Two or more enterprises are linked when “one enterprise is able, by agreement, to exercise sole control over a majority of shareholders’ or members’ voting rights in another”. Wholly owned subsidiaries are regarded as a typical example for linked enterprises.

Source: author’s ideas, based on European Commission (2020)

Furthermore, the use of the benefits derived from the intellectual capital in organizations represents the key solution for most entrepreneurs all around the world. In this regard, Sebestova, and Krejčí, (2018) highlighted in their work entitled “Social innovation ties: A dilemma of product and employee orientation” that evaluating the existing situation “in the area of innovative activity in social enterprises” is crucial for SMEs and represents a top priority when analyzing “the level of innovative activity, development of social enterprises and social innovation” in terms of discovering potential solutions for an inclusive, resilient, robust and sustainable environment. Also, Sebestova et al. (2018) have addressed successfully the new trends in management, while referring to discovering and promoting potential solutions for an inclusive, resilient, robust and sustainable environment, and concluded that there are numerous opportunities and changes that are specific today to modern businesses. This lead to the ideas promoted by Popescu (2019b), according to which business development opportunities may be successfully found when emphasizing the role of intellectual capital for entities and demonstrating present and future performance by using accordingly intellectual capital in entities. Evaluating intellectual capital and its influence on companies’ performance may seem rather difficult, however using accordingly the methods of evaluating intellectual capital of an organization and understating the ways of enhancing performance in the knowledge-based economy might prove to be crucial in achieving the SDG (Popescu and Popescu 2018; Popescu, 2019a).

According to Eurostat (2020a), “in 2017, the majority of enterprises in the EU were small enterprises, with shares of 97 % or above among the EU countries”. In continuation, SMEs “employed two thirds of the active population in the EU-27’s non-financial business economy in 2017”, while, in particular, in Romania, in 2017, the data available from Eurostat (2020b) Statistics Explained showed that the number of persons employed by enterprise size class in 2017 (as % of total employment) was 44.4 % in small enterprises from the total business economy, 20.5 % in medium enterprises from the total business economy and 35.1 % in large enterprises from the total business economy (Eurostat, 2020b). These statistics highlighted above clearly show the importance of SMEs in EU as well as in Romania, which indicate the fact that SMEs “make diverse contributions to economic and social well-being, which could be further enhanced, (...) play a key role in national economies around the world, generating employment and value added and contributing to innovation, (...) are central to the efforts to achieve environmental sustainability and more inclusive growth”, and also “are lagging behind in the digital transition and disruptive effects need to be considered” (OECD, 2017).

3. Research methodology

This section presents the research methodology for the paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic”. On the one hand, it should be acknowledged that, in terms of research methods used to collect secondary data, performing a literature review proved to be absolutely necessary, in this way being able to evaluate the current trends within the research topic. Thus, this step was covered in the previous section which focused on the literature review and which described the general background. On the other hand, in addition to the research methods used to collect secondary data displayed in the previous section, the research methods used to collect primary data were surveys, interviews and focus groups with representatives and employees from SMEs in Romania. Thus, this step was meant to show the role played by SMEs in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential.

Based on the figures presented in the previous section, between the 1st of November 2020 and the 30th of November 2020, a survey has been applied to the representatives and employees from SMEs in Romania, being able to gather 235 responses, out of which 210 were considered correctly and fully completed and able to be taken into consideration for further analysis. Besides the surveys, between the 1st of December 2020 and the 20th of December 2020, a number of ten interviews were performed with representatives from SMEs in Romania and ten interviews with employees from SMEs in Romania. In continuation, based on the results gathered from the surveys and interviews, two focus group sessions took place between the 11th of January 2021 and 15th of January 2021, the first session being dedicated to debates with six representatives from SMEs in Romania, and the second session being dedicated to debates with six employees from SMEs in Romania.

4. Results and findings

This section presents the key results and major findings for the paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic”. The results and findings from the surveys were analyzed between the 21st December 2020 and 31st December 2020, while the results and findings from the interviews were analyzed between the 21st December 2020 and 31st December 2020. In like manner, the results and findings from the two focus group sessions were carefully analyzed between the 16th of January 2021 and 25th of January 2021.

The main results and the most important findings from the surveys, interviews and focus group sessions are highlighted in Table 3.

Table 3: Key results and major findings from the surveys, interviews and focus group sessions in SMEs in Romania

Key questions	Small and Medium-Sized Enterprises (SMEs)
(Q1) - SMEs major attributes	From the total number of respondents, 97 % of the respondents consider SMEs as playing a key role in the Romanian economy, believing that SMEs major attributes are (in the order of responses provided): (1) major employment sources, while compared with other organizations; (2) entities capable to generate high added value, managing to increase creativity and innovation through research, development, and innovative programs; (3) highly dependent on human and intellectual capital, with major emphasis on the benefits derived from knowledge, human resources management and intellectual property; and (4) increasingly dependent on social, political, demographical and environmental changes, with a particular focus on the concern towards DS and SDG, striving for environmental sustainability and more inclusive, resilient and robust economic growth.
(Q2) - most common barriers for SMEs	From the total number of respondents, 98 % of the respondents have acknowledged as most common barriers for SMEs: (a) constant social, political, demographical and environmental changes; (b) trade and investment barriers specific to global / international markets; and (c) restricted access to knowledge and information, since being part of knowledge networks could represent the privilege of countries that invest considerably in research, development, innovation, human and intellectual capital.
(Q3) - most common solutions to the barriers and potential limitations for SMEs	From the total number of respondents, 88 % of the respondents have acknowledged as most common solutions to the barriers and potential limitations for SMEs: (a) better access to global / international markets, which could increase competitive advantages and give competitive edges to more determined and highly dedicated entities towards humans and environment; and (b) well developed physical and Information and Communication Technology (ICT) infrastructure, which could increase SMEs performance and facilitate transparent access to global / international markets.
(Q4) - most common burdens on SMEs	From the total number of respondents, 92 % of the respondents have acknowledged as most common burdens on SMEs: (a) both the regulatory framework and the institutional framework have disruptive effects on SMEs, which Romanian authorities need to consider; (b) the rules, regulations and laws are numerous, however they may prove to be subject to constant debate and interpretation, which resides into disputes, tensions and unwanted problems for SMEs with governmental officials; (c) some taxes are seen as too high by some of SMEs representatives, and also others consider that some taxes are not displayed transparently from the very beginning of their activity; and (d) the insolvency regimes is regarded, in most cases, as inefficient, being one of the reasons why businesses dynamism is so low.

Source: author’s own calculations, based on data gathered from surveys, interviews and focus group sessions in SMEs in Romania

5. Solutions and recommendations

This section presents a set of major solutions and a key recommendations for the paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic”. Through the results obtained, this work showed the role played by SMEs in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential. What is more, the case study on the Romanian SMEs has acknowledged as most common solutions to the barriers and potential

limitations for SMEs: first of all, the idea of having better access to global / international markets, which could increase competitive advantages and give competitive edges to more determined and highly dedicated entities towards humans and environment; and, second of all, the need to have access to well-developed physical and Information and Communication Technology (ICT) infrastructure, which could increase SMEs performance and facilitate transparent access to global / international markets.

Also, this work has confirmed previous results and studies addressing the process of decision making for SMEs, as well as the need for sustainability and risk assessment during the Covid-19 pandemic, since it has also acknowledged that: “Regulatory uncertainty, complexity and inconsistency affect SMEs disproportionately. SMEs are typically less efficient than large firms in screening the regulatory environment and dealing with relevant norms. Since they might lack information or expertise in house, SMEs often incur in other indirect costs, paying for external advisors’ expertise or investing in specific training of staff to comply with new obligations” (OECD, 2017). Thus, in the case of Romania, for instance, both SMEs representative and employees have highlighted, on numerous occasions, on the one hand, the complexity of regulatory procedures and have acknowledged the high administrative burdens they cannot easily meet due to lack of concise and coherent information, and, on the other hand, the high costs of tax compliance, which seem to affect, according to the results obtained, in particular, young companies.

6. Conclusion

This section presents the conclusions for the paper entitled “Decision making for small and medium-sized enterprises: sustainability and risk assessment during the Covid-19 pandemic”. This paper shows the role played by SMEs in helping the business environment to become more sustainable, by ensuring resilient and inclusive societies where individuals are encouraged to reach their full potential. The results gathered from the surveys, interviews and focus group sessions in SMEs in Romania highlighted the following major aspects:

- In Romania, due to the implications and influences of the knowledge-based economy and society, SMEs are encouraged to take full advantage of the research, development and innovation capacities and possibilities, receiving governmental support in creating knowledge networks and partnerships with reputed universities, highly positioned research centers and multinational.
- In Romania, SMEs are encouraged to put accent on valuing their intangible assets, being guided to take action in order to better acknowledge human and intellectual capital. In this regard, for example, intellectual property protection is highly valued by governmental officials, thus research, development and innovation being strongly encouraged in all environments, with a particular emphasis on SMEs, in order to increase their reputation, as well as their institutional and infrastructure quality.

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BUSINESS PERFORMANCE MEASUREMENT AND SMALL AND MEDIUM-SIZED ENTERPRISES MANAGEMENT: INTELLECTUAL CAPITAL AS A KEY FACTOR DURING THE COVID-19 PANDEMIC

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Abstract

The importance of Small and Medium-Sized Enterprises Management has continuously grown over the last decades, especially since doing business in the current context dominated by the COVID-19 Pandemic is the prerogative of wise, visionary and strategically oriented entrepreneurs, choosing to focus more on intangible assets' potential rather than on tangible assets benefits. Business performance measurement has become a vital process these days, being specific to Small and Medium-Sized Enterprises and referring to both their growth as well as progress capacity. This work proposes a new approach in presenting Intellectual Capital as a key factor for business performance measurement and Small and Medium-Sized Enterprises Management, during the COVID-19 pandemic, by using both qualitative and quantitative data. What is more, this paper centers also on: addressing the role and importance of measuring businesses actual performance in comparison with intended objectives and goals; defining suitable metrics specific to effective and efficient business processes; establishing critical success factors for businesses while considering determinant aspects such as ethics, sustainability and corporate social responsibility.

Keywords: business performance measurement, COVID-19 pandemic, intellectual capital, small and medium-sized enterprises, sustainability

JEL codes: A10, D81, D83, O32, O34

1. Introduction

These days, the importance of Small and Medium-Sized Enterprises (SMEs) management has continuously grown, especially since doing business in the current context dominated by the Covid-19 pandemic is the prerogative of wise, visionary and strategically oriented entrepreneurs, choosing to focus more on intangible assets' potential rather than on tangible assets benefits. According to recent data published in the "Organization for Economic Co-operation and Development (OECD) SME and Entrepreneurship Outlook 2019", it has been remarked that SMEs are regarded "as the predominant form of business and employment" being, on the one hand, "key actors for promoting more inclusive and sustainable growth, increasing economic resilience and improving social cohesion" and, on the other hand, "critical partners for building a better future" (OECD, 2019). In continuation, it should be highlighted that, according to statistics, "across the OECD, SMEs account for 99% of all businesses and between 50% and 60% of value added", which means that "almost one person out of three is employed in a micro firm with less than 10 employees and two out of three in an SME", which indicates that "in many regions and cities, SMEs have been the main drivers of job creation" (OECD, 2019).

Nowadays, business performance measurement has become a vital process in organizations worldwide, being specific to SMEs and referring to both their paramount growth as well as their tremendous progress capacity, with a particular emphasis on the fact that SMEs are believed to "often contribute to the identity and social cohesion of local communities", display "similar patterns across OECD countries" and have "remained stable over time" (OECD, 2019). Moreover, according to recent

statistics thoroughly presented and carefully analyzed in the “OECD SME and Entrepreneurship Outlook 2019”: (a) “SMEs typically operate in service sectors with lower entry costs and resource requirements, notably wholesale and retail trade and construction”; (b) SMEs may be also encountered “in manufacturing sectors, notably those that are capital or knowledge-intensive, requiring a larger scale of production”, however they are rare, in comparison with the rest of the actors on the marketplace (OECD, 2019). Nonetheless, while addressing some major knowledge-intensive services, it should be prompted that SMEs can successfully dominate this sector, for instance, when referring to the case of “advertising, market research and other professional, scientific and technical activities, as well as legal, accounting and management services” (OECD, 2019).

This work proposes a new approach in presenting intellectual capital (IC) as a key factor for business performance measurement and SMEs management, during the Covid-19 pandemic, by using both qualitative and quantitative data. What is more, this paper centers also on: (1) addressing the role and importance of measuring businesses actual performance in comparison with intended objectives and goals; (2) defining suitable metrics specific to effective and efficient business processes; establishing critical success factors for businesses while considering determinant aspects such as ethics, sustainability and corporate social responsibility.

Firstly, addressing the role and importance of measuring businesses actual performance in comparison with intended objectives and goals should represent a main aim in any new approach in presenting intellectual capital (IC) as a key factor for business performance measurement and SMEs management, during the Covid-19 pandemic, especially based on the fact that “SMEs are driving job growth, but need higher investment in skills, innovation and tech to boost wages and productivity” (OECD, 2019). In addition, measuring businesses actual performance should address environmental sustainability, since “the 2030 vision for sustainability management” belonging to leading organizations worldwide – such as, for example, the United Nations (UN), should focus on the following key aspects: “integrating environmental and social sustainability considerations”, in order “to embody the Sustainable Development Goals at all levels of management”; “lead by example; ensure harmonization of internal sustainability initiatives; manage risks; strengthen business resilience; enhance credibility and accountability; and achieve financial savings through optimal resource efficiency” (UN, 2019).

Secondly, on the one hand, defining suitable metrics specific to effective and efficient business processes, and, on the other hand, establishing critical success factors for businesses while considering determinant aspects such as ethics, sustainability and corporate social responsibility should represent a main aim in any new approach in presenting intellectual capital (IC) as a key factor for business performance measurement and SMEs management, during the Covid-19 pandemic, especially based on the fact that: (a) “a broader strategic approach to cooperation” is required among all economic agents, especially “in the areas of security, health and the environment”; (b) the idea “to improve and update governance, both in terms of structures and working methods, notably by evolving towards a more business-oriented approach to the customs union processes” is of ad most importance; (c) the necessity to collaborate, cooperate and share knowledge in order to improve “efficiency and uniformity and realize economies of scale” is crucial to the development and growth of nations; and (d) the capacity and capability “to define a basis for measuring and assessing performance (outcomes as well as outputs)” is a top priority on all reputed leaders agenda (EU, 2012).

On one hand, this paper reviews the theory on business process management, business performance, business performance measurement, SMEs management, intangible assets, intellectual capital and intellectual property, with specific details related to current challenging and turbulent times (such as, the Covid-19 pandemic), and on the other hand, this work focuses on the manner in which intangible business assets, intellectual capital and intellectual property position themselves in entities’ business process management while addressing the specificities of business performance measurement and SMEs management, during challenging and turbulent times (such as, the Covid-19 pandemic).

This multidisciplinary study proves to be extremely useful given the current economic, financial, political and social challenges and changes, “as current business dynamics weigh on income and material well-being”, while current developments (such as, the Covid-19 pandemic) “could also raise concerns about education and training prospects of the workforce, the sustainability of pension systems, the breadth of the tax base and public acceptance of technological change and globalization” (OECD, 2019). In continuation, this multidisciplinary study, which highlights research results based on both quantitative and qualitative indicators, stresses that the intellectual capital factor plays a major role

in all organizations, not only at a national, but also at an international level, since there are “o three core issue areas” that require specific attention, namely: (1) the “macro-level: national accounts and estimations of investment in intellectual assets”; (2) the “regional level: the regional dimension of innovation, firm location and linkages”; and the “firm-level: corporate reporting, value creation, SMEs” (OECD, 2008).

The central research question (RQ) in this paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic” asks what are the main connections between business performance measurement and SMEs management, and which role does intellectual capital play when addressing the connections between business performance measurement and SMEs management, especially when referring to the recent implications of the Covid-19 pandemic.

In particular, this scientific research paper, will also examine eight secondary research questions derived from the main aforementioned question, as follows: (RQ1) what does business performance measurement represent? (RQ2) what do SMEs stand for? (RQ3) what are the implications of business process management while analyzing business performance measurement? (RQ4) what does SMEs management require? (RQ5) which are the entities’ intangible assets? (RQ6) which connections may be encountered between entities’ tangible and intangible assets, and what makes specialist believe that intangible assets valuation represent the future of organizations? (RQ7) how can be intellectual capital defined? (RQ8) which are the key attributes of intangible assets – and, in particular, of intellectual capital, for today’s entities, especially during the Covid-19 pandemic?

This paper has been divided into five parts. The first part of this current work addresses the literature review and the general background section, with a particular emphasis on explaining key concepts, such as: business processes, business process measurement, business performance measurement, decision making, entrepreneur, entrepreneurship, knowledge-intensive, knowledge society, learning organizations, intangible assets, intellectual capital, intellectual property, performance, SMEs, and Covid-19 pandemic. The second part of this current work addresses the research methodology, which proposes a new approach in presenting IC as a key factor for business performance measurement and SMEs management, during the Covid-19 pandemic, by using both qualitative and quantitative data. In continuation, the third part of this current work addresses the results and findings, centering also, on the one hand, on tackling the role and importance of measuring businesses actual performance in comparison with intended objectives and goals and, on the other hand, on defining suitable metrics specific to effective and efficient business processes; establishing critical success factors for businesses while considering determinant aspects such as ethics, sustainability and corporate social responsibility. This work also embodies two more sections, namely the fourth section which reports a set of major solutions and a key recommendations and the fifth section which points out the most representative conclusions for the paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic”.

2. Literature review and background

This section presents the literature review and describes the general background for the paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic”. In particular, the literature review and background section facilitates access to the most important elements that describe the key concepts encountered in this study, namely: business performance measurement, Covid-19 pandemic, IC, SMEs, and sustainability.

According to a 2013 World Bank paper (no. 82516) suggestively entitled “Competitive Small and Medium Enterprises: A diagnostic to help design smart SME policy, Competitive Industries Global Practice”, “Small and Medium-sized Enterprises (SMEs) have been the subject of increasing attention by policymakers in national governments and international institutions in both developed and developing countries”, since “SMEs account for a lion’s share of the enterprises in most economies, and employ significant numbers of people” being “also thought to be an engine of new growth and innovation” (WB, 2013). In addition, the same document comprehensively attests the most relevant characteristics of SMEs and adequately prompts to the most important beliefs surrounding their

evolution at a worldwide level, based on their substantial “contribution to economic output and growth” (WB, 2013) (Table 1).

Table 1: Small and Medium-Sized Enterprises (SMEs): main characteristics

Small and Medium-Sized Enterprises (SMEs) prominent characteristics
- SMEs have determined worldwide policymakers, prominent governmental figures, public and private sector figures, investors, sustainability and growth professionals to find solutions capable to manage SMEs sector – believed to be one of the most complex and representative sector in a country’s economy these days;
- based on most recent data, “SME policy is a critical space because in most countries the highest concentration of economic activity happens here”;
- SMEs have a tremendous potential to create jobs (being based, in essence, on self-employment) and generate, when focused correctly, “shared prosperity at scale”;
- the development opportunities and the policy making process are specific and considered very challenging, since “SME space tends to be highly complex – with heterogeneity in firm size, specialization, spatial dispersion and performance”;
- “in many countries SMEs, for a large part, operate in the informal sector compounding complexity”, which offers them specific traits and automatically imposes a specific analysis of each and every business;
- at a general level, SMEs make a consistent “contribution to economic output and growth”, while in particular, in middle and high income countries “smart SME policy design” may “reward performance while being equal opportunity”, implying that “there is need to create a segmented and focused approach for SME development while being inclusive”.

Source: authors’ adaptation based on the 2013 World Bank paper (no. 82516) “Competitive Small and Medium Enterprises: A diagnostic to help design smart SME policy, Competitive Industries Global Practice” (WB, 2013)

According to most recent trends in the market’s evolution, specialists believe that SMEs should be analyzed from the perspective of technological innovation, since, in essence, technological innovation has the immense power to transform every single part of individuals’ lives and daily activities (ILO, 2021). In this matter, recent studies have mentioned that, on the one hand, “there is significant variation in the definition of SMEs across geographies”, while, on the other hand, there exists “significant difference between the characteristics of the SME space across geographies in terms of sector mix, integration in the global supply chains, level of informality and other factors”, which “makes it very difficult to make any general assertion for SMEs as a whole” (WB, 2013) (Table 2).

Table 2: Small and Medium-Sized Enterprises (SMEs): major role and key importance

Small and Medium-Sized Enterprises (SMEs): key findings in emphasizing their role and importance
- SMEs may represent the key to a successful medium-term and long-term evolution for the middle and higher income economies, as well as for developing and emerging economies, since they have such an increased influence on the countries’ Gross Domestic Product (GDP);
- in every country or region, SMEs relate to the firms’ ecosystems, making the economy more dynamic;
- SMEs are known to increase and improve productivity, making them “a major driver of productivity growth in the overall economy”;
- SMEs attract and encourage competition and generate competitive advantage;
- SMEs require financial support, especially in the early stages and would highly benefit from continuous assistance in the decision making process, especially in turning into more inclusive, resilient, robust and sustainable activities;
- SMEs depend at a large extent on coherent SME policy, which “could be made smarter by enabling competitive SMEs” using two pillars, namely: “The first pillar is a set of policy themes that reward outcome and impact, while the second pillar is about the process of policy design, delivery, monitoring and iteration”.

Source: authors’ adaptation based on the 2013 World Bank paper (no. 82516) “Competitive Small and Medium Enterprises: A diagnostic to help design smart SME policy, Competitive Industries Global Practice” (WB, 2013)

The Organization for Economic Co-operation and Development (OECD) Environment Directorate and the International Energy Agency (IEA) have revealed in the document entitled “Technology Innovation, Development and Diffusion: Information Paper” the fact that “new technologies will play a critical role in achieving the objective of the UN Convention on Climate

Change”, and pointed out that “without radical changes in lifestyles, only a massive deployment of carbon-free (or close to carbon-free) energy technologies can power the world economy and satisfy growing energy needs, especially of the developing world, while stabilizing atmospheric CO₂ concentrations in the long run” (OECD and IEA, 2003). Under these circumstances, while analyzing specific opportunities capable to enhance SMEs role and importance in our society and make these entities more inclusive and more sustainable, specialists have concluded that: “Reduced energy-related CO₂ emissions can be created by technical improvements at different levels and involve: (a) end-use technologies in all sectors: household and commercial, industry, transport, which could reduce the amount of energy used; (b) fuel switching from coal to oil to gas; (c) increased efficiency of energy conversion (such as power plants and refineries); (d) phasing in non-carbon energy sources, such as nuclear power and renewable energy sources; and (e) CO₂ capture and storage” (OECD and IEA, 2003).

When referring to the World Trade Organization (WTO) and its involvement in creating a general framework for IC, in general, and for intellectual property (IP), in particular, it should be stressed that: “The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is the most comprehensive multilateral agreement on intellectual property (IP)”, playing “a central role in facilitating trade in knowledge and creativity, in resolving trade disputes over IP, and in assuring WTO members the latitude to achieve their domestic policy objectives”, framing “the IP system in terms of innovation, technology transfer and public welfare”, and having “a legal recognition of the significance of links between IP and trade and the need for a balanced IP system” (WTO, 2021b). In continuation, it has been observed that a large body of literature has focused in the last decade on the extremely close relationship that exists between IC and SMEs, which, in turn, has a paramount influence on the role and the opportunities offered by technological innovation at an industry’s level, a region’s level and a country’s level (Table 3).

Table 3: Intellectual capital (IC) and Small and Medium-Sized Enterprises (SMEs): the influences of technological innovation

Research and Development (R&D) and Innovation	Small and Medium-Sized Enterprises (SMEs)
- Although specialists have stated “it is not possible to define what exact mix of these various technologies would best be able to stabilize atmospheric CO ₂ concentrations, at what level and for what price”, the key for the existence of a more inclusive and more sustainable society is represented by serious R&D and innovation investments, in order to create new and innovative technologies and “niche markets” (OECD and IEA, 2003).	- SMEs fast growth and well-known capacity to adapt and innovate will “expand markets for existing and forthcoming carbon free technologies and accelerate their deployment”, which will clearly represent a successful step in reaching the proposed and targeted sustainable development goals (SDG), tacking constant action in this regard.
- “Creating markets for new energy technologies” requires governmental officials and specialists particular attention on taking “a broad range of measures”, among which “support for research and development is of primary importance” since “current levels in most developed countries are likely insufficient” (OECD and IEA, 2003). Also, it has been highlighted that “in most cases, however, “learning investments” will have to be spent before full competitiveness can be reached by new technologies” (OECD and IEA, 2003).	- Although SMEs policies are geographically differentiated, research and development (R&D) and innovation should be, in all cases, the main targets for SMEs activities, since becoming more competitive based on research and development and innovation could represent, over the years, the strongest contribution to the national economic efficiency, efficacy, performance, productivity, and Gross Domestic Product (GDP).
- IC represents a strong driver for all research and development and innovation, and in most cases, the focus is put on intellectual property (IP), as follows: “The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations” (WTO, 2021).	- SMEs need to focus their activity on becoming more inclusive and more sustainable by investing in business activities, procedures and technologies that are environmentally friendly and that are capable to ensure long-term protection for the generations to come, showing concern for all forms of life, while preserving biodiversity and ecosystems. SMEs activities, products, procedures and technologies are also protected by different laws, rules and regulations, such as, for instance, “Agreement on Trade-Related Aspects of Intellectual Property Rights” (WTO, 2021a).

Source: authors' adaptation based on the Organization for Economic Co-operation and Development (OECD) Environment Directorate and the International Energy Agency (IEA) document "Technology Innovation, Development and Diffusion: Information Paper" (OECD and IEA, 2003) and on The World Trade Organization (WTO) "Agreement on Trade-Related Aspects of Intellectual Property Rights" (WTO, 2021a)

The Covid-19 pandemic has managed to bring new challenges as well as new opportunities to the business, demographic, economic, financial, political, and social environment worldwide, which meant that all the Sustainable Development Goals (SDGs) needed to be aligned accordingly, as follows (UN, 2020):

- A main key question is "How can SDG-aligned investment strategies strengthen the competitiveness of SMEs and women- and youth-owned enterprises and ultimately help economies recover from the COVID-19 crisis?" (UN, 2020). The answer might take into account the following key elements:
 - Firstly, it should be mentioned that SMEs are highly sensitive entities, which might even be considered the country's diagnostic tools while referring to its growth and performance evolution. Thus, the most competitive SMEs should be immediately identified and afterwards supported through governmental policies as one of the top priorities on the countries agenda.
 - Secondly, it should be emphasized that, while extremely diverse, SMEs have common backgrounds, which might determine these entities, in these times of need, either to group themselves, or to become partners with other larger public or private organizations, for pure survival reasons.
- Another main key question is "With lockdowns and social distancing measures in place in much of the world, how are SMEs turning disruption into opportunity by scaling technology-enabled models to deliver essential goods and services?" (UN, 2020). The answer might take into account the following key elements:
 - Firstly, it should be mentioned that SMEs are highly competitive and may adapt their economic activity at any point in time, especially since these entities can much more easier sense the new trends in the overall economy, for instance, based on their productivity, sales, and turnover.
 - Secondly, it should be emphasized that SMEs have the advantage of being in a complementary relationship with large firms, which could determine them to invest more in research, development and innovation.

3. Research methodology

This section presents the research methodology for the paper entitled "Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic". In addition, it should be stated that the research methodology used was appropriate for this work, in order to facilitate the proposal of a new approach in presenting IC as a key factor for business performance measurement and SMEs Management, during the Covid-19 pandemic, by using both qualitative and quantitative data.

What is more, the research methodology instruments used in this paper were centered also on: (a) addressing the role and importance of measuring businesses actual performance in comparison with intended objectives and goals; (b) defining suitable metrics specific to effective and efficient business processes; and (c) establishing critical success factors for businesses while considering determinant aspects such as ethics, sustainability and corporate social responsibility.

Furthermore, it should be highlighted that the research methodology for this work implicated the use of surveys, interviews and questioners. The country targeted as a case study was Romania (a country in the EU). Firstly, it should be stressed that the surveys were performed between the 1st of December 2020 and the 13th of December 2020, with the responses that were analyzed and commented on between the 14th of December 2020 and the 27th of December 2020. Secondly, while referring to the interviews, it should be mentioned that they were performed between the 4th of January 2021 and the 12th of January 2021, with the responses that were analyzed and commented on between the 13th of

January 2021 and the 20th of January 2021. In the end, the focus groups took place between the 22nd of January 2021 and the 30th of January 2021, with the responses that were analyzed and commented on between the 1st of February 2021 and the 7th of February 2021.

The questioners were given both to SMEs employees and SMEs representatives (leaders, managers, administrators). The numbers of questioners answered, in total, was 198, while the number of complete and corrected filled-in questioners was 186, in total. In terms of interviews, it should be underlined that 12 interviews were done, in total, with both SMEs employees and SMEs representatives (leaders, managers, administrators). In continuation, while referring to the focus groups, there were two such sessions, in total, having responses from eight individuals which were working at that time in Romanian SMEs – namely, SMEs employees and SMEs representatives (leaders, managers, and administrators).

4. Results and findings

This section presents the key results and major findings for the paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic”. The results highlighted in this section refer to key results and major findings derived from the analysis of the data gathered from the surveys, interviews and focus group sessions in SMEs in Romania (Table 4).

Table 4: Key results and major findings from the surveys, interviews and focus group sessions in SMEs in Romania

Key questions (selection)	Small and Medium-Sized Enterprises (SMEs)
(Q1): “In what way was your business affected by Covid-19 pandemic?”	- In particular, the lockdown and social distancing measures in place have severely affected 89% of the individuals employed in the Romanian SMEs, especially due to the fact that the businesses were not prepared in terms of the newly imposed restrictions, sanitary measures, and technology, to cope with the new challenges.
(Q2): “Which are the most important measures that could be taken now in order to save the business that you are currently part of and continue developing on the marketplace?”	- According to our calculations, 98% of the respondents stated that they put their faith in national and international assistance and support measures and projects; since they all feel that a near crisis is eminent, complaining that they feel threatened by potential attacks on the real and informal economy. - Also, 87% of the respondents emphasized there is no one-size-fits-all solution for all SMEs, which means that policymakers will need to adapt different tools and policies to address the needs of SMEs.
(Q3): “Do you believe that by engaging in partnerships with other SMEs or large companies in Romania or at a global level your business will have an advantage?”	- The data gathered showed that 78% of the respondents acknowledged the fact that becoming more visible on the marketplace constitutes clear and decisive advantage under given circumstances. In addition, such partnerships might prove to be beneficial for all members, since it would ensure critical options to economic recovery by having access to international trade – for instance. However, there were also individuals showing reluctance to change and to partnerships, namely 22% of the respondents, due to not knowing exactly the risks that need to be assumed and the legal background that they will have to confront themselves with.
(Q4): “What are the biggest challenges that you are currently facing?”	- According to our calculations, 98% of the respondents stated that the major challenge that they have always faced was access to finance, which they described as a real issue even long before the Covid-19 pandemic. - Also, according to our calculations, 96% of the respondents stated that another major challenge that they have always faced was the political insecurity and instability and the laws continually changing and always subject to interpretation, which they described as a real issue even long before the Covid-19 pandemic.

Source: author’s own calculations, based on data gathered from surveys, interviews and focus group sessions in SMEs in Romania

What is more, the results highlighted in this section refer to key opportunities derived from the analysis of the data gathered from the surveys, interviews and focus group sessions in SMEs in Romania (Table 5).

Table 5: Key opportunities derived from the surveys, interviews and focus group sessions in SMEs in Romania

Key questions (selection)	Small and Medium-Sized Enterprises (SMEs)
(Q1): “Which are some of the main opportunities derived from Covid-19 pandemic for your business?”	- According to our calculations, 98% of the respondents stated that they would invest more in research, development and innovation, since intangible assets are truly an advantage and an immense value for each and every responsible and visionary organization. - In continuation, according to our calculations, 94% of the respondents stated that they would invest more in e-commerce, thus being able to empower their activities and make their businesses more attractive and accessible to individuals’ nationwide and worldwide.
(Q2): “How would you enable the business that you currently activate to become more inclusive and more sustainable?”	- According to our calculations, 98% of the respondents stated that they intend to focus more on turning their businesses into more inclusive and more sustainable activities, since they are aware that survival on the marketplace depends on respecting humans and the environment. Also, corporate social responsibility has become a key issue in all discourses worldwide, which clearly sends a message to entrepreneurs to find as soon as possible the instruments and means to become more competitive using sustainable resources and by producing sustainable goods and services.

Source: author’s own calculations, based on data gathered from surveys, interviews and focus group sessions in SMEs in Romania

5. Solutions and recommendations

This section presents a set of major solutions and a key recommendations for the paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic”.

First of all, the findings displayed in this work are in line with other major results featured in other researches, such as, for instance, in the recent study “Sustainability Assessment: Does the OECD/G20 Inclusive Framework for BEPS (Base Erosion and Profit Shifting Project) Put an End to Disputes Over The Recognition and Measurement of Intellectual Capital?”, which concludes that: “Nowadays, sustainability assessment procedures, sustainability assessment indicators, and sustainability assessment models are regarded by specialists as powerful decision-supporting tools able to foster sustainable development worldwide by addressing the main economic, financial, social, and environmental challenges. In like manner, the role and relevance of intangible assets have managed to produce an irreversible change in today’s world which also seriously affected the general traits of our economic systems, leading to a phenomenon known by specialists as the “revolution of intangibles”” (Popescu, 2020).

Second of all, this current work might be considered a successful continuation of previous studies in the field which target, for example, evaluating IC and its influence on companies’ performance, by including a case study on Romania’s experience (Popescu, 2019a) or, for instance, business development opportunities, by demonstrating present and future performance, auditing IC, by addressing the results of a case study on Romanian organizations (Popescu, 2019b). Nonetheless, the methods of evaluating IC of an organization and the ways of enhancing performance in the knowledge-based economy are extremely diverse and require a very complex approach (Popescu and Popescu, 2018), especially when focusing on potential new trends in management through regional and cross-border perspectives (Sebestova et al., 2018), or on social innovation ties, which clearly might lead to a dilemma of product and employee orientation (Sebestova and Krejčí, 2018).

These findings based on the data gathered from surveys, interviews and focus group sessions in SMEs in Romania may be grouped as follows:

- In order to begin with, according to the data gathered the lockdown and social distancing measures in place have severely affected individuals employed in the Romanian SMEs, especially due to the fact that the businesses were not prepared in terms of the newly imposed restrictions, sanitary measures, and technology, to cope with the new challenges.
- What is more, most of the respondents have stated that they put their faith in national and international assistance and support measures and projects; since they all feel that

a near crisis is eminent, complaining that they feel threatened by potential attacks on the real and informal economy.

6. Conclusion

This section presents the conclusions for the paper entitled “Business performance measurement and small and medium-sized enterprises management: intellectual capital as a key factor during the Covid-19 pandemic”.

These conclusions of this study are based on the data gathered from surveys, interviews and focus group sessions in SMEs in Romania may be grouped as follows:

- Firstly, a consistent number of the respondents emphasized there is no one-size-fits-all solution for all SMEs, which means that policymakers will need to adapt different tools and policies to address the needs of SMEs.
- Secondly, the data gathered showed that most of the respondents acknowledged the fact that becoming more visible on the marketplace constitutes clear and decisive advantage under given circumstances.
- Thirdly, based on figures derived from our calculations, 98% of the respondents stated that the major challenge that they have always faced was access to finance, which they described a real issue even long before the Covid-19 pandemic.
- Also, fourthly, according to our calculations, 96% of the respondents stated that another major challenge that they have always faced was the political insecurity and instability and the laws continually changing and always subject to interpretation, which they described a real issue even long before the Covid-19 pandemic.
- In like manner, fifthly, 98% of the respondents stated that they would invest more in research, development and innovation, since intangible assets are truly an advantage and an immense value for each and every responsible and visionary organization.
- In continuation, sixthly, according to our calculations, 94% of the respondents stated that they would invest more in e-commerce, thus being able to empower their activities and make their businesses more attractive and accessible to individuals’ nationwide and worldwide.
- In the end, according to our calculations, 98% of the respondents stated that they intend to focus more on turning their businesses into more inclusive and more sustainable activities, since they are aware that survival on the marketplace depends on respecting humans and the environment. Also, corporate social responsibility has become a key issue in all discourses worldwide, which clearly sends a message to entrepreneurs to find as soon as possible the instruments and means to become more competitive using sustainable resources and by producing sustainable goods and services.

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THE USABILITY OF BANKRUPTCY MODELS CAPTURING THE FINANCIAL SITUATION OF SMALL AND MEDIUM ENTERPRISES IN BUSINESS PRACTICE

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Abstract

The aim of the paper is to evaluate the usability of the bankruptcy models for SMEs in the V4 countries. The available research shows that the suitability of applying bankruptcy models varies according to the country in which the analyzed companies operate. For evaluation of the company's financial situation the Altman analysis, Taffler analysis and Index 05 are used. The observed period is set for the years of 2005 – 2016. This period contains the effect of business cycle on the financial health of companies. The practical applicability of the selected bankruptcy models is evaluated on the basis of a comparison of their results with the number of detected bankruptcies in V4 countries. In particular, the Z'EM and IN05 models can be recommended for practical applicability.

Keywords: Bankruptcy models, Financial distress, Financial situation, Visegrad Group

JEL codes: M21, G33

1. Introduction

The evaluation of the company's financial situation is associated with the company's ability to create added value, return on invested capital or profitability of invested inputs. The financial health of a company is given by the current state of corporate finances, when a financially sound company has an effective amount of capital usable to cover assets, is able to meet its financial obligations and has the ability to convert individual assets into cash as needed. The financially sound company is attractive to investors, which is subsequently reflected in their interest in investing and capital appreciation through the development of new activities or strengthening its position in the capital market.

In addition to financial analysis tools, a company's financial situation can be captured using multidimensional models working with criteria to which a specific weight is assigned. The state of the company is then expressed by one summary number, which evaluates the degree of financial health of the company. The resulting values of aggregate indices focus on determining the financial situation of the company in terms of value creation (creditworthiness models) or on the evaluation of the company in terms of its ability to repay its liabilities (bankruptcy models). Models for predicting the financial situation of a company enable the basic classification of the evaluated company into the categories of prosperous or failing companies. The aim of the paper is to evaluate the usability of the bankruptcy models for SMEs in the Visegrad Group (V4) countries. The V4 countries was created as a result of the joint efforts of these countries for pan-European integration. These countries share common cultural and intellectual values and their activities aim to strengthen stability in the Central European region.

Bankruptcy models can be included among the ex-ante analyzes, which can predict the financial health of companies and how the company will develop in the next 3 to 5 years. The construction of bankruptcy models proved to be the most suitable for monitoring the company's activities according to Lízal (2012) or Škerlíková and Rudolfová (2015). The instability and risk of the overall economic environment in recent years have highlighted the need for precise tools to anticipate financial distress and assess the overall financial situation of companies.

The basic models for predicting financial distress and bankruptcy businesses based on financial indicators are Edward Altman's models, Taffler's models or Neumaierová and Neumaier's models. Altman (1968) developed multivariate discriminant analysis, which showed that in most cases he correctly classified bankrupt company for one year to a two-year forecast horizon. For its analysis, 22 indicators divided into liquidity, profitability, indebtedness, solvency and asset management were selected. The Taffler Bankruptcy Model (1983) was developed by compiling more than 80 selected ratios of all industrial firms in 1968 to 1976 and 46 randomly selected solvent industrial firms. The predictive ability of the original Taffler model over the years has been confirmed by Agarwal and Taffler (2007). The specifics of Czech financial statements and the economic situation in the Czechia are included in Neumaierová and Neumaier's model (2005). The remainder of this paper is organized as follows. The relevant literature is reviewed in Section 2. The data and the methodology used in this paper are introduced in Section 3. The results of the empirical estimation are reported in Section 4. The conclusions and summary of the main findings are contained in Section 5.

2. Literature Review

The above-mentioned bankruptcy models have become a frequent object of research. Opinions on the applicability of bankruptcy models vary widely. However, a common feature of the monitored studies dealing with the practical application of bankruptcy models is the opinion on the need for their combination.

Machek (2014) or Čamská (2016) dealt with the comparison of individual models and their ability to identify a company in financial distress in Czechia. Machek (2014) analyzed Kralick's Quick test, Taffler's bankruptcy model, IN99 and IN 05 indices and Altman's Z' score in the case of Czech companies from 2007 to 2010. Based on the results of individual models, which predicted the company's financial distress, he found that the most suitable models for the practical use of the prediction of financial distress are Altman's Z' score and indices IN 99 and IN05. On the contrary, the Quick test is the least suitable. Although Taffler's model was able to draw attention to companies in financial distress, its predictive ability was low compared to other bankruptcy models. Similarly, Čamská (2016) compared the predictive power of bankruptcy models in the manufacturing industry during the global financial crisis. The bankruptcy models that achieved the highest predictive values were IN01, IN05 or Altman's Z' score, thus confirming Machek's (2014) conclusions.

Gavurová et al. (2017) or Gavurová et al. (2017) determined a portfolio of four models (Altman's model, Ohlson's model and indices IN01 and IN05), which were validated on a sample of 700 Slovak companies. In their articles, they monitored the overall accuracy of bankruptcy prediction. Based on the results, they proved that Ohlson's model is not applicable for bankruptcy predictions in Slovak conditions, as it achieved the lowest predictability of bankruptcy. On the other hand, the IN05 index is the most suitable model applicable to the Slovak business environment.

The study of Bohdalová and Klempai (2017) also reaches similar conclusions, which is focused on monitoring the predictive abilities of bankruptcy and creditworthiness models in Slovakia. The best results from the bankruptcy models used are achieved by the IN05 models and the original Altman Z score. On the contrary, Taffler's bankruptcy model performed worst. While the predictive power of the IN05 index for 2 years is up to 87%, for the Altman model 67%, for the Taffler model it was only 7%. The authors recommend using a combination of the IN05 index and the Altman model to monitor the financial situation of companies in individual sectors and to predict their financial distress.

Csikosová et al. (2019) dealt with the application and comparison of the most frequently used bankruptcy models in the V4 countries. Models IN95, IN99, IN01, IN05, the original Altman's Z score model as well as modified Z' score or Z''EM Score models were applied to the data of V4 industrial companies. The results of the studies draw attention to the fact that the financial situation of companies is influenced not only by the decisions of managers, but also by the macroeconomic environment. By

applying correlation analysis or chow test, they confirmed the theory that structural changes had a strong negative impact on the financial situation of the monitored companies. According to the results, Z'Score Model, Z'EM Score or IN05 models can predict possible financial distress of companies. Karas and Režňáková (2014) discuss the possibility of use Z'EM Score model in V4 countries. The results of study show important differences between Z'Score and Z'EM Score models. Due to the construction model, especially the higher attention to liquidity ratios, the Z'EM Score model captures specifics of companies in V4 countries.

On the contrary, Delina and Packová (2013) came with completely different results. The validation of the IN05 bankruptcy models, Altman's Z' Score and the Creditworthiness Index, found that in the conditions of the Slovak economy, the models achieve high error values. The low predictive ability of default models was also mentioned by Misanková et al. (2017). The study tested the predictive ability of default models designed in the V4 countries. The authors point out the different explanatory power within individual branches of business activity.

3. Data and Methodology

Company data are used to determine the financial situation of companies in V4. The annual reports of companies are recorded in the company data databases Orbis from Bureau van Dijk (BvD) Orbis and Amadeus. Due to the availability of data and obtaining a sufficient time series, both mentioned databases were used. Based on the BvD identification number of companies and the use of advanced functions in MS Excel, it was possible to connect the two available databases. Based on the availability of data and to fulfill the aim of the paper, the period between 2005 and 2016 became the observed period. In the second phase of the research, bankruptcy models were processed using the MS Excel tool. The selected period includes the development of the entire business cycle; from economic growth lasting until 2008, through the global financial crisis and the euro area debt crisis, to the gradual recovery of the V4 economies. A total of 3,736 companies are monitored in the Czechia. In Hungary, attention is paid to a total of 1,502 companies. A total of 4,006 companies are monitored in Poland and a total of 985 companies in Slovakia. The following bankruptcy models will be used in the paper:

- Altman's model for companies not traded on capital markets (Z'Score),
- Altman's model for companies operating in emerging markets (Z'EM),
- A modified variant of the Taffler Index (T_f),
- Modified variant of index IN05 (IN05).

Altman's original bankruptcy model was subsequently modified for companies that are not traded on the capital markets (Z'Score). The highest weight is still given to indicator X 3 (EBIT / assets), but the second highest weight this time belongs to indicator X 5 (sales / assets). The final form of the equation according to Altman (2006, p. 246) is as follows:

$$Z' = 0,717X_1 + 0,847X_2 + 3,107X_3 + 0,420X_4 + 0,998X_5, \quad (1)$$

where: X_1 = net working capital / assets,
 X_2 = retained earnings / assets,
 X_3 = EBIT / assets,
 X_4 = market value of equity / debt,
 X_5 = sales / assets.

In the Z'Score model, these boundary points are 1.23 and 2.90 (Table 1). Altman states that this variant of the bankruptcy model can predict a possible financial distress of a company with a probability of 91% and an error rate of 3% will include a prosperous company in the set of companies at risk of possible bankruptcy.

Table 1: Categories of the evaluation of the financial situation according to Altman's Z' Score

Intervals	Evaluation
Z'Score $\epsilon < 2,90 ; \infty$)	Safe zone
Z'Score $\epsilon (1,23 ; 2,90)$	Gray zone
Z'Score $\epsilon (- \infty ; 1,23 >$	Distress zone

Source: Altman (2006, p. 246)

Another selected model is a variant of Altman model designed for the evaluation of companies in emerging markets (Z''EM Score). For the purposes of constructing the model, it is abstracted from the indicator X 5 (sales/assets) and the individual weights of the coefficients are also adjusted. Due to the reduced number of indicators, the weights are increased compared to the previous models. For the comparison of the resulting value of the bankruptcy model for companies operating in emerging markets with the US Bond Rating, a constant of 3.25 was added. The resulting values of the Z''EM model for assessing the financial health of non-US companies and for emerging markets allow the monitored companies to assign an adequate rating, which indicates the ability of the entity to meet its obligations on time. According to Altman (2006, p. 248), individual models can be quantified as follows:

$$Z''EM = 3,25 + 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4, \quad (2)$$

where: X_1 = net working capital / assets,
 X_2 = retained earnings / assets,
 X_3 = EBIT / assets,
 X_4 = market value of equity / debt.

Based on the changes in the construction of the model, it was also necessary to change the individual boundaries of the intervals. As shown in Table 2, the boundary points of the intervals in this case are 4.35 and 5.85.

Table 2: Categories of the evaluation of the financial situation according to Altman's Z''EM Score

Intervals	Evaluation
Z''EM Score $\in (5,85 ; \infty)$	Safe zone
Z''EM Score $\in (4,35 ; 5,85)$	Gray zone
Z''EM Score $\in (-\infty ; 4,35)$	Distress zone

Source: Basovníková et al. (2018)

The reaction to Altman's original bankruptcy model was the creation of the Taffler Index (1977). British economists Taffler and Tisshaw analyzed the financial situation of British companies on more than 80 ratios, from which they selected four key figures and assigned them specific weights. The modified version of the original version of model was captured by Taffler (1984):

$$T_f = 0,53X_1 + 0,13X_2 + 0,18X_3 + 0,16X_4, \quad (3)$$

where: X_1 = EBIT / current liabilities
 X_2 = increase in fixed assets / depreciation,
 X_3 = EBIT / sales,
 X_4 = liabilities to banks / debt.

The modified variant already considers the existence of a gray area category, which includes companies that could not be classified as having a low or high probability of bankruptcy. As shown in Table 3, the boundary points in this variant are 0.2 and 0.3.

Table 3: Categories of the financial situation according to the modified Taffler Index

Intervals	Evaluation
T $\in (0,3 ; \infty)$	A company with a low probability of bankruptcy
T $\in (0,2 ; 0,3)$	Gray zone
T $\in (-\infty ; 0,2)$	A company with a high probability of bankruptcy

Source: Taffler (1984)

The specifics of the Czech financial statements are described by the Neumaierová and Neumaier's model (2005). Over the years, four modifications of bankruptcy indices have emerged. The IN05 index was created in 2005 as an updated version of IN01. The modified version of IN05 is focused on predicting financial difficulties, but also on the ability to create value for owners. According to Csikosová et al. (2019), the IN05 model is considered to be the most accurate and most suitable for use

in monitoring companies from V4 countries. The boundary points for the classification of companies into individual categories are 0.9 and 1.6 (Table 4). The construction of model is as follows:

$$IN05 = 0,13X_1 + 0,04X_2 + 3,97X_3 + 0,21X_4 + 0,09X_5 \quad (4)$$

where: X_1 = assets / debt,
 X_2 = EBIT / interest expenses,
 X_3 = EBIT / assets,
 X_4 = income / assets,
 X_5 = current assets / current liabilities.

Table 4: Categories of the financial situation according to Index IN05

Intervals	Evaluation
IN05 \in (1,6 ; ∞)	Creditworthy company
IN05 \in (0,9 ; 1,6)	Gray zone
IN05 \in ($-\infty$; 0,9 >	Bankruptcy company

Source: Neumaierová and Neumaier (2005)

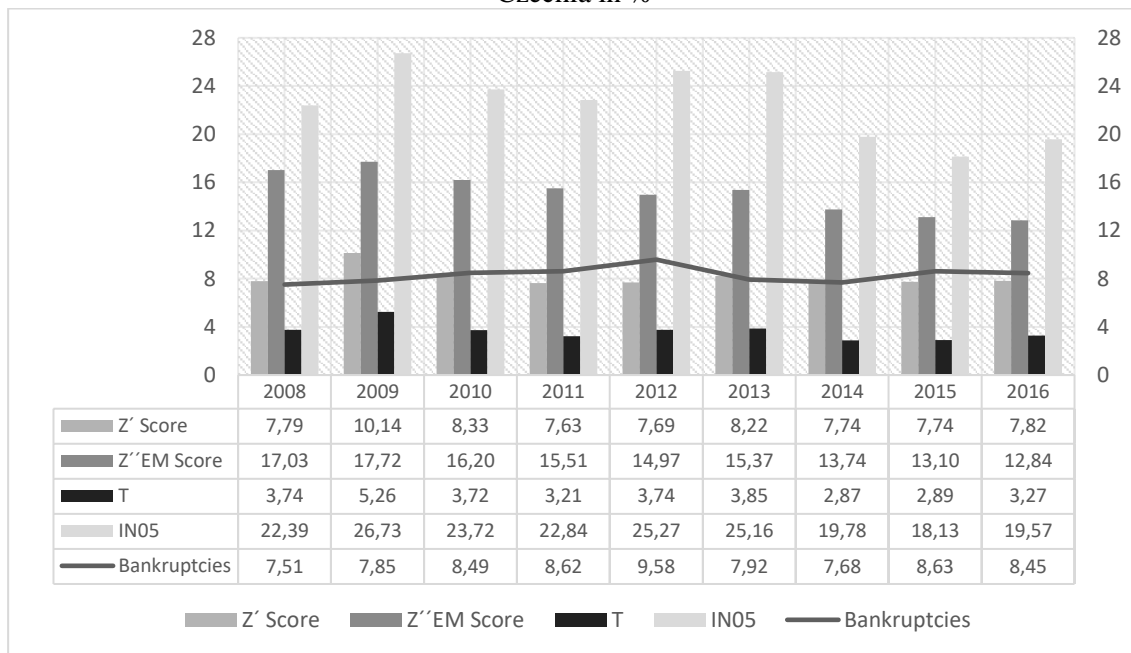
The practical applicability of the monitored bankruptcy models is evaluated on the basis of a comparison of their results with the number of detected bankruptcies. In the case, where the identified number of companies with potential financial distress was higher than the number of companies with terminated business activity, it was possible to evaluate the model as practically applicable. In the opposite case, when the number of companies in financial distress was lower or the same as the number of companies with terminated business activity, the model was not recommended for practical use in the V4 countries. When evaluating the usability of individual models, the comparison of the identified bankrupt companies in year t with the number of identified companies in financial distress in years $t-1$ and $t-2$ was also taken into account.

4. Results

Comparing the real number of bankruptcies with the results of the predictive bankruptcy models in Czechia, it is clear that only Taffler's model ranked fewer companies in financial distress than actually ceased their activities. A similar number of companies in financial distress as already bankrupt can be seen in the results of the Altman's Z' Score. The other two models; Altman's Z'EM Score and IN05, ranked more companies among the potentially financially vulnerable than they actually bankrupt. Based on these facts, it can be stated that only the Z'EM Score and IN05 models fulfill their predictive ability of the company's financial distress. On the contrary, the Taffler and Z' Score models could not adequately predict financial situation of companies.

Figure. 1 shows that the largest number of companies at risk of financial distress was, in 2009. Conversely, the number of bankruptcies can conclude that 2009 was a year of accelerating bankruptcies, where until 2012 it is possible to see the peak of the maximum number enterprises that have ceased their activities. The real number of bankruptcies is affected by the insolvency proceedings in which companies enter. Whether a company really goes bankrupt or is saved will only become apparent after the time when the company is officially included in the database of companies with closed activities. Most companies at risk of financial distress are recognized by the IN05 bankruptcy model, which in 2009 draws attention to possible financial difficulties for up to 26.73% of companies. In the same year, the Z'EM Score model ranked 17.72% of the monitored companies among the financially endangered companies, the Z' Score model 10.14% of companies and the Taffler model 5.26%. The renewed economic growth in Czechia was also reflected in the improved financial situation of the monitored companies, where in 2014 and 2015 the monitored models show the lowest number of companies at risk of financial distress. Only the Z' Score model achieves the best results (lowest values of the indicator) in 2011 and 2012.

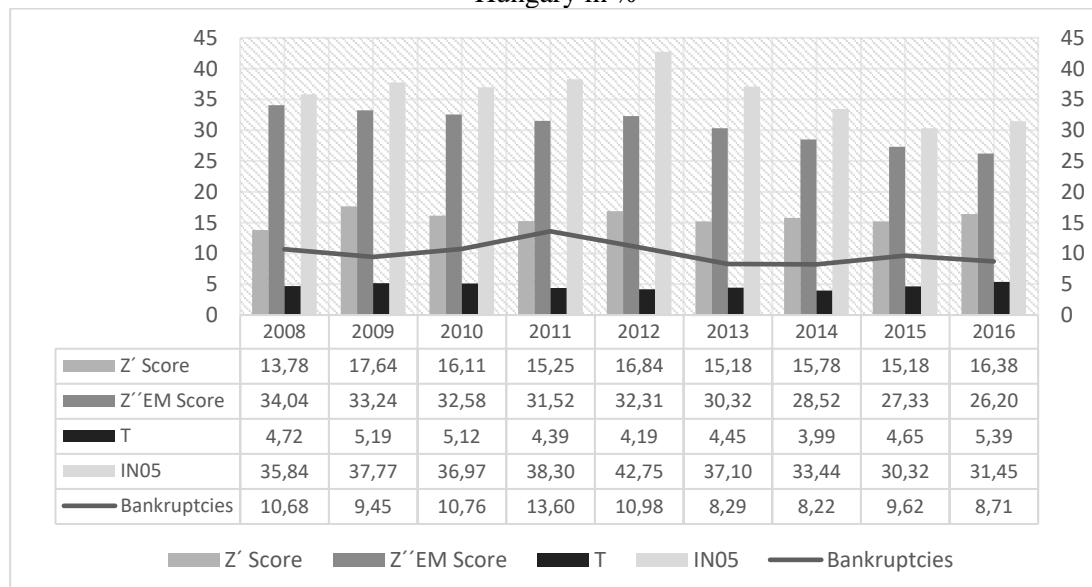
Figure 1: Resulting values of the number of bankruptcies and companies in financial distress in Czechia in %



Source: author's calculations

Figure 2 shows that only the Taffler model has classified fewer companies with potential financial distress than actually bankrupt in Hungary. The remaining three models assigned more companies to the category of potential financial distress than the number of bankruptcies. The predictive ability of the company's financial distress is therefore fulfilled by the Z' Score, Z''EM and IN05 models. On the contrary, the Taffler model could not adequately predict financial situation of companies.

Figure 2: Resulting values of the number of bankruptcies and companies in financial distress in Hungary in %



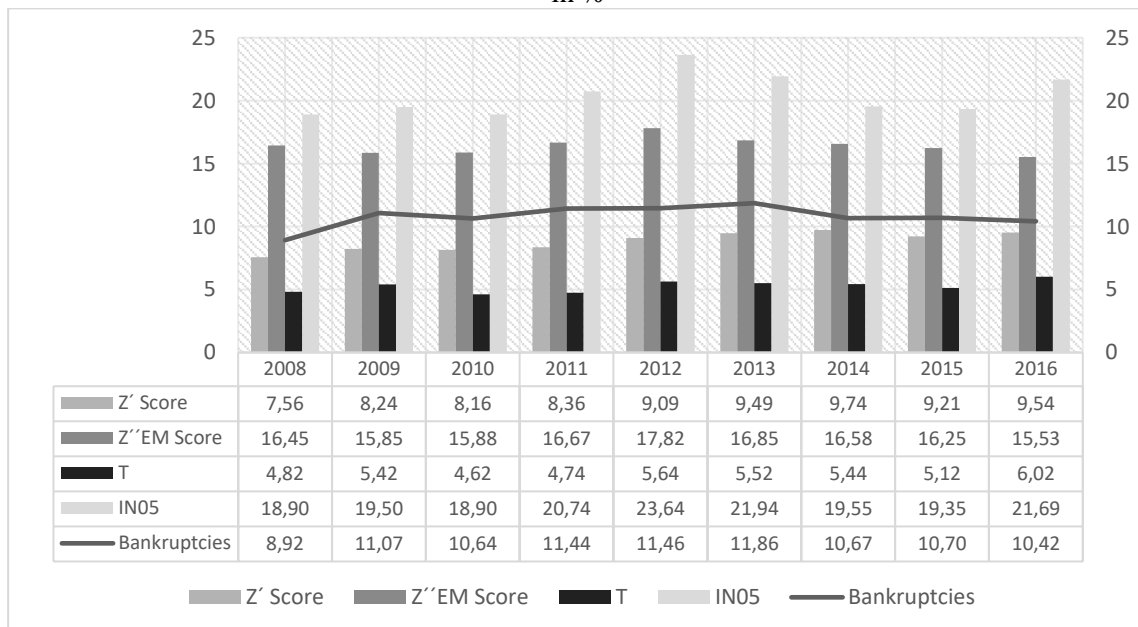
Source: author's calculations

The IN05 model ranked the most companies among companies with potential financial distress, which in the whole period included more than 30% of the monitored companies in this category. In 2012, it was as high as 42.75% of companies. The different development of the number of companies in financial distress can be observed in the case of the Z''EM Score model. This model ranked most

companies among them already in 2008 (34.04%). In the following years, the values of the indicator gradually decreased to 26.20%. The development of the values of the last monitored Z'Score model almost copies the development of the domestic Hungarian economy. The peak number of businesses at risk model achieves the crisis in 2009. Then owned by Z'Score between businesses at risk of financial distress to 17.64% of monitored enterprises. In the following years, the number of companies in financial distress increased in 2012 and 2016.

As can be seen from Figure 3, the practical applicability of the analyzed models was demonstrated only for the Z'EM and IN05 models, which regularly predict the possible financial distress in more companies during the monitored period than they actually bankrupt in Poland. From this point of view, the Z'Score and Taffler models did not fulfill their ability to provide early warning of possible financial difficulties. It can be seen that the Taffler and Z'Score models ranked less than 10% of companies among the financial distressed companies at risk. The remaining two models Z'EM Score and IN05 ranked more than 15% of companies among the endangered companies. The bankruptcy models Z'Score and T ranked the most companies among companies with possible financial distress in 2016. On the contrary, the models Z'EM Score and IN05 do so already in 2012.

Figure 3: Resulting values of the number of bankruptcies and companies in financial distress in Poland in %

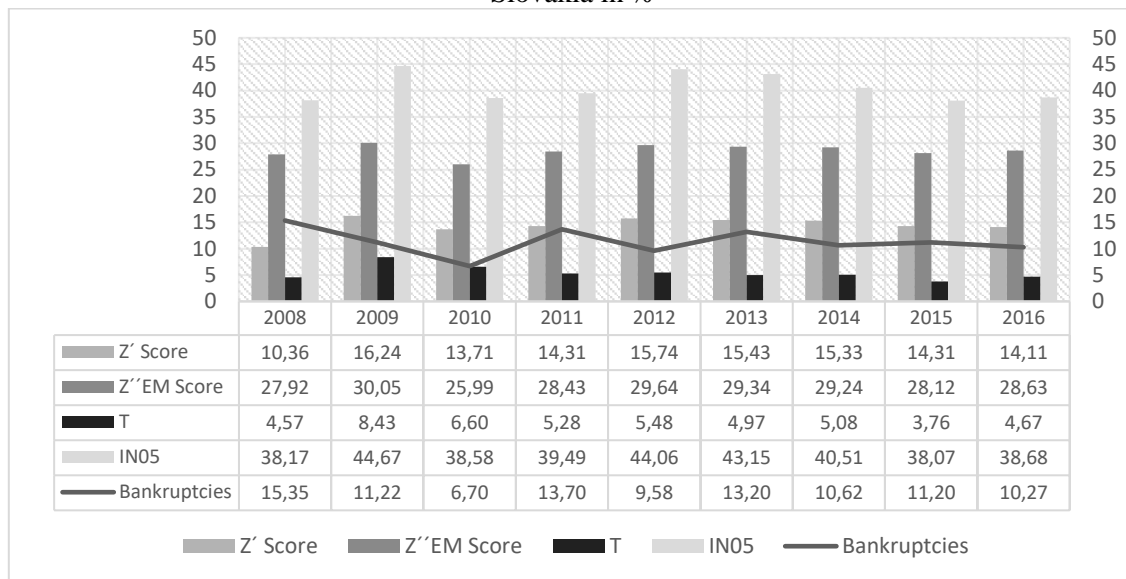


Source: author's calculations

The results from Slovakia shows that the Taffler and Z'Score models did not fulfill their predictive ability (see Figure 4). The number of companies identifying financial difficulties either did not even reach the number of real bankruptcies in Slovakia (Tfm model) or reached a number similar to actually terminated companies (Z'Score model). For practical use, it is recommended to use the Z'EM or IN05 models. From Figure 4 is further evident big difference between the development model of the measured values monitoring the financial health of companies. The lowest number of companies in potential financial distress is recorded by the T model. In the period under review, the bankruptcy model of Z'Score included on average about 15% of companies in the category with potential financial distress. The Z'EM Score model ranked 26 - 30 % among companies with financial problems. The last analyzed model IN05 classified them between 38% and 45%.

A common feature of all models is the highest number of companies listed among the financially vulnerable in 2009, the fewest in the case of the model IN05 and T in 2015, the model Z'EM Score in 2010 and Z'Score in 2008. At the same time, only the results analysis of the financial situation of companies using the model Z'Score the year 2016 will not come to the level of the pre-crisis period. The evaluation of other models in 2016 almost corresponds to the evaluation from 2008.

Figure 4: Resulting values of the number of bankruptcies and companies in financial distress in Slovakia in %



Source: author's calculations

5. Conclusion

Bankruptcy models are used to express the financial situation of companies. The construction of models is based on the assumption that companies in financial distress experience certain anomalies several years before their bankruptcy. Their use is suitable not only for current and future management decisions, but also in the evaluation of companies by the banking sector. The aim of the paper was to evaluate the usability of the bankruptcy models for SMEs in the V4 countries.

In particular, the Z''EM and IN05 models can be recommended for practical applicability. The resulting assessment of the financial situation of companies on the basis of the values of these models help predict possible financial distress of more companies than they actually bankrupt. As a result, they fulfilled their function of early warning of companies in a deteriorating financial situation in all V4 countries. The Z'Score model performed its function only in the case of companies operating in Hungary. In other cases, it was possible to accept the opinions of Delina and Packová (2013), Gavurová et al. (2017) or Misanková et al. (2017), who pointed out the inappropriate use of this model. This bankruptcy model mainly reflects the specifics of American companies. The difference compared to Altman's Z''EM model, adapted especially to emerging economies, is mainly in monitoring the liquidity of companies through working capital. While indicators of working capital to total assets is the model Z'Score assigned to the fourth largest weight, in the model Z'EM is assigned the second highest weight after EBIT / total assets.

Different results for the two Altman models can also be found in the ratio retained earnings/ total assets. Despite the higher coefficient in the Z''EM model, it is assigned up to the third highest weight compared to the others. In the Z'Score model, it is assigned the second highest weight and favors companies operating in the market for longer and have created sufficient reserves. Thanks to these observations, the results are in line with the studies by Karas and Režňáková (2014), Basovníková et al. (2018) or Csikosová et al. (2019).

The Taffler model could be evaluate as a model with the lowest predictive value in all V4 countries. The same results were also reached by Machek (2014) or Bohdalová and Klempaiová (2017). Due to its construction, which includes only basic information about the company and inappropriate setting of limits for the assessment of the financial situation, it is not possible to recommend this model for practical use in the V4 countries. The opposite results were found for the usability of the IN05 model. The paper resulted in the same conclusions as Machek (2014), Čamská (2016), Bohdalová and Klempaiová (2017), or Csikosová et al., who recommend the model within V4 for practical use. The advantage of the model is its construction, where the attention is paid especially to the ability to cover the company's own assets with its own profit or revenues.

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BANKRUPTCY PROBLEM UNDER UNCERTAINTY

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Abstract

In this paper we concentrate on situations where certain perfectly divisible estate has to be divided among claimants who can merely indicate the range of their claims, and the available amount is smaller than the aggregated claim. Funds' allocation of a firm among its divisions, taxation problems, priority problems, distribution of costs of a joint project among the agents involved, various disputes including those generated by inheritance, or by cooperation in joint projects based on restricted willingness to pay, fit into this framework. The corresponding claim of each claimant can vary within a closed interval or fuzzy interval. For claims, fuzzy intervals are applied whenever the claimants can distinguish a possibility of attaining the amount of estate, and/or its membership degree of a possibility of attainment. When claims of claimants have fuzzy interval uncertainty, we settle such type of division problems by transforming it into division problems under interval uncertainty. A similar approach is applied to deal with uncertainty of estate to be divided. Here, a probability interpretation can also be considered e.g. in taxation problems. We classify the division problems under uncertainty of claims and/or estate and present basic division scheme, which is consistent with the classical bankruptcy proportional rule. Two examples are presented to illustrating particular problems and solution concepts.

Keywords: bankruptcy problem, division scheme, interval claims, fuzzy interval claims, uncertain estate

JEL codes: C44, C63, C71, C78

1. Introduction

The classical bankruptcy problem is described as follows: Several individuals hold claims on a finite resource and the total amount is not enough to fulfill all of the claims. Sometimes, the problem is considered under interval uncertainty of claims and/or the total amount of resource. In some more realistic situations claimants are also likely to declare their claims with vague words just like “about”, “around” and so on. The key issue is how to distribute the estate to the claimants. Different from the classical bankruptcy problems which require an exact knowledge of each term, Yager et. al. (2000), investigated the uncertainty in the division problems, in which the possible fair proportion of the total estate assigned to each claimant is an interval, eventually, fuzzy interval. Branzei et al. (2004), concentrated on the bankruptcy problems under interval uncertainty of claims. They deleted the uncertainty of claims by compromising the lower and upper bounds of the claim intervals and then considered the deterministic division problems with compromise claims. In fact, in some bankruptcy problems, the claims of claimants are in a possible range and can only be described using some fuzzy words, such as “between” and “around”.

This paper deals with a generalization of the classical bankruptcy problem, that we call division problems under uncertainty of claims and estate. In comparison with the former works on this subject, see Branzei et al. (2004, 2010), where only the interval claims have been investigated, here, we consider in Interval Bankruptcy-problems (IB-problems) also an uncertain (i.e. interval/fuzzy interval) estate to be divided. We mainly pay attention to the interval and fuzzy interval uncertainty of claims and/or estate. Applying interval calculus, we introduce the corresponding division schemes, in the similar spirit of the classical bankruptcy rules. When the claims and/or estate have the forms of (fuzzy) intervals, we transform such type of division problems (*FIB*-problems for short) into *IB*-problems and then propose the corresponding division rule(s).

It is important to consider bankruptcy problems under uncertainty, because in various disputes including inheritance, claimants face uncertainty with regard to their effective rights and as a result, individual claims can be expressed in the form of intervals or fuzzy intervals. In such situations, our model offers flexibility to tackle with resource conflict under uncertainty. In order to get some insight into applications, interpretations and extensions for division problems under uncertainty, the readers can refer to a wide range of papers such as cooperative interval games Branzei et al. (2010), and stochastic bankruptcy games Habis et al. (2013).

The rest of this paper is organized as follows. In Section 2, we briefly review the classical bankruptcy problems. In Section 3, we propose the division scheme under interval uncertainty. Section 4 further discusses the division schemes for division problems under fuzzy interval uncertainty. In Section 5 an illustrating simulation example is presented and discussed. In Section 6, some conclusions and future research are mentioned.

2. Classical bankruptcy problems and games

Bankruptcy problems originate from the situations that several agents claim portions of certain amount of estate and the sum of claims is larger than the total estate. The *classical bankruptcy problem* (CB-problem) can be modeled by a triple (N, c, E) , written as (c, E) for convenience, where $N = \{1, 2, \dots, n\}$, $c = (c_1, c_2, \dots, c_n)$ is the vector of claims with $c_i > 0$, $i \in N$, being the claim of i and $E > 0$ is the total estate.

In the game theoretic language, a *cooperative game in characteristic form* is an ordered pair $(N; v)$, where N is a set of players and $v : 2^N \rightarrow \mathbf{R}$ is a real-valued function satisfying $v(\emptyset) = 0$. The subset T of N is called a *coalition* and $v(T)$ the *worth*, or *value* of coalition T . A cooperative game is said to be a *convex game* if for any $T, U \subseteq N$, $v(T \cup U) + v(T \cap U) \geq v(T) + v(U)$.

Any bankruptcy problem $(c; E)$ generates a corresponding cooperative game $(N; v)$, called the *bankruptcy game*, whose characteristic form is given by

$$v(T) = \max\{0, E - \sum_{i \in N \setminus T} c_i\}, \text{ for any } T \subseteq N.$$

For classical bankruptcy problems, the adjusted proportional rule (AP-rule), contested garment consistent rule (CGC-rule) and recursive completion rule (RC-rule) are known as particular bankruptcy rules, see Curiel et al. (1987).

A bankruptcy problem (c, E) can also be interpreted as the *tax assessment problem*, where N is a set of tax payers, c_i , $i \in N$, are their incomes and the cost E of the project must be covered by themselves. A different interpretation of c_i , $i \in N$, is the benefits of consumer $i \in N$ being derived from the project with total cost E .

3. Interval bankruptcy problem

Sometimes, the problem is considered under interval uncertainty of claims and/or the total amount of resource - estate. We start with some basic concepts of interval arithmetic, then we introduce a bankruptcy problem under interval uncertainty of claims and estate (IB-problem)

Definition 3.1: Let $I(\mathbf{R})$ be the set of all closed and bounded intervals in the set of real numbers \mathbf{R} . By $I(\mathbf{R})^n$ we denote the set of all n -dimensional vectors with components in $I(\mathbf{R})$.

Let $I, J \in I(\mathbf{R})$, with $I = [I^-; I^+]$, $J = [J^-; J^+]$ and $k \geq 0$.

Then the interval operations are defined by

$$I + J = [I^- + J^-; I^+ + J^+], \tag{1}$$

$$kI = [kI^-; kI^+]. \tag{2}$$

In particular, $0 = [0;0]$.

The partial ordering on $I(\mathbf{R})^n$ is defined as follows:

$$I \leq J \quad \text{if} \quad I^- \leq J^- \quad \text{and} \quad I^+ \leq J^+.$$

We denote $I = J$, if $I \leq J$ and $J \leq I$. Moreover, we denote $I < J$, if $I \leq J$ and $I \neq J$.

Let N be a set of claimants who face uncertainty regarding claims, E is the total estate that will be divided among members of N . The claim vector is denoted by $\mathbf{c} \in I(\mathbf{R})^n$ with $c_i = [c_i^-; c_i^+] \geq 0$, $i \in N$, meaning the claim interval of claimant $i \in N$. The total estate $E = [E^-; E^+] > 0$, is also an interval meaning the interval of uncertainty of the known estate to be divided. A *bankruptcy problem under interval uncertainty* of claims and estate (IB-problem) can be defined by a triple (N, \mathbf{c}, E) , abbreviated to (\mathbf{c}, E) . Particularly, when $c_i^- = c_i^+$ for all $i \in N$, the claim interval c_i degenerates into a real number c_i . Moreover, when the total estate $E = E^- = E^+$ then we obtain the classic bankruptcy problem, see e.g. Curiel (1987). In case of uncertainty, i.e. IB-problem, we interpret c_i^- as the lower bound of claim or the least demand of claimant $i \in N$. Similarly, c_i^+ is interpreted as the upper bound of claim, or, the utmost expectation of claimant $i \in N$. For any $T \subseteq N$, we use the notation

$$c^-(T) = \sum_{i \in T} c_i^-, \quad c^+(T) = \sum_{i \in T} c_i^+. \quad (3)$$

Moreover, for $e \in E = [E^-; E^+]$, $i \in N$, we define the *minimal right* m_i^- of e and the *maximal right* m_i^+ of e for each claimant $i \in N$, respectively, as follows

$$m_i^-(e) = \max\{c_i^-, e - c^+(N \setminus \{i\})\}, \quad m_i^+(e) = \min\{c_i^+, e - c^-(N \setminus \{i\})\}. \quad (4)$$

Moreover, for $T \subseteq N$, we denote

$$m_T^-(e) = \sum_{i \in T} m_i^-(e), \quad m_T^+(e) = \sum_{i \in T} m_i^+(e). \quad (5)$$

Proposition 3.1: Let $c^-(N) \leq E^- \leq e \leq E^+ \leq c^+(N)$. Then for $i \in N$, it holds

$$c_i^- \leq m_i^-(e) \leq m_i^+(e) \leq c_i^+. \quad (6)$$

Definition 3.2: A *division scheme* for an IB-problem $(\mathbf{c}; E)$ is a vector mapping $s : I(\mathbf{R}^+)^{n+1} \rightarrow I(\mathbf{R}^+)^n$, where $s(\mathbf{c}, E) = (s_1(\mathbf{c}, E), \dots, s_n(\mathbf{c}, E))$, $s_i : I(\mathbf{R}^+)^{n+1} \rightarrow I(\mathbf{R}^+)$, $i \in N$, such that $\mathbf{c} = (c_1, \dots, c_n) \in I(\mathbf{R}^+)^n$, $c_i = [c_i^-; c_i^+]$, $i \in N$, and $E = [E^-; E^+] \in I(\mathbf{R}^+)$, satisfying

$$s_i(\mathbf{c}, E) = [s_i^-(\mathbf{c}, E), s_i^+(\mathbf{c}, E)] \subseteq c_i = [c_i^-, c_i^+], \quad \text{for all } i \in N, \quad (\text{Individual rationality}), \quad (9)$$

$$E = [E^-; E^+] \subseteq \sum_{j \in N} s_j(\mathbf{c}, E). \quad (\text{Efficiency}) \quad (10)$$

From (9), (10), it is evident that the following property holds.

Proposition 3.3: Let (\mathbf{c}, E) be an IB-problem, $\mathbf{c} = (c_1, \dots, c_n) \in I(\mathbf{R}^+)^n$, $E = [E^-; E^+] \subseteq \mathbf{R}^+$, and let $s(\mathbf{c}, E) = (s_1(\mathbf{c}, E), \dots, s_n(\mathbf{c}, E))$ be a division scheme for an IB-problem $(\mathbf{c}; E)$ satisfying (9) and (10). Then for each $e \in E$ and each $i \in N$, there exists $s_i(e) \in s_i(\mathbf{c}, E)$, such that

$$\sum_{j \in N} s_j(e) = e. \quad (11)$$

and

$$c^-(N) \leq \sum_{j \in N} s_j(e) \leq c^+(N). \quad (12)$$

Evidently, the division scheme for the IB-problem $(E; c)$ prescribes for each estate $e \in E$ a specific division of e among n claimants. The following proposition states that under the assumption that the sum of utmost expectations of all claimants is not greater than the lower limit of the estate, E^- , and, the sum of utmost expectations of all claimants is not less than the upper limit of the estate E^+ , then there exists a unique specific division of e satisfying some desirable properties.

Proposition 3.4: Let $(c; E)$ be an IB-problem. Let $c^-(N) \leq E^- \leq E^+ \leq c^+(N)$, and $E = [E^-; E^+]$. Then $s_i(c; E) = [s_i^-; s_i^+] \in I(\mathbf{R}^+)$ defined by

$$s_i^- = m_i^-(E^-) + [m_i^+(E^-) - m_i^-(E^-)] \frac{E^- - m_N^-(E^-)}{m_N^+(E^-) - m_N^-(E^-)}, i \in N, \quad (12)$$

$$s_i^+ = m_i^-(E^+) + [m_i^+(E^+) - m_i^-(E^+)] \frac{E^+ - m_N^-(E^+)}{m_N^+(E^+) - m_N^-(E^+)}, i \in N, \quad (13)$$

is a division scheme called the *adjusted proportional rule (AP-rule)* for the IB-problem $(c; E)$ satisfying individual rationality condition (9), efficiency condition (10), and the following three properties:

- (i) if for some $i, j \in N$, $c_i = c_j$, i.e. $[c_i^-; c_i^+] = [c_j^-; c_j^+]$, then $[s_i^-; s_i^+] = [s_j^-; s_j^+]$,
- (ii) $s_i(e) = m_i^-(e) + [m_i^+(e) - m_i^-(e)] \frac{e - m_N^-(e)}{m_N^+(e) - m_N^-(e)}$, $i \in N$, where $e \in E$ (14)
- (iii) if for some $e, e^* \in E$, $e \leq e^*$, then $s_i(e) \leq s_i(e^*)$ for all $i \in N$.

Property (i) is a natural property saying that the same claims obtain the same division shares.

In property (ii), for each $e \in E$, $s_i(e)$ is the crisp corresponding division share of claimant i .

Property (iii) is called *monotonicity* of the division scheme with respect to estate E .

Example 3.5: Let (c, E) be an IB-problem as follows, see Fig. 1. We consider a dying man whose remaining estate is estimated between 85 and 115 (unit of money). There are also 3 remaining debtors having three interval claims of the estate $c_1, c_2, c_3 > 0$ as follows: $N = \{1, 2, 3\}$, $c = (c_1, c_2, c_3)$, where $c_1 = [c_1^-; c_1^+] = [10; 35]$, $c_2 = [c_2^-; c_2^+] = [25; 50]$, $c_3 = [c_3^-; c_3^+] = [30; 60]$, $E = [E^-; E^+] = [85; 115]$. The key issue is how to distribute the estate to the claimants then the mean value M of E is $M = (85+115)/2 = 100,0$.

By (4) and (5) we calculate

$$m_1^-(E^-) = 10, m_2^-(E^-) = 25, m_3^-(E^-) = 30, m_1^-(E^+) = 10, m_2^-(E^+) = 25, m_3^-(E^+) = 30. \\ m_1^+(E^-) = 30, m_2^+(E^-) = 45, m_3^+(E^-) = 50, m_1^+(E^+) = 35, m_2^+(E^+) = 50, m_3^+(E^+) = 60. \\ m_N^-(E^-) = 65, m_N^+(E^-) = 125, m_N^-(E^+) = 65, m_N^+(E^+) = 145.$$

Then by formulas (12) and (13) we obtain the corresponding division scheme as follows.

$$s_1(c; E) = [s_1^-; s_1^+] = [10.00; 25.63], \text{ the mean value } S_1(M) = S_1(100.0) = 20.94 .$$

$$s_2(c; E) = [s_2^-; s_2^+] = [25.00; 40.63], \text{ the mean value } S_2(M) = S_2(100.0) = 35.94 .$$

$$s_3(c; E) = [s_3^-; s_3^+] = [30.00; 48.75], \text{ the mean value } S_3(M) = S_3(100.0) = 43.13 .$$

The above mentioned division scheme $\mathcal{S}(c, E)$ is an interval solution of the given IB-problem (c, E) . Moreover, by the mean value $\mathcal{S}(M)$ we obtain a crisp solution of (c, E) .

4. Fuzzy interval bankruptcy problem (FIB-problem)

In some realistic situations claimants are likely to declare their claims with vague words just like “about”, “around”, “rather small”, “very big”, etc. The key issue is how to distribute the uncertain, i.e. interval, fuzzy interval or, eventually, the estate given with some probability, to the individual claimants. Different from the classical bankruptcy problems, which require an exact knowledge of each term, Yager et. al. (2000) investigated the uncertainty in the division problems, in which the possible fair proportion of the total estate assigned to each claimant is a fuzzy interval. The estate to be divided among claimants has been considered, however, crisp (deterministic).

In this section we consider fuzzy interval uncertainty of claims and/or the total amount of resource - estate. Applying fuzzy intervals instead of usual closed intervals we formulate the *fuzzy bankruptcy problem* (FB-problem) and its solution – a division scheme for a FB-problem transforming the FB-problem into a family of IB-problems - α -cuts from Section 3.

Definition 4.1: A fuzzy set A of \mathbf{R} is a *bounded fuzzy interval*, whenever A is normal (i.e. there exists x_0 such that $\mu_A(x_0) = 1$) and its membership function $\mu_A : \mathbf{R} \rightarrow [0;1]$ satisfies that the α -cut of A , $[A]_\alpha = \{x \mid \mu_A(x) \geq \alpha\}$ is closed, compact and convex subset of \mathbf{R} for every $\alpha \in [0;1]$. Then, the fuzzy set A of \mathbf{R} is equivalent to the family of α -cuts $\{[A]_\alpha \mid \alpha \in [0;1]\}$, see Ramík et.al. (2004).

By $F(\mathbf{R})$ we denote the set of all bounded fuzzy intervals (BFIs) on \mathbf{R} .

Definition 4.2: Let $\tilde{c} = (\tilde{c}_1, \dots, \tilde{c}_n) \in F(\mathbf{R}^+)^n$ be a vector of bounded fuzzy intervals, let $\tilde{c}_i = [c_i^-(\alpha); c_i^+(\alpha)]$, $i \in N$, and $\tilde{E} = [E^-(\alpha); E^+(\alpha)] \in F(\mathbf{R}^+)$, $\alpha \in [0;1]$ be the families of α -cuts. A *division scheme* for an FB-problem (\tilde{c}, \tilde{E}) is a vector mapping $\tilde{s} : F(\mathbf{R}^+)^{n+1} \rightarrow F(\mathbf{R}^+)^n$, such that

$$[\tilde{s}(\tilde{c}, \tilde{E})]_\alpha = ([\tilde{s}_1(\tilde{c}, \tilde{E})]_\alpha, \dots, [\tilde{s}_n(\tilde{c}, \tilde{E})]_\alpha), \quad (15)$$

$\tilde{s}_i : F(\mathbf{R}^+)^{n+1} \rightarrow F(\mathbf{R}^+)$, $i \in N$. Here, for each $\alpha \in [0;1]$, $[\tilde{s}(\tilde{c}, \tilde{E})]_\alpha$ is an **IB**-problem.

Proposition 4.3: Let (\tilde{c}, \tilde{E}) be a FB-problem. Let $\tilde{E} = \{[E^-(\alpha); E^+(\alpha)] \mid \alpha \in [0;1]\}$ and let $\sum_{i \in S} c_i^-(\alpha) \leq E^-(\alpha) \leq E^+(\alpha) \leq \sum_{i \in S} c_i^+(\alpha)$ for all $\alpha \in [0;1]$. Then for $\alpha \in [0;1]$, $[\tilde{s}_i(\tilde{c}, \tilde{E})]_\alpha = [s_i^-(\alpha); s_i^+(\alpha)] \in I(\mathbf{R}^+)$ is a closed interval defined by

$$s_i^-(\alpha) = m_i^-(E^-(\alpha)) + [m_i^+(E^-(\alpha)) - m_i^-(E^-(\alpha))] \frac{E^-(\alpha) - m_N^-(E^-(\alpha))}{m_N^+(E^-(\alpha)) - m_N^-(E^-(\alpha))}, i \in N, \quad (16)$$

$$s_i^+(\alpha) = m_i^-(E^+(\alpha)) + [m_i^+(E^+(\alpha)) - m_i^-(E^+(\alpha))] \frac{E^+(\alpha) - m_N^-(E^+(\alpha))}{m_N^+(E^+(\alpha)) - m_N^-(E^+(\alpha))}, i \in N. \quad (17)$$

A family of intervals $\{[s_i^-(\alpha); s_i^+(\alpha)] \mid \alpha \in [0;1]\}$, where the elements are given by (16), (17), defines a division scheme called the *adjusted fuzzy proportional rule (AFP-rule) for the FB-problem (\tilde{c}, \tilde{E})* .

The mean values $s_i^-(\tilde{E})$, $s_i^+(\tilde{E})$ give the corresponding interval share $[s_i^-(\tilde{E}); s_i^+(\tilde{E})]$ of claimant i , which can be defined by the well-known defuzzification formulas, see e.g. Dubois (1980)

$$s_i^-(\tilde{E}) = \frac{\int_0^1 \alpha s_i^-(\alpha) d\alpha}{\int_0^1 s_i^-(\alpha) d\alpha}, \quad s_i^+(\tilde{E}) = \frac{\int_0^1 \alpha s_i^+(\alpha) d\alpha}{\int_0^1 s_i^+(\alpha) d\alpha}, i \in N. \quad (18)$$

Moreover, $S_i(\tilde{E})$ is the crisp corresponding division share of claimant $i \in N$, defined by

$$S_i(\tilde{E}) = \frac{s_i^-(\tilde{E}) + s_i^+(\tilde{E})}{2}, i \in N. \quad (19)$$

Remark 4.4: Each fuzzy interval could be expressed as a quadruple of $\tilde{c} = [c_1, c_2, c_3, c_4]$, with $c_1 \leq c_2 \leq c_3 \leq c_4$, where the membership function μ of \tilde{c} is non-decreasing between c_1 and c_2 , constantly equal to 1 between c_2 and c_3 , and non-increasing between c_3 and c_4 , otherwise, it is equal to zero.

If the membership function μ is in parts linear function, then \tilde{c} is called a *trapezoidal fuzzy interval* (or, *trapezoidal fuzzy number*). If $c_1 < c_2 = c_3 < c_4$, then \tilde{c} is called a *triangular fuzzy interval* (or, *triangular fuzzy number*). If $c_1 = c_2 < c_3 = c_4$, then each FB-problem becomes an IB-problem, moreover, if $c_2 = c_3$, we obtain a classical CB-problem. From this point of view, FB-problem is a true extension of CB-problem, as well as IB-problem.

5. FB-problem - Example

Let (\tilde{c}, \tilde{E}) be a FB-problem analogical to Example 3.5, where instead of interval claims, the claims are expressed as trapezoidal fuzzy intervals (fuzzy numbers):

$N = \{1,2,3\}$, $\tilde{c} = (\tilde{c}_1, \tilde{c}_2, \tilde{c}_3) \in F(\mathbf{R}^+)^3$, where

$\tilde{c}_1 = [c_{11}, c_{12}, c_{13}, c_{14}] = [10, 25, 25, 35]$, $\tilde{c}_2 = [c_{21}, c_{22}, c_{23}, c_{24}] = [25, 35, 35, 50]$,
 $\tilde{c}_3 = [c_{31}, c_{32}, c_{33}, c_{34}] = [30, 40, 40, 60]$.

Fuzzy estate is also a trapezoidal fuzzy number

$\tilde{E} = [E_1, E_2, E_3, E_4] = [85, 100, 100, 115]$.

For $\alpha \in [0;1]$ the equivalent formulas by α -cuts are as follows

$\tilde{c}_1 = [10 + 15\alpha ; 35 - 10\alpha]$, $\tilde{c}_2 = [25 + 10\alpha ; 50 - 15\alpha]$, $\tilde{c}_3 = [30 + 10\alpha ; 60 - 20\alpha]$.

$\tilde{E} = [85 + 15\alpha ; 115 - 15\alpha]$, see Fig. 2.

Substituting these values into formulas (16) and (17), we obtain functions $s_i^-(\alpha)$ and $s_i^+(\alpha)$. Hence, by formulas (18) we calculate the integrals of the interval share of each claimant i as

$[s_1^-(\tilde{E}); s_1^+(\tilde{E})] = [19.00 ; 25.25]$,

$[s_2^-(\tilde{E}); s_2^+(\tilde{E})] = [31.00 ; 37.25]$,

$[s_3^-(\tilde{E}); s_3^+(\tilde{E})] = [36.00 ; 43.50]$.

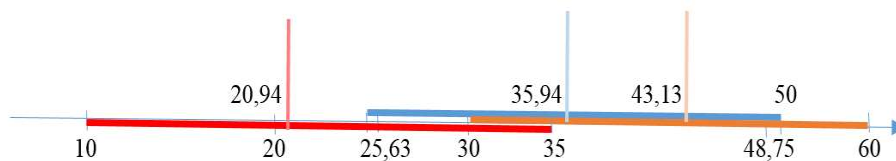


Figure 1. Interval claims and division schemes

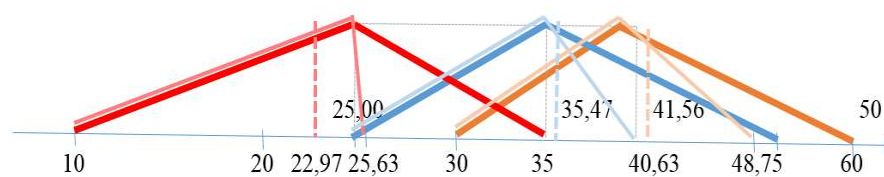


Figure 2. Fuzzy interval claims and division schemes

Moreover, by (19) we obtain the crisp division share of each claimant $i \in N = \{1,2,3\}$, as

$$S_1(\tilde{E}) = 22.32, S_2(\tilde{E}) = 31.65, S_3(\tilde{E}) = 44.02.$$

The above mentioned division scheme $s(\tilde{c}, \tilde{E})$ is an interval solution of the given FB-problem $(\tilde{c}; \tilde{E})$. Moreover, by the vector of mean values $S(\tilde{E}) = (22.32, 31.65, 44.02)$ we obtain a crisp solution of FB-problem (\tilde{c}, \tilde{E}) .

6. Conclusion

In this paper we considered situations where a perfectly divisible estate had to be divided among claimants who were subjected to uncertainty in the form of a closed interval and/or fuzzy intervals. The corresponding claim of each claimant could vary within a closed interval or fuzzy interval. We classified the division problems under uncertainty of claims and presented a basic division scheme, which was consistent with the classical bankruptcy rules. When claims of claimants had fuzzy interval uncertainty, we settled such type of division problems by transforming it into division problems under classical interval uncertainty. Two examples were presented to illustrate particular problems and solution concepts. Here, we extended the classical bankruptcy problem (CB-problem), and the corresponding proportional rule (AP-rule) to FB-problem. The other classical bankruptcy rules, e.g. contested garment consistent rule (CGC-rule) and recursive completion rule (RC-rule) could be also extended to FB-problem in the future research.

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CONSTRUCTING SHORTLISTS OF POTENTIALLY ATTRACTIVE OFFERS FROM LARGE DATABASES USING THE TOPSIS METHOD

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Abstract

Thanks to the Internet, prospective consumers can find basic information about many offers with very little effort. For example, databases of properties for sale contain information about the price, location, number of rooms and size of a flat. This enables purchasers to assess whether a property is potentially attractive, but is not sufficient to make an ultimate decision on such an important purchase. Automating the selection of an initial shortlist may be a useful aid to finally choosing an attractive offer while limiting search costs. This presentation describes an algorithm that constructs shortlists of potentially attractive offers from a large database according to a consumer's preferences. The selection of offers is based on maximizing a weighted average of their attractiveness (assessed via the TOPSIS method of evaluating offers with multiple traits) and diversity. The number of offers to be placed on the shortlist is set by the user. Such shortlists may be interpreted as a list of flats to be physically viewed or as an initial step in defining such a set. This algorithm can be applied in a range of scenarios, e.g. an employer wishing to hire a specialist employee (or a set of employees).

Keywords: consumer decision, heuristic algorithm, job search problem, multi-criteria decision process, TOPSIS

JEL codes: C44, C61, D11, D83

1. Introduction

Thanks to the Internet, consumers can find information about a huge number of offers with very little effort. However, this may lead to the so-called paradox of choice, as a result of the limited capacity to process information that humans possess (Schwartz, 2004). The paradox of choice states that when there are a large number of offers, a consumer can gain by concentrating on a small subset of offers rather than expending a lot of effort in order to find the best out of all the offers. A decision maker who constrains his/her searching efforts in this way will probably not purchase the absolutely best offer. However, since less time and effort are required to make a purchase, the expected overall reward from search, taking into account the costs of searching, may well be greater.

As a result of limited rationality, decision makers often use heuristics that are well adapted to the structure of the information that is available to them (see Simon, 1956, as well as Todd and Gigerenzer, 2000). Shortlists are appropriate in situations where a consumer is able to gain some useful information about offers at low cost, but it is relatively costly to obtain the information required to accurately appraise the value of an offer.

This article assumes that the ultimate goal of forming a shortlist is to acquire a single valuable resource, rather than using a shortlist as a means of choosing multiple options. As an example of the second approach, Durbach and Davis (2012) consider the problem of choosing several ways of reducing electricity bills. On the other hand, Belton (1985) considers how a final choice is made after an initial shortlist has been constructed. Here, we just consider the construction of an initial shortlist when faced with such a decision problem.

A number of articles have been published recently on the concept and theoretical properties of shortlists (e.g. Masatlioglu et al., 2012, Lleras et al. 2017). Borah and Kops (2019) describe search processes where decision makers construct shortlists based on information obtained from friends. The shortlist heuristic can also be useful when multiple criteria are considered (Dulleck et al., 2011) or offers may be categorized (Armouti-Hansen and Kops, 2018).

Manzini and Mariotti (2007) present a model according to which shortlists of ever decreasing size are constructed on the basis of a sequence of criteria until a final choice is made. Au and Kawai (2011) describe a similar model where initial information is used to construct a shortlist of offers, after which an offer is selected from this shortlist using a richer source of information. These two papers derive the general properties of such decision rules. However, very few articles consider optimization models involving shortlists. Ramsey (2019) describes a model where a decision maker constructs a shortlist as a means to making a final decision. The decision maker is not able to precisely assess the value of offers, but can define a linear ranking of offers according to the information currently available. Basic information regarding offers may be gained at very little cost. However, obtaining the information required to make a precise assessment of an offer's value requires much more effort. The search policy of the decision maker is specified by the number of offers to be placed on the shortlist, k . The offers placed on the shortlist are then inspected more closely and the best offer on the shortlist, according to all of the information gained, is accepted. It is assumed that the marginal increase in the search costs resulting from increasing the length of the shortlist from k to $k + 1$ is non-decreasing in k . Under fairly weak assumptions regarding the structure of the information regarding the value of an offer, the marginal gain from increasing the length of the shortlist from k to $k + 1$ (the increase in the expected value of the offer ultimately accepted) is decreasing in k . It follows that the optimal number of offers to place on the shortlist is the smallest value of k satisfying the following condition: the marginal gain from increasing k does not exceed the corresponding marginal increase in search costs. Olkin and Stephens (1993) consider the problem of selecting a shortlist of candidates for a job when the goal is to employ the best of all the candidates available.

The model described in this paper addresses a number of the shortcomings in the model of Ramsey (2019). Firstly, that model does not take into account the fact that at each stage decisions are made on the basis of a number of traits. Secondly, that model does not consider the role of a shortlist in exploring the variety of the offers available. A number of approaches to assessing the attractiveness of offers based on a set of traits can be applied. This article considers the TOPSIS approach (Technique for Order of Preference by Similarity to Ideal Solution, see Yoon and Hwang, 1995), which assesses an offer on the basis of its distances from the ideal offer and the "anti-ideal" offer in the space defined by the traits describing an offer. Górecka et al. (2016) define the MARS approach (Measuring

Attractiveness around Reference Solutions). This approach may be understood as a generalization of the TOPSIS approach. One relatively simple approach is given by the SAW (Simple Additive Weights) method. The measure of the overall attractiveness of an offer is defined to be a weighted sum of scores based on the component traits. Each score is based on a linear or triangular function of a trait. It has been argued that decisions based on more complex approaches can be interpreted as choices made using the SAW method according to appropriately defined weights (see Kaliszewski and Podkopaev, 2016). Mariański et al. (2020) present a similar algorithm for constructing shortlists based on assessments of the attractiveness of offers via the SAW method.

Due to the potentially very large dimensions of a database holding information about offers, algorithms that automatically construct shortlists of potentially attractive offers might be of great use to those searching for a unique good. According to the approach defined in this paper, it is necessary to define which traits are incentives (larger values are more attractive) and which are disincentives (larger values are less attractive). In addition, the decision maker can input minimum and/or maximum acceptable values for the traits of interest, the relative weight of each trait and the required length of the shortlist. Note that it is natural to define minimum values for incentives and maximum values for disincentives. As a database may also contain some qualitative information about offers (e.g. when searching for a flat – the type of building, photos), such a shortlist can be applied as an initial step in deciding which offers to physically view.

Section 2 presents an algorithm for shortlist construction that uses the TOPSIS method to assess the attractiveness of offers. Section 3 illustrates how this algorithm is implemented on the basis of a simple example. Using a real database of real estate offers, Section 4 compares the results obtained by the algorithm presented here with the results obtained via an algorithm based on SAW. Finally, some conclusions and directions for future research are given in Section 5.

2. Algorithm for Constructing Shortlists

This algorithm is designed to construct shortlists of offers based on multivariate data from an easily accessible source, e.g. the Internet, that include continuous variables. The decision maker can give a set of hard constraints that must be satisfied, e.g. upper and/or lower limits for a given variable. These hard constraints can take discrete and qualitative variables into consideration. Each of the continuous variables under consideration is classified as either as an incentive (large values are attractive) or a disincentive (low values are attractive). If required, a weight can be assigned to each of these variables. The number of offers to be placed on a shortlist, n , is chosen by the user. It is assumed that the shortlist constructed should satisfy the following two criteria: a) the offers on the list should have been assessed as attractive on the basis of the available information, b) these offers should exhibit diversity. The second condition may well be important in allowing the decision maker to make a more informed final decision. Hence, the algorithm is based on maximizing a weighted sum of the attractiveness scores of the offers placed on the shortlist and a measure of their diversity. The definition of the attractiveness score and the diversity measure are given in the following two subsections. The initial filtering of offers based on hard constraints is considered in Section 3.

2.1 Definition of the attractiveness measure

Suppose that there are I offers that satisfy the hard constraints and J continuous variables are used to assess the attractiveness of an offer based on initial information. Let $x_{i,j}$ denote the observation of the j -th variable describing the attractiveness of the i -th offer. First, these observations are normalized to a value $r_{i,j}$ in the interval $[0,1]$ using the following linear transformations. If the j -th variable is classified as an incentive, then

$$r_{i,j} = \frac{x_{i,j} - x_{min,j}}{x_{max,j} - x_{min,j}}, \quad (1)$$

where $x_{min,j}$ and $x_{max,j}$ are the minimum and maximum values, respectively, of the j -th variable (in the set of offers satisfying the hard constraints). If the j -th variable is classified as a disincentive, then

$$r_{i,j} = \frac{x_{max,j} - x_{i,j}}{x_{max,j} - x_{min,j}}. \quad (2)$$

If required, weights can be ascribed to the variables. Let w_j denote the weight of the j -th variable. The final value of $r_{i,j}$ is then obtained by multiplying by w_j . Defined in this way, $r_{i,j} = w_j$ can be interpreted as the “ideal” value of a variable and $r_{i,j} = 0$ as the “anti-ideal” value. Suppose that the i -th offer is described by the vector of scaled traits $(r_{i,1}, r_{i,2}, \dots, r_{i,J})$. Hence, the vector (w_1, w_2, \dots, w_J) corresponds to an “ideal” offer, while $(0, 0, \dots, 0)$ corresponds to an “anti-ideal” offer. Based on this interpretation, the Euclidean distance between the i -th offer and the anti-ideal offer is given by S_i^+ and the Euclidean distance between the i -th offer and the ideal offer is S_i^- , where

$$S_i^+ = \sqrt{r_{i,1}^2 + r_{i,2}^2 + \dots + r_{i,J}^2} ; \quad S_i^- = \sqrt{(w_1 - r_{i,1})^2 + (w_2 - r_{i,2})^2 + \dots + (w_J - r_{i,J})^2}. \quad (3)$$

It should be noted that other distance measures (norms) can be used to define these two distances. Since offers that are close to the ideal and far from the anti-ideal are understood to be highly attractive, we may define the standardized value of the attractiveness of the i -th offer, A_i , as

$$A_i = \frac{S_i^+}{S_i^+ + S_i^-}. \quad (4)$$

By definition, this measure of attractiveness is between zero and one.

2.2 Definition of the diversity measure

Assume that the measure of diversity between the offers placed on the shortlist is based on K continuous variables. It should be noted that these might be the same variables as those used to assess the attractiveness of offers. However, suppose, for example, that the distance of a flat from the city center is used to define its attractiveness. In such a case, the distance between offers should depend on the physical distance between flats and not on the “difference between distances to the center”. This will be illustrated in Section 3. In general, it suffices that the variables defining the attractiveness of an offer, as well as the distances between offers, can be defined from the raw data available from the Internet.

Let $y_{i,k}$ denote the observation of the k -th variable used to define the distance between offers for the i -th offer. First, each of these variables is scaled to the interval $[0, 1]$ as in Equation (1), i.e. set

$$s_{i,k} = \frac{y_{i,k} - y_{min,k}}{y_{max,k} - y_{min,k}}. \quad (5)$$

The distance between the i -th and m -th offers, $d_{i,m}$, can then be defined to be the Euclidean distance between the scaled vectors \mathbf{s}_i and \mathbf{s}_m , where $\mathbf{s}_i = (s_{i,1}, s_{i,2}, \dots, s_{i,K})$. Thus

$$d_{i,m} = \sqrt{(s_{i,1} - s_{m,1})^2 + (s_{i,2} - s_{m,2})^2 + \dots + (s_{i,K} - s_{m,K})^2}. \quad (6)$$

Again other distance measures (norms) can be used to describe the distance between offers. This will be considered in future research (see the Conclusion).

2.3 Construction of a shortlist

Define the weight of the diversity of a shortlist to be α . The goal of the algorithm is to form a shortlist of n offers with a near-optimal score. The score of a shortlist given by the set of offers N , $v(N)$, is defined to be $v(N) = (1 - \alpha)\bar{x}_N + \alpha\bar{d}_N$, where \bar{x}_N is the mean attractiveness of the offers on the shortlist and \bar{d}_N is the mean distance between pairs of offers on the shortlist. This shortlist is formed by sequentially adding offers according to the following greedy algorithm:

1. Let $c = 1$. The most attractive offer is placed on the list.
2. Add the offer not yet on the list that maximizes the score of the newly formed list.
3. Let $c = c + 1$. If $c = n$, then stop, otherwise return to 2.

It should be noted that when no weight is placed on the diversity of offers, then this algorithm simply places the n most attractive offers on the shortlist. Hence, in this case, the algorithm maximizes the score of the shortlist formed (maximizing the sum of the attractiveness measures automatically maximizes their mean). When $\alpha > 0$, the shortlist constructed is not necessarily optimal, since its score cannot be defined as the “sum of the gains made at each stage”.

3. A Simple Example

Suppose that a decision maker is searching for a flat. An Internet site gives the following information on an offer: a) price, b) size (in m^2), c) no. of bedrooms, d) latitude relative to the city center (“distance north” - in kms), e) longitude relative to the city center (“distance east” - in kms). The strict constraints of the decision maker and the types of these variables are:

- **Price:** below 500 000 (disincentive).
- **Size:** at least $60m^2$ (incentive).
- **No. of bedrooms:** between 2 and 4.
- **Distance from city center:** less than 10km (disincentive).

The data regarding eight offers are given in Table 1. It is assumed that the distance from the city center is simply the Euclidean distance based on the two positional coordinates. The decision maker wishes to choose a shortlist of three flats to view. It should be noted that the number of bedrooms is only used for the purposes of initial filtering based on the hard constraints.

Table 1: Data on Offers of Flats

	Price	Size	No. of bedrooms	Distance N	Distance E
Flat 1	450 000	84	4	2.5	-1.4
Flat 2	390 000	68	3	1.4	-0.9
Flat 3	440 000	63	2	-0.8	0.6
Flat 4	480 000	108	5	2.1	3.2
Flat 5	420 000	76	3	3.1	1.4
Flat 6	450 000	112	4	6.8	-9.3
Flat 7	410 000	88	3	4.0	3.6
Flat 8	490 000	72	3	-1.0	1.2

Source: example data given by the authors

On the basis of the hard constraints, Flat 4 and Flat 6 are removed (too many bedrooms and too far from the city center, respectively). The data (raw and scaled) used to assess the attractiveness of these offers are given in Table 2. It is assumed that these variables are given equal weighting (i.e. $w_i = 1, i = 1, 2, 3$).

Table 2: Data used to assess the attractiveness of flats (scaled data given in brackets)

	Price	Size	Distance from center	S_i^+	S_i^-	A_i
Flat 1	450 000 (0.4)	84 (0.84)	2.8653 (0.5743)	1.0934	0.7529	0.5922
Flat 2	390 000 (1)	68 (0.2)	1.6643 (0.8484)	1.3266	0.8142	0.6197
Flat 3	440 000 (0.5)	63 (0)	1.0000 (1)	1.1180	1.1180	0.5000
Flat 5	420 000 (0.7)	76 (0.52)	3.4015 (0.4519)	0.9821	0.7879	0.5549

Flat 7	410 000 (0.8)	88 (1)	5.3814 (0)	1.2806	1.0198	0.5567
Flat 8	490 000 (0)	72 (0.36)	1.5620 (0.8717)	0.9431	1.1942	0.4413

Source: example data given by the authors (based on Table 1)

The data used to calculate the distance between the offers considered are given in Table 3. The matrix of distances between offers is given in Table 4.

Table 3: Data used to assess the distance between offers (scaled data given in brackets)

	Price	Size	Distance N	Distance E
Flat 1	450 000 (0.6)	84 (0.84)	2.5 (0.7)	-1.4 (0)
Flat 2	390 000 (0)	68 (0.2)	1.4 (0.48)	-0.9 (0.10)
Flat 3	440 000 (0.5)	63 (0)	-0.8 (0.04)	0.6 (0.4)
Flat 5	420 000 (0.3)	76 (0.52)	3.1 (0.82)	1.4 (0.56)
Flat 7	410 000 (0.2)	88 (1)	4.0 (1)	3.6 (1)
Flat 8	490 000 (1)	72 (0.36)	-1.0 (0)	1.2 (0.52)

Source: example data given by the authors (based on Table 1)

Table 4: Matrix of distances between offers

	Flat 2	Flat 3	Flat 5	Flat 7	Flat 8
Flat 1	0.9099	1.1451	0.7214	1.1294	1.0728
Flat 2		0.7574	0.7208	1.3268	1.1968
Flat 3			0.9718	1.5400	0.6290
Flat 5				0.6829	1.0907
Flat 7					1.5100

Source: example data given by the authors (based on Table 1)

We now construct a shortlist of length three under the assumption that the relative weights ascribed to attractiveness and diversity are 10 and 3, respectively, i.e $\alpha = 3/13$. First, the offer assessed to be most attractive (Flat 2) is added to the shortlist. Next, we add an offer to maximize the score of the shortlist. This is illustrated in Table 5. On the basis of these calculations, Flat 7 is added to the shortlist.

Table 5: Step two of constructing a shortlist

Shortlist	Attractiveness scores	Mean attractiveness	Distance between offers	Weighted Score
{2, 1}	{0.6197, 0.5922}	0.60595	0.9099	0.6761
{2, 3}	{0.6197, 0.5000}	0.55985	0.7574	0.6054
{2, 5}	{0.6197, 0.5549}	0.58730	0.7208	0.6181
{2, 7}	{0.6197, 0.5567}	0.58820	1.3268	0.7586
{2, 8}	{0.6197, 0.4413}	0.53050	1.1968	0.6843

Source: example data given by the authors (based on Table 1)

Finally, a third offer is added to the shortlist. This is illustrated in Table 6. On the basis of this, the final shortlist consists of Flats 2, 7 and 8.

Table 6: Step three of constructing a shortlist

Shortlist	Attractiveness scores	Distance between offers	Weighted score
{2, 7, 1}	{0.6197, 0.5567, 0.5922}	{1.3268, 0.9099, 1.1294}	0.7124
{2, 7, 3}	{0.6197, 0.5567, 0.5000}	{1.3268, 0.7574, 1.5400}	0.7086
{2, 7, 5}	{0.6197, 0.5567, 0.5549}	{1.3268, 0.7208, 0.6829}	0.6540
{2, 7, 8}	{0.6197, 0.5567, 0.4413}	{1.3268, 1.1968, 1.5100}	0.7251

Source: example data given by the authors (based on Table 1)

There are ${}_6C_3 = \frac{6!}{3!3!} = 20$ possible shortlists of length three. Hence, the optimal shortlist could easily be found by exhaustive search. However, suppose that there are a large number of offers that satisfy the hard constraints, I , compared to the required length of the shortlist, n . The possible

number of shortlists is approximately $I^n/n!$. Using the greedy algorithm considered above, the number of shortlists considered is of order In , which is much smaller. Exhaustive search indicates that, in this case, the greedy algorithm finds the optimal shortlist of three offers based on the weighted score.

4. A Practical Example

Data regarding 11 321 offers of properties in the city of Wrocław were downloaded on 4th Feb. 2021 from the Internet site www.otodom.pl. The data used were: price, size (in m^2) and number of rooms¹. The goal is to construct a shortlist of 30 offers using two approaches to assess the attractiveness of offers: TOPSIS (as described above) and simple additive weighting (SAW, as described in Mariański et al., 2020). The definition of the distance between offers is as described above, independently of the approach used. The hard constraints that an offer must satisfy are:

1. **Price:** cannot exceed 500 000 PLN (approx. €111 500).
2. **Size:** at least $60m^2$.
3. **No. of rooms:** between three and five.

After eliminating the offers that did not satisfy these constraints, 917 offers remained.

In order to assess the attractiveness of an offer, price was treated as a disincentive and size as an incentive (the number of rooms was not considered as a factor at this stage). Price and size were ascribed weights of 0.3 and 0.7, respectively. Using SAW, the attractiveness of offer i was assessed to be $A_i = 0.3r_{i,1} + 0.7r_{i,2}$, where $r_{i,1}$ and $r_{i,2}$ are the standardized values of the price and size of a flat as given by Equations (2) and (1), respectively. The greedy algorithm described in Section 2 was used to derive shortlists of 30 flats for further investigation using weights for the diversity of offers from the set $\alpha \in \{0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1\}$.

Table 7: The effect of the weight placed on diversity to the mean ranks, attractiveness and diversity of real estate offers placed on a shortlist of length 30 (917 offers satisfy the hard constraints)

		TOPSIS	SAW
$\alpha = 0$	Mean rank (Max. rank)	15.5000 (30)	15.5000 (30)
	Mean attractiveness (mean diversity)	0.6207 (0.2321)	0.5686 (0.2619)
	Relative attractiveness (relative diversity)	1.0000 (0.3407)	1.0000 (0.3695)
	No. in common (ranks of offers omitted by SAW)	29	(26)
$\alpha = 0.1$	Mean rank (Max. rank)	15.5000 (30)	15.5000 (30)
	Mean attractiveness (mean diversity)	0.6207 (0.2321)	0.5686 (0.2619)
	Relative attractiveness (relative diversity)	1.0000 (0.3407)	1.0000 (0.3695)
	No. in common (ranks of offers omitted by SAW)	29	(26)
$\alpha = 0.2$	Mean rank (Max. rank)	15.5000 (30)	20.2000 (171)
	Mean attractiveness (mean diversity)	0.6207 (0.2321)	0.5637 (0.2905)
	Relative attractiveness (relative diversity)	1.0000 (0.3407)	0.9915 (0.4100)
	No. in common (ranks of offers omitted by SAW)	29	(26)
$\alpha = 0.3$	Mean rank (Max. rank)	20.8333 (190)	20.2500 (171)
	Mean attractiveness (mean diversity)	0.6134 (0.2782)	0.5632 (0.3191)
	Relative attractiveness (relative diversity)	0.9882 (0.4083)	0.9906 (0.4504)
	No. in common (ranks of offers omitted by SAW)	28	(23.5, 26)
$\alpha = 0.4$	Mean rank (Max. rank)	20.8333 (190)	20.3833 (171)
	Mean attractiveness (mean diversity)	0.6134 (0.2782)	0.5627 (0.3282)
	Relative attractiveness (relative diversity)	0.9882 (0.4083)	0.9898 (0.4631)
	No. in common (ranks of offers omitted by SAW)	27	(23.5, 26, 28)
$\alpha = 0.5$	Mean rank (Max. rank)	20.9000 (190)	25.3500 (175)
	Mean attractiveness (mean diversity)	0.6126 (0.2929)	0.5571 (0.3690)
	Relative attractiveness (relative diversity)	0.9870 (0.4299)	0.9799 (0.5207)

¹ Based on a review of websites specializing in domestic real estate, Mariański et al. (2020) compiled a list of other factors used, but less generally, when describing real estate offers on the Internet.

	No. in common (ranks of offers omitted by SAW)	27	(23.5, 26, 27)
$\alpha = 0.6$	Mean rank (Max. rank)	27.6667 (229)	25.8667 (175)
	Mean attractiveness (mean diversity)	0.6031 (0.3383)	0.5558 (0.3828)
	Relative attractiveness (relative diversity)	0.9716 (0.4966)	0.9776 (0.5402)
	No. in common (ranks of offers omitted by SAW)	26	(23.5, 23.5, 27, 229)
$\alpha = 0.7$	Mean rank (Max. rank)	33.7167 (229)	34.2000 (223)
	Mean attractiveness (mean diversity)	0.5941 (0.3814)	0.5437 (0.4409)
	Relative attractiveness (relative diversity)	0.9571 (0.5598)	0.9564 (0.6222)
	No. in common (ranks of offers omitted by SAW)	25	(20, 21, 22, 23.5, 26)
$\alpha = 0.8$	Mean rank (Max. rank)	51.4333 (272)	54.6000 (293)
	Mean attractiveness (mean diversity)	0.5677 (0.4748)	0.5187 (0.5119)
	Relative attractiveness (relative diversity)	0.9146 (0.6969)	0.9124 (0.7224)
	No. in common (ranks of offers omitted by SAW)	24	(17, 19, 20, 26, 29, 272)
$\alpha = 0.9$	Mean rank (Max. rank)	114.0000 (312)	100.0333 (382)
	Mean attractiveness (mean diversity)	0.4852 (0.5890)	0.4734 (0.5796)
	Relative attractiveness (relative diversity)	0.7818 (0.8645)	0.8327 (0.8179)
	No. in common (ranks of offers omitted by SAW)	28	(301, 312)
$\alpha = 1.0$	Mean rank (Max. rank)	221.4667 (917)	225.8000 (917)
	Mean attractiveness (mean diversity)	0.4228 (0.6490)	0.4029 (0.6490)
	Relative attractiveness (relative diversity)	0.6812 (1.0000)	0.7086 (1.0000)
	No. in common (ranks of offers omitted by SAW)	30	-

Source: Analysis using a program written in R by the authors based on data from the Internet site www.otodom.pl (accessed Feb. 4th, 2021)

Table 7 gives results regarding the mean rank, attractiveness and diversity of the offers placed on the shortlist. Since the mean measure of attractiveness depends on the method used, relative measures of the mean attractiveness of offers placed on the shortlist are used for comparative purposes.

The relative attractiveness and diversity scores are calculated as the ratio of the given mean scores to the maximum mean score (for each method individually). Note that the maximum mean attractiveness is obtained when $\alpha = 0$, i.e. all the weight is placed on attractiveness, rather than diversity. The maximum mean diversity is obtained when $\alpha = 1$, i.e. all the weight is placed on diversity, rather than attractiveness. The position “no. in common” indicates the size of the set of offers that are placed on the shortlist by both methods for a fixed value of α . The position “ranks of offers omitted by SAW” gives the ranks of the offers (according to TOPSIS) that are placed on the shortlist using the algorithm based on TOPSIS, but are not placed on the shortlist using the algorithm based on SAW.

When $\alpha = 0$, the algorithm places the thirty highest-ranked offers, according to the assessment method used, onto the shortlist. All but one (the 26th ranked) of the 30 highest-ranked offers based on TOPSIS are ranked in the top thirty using SAW. It is thus clear that the rankings according to these two methods are very highly correlated. When $\alpha = 1$, the algorithm first places the highest-ranked offer onto the shortlist and then at each stage adds the offer which maximizes the mean diversity of offers. The same diversity measure is used in both algorithms. Hence, the shortlists formed will be identical whenever the assessment methods used indicate the same offer as being highest-ranked (as is the case here). The differences between the mean ranks of these offers in this case results from the differences between the rankings as defined by TOPSIS and SAW.

It can be seen that for $\alpha \leq 0.7$, the relative attractiveness of the offers on the shortlist is at least 0.95. Investigation of the ranks of the offers placed on the shortlist shows that in these cases all of the fifteen most highly ranked offers are placed on the short list. In addition, for intermediate values of α , several offers on the short list differ significantly from the most highly ranked offers, but are still relatively highly ranked (within the top 25% of the offers that satisfy the hard constraints). This indicates that using such values of α to derive shortlists may be appropriate in such a problem.

5. Conclusion

This paper has presented a method for constructing shortlists of potentially attractive offers from large databases. Such an approach may well be of use when searching for a unique good (e.g. flat or second-hand car) for which some useful, numerical information can be found easily via the Internet, but offers should be more carefully inspected before purchase. The length of this shortlist, together with the hard constraints that the offer should satisfy based on information available from the database, are given by the decision maker. First, offers that do not satisfy this set of hard constraints are removed. The remaining offers are then assessed on the basis of the TOPSIS method. Finally, a greedy algorithm then constructs a shortlist with the aim of maximizing a weighted average of the mean assessments of the offers on the shortlist and a measure of their diversity. Since such Internet sites give both quantitative and qualitative information about offers, such a procedure can be used as an initial filter when deciding which offers to observe in real life.

This method has been illustrated in Section 4 by an example in which a shortlist of flats is chosen and compared with an algorithm based on ascribing attractiveness scores via SAW (see Mariański et al., 2020). For the problem considered, where attractiveness is based on the size and price of a flat, the results indicate that both approaches can be successfully used to construct such shortlists. By ascribing a similar weight to attractiveness and diversity, this algorithm produces shortlists of a relatively high level of diversity, while ensuring that all of the offers are relatively highly ranked.

Note that the set of variables used to assess the attractiveness of an offer may be extended relatively easily. For example, the example given in Section 3 to illustrate the algorithm uses the geographical location of an offer as a factor. Although the range of the measures of attractiveness is $[0, 1]$, regardless of the number of factors used, the range of the measure of diversity (based on Euclidean distance) depends on the number of factors used (when J factors are used the maximum distance between offers is \sqrt{J}). For this reason, future research should investigate other possible measures of distance and how to choose appropriate values for α (the weight of the measure of diversity) according to the number of variables and the distance measure used to assess diversity. In addition, the choice of the value of this parameter should depend on the knowledge of a decision maker about a market and the strength of his/her preferences. For example, when searching for a new flat, a relatively high value of α should be used when the decision maker is moving to a new city.

A number of methods of assessing the attractiveness of an offer based on multiple traits are available. This article has compared the use of the TOPSIS and SAW methods of assessing the attractiveness of an offer in constructing a shortlist of real estate offers. The short lists formed using these two approaches were almost identical. It should be noted, however, that the SAW method possesses some advantages: 1) it is easier to understand/interpret, 2) it can be more easily adapted to cases where intermediate values of a variable are preferred (see Mariański et al., 2020). Future research will investigate a range of approaches to such problems over a wider range of problems, in order to develop a robust approach to the problem of shortlist formation.

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THE IMPACT OF PERSONALITY TRAITS ON ENTREPRENEURIAL EDUCATION EFFECTIVENESS

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Abstract

The purpose of this paper is to examine the personality factors that cause changes on entrepreneurial intention after the intervention of entrepreneurial education. A pre-test-post-test group design was used to measure the changes in students' entrepreneurial intention. Two questionnaires were completed by 202 business students, studying at a public university based in Athens, Greece. Our statistical analysis showed that Openness, Extraversion of the Five factor Model and Risk Aversion are important factors influencing entrepreneurial intention. A Wilcoxon test we employed indicated that there is an increase in entrepreneurial intention following the course attendance. Furthermore, a cluster analysis we used, divided our sample in two groups. The first group included the students with a mean change in entrepreneurial intention levels (following the intervention) approximately zero, while the second group consisted of the students whose mean change was positive. The findings indicate that students with lower levels of extraversion, openness and conscientiousness demonstrated higher means of change in entrepreneurial intention levels. This study approach has several limitations however, future studies could investigate the generalizability of the findings reported here and inquire the potential existence of latent variables which may be confounding the relationships discussed in this paper.

Keywords: entrepreneurial education, entrepreneurial Intention, five factor model, personality traits, risk-aversion

JEL codes: I23, L26, I2, J24

1. Introduction

The Big Five personality traits Model was developed in 1990, proposing the organization of the various personality variables in the literature into a Five Factor Model comprised of relatively independent and distinct factors (Costa and McCrae, 1992). The five personality traits are conscientiousness, neuroticism (some refer to this trait as Emotional Stability), agreeableness, extraversion and openness. Researchers in the entrepreneurship field have used extensively the Five Factor Model in trying to identify the personality traits associated with the entrepreneurs (Collins et al., 2004; Stewart and Roth, 2007; Zhao and Seibert, 2006). One important personality trait in the extant entrepreneurship research is risk aversion (Rauch and Frese, 2007). Some researchers argue that risk aversion is a sixth characteristic that is not included in the five-factor model, however, due to its importance and the difficulty in clustering personality traits it is studied as an additional variable (Paunonen and Jackson, 1996; Sahinidis, et al., 2020; Sahinidis and Tsaknis, 2021). The first studies about how education can promote entrepreneurship were proposed by Cantillon (1931) and more recently by Cotrugli (1990) among others studied the effectiveness of entrepreneurship education programs. Entrepreneurship Education has evolved greatly since 1931. The entrepreneurial intention variable is among the important considerations in the field of education as it can affect the awareness, the knowledge about entrepreneurship and the career options of individuals.

2. Literature review

2.1 Big Five Personality Traits and Risk Aversion

Openness to experience refers to a personality trait that describes an individual who is intellectually curious, imaginative, and creative. Individuals with this personality trait appreciate the importance of spiritual and artistic quests and are not afraid of new challenges (Yong, 2007; Sahinidis et.al, 2013; Costa and McCrae, 1992; Hazrati-Viari et al., 2012). Businesses expect creativity in order to keep up with the changing market trends, with their competitors and new technologies (Sahinidis et.al. 2020; Brice 2002; Nordvik and Brovold, 1998). Openness to experience is expected to be associated with stronger entrepreneurial intentions (Murugesan and Jayavelu, 2017; Zhao and Seibert, 2006). Based on the above we propose that:

H1: There is a positive relationship between Openness to experience and entrepreneurial intention.

Conscientiousness according to Costa and McCrae, (1992) and Sahinidis et al. (2013), describes the level of achievement orientation, impulse control, organization and planning, acceptance of traditional norms and feeling responsibility toward others (also see, Zhao et al., 2010; Roberts et.al, 2005). McClelland's (1961) stated that individuals with high need for achievement would be more attracted to entrepreneurship. Conscientious people are working hard and persist in overcoming obstacles to achieving their goals, traits closely related to entrepreneurship (Locke, 2000). Individuals with this trait are more attracted to entrepreneurship according to research findings (Howard and Howard, 1995; Murugesan and Jayavelu, 2017) and are also positively linked to long-term survival of a business venture (Ciavarella et al., 2004). Based on the above the following hypothesis is proposed:

H2: Conscientiousness is expected to relate positively with entrepreneurial intention.

Extraversion. Individuals with this trait are ambitious, altruistic, communicative, social, warm, and friendly (Clark and Schroth, 2010; Trappman et al., 2007). Sahinidis et al.

(2013) proposed that extraversion implies an energetic spontaneous and adventurous with positive emotions individual. An entrepreneurial career may appear to be more stimulating and exciting than many traditional business-related occupations, and thus more appealing to extraverts. Many researchers report findings suggesting that extraversion is a common characteristic of entrepreneurs (Nordvik and Brovold, 1998; Baron, 1998; Locke, 2000; Vecchio, 2003; McCarthy, 2003). Extraversion is expected to have a positive and direct relationship with the entrepreneurial intention since it has been strongly correlated with interest in enterprising occupations (Brice, 2002). We conclude that:

H3: There is a positive relationship between Extraversion and Entrepreneurial Intention.

Agreeableness refers to a person's attitude and behaviour toward other people. People with high levels of agreeableness are characterized as trustworthy, altruistic, and cooperative. They show sympathy and concern for the others, are good listeners and promote harmony in order to avoid conflicts (Caliendo and Kritikos, 2008). Barrick et al., (2013) showed that people high on agreeableness are more likely to have career interests in social occupations such as social work and teaching, rather than business, because those occupations provide frequent interpersonal interactions where they can work for the benefit of others. On the other hand, entrepreneurship involves establishing a profitable enterprise built around the owner's personal needs and interests (Singh and DeNoble, 2003). The entrepreneur must try hard for the survival of the new venture disregarding sometimes the other stakeholders. Given the limited altruistic behavior, with the exception of social entrepreneurs, and the higher probability of interpersonal conflict associated with entrepreneurship, highly agreeable people are less likely to show high levels of entrepreneurial intentions (Murugesan and Jayavelu, 2017). In line with the above, the following hypothesis is proposed:

H4: Agreeableness is expected to have a negative relationship with entrepreneurial intention.

Neuroticism. This personality dimension characterizes individuals as tense, anxious, nervous and emotional (De Feyter et.al, 2012). Neuroticism refers to the degree of the individual's emotional stability (Llewellyn and Wilson, 2003; Yong, 2007). Costa and McCrae (1992) mentioned that individuals, who are highly neurotic display mood swings, are being impulsive, are self-conscious, have low self-esteem and suffer from depression. Lack of self-esteem makes people unsuitable for having their own business since self-confidence is a catalyst for starting a venture (Brice, 2002). People with low levels of neuroticism on the other hand are described as stable, relaxed, resilient and calm. These traits are positively associated with entrepreneurship (Baron and Markman, 1999; Locke, 2000; Ahmed et al., 2020; Zhao et al., 2010; Zhao and Seibert, 2006). Singh and Noble (2003) reported that neuroticism may be negatively related to entrepreneurship activities and orientation. Thus, people with low neuroticism are more likely to start their own new business, while people with high neuroticism will be less likely to do so. We propose that:

H5: Neuroticism is expected to have a negative relationship with entrepreneurial intention.

Risk propensity. Risk propensity can be defined as a personality trait involving the willingness to make decisions or actions that entail an uncertain outcome (Jackson, 1979; Sahinidis et al., 2020). This trait is uncommon among the unemployed individuals (Dvoulety et al., 2018). Zhang and Cain (2017) suggest that risk aversion has a negative relationship with business intention. Furthermore, a study by Sahinidis et al (2020) corroborated earlier findings showing that risk aversion plays an important role in obstructing new business creation, stifling entrepreneurial intention. People who avoid risk-taking will tend to consider career options other than entrepreneurship. Other studies (e.g. Mayfield et al., 2008) also found significant negative relationships between risk aversion and investment intentions. Since entrepreneurship is an activity with high levels of risk that therefore requires a high level of risk tolerance,

researchers suggest that entrepreneurship activities require more risk-taking behaviors (Ahmed et al, 2020; Tubadji et al., 2019). Similarly, Zhao et al. (2010) analyzed the relationship between risk propensity and entrepreneurial intentions and found a significant positive relationship between them. Therefore, we suggest that:

H6: Risk aversion is expected to have a negative relationship with entrepreneurial intention.

2.2 Entrepreneurship Education

There is a general assumption that successful entrepreneurship is positively influenced by the mood, skills and abilities of the founders of a business (Unger et al., 2011), characteristics that can be shaped by education. Through education, students' abilities are enhanced and they develop such skills that they can take advantage of business opportunities (Maresch, et al., 2016). Entrepreneurial education is an important demographic factor studied from the literature which consists of any pedagogical program or process of education for entrepreneurial attitudes and skills (Patricia and Silangen, 2016). The role of education in entrepreneurship consists mainly of raising awareness of starting a business, building a business culture among students and improving their career choices towards entrepreneurship (Deakins et al., 2005). This view is shared in general by many researchers in the field (Bae et al., 2014; Fayolle and Gailly, 2009; Oosterbeek et al., 2010; Kefis and Xanthopoulou, 2015; Karanassios et al., 2006) who state that an entrepreneurial education program aims to increase students' awareness towards entrepreneurship, to allow them further develop their entrepreneurial skills, and highlight the entrepreneurial path as a career option (Patricia and Silangen, 2016). The findings of Ojogbo et al. (2016) also suggest a positive relationship between entrepreneurship education and entrepreneurial intention and perceived desirability, while no relationship existed with perceived feasibility or self-efficacy. Sahinidis and Tsaknis (2020) also concluded that entrepreneurship education enables students to become familiar with the entrepreneurial logic, the challenges and the processes involved in entrepreneurship. From the above mentioned, the following hypothesis is proposed.

H7: There is a significant relationship between entrepreneurial education and students entrepreneurial intentions

3. Methods

After determining the initial aim of the proposed study and given its complexity, a pre-test-post-test group design was adopted to measure the change in students' entrepreneurial intention. In order to determine the relationship between the variables stated in the hypotheses above and entrepreneurial education the questionnaire method is deemed as appropriate to get answers to the questions raised. Both questionnaires were completed by 202 undergraduate business students, studying at a public university based in Athens, from a class of 350 second-year students (school of administrative, economics and social sciences, department of business). The sample comprises 87 men and 115 women all of them are young adults (from 18 to 25 years old). The group participating in this study was voluntarily tested at both times. The first questionnaire was completed at the beginning of a 13-week compulsory course (spring semester 2019-2020) in Entrepreneurship and contained questions that measure big five personality traits, risk aversion and entrepreneurial intention. The questionnaire was re-sent to the students who responded to the first one, at the end of the course with the same questions aiming to measure students' entrepreneurial intentions. The size of the sample allows us to proceed with reliable statistical analyses and produce valid conclusions. The data was empirically tested using the SPSS software version 24.

4. Results and findings

In order to prove the linear components that are presented in the data, we used principal component analysis (PCA) with Varimax rotation. All the components have a reliability coefficient higher than 0.5, according to the literature all of these prices are acceptable (Stevens 2002; Hair, et al., 1995). The PCA method was chosen as the questionnaires have been adequately studied by previous surveys in terms of their factor structure and reliability. The most commonly used method in the literature for the analysis of these questionnaires is PCA (Sahinidis et al., 2020; Tsaknis and Sahinidis, 2020). Six components were formed (risk aversion, neuroticism, conscientiousness, agreeableness, extraversion, openness) (KMO=0.728, $\lambda^2 = 1163$, $p < 0.01$).

Using Cronbach's alpha reliability test we measured the internal consistency of our sample. This test was interpreted for the questions of each component. The results have shown that alpha coefficient for the component openness is 0.768 (N=4 questions), for the component conscientiousness is 0.682 (N=4 questions), for extraversion is 0.733 (N=4 questions), for agreeableness is 0.657 (N=3 questions), for neuroticism is 0.739 (N=3 questions) and for risk aversion is 0.683 (N=4 questions). The components of agreeableness and neuroticism has a low reliability factor, which indicates a low degree of internal relevance of the individual questions that form these components (Field, 2009). Table 1 demonstrates the descriptive statistics of the variables.

Table 1: Descriptive Statistics

Statistics								
	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism	Risk Aversion	EI Before Education	EI After Education
N	202	202	202	202	202	202	202	202
Mean	5.152	5.875	4.895	4.817	3.761	2.812	4.767	4.927
Std. Deviation	0.983	0.764	1.124	0.986	1.118	0.964	1.573	1.426
Variance	0.966	0.584	1.263	0.973	1.251	0.930	2.474	2.032
Range	4.500	3.750	5.250	5.000	6.000	3.750	6.000	6.000

Source: author's calculations

Table 2 demonstrates the predictive power of the independent variables, in terms of entrepreneurial intention. The results show that 22.6% of the variance the depended variable is explained by the independent variables. Table 3 shows the predictive ability of the five factors, plus risk aversion, concerning entrepreneurial intention. Openness, extraversion and risk aversion are important factors influencing entrepreneurial intention. Openness to experience and agreeableness, have a positive relationship with entrepreneurial intention while risk aversion has a negative one. The variable that affects entrepreneurial intention the most is openness. Openness, extraversion and risk aversion have a statistically significant impact on the outcome variable (p values < 0.05) while conscientiousness, agreeableness and neuroticism were found to be non-significant predictors (p value = .076, p value = 0.465, p value = 0.699 respectively) (Stevens 2012).

Table 2: Model Summary

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.499 ^a	.249	.226	1.383679659000000	.249	10.780	6	195	.000

a. Predictors: (Constant), Risk Aversion, Neuroticism, Conscientiousness, Agreeableness, Extraversion, Openness

Source: author's calculations

Table 3: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	123.834	6	20.639	10.780	.000 ^b
	Residual	373.341	195	1.915		
	Total	497.175	201			

a. Dependent Variable: EI Before Education

b. Predictors: (Constant), Risk Aversion, Neuroticism, Conscientiousness, Agreeableness, Extraversion, Openness

Source: author's calculations

Table 4: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.130	1.228		2.549	.012
	Openness	.461	.110	.288	4.207	.000
	Conscientiousness	-.239	.134	-.116	-1.787	.076
	Extraversion	.299	.092	.213	3.240	.001
	Agreeableness	.075	.102	.047	.731	.465
	Neuroticism	-.035	.090	-.025	-.387	.699
	Risk Aversion	-.365	.109	-.224	-3.346	.001

a. Dependent Variable: EI Before Education

Source: author's calculations

In Table 6, Wilcoxon Signed Ranks Test indicate that there is a statistically significant change in the entrepreneurial intention levels after the entrepreneurial education took place (p value<0.05) (Field, 2009).

Table 5: Ranks of change on Entrepreneurial Intention levels

Ranks		N	Mean Rank	Sum of Ranks
Before - After	Negative Ranks	94 ^a	81.48	7659.50
	Positive Ranks	64 ^b	76.59	4901.50
	Ties	44 ^c		
	Total	202		
a. Before < After				
b. Before > After				
c. Before = After				

Source: author's calculations

Table 6: Wilcoxon Test

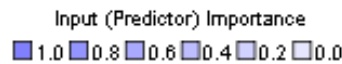
Test Statistics^a	
	Before - After
Z	-2.409 ^b
Asymp. Sig. (2-tailed)	.016
a. Wilcoxon Signed Ranks Test	
b. Based on positive ranks.	

Source: author's calculations

In Table 7, cluster analysis was used dividing our sample in the middle. In the first group there were 101 students whose mean of changes in entrepreneurial intention levels (before and after the entrepreneurial education) was almost zero. In the second group there were 101 students whose mean of change in entrepreneurial intention levels (before and after the entrepreneurial education) was positive 0.34. The findings indicate that students that have lower levels of extraversion, openness and conscientiousness displayed higher means of changes in entrepreneurial intention levels. On the other hand, the means of changes in entrepreneurial intention levels of students with higher levels of extraversion, openness and conscientiousness was almost zero (Hair et al., 2010; Crum et al., 2020).

Table 7: Cluster Analysis

Clusters



Cluster	1	2
Label		
Description		
Size	50.0% (101)	50.0% (101)
Inputs	Extraversion 5.57	Extraversion 4.22
	Openness 5.69	Openness 4.61
	Conscientiousness 6.23	Conscientiousness 5.52
	Risk Aversion 2.50	Risk Aversion 3.13
	Neuroticism 3.54	Neuroticism 3.98
	Agreeableness 4.63	Agreeableness 5.00
	diffINT -0.02	diffINT 0.34

Source: author's calculations

The findings above indicate the emphasis that needs to be placed in personality factors, when teaching entrepreneurship courses and attention must be paid to the personal differences of students, in order to maximize the outcome of the intervention. The implications of the findings of this study are far reaching, helping teaching staff provide more targeted approaches based on personality factors, so as to generate greater awareness or entrepreneurial intention, or both, depending on the goal of a program. Students with low levels of extraversion, openness and conscientiousness, will be more responsive to entrepreneurship courses and this can help boost the course ultimate success.

5. Conclusion

Taking into consideration the theoretical framework that was developed around the five-factor model of personality and risk-taking, many researchers have tried to relate these

characteristics to entrepreneurial intention leading to interesting conclusions, that in many cases require further research (Sahinidis et al., 2020; Zhang et al., 2017; Sahin et al., 2019). Our hypotheses draw valid conclusions about the influence of the five personality factors and risk aversion on entrepreneurial intention and the extent to which entrepreneurial education affects the entrepreneurial intention levels. The improvement in entrepreneurship education programs provided by universities, in both quantitative and qualitative terms, is associated with greater levels of entrepreneurial intention (Sahinidis and Tsaknis, 2020).

Aside from the aforementioned contributions, this study also has a number of limitations that must be addressed. One limitation of this study is the fact that the findings are based on a setting of university students. The size of the sample in this study allows us to proceed with reasonable and reliable statistical analyses, nevertheless university students of business studies are not representative of all students. (Tsaknis and Sahinidis, 2020). Another limitation is that our regression model does not include sample characteristics such as age, gender, year of study. Individual characteristics have an important role also in shaping the entrepreneurial engagement of youth (Dvouletý et al., 2018). Finally, another limitation is that cluster analysis revealed the characteristics of the students that the entrepreneurship course improved their entrepreneurial intention levels. We did not investigate the characteristics of the students that had lower entrepreneurial intention levels after the entrepreneurship course.

This study, contributes to the literature by addressing the influence of the factors affecting entrepreneurial intention and by providing empirical evidence to help formulate policies to encourage university students' entrepreneurship practices, attracting the interest of both educators and policy makers. The findings will become increasingly important, as research in the field of entrepreneurship continues to place models of entrepreneurial intentions at the center of our understanding of the entrepreneurial process (Tsaknis and Sahinidis, 2020; Butz et al., 2018; Belias, 2019; Kavoura and Koziol, 2017; Kavoura and Andersson, 2016; Makarona and Kavoura, 2019; Sahinidis et al., 2013).

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THE EMERGING DILEMMA OF EURO ADOPTION IN ROMANIA

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Abstract

This paper aims to analyze the third round of the Euro Area enlargement, with its risks and structural challenges, focusing on the euro adoption process of Romania and its path to Exchange Rate Mechanism (ERM II) milestone. Both nominal and real convergence criteria were considered to outline the overall achievements of the monetary and fiscal policies, stressing the necessity to find an optimum timing for joining the Euro Area without increased euro adoption costs. While the compliance of the Maastricht criteria stimulates the illusion of the monetary integration for short periods, the main findings of the paper suggest a more temperate attitude of the citizens regarding the euro adoption process, but also the gaps between Romania and the Euro Area Member States in terms of economic structures. The recent evolution of the COVID-19 pandemic cannot be neglected, the negative effects being correlated with the citizen's trust in the unique currency, the people support for the euro adoption process being seriously affected by the premises of a new economic crisis.

Keywords: convergence, euro adoption, pandemic, Romania

JEL codes: F15, F36, E52

1. Introduction

The monetary unification process of the Euro Area is subject to a large debate on both academic and popular scenes. The third round of enlargement is often promoted by the political factors in more theoretical terms, rather than on practical grounds. Currently, the Euro Area comprises 19 EU Member States: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain (from 1999), Greece (from 2001), Slovenia (from 2007), Cyprus and Malta (from 2008), Slovakia (from 2009), Estonia (from 2011), Latvia (from 2014) and Lithuania (from 2015). The next round of Euro Area enlargement puts more pressure on the economic framework of the area as a whole, raising new challenges derived from some artificially fulfilled conditions of the candidate countries with weak sustainability premises. Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, and Sweden, as Member States with derogation are constantly subject to the European Commission diagnosis based on the Maastricht criteria, to explore the integration perspective concerning the dynamics of the Euro Area.

In this context, the main aim of the present paper is to analyze the third round of the Euro Area enlargement, focusing on the euro adoption process of Romania and its path to Exchange Rate Mechanism (ERM II) milestone. The multifaceted process of euro adoption in Romania is distilled by using nominal and real convergence criteria, without neglecting the time framework. The endeavor is in line with the main research objective of the paper, assuming that Romania has to find the optimum timing for joining the Euro Area without increased euro adoption costs. Even if the nominal criteria are

met, their unsustainable nature suggests the necessity to achieve the real convergence criteria as a measure to correlate the business cycles within the monetary union. To highlight the position of Romania in the euro adoption mechanism, we have divided the paper into three main sections: (a) euro adoption targets and general assessment of the nominal convergence criteria; (b) perspectives of the third euro enlargement based on comparative studies with other Euro Area candidates; (c) public opinion regarding the euro adoption process.

2. Literature review

Considering the case of PIGS countries (Portugal, Italy, Greece, and Spain), Demeter (2011) highlights the business cycle synchronization as one of the most stressing issues of monetary unification. Even if the decision of taking part in the Euro Area has not a unilateral character, being carefully monitored by the EU authorities in terms of efficient functioning of the economic mechanisms, the public opinion reveals a partial validation of the integration objective through the general support for the unique currency. Entering the Euro Area can bring serious advantages for Romania, summarized by Făt and Filip (2007) as following: (1) the elimination of the substantial exchange rate risks concerning the other Euro Area member states; (2) favoring the foreign investments inflows and the sustainable economic growth; (3) more coherence of the tax policies based on the provisions of the Stability and Economic Growth Pact; and (4) the contraction of interest rates as a result of alignment to the EU average.

The Treaty of Maastricht includes the necessary conditions for a country to enter the Euro Area, known as the nominal convergence criteria:

- the budget deficit < 3% of GDP
- the total public debt < 60% of GDP
- the inflation rate with no more 1.5 pp higher than the 3 best-performers
- the interest rate on bonds that are issued with a maturity of ten years with no more than 2 pp higher than the 3 best-performers
- the stability of exchange rate without significant turbulences for at least two years.

The integration of the Eastern and Central European countries to the European Union has raised the problem of structural discrepancies between these states and the former ones (with more comparable economic patterns), leading to the idea of unpredictable asymmetrical shocks in the absence of real convergence criteria fulfillment. From this category, we can mention the degree of economic openness, the structure of the economy, the GDP per capita indicator, or the bilateral trade of one country with the EU member states (as part of the total foreign trade). These additional criteria are meant to make the Euro Area more efficient, Horațiu (2019) emphasizing the real beta convergence requirements for Romania, Croatia, and Bulgaria, while the same author found the convergence trinity (expressed in terms of nominal, real, and structural convergence) as crucial for the Euro Area integration process. The main structural components depicted in its study were the unemployment rate, the business cycle, the current account, and the economic specialization, shaping a sustainable euro adoption process for the three mentioned candidates in the case of proper management of the post-joining challenges caused by the significant loss of the monetary policy instruments. To the same extent, other research papers (Lein-Rupprecht et al., 2007) reveal that the real convergence process influences the nominal convergence process through the trade openness (a negative relationship) and productivity growth (a positive relationship).

The main findings of the study conducted by Blesse et al. (2020) suggest that the experts from the CEE states are more cautious for more coordination and centralization from the European Union part, due to the pressure of the monetary policy established by the European Central Bank to the successful accommodation to the Euro Area. Analyzing ten Central and Eastern European countries from the former Communist regime block in the context of Economic and Monetary Union (EMU) enlargement, Raileanu Szeles and Marinescu (2010) suggest that “the conditional convergence in the CEE region becomes more powerful when Romania is included in the model” (p. 195), considering the values of GDP per capita coefficients.

In line with the current position of Romania in the Euro Area accession process are the findings of Dandashly and Verdun (2016), which have offered valuable insights into the euro adoption objective

for the Czech Republic, Hungary, and Poland. Their research study emphasizes that these countries which were close to fulfilling the convergence criteria in one moment in time, have “gradually abandoned an early euro adoption objective or did not push for euro adoption” (Dandashly and Verdun 2016, p. 406) due to the domestic political factors that characterize the government in power. To the same extent, Juliet Johnson (2008) divide some of the post-communist EU states into *laggards* (Poland, the Czech Republic, and Hungary) and *pacesetters* (the Baltic states, Slovenia, and Slovakia), suggesting that the conditionality of Maastricht has amplified the laggards to further delay the euro adoption.

Focusing on the EU countries which are still not willing to join the Euro Area, Deskar-Škrbić and Kunovac (2020) describe the reasons as political, sociological, and emotional, explaining that the loss of the monetary policy independence and the experience of the euro crisis has emphasized the major impact of the real convergence for the adjustment mechanisms. Dragan and Pascariu (2008) advocate for an optimum timing for Romania to enter the Euro Area, arguing that both a rush in process or a slowdown movement can be counterproductive. The single currency adoption course must be well balanced, the Romania-EU convergence being examined in the long run, with a special focus on the sustainability of the Maastricht criteria fulfillment. The European construction is based on a progressive integration and depends on the mentioned macroeconomic indicators, which make the independent national economies more compatible with the Euro Area mechanism, as a whole.

3. Methodology

The methodological approach is based on descriptive analysis, to explore the third round of Euro Area enlargement. The euro adoption process was depicted by nominal and real convergence criteria, focusing on designing a complex case study on Romania, compared to other Euro Area candidates. First, were analyzed the nominal convergence criteria achieved by Romania in a dynamic time framework to catch the causes of the abandoned euro adoption targets. Then, we completed the analysis by a one-point-in-time approach, focusing on the ERM II milestone achieved by Croatia and Bulgaria on July 10, 2020, to extend the analysis on a comparative basis. Second, taking into account the disparities of the Central and Eastern European block in the new euro enlargement horizon, we capture the real convergence degree of the Romanian economy using the GDP per capita indicator, the economic openness, the structure of the economy, and the intra-EU trade. The final section was devoted to the citizen’s perceptions regarding the euro adoption process, amplifying the emerging dilemma of euro adoption in Romania as part of a nuanced political action that strengthened the illusion of a feasible target continuously abandoned over the years.

4. Euro adoption targets: Is Romania Ready?

The Euro adoption process in Romania is based on an ongoing strategy, claiming for an optimum timing to join the Euro Area following the Romanian capacity to meet its medium-term objectives. The speed of the process is influenced by the cost-benefit analysis, while the mandatory requirements are related to the nominal and real convergence criteria, reducing the time spent in the ERM II mechanism at the minimum level (two years). According to Table 1, Romania has experienced three abandoned euro adoption targets (2014, 2015, and 2019), fixing in the Convergence Program 2019-2022 the year 2024 as a new deadline.

However, the last Convergence Program published in May 2020 suggests serious macroeconomic imbalances, some of which being amplified in the context of the COVID-19 pandemic. Before establishing a timetable for joining the euro, Romania will have to restore its internal and external imbalances caused by the expansionist fiscal policies, the reduced capacity of absorption of the European funds, and the low level of investments. Thus, Romania has to meet several conditions of macroeconomic robustness in parallel with combating the negative effects generated by the COVID-19 crisis.

Table 1: The euro adoption process in Romania (2006-2020)

Convergence Program	Target year	<i>Nominal convergence criteria achieved by Romania according to the Convergence Reports (European Commission)</i>		
		<i>Indicator</i>	<i>Reference value</i>	<i>Achievements</i>
2006-2009	-			
2007-2010	-			
2008-2011	2014	<i>HICP Inflation (%)</i>	1.7%	2.1%
		<i>Government deficit (% of GDP)</i>	3%	2.3%
		<i>Government debt (% of GDP)</i>	60%	38.4%
		<i>Long term interest rates (%)</i>	6.2%	5.3%
		<i>ERM II</i>	Yes	No
		<i>Legal compatibility with the Treaty</i>	Yes	No
2009-2012 2011-2014 2012-2015	2015	<i>HICP Inflation (%)</i>	0.7%	-1.3%
		<i>Government deficit (% of GDP)</i>	3%	0.7%
		<i>Government debt (% of GDP)</i>	60%	38.4%
		<i>Long term interest rates (%)</i>	4%	3.6%
		<i>ERM II</i>	Yes	No
		<i>Legal compatibility with the Treaty</i>	Yes	No
2013-2016	-			
2014-2017 2015-2018	2019	<i>HICP Inflation (%)</i>	1.8%	3.7%
		<i>Government deficit (% of GDP)</i>	3%	4.3%
		<i>Government debt (% of GDP)</i>	60%	35.2%
		<i>Long term interest rates (%)</i>	2.9%	4.4%
		<i>ERM II</i>	Yes	No
		<i>Legal compatibility with the Treaty</i>	Yes	No
2016-2019	-			
2017-2020	-			
2017-2020	-			
2019-2022	2024			
2020	-			

Source: authors' compilation using data from <https://mfinante.gov.ro/>, <https://ec.europa.eu/>

We can notice the substantial regression of Romania to fulfill the mandatory Maastricht criteria in the last years, the 2019 milestone being a crucial point in the euro adoption process. Even if 2014 and 2015 have brought Romania closer to the inclusion goal, the last abandoned target suggests the unsustainable nature of the economic achievements, which can reveal major financial frictions between Romania and the Euro Area. After picking in the middle of 2018, the HICP inflation in Romania was constantly higher than the Euro Area average due to the diffusion of past VAT cuts effects and the rise of the global oil prices, while in 2019 the slight deceleration was trained by the reduction of the energy prices.

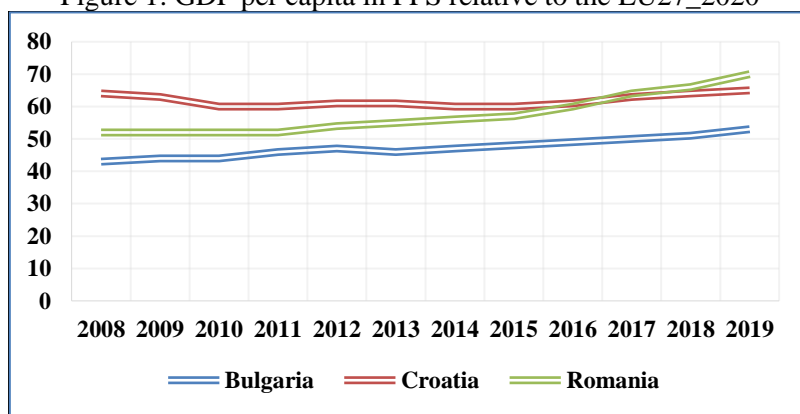
The fiscal developments were significantly higher than the targets established in the Convergence Programme, totalizing a Government deficit in 2019 of about 4.3% of GDP. The 4.4% long-term interest rate (2019), which reflects for the mentioned period the secondary market yields on a single government benchmark bond, was also influenced by the monetary policy loosening actions of the major central banks, which substantially suppressed the long-term yield. The Romanian leu is not included in the ERM II, which is the euro waiting room for two other Euro Area candidate countries since July 10, 2020 (Croatia and Bulgaria). ERM II plays an important role in the euro adoption roadmap, being a preparatory phase that substantially accelerates the convergence process. Under the legislative approach, Romania has serious incompatibilities with the ESCB/ECB Statute and the TFEU, where the legislative imperfections were largely repeated from the previous year's assessments.

5. Perspectives of the third euro enlargement. The case of Romania, Bulgaria, and Croatia

The third round of euro enlargement is one of the most provocative challenges because the Euro Area has to face the disparities of the Central and Eastern European block in parallel with the negative effects of a prolonged COVID-19 pandemic. At the same time, the new enlargement significance is amplified by the lessons achieved after the financial crisis, a crucial moment that moved the concerns towards financial stability issues and institutional resilience. While the euro adoption is still an obligation for the Member States with a derogation, each country has its progress rhythm. Croatia and Bulgaria are experiencing more significant results once the Croatian kuna and the Bulgarian lev were included in ERM II, testing the ground before the single currency adoption through both a market and a policy test. Their economies are expected to strengthen in this preparatory period, operating in a regime of stable exchange rates against the euro with even more efficient supervisory and macroprudential policies.

In this context, Romanian remaining vulnerabilities removed gradually the proclaimed euro adoption targets, while Bulgaria traversed the same route with different speeds without any assumed deadline. Even if joining the Euro Area was constantly on the Governmental agenda in Romania, most of the actions were mainly declarative and adjusted to the political election calendar. The current section highlights a comparative analysis of the real convergence criteria for Croatia, Bulgaria, and Romania, taking into account the evolutions of other CEE countries which are full EMU members (Estonia, Latvia, Lithuania, Slovakia, and Slovenia) or are still outside the area (the Czech Republic, Hungary, and Poland).

Figure 1: GDP per capita in PPS relative to the EU27_2020

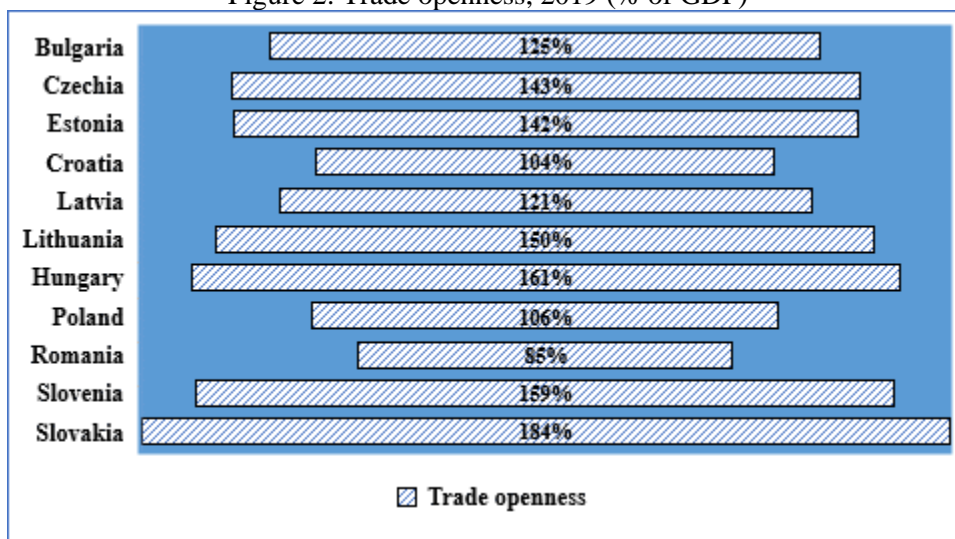


Source: authors' compilation using data from Eurostat

The real beta convergence analysis depicted in Figure 1 emphasizes the levels of GDP per capita in PPS for Romania, Croatia, and Bulgaria (EU27_2020 = 100). The data provided by Eurostat for the period 2008-2019 revealed that the GDP per capita in PPS related to the EU27_2020 grew by 18 percentage points in Romania, compared with an increase of 10 percentage points in Bulgaria. For Croatia, the level of GDP per capita in PPS remains relatively constant in the mentioned period, while the registered value for the Euro Area in 2019 was above the EU_27 average. From the CEE block, the highest levels of GDP per capita in PPS were achieved by the Czech Republic (93% of the EU27 average), Slovenia (89% of the EU27 average), Estonia, and Lithuania (84% of the EU27 average).

The degree of trade openness (Figure 2) suggests that Romania has the lowest degree of trade openness (85%), while the most open economies are Slovakia (184%), Hungary (161%), and Slovenia (159%). Both Bulgaria and Croatia exceed 100%, with a continuously progressive trend of the last one after the financial crisis. The increasing trend of the indicator for Romania can be explained by the comparative advantage due to the reduced costs of manpower. Primary importance is also devoted to the sectoral structure of GDP, the data provided by the National Commission for Strategy and Prognosis suggesting the prevalence of the services sector in the horizon of 2022 (58.5%), followed by the industry sector (23.2%). It must be mentioned the decreasing trend of agriculture in the GDP structure, which was an important sector before the EU accession, similar to Bulgaria and the other CEE countries. This sector is mostly affected by the seasonality, being related to the underdeveloped countries.

Figure 2: Trade openness, 2019 (% of GDP)



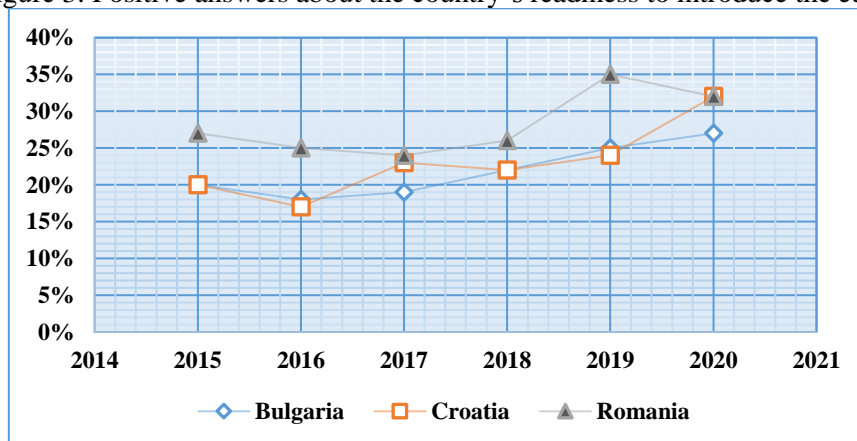
Source: authors' compilation using data from the World Bank

From this point of view, Romania has still a low level of structural convergence with the European Union, the services sector being well below the level recorded by the former EU Member States. For the period 01.01.2020-31.10.2020, the Romanian exports decreased by 12.2% and the imports decreased by 8.7%, compared to the same period of the previous year. The values of intra-EU trade were 73.8% of total exports and 73.3% of total imports, whereas for Bulgaria the values were 65.4% of total exports and 63.7% of total imports.

6. Romania: For or against the Euro Area integration?

Romania has to address both nominal and real convergence criteria to complete the European integration, but it can not be neglected the public opinion perceptions about joining the Economic and Monetary Union. Brexit has highlighted the importance of public support in the integration process, suggesting that a gap between the economic performance and the citizen's approval can lead to a damaging financial turmoil caused by the popular dissatisfaction with the EU mechanism. The main findings of the paper outline the deterioration of the Romanian position in terms of mandatory criteria for joining the Euro Area, but also the improvement of other states' status (Bulgaria and Croatia) by entering the ERM II. These results are in line with the change in the public opinion perceptions about the readiness to introduce the euro in their countries (Figure 3).

Figure 3: Positive answers about the country's readiness to introduce the euro?

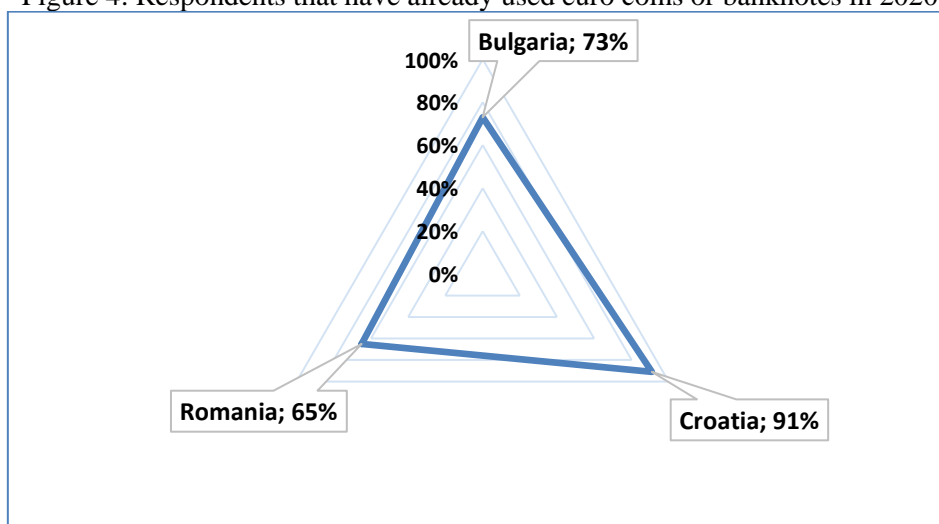


Source: Authors' compilation using data from the Flash Eurobarometer 487, 2020

Even if the majority of the Romanian respondents have seized the downturn of the Maastricht criteria achievements in the last period, their optimism is still very high, superior to Bulgaria which is much closer to the Euro area integration. Both Bulgaria and Croatia were more tempered about the euro adoption process in the 2015-2020 time framework, while the Romanian people are trained by the euro adoption illusion mainly through the political factor. However, the Convergence Report from June 2020 has proved that Romania no longer meets any Maastricht criteria and is subject to the excessive deficit procedure since April 2020. An interesting fact is that opinions in favor of introducing the euro were most positive in Romania (63%) than in Croatia (56%) and Bulgaria (48%).

The majority of Romanians feel well-informed about the euro (52%), similar to the citizens from Croatia, while only 45% of the Bulgarians feel well-informed. The general data provided by the European Commission suggest that people who have previously used the euro coins or banknotes are more likely to feel more informed about the euro than those who have not used them. According to this finding, we included in the analysis the percentage of those people that have declared their familiarity with the euro coins or banknotes due to their use in the past (Figure 4). Form the seven Member States with Derogation (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Sweden), the Romanian people were the least likely to have used the euro coins or banknotes in 2020 (65%). The proportion has decreased by 6 pp since the previous year, maintaining the downward trend since 2018 (75%). By reverse, the respondents from Croatia were more likely to have used the euro in 2020, reaching the level of 91%.

Figure 4: Respondents that have already used euro coins or banknotes in 2020



Source: Authors' compilation using data from the Flash Eurobarometer 487, 2020

In the same extent, 89% of Romanians find essential a dual display of prices in shops, alongside a decrease in the agreement that they will manage to adapt to the replacement of the national currency by the single currency on an individual basis (from 55% in 2015 to 40% in 2020). There is a large majority of respondents in Romania who believe that the euro adoption would have positive consequences for the country (51%), while in Croatia the opinions are more divided (48% negative consequences, 47% positive consequences). In line with these findings, 38% of the respondents from Croatia would like the euro to become their currency as late as possible/never and 41% of the Bulgarians think in the same way, while for Romania the public support dilemma is more intense (26% as soon as possible, 29% as late as possible/never).

7. Conclusion

The third round of Euro Area enlargement is more provocative than ever in the actual context of the COVID-19 pandemic, Brexit, and recovery after the financial crisis, in parallel with the discrepancies between the Central and Eastern European countries and the former countries of the area.

The convergence trinity becomes the only way to fight against the asymmetrical shocks, which is crucial for both individual economies and EMU financial health.

After the most recent economic evolutions, the optimum timing for Romania to join the Euro Area can be best perceived as an illusion trained by the political actors, proclaimed mainly in the election campaigns. The assumed euro adoption targets were gradually abandoned by the same actors suggesting that the process is viewed more in theoretical terms, rather than on practical grounds. Thus, the Romanian path to the ERM II milestone reveals major financial frictions that amplified the substantial regression of Romania to fulfill the mandatory Maastricht criteria due to the unsustainable nature of the economic achievements.

The paper outlines the high volatility of the Maastricht criteria achieved by Romania in the last years, revealing only short periods of stability. After its peak in 2019, when Romania was closest to the Euro adoption goal, the HICP inflation in Romania was constantly higher than in the Euro Area. Moreover, the fiscal evolution significantly depreciated just before the COVID-19 crisis, Romania being subject to the excessive deficit procedure since April 2020. In this context, the ERM II milestone, which had the potential to accelerate the convergence process was ruined by the remaining vulnerabilities of the Romanian economy, while Croatia and Bulgaria have started to test the ground before the single currency adoption in the Euro Area waiting room. However, the comparative analysis of the real convergence criteria suggests some convergence points between Romania and the other states, the main negative issues being related to the lack of long-term consistency in the economic policies.

The emerging dilemma of the euro adoption in Romania can be best outlined by the citizen's perceptions on the subject through a partial validation of the integration objective. The poor performance in terms of nominal and real convergence criteria was seized by the general public, generating a shift in perceptions and a more temperate attitude. Even if the Romanians optimism is still very high compared with the other candidate countries, there is a significant decrease regarding the readiness to introduce the euro, the use of euro coins/banknotes, or the confidence to adapt to the replacement of the national currency by the single currency.

The concluding remarks suggest that the public support dilemma is more intense in Romania, with 26% of the respondents that would like the euro to become their currency as soon as possible and 29% of them that would like the contrary. These facts are not linked to popular dissatisfaction with the EU mechanism, but mostly to the negative effects of the COVID-19 pandemic and the premises of a new economic crisis. Before establishing a new timetable for joining the euro, Romania will have to restore its economic imbalances caused by the expansionist fiscal policies, in parallel with combating the negative effects generated by the COVID-19 crisis. The lessons achieved after the inclusion of the Bulgarian lev and the Croatian kuna in ERM II reveal that each country has its progress rhythm and both a rush in process or a slowdown movement can only increase the euro adoption costs.

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SYSTEMS OF HUMAN RESOURCE MANAGEMENT IN SMALL AND MID-SIZE FAMILY ENTERPRISES WITH PRODUCTION ACTIVITIES

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Abstract: *Human resource management in small and mid-size family businesses is characterized by simplicity of the applied systems and lack of complicated instruments, and its characteristics depend on the scale of the respective company's operations. The paper discusses factors that influence human resource management in small and mid-size family businesses with production activities or where these activities predominated. The nature of this paper is theoretical and empirical. The theoretical part presents the concept of a small and mid-size family business and selected procedures and systems in human resource management in manufacturing family SMEs. The empirical part presents results of the author's own studies on diagnosis of the state of human resource management in manufacturing family SMEs in a changing environment and indicates areas of the diagnosed process that should be improved.*

Keywords: *family business, family SMEs, human resource management, selection of personnel, motivating, training courses.*

JEL codes: *L26, M12, M50.*

1. Introduction

Management of today's businesses is becoming increasingly complex. This fully applies to small and mid-size family businesses. This is a specific type of companies where the staff plays a very important role. Success of these organizations depends on employees who are their most valuable asset (Dzieńdziora 2010). This is true not only of large corporations, but also of companies classified as small and mid-size enterprises (SMEs). The authors are of the opinion that many entrepreneurs are not aware of the full potential of engagement and are treating the behaviours taking place in the company as organisational routine (Drewniak, 2020; Hys et al., 2020).

Functioning of human resource management in family enterprises is manifested, on the one hand, in the commitment, trust, loyalty, and motivation of employees and, on the other hand, in a policy of employment and promotion of employees with family connections.

Every day family SMEs have to confront dynamic and unforeseen changes in a turbulent environment. An important factor that neutralizes the negative effects of these changes and determines the development of enterprises is the need to improve their management systems. Particularly important

are elements related to the strategic view of organizational development. However, the complexity and unique characteristics of family SMEs mean that they have to additionally face different management problems, especially those related to strategic management, than non-family businesses. In the case of family businesses, their strategy is determined not only by economic factors, but also by factors that result from ownership and family relationships (Sipa and Smolarek, 2015, pp. 175-176).

The aim of the paper is to indicate systems that shape human resource management in manufacturing family SMEs. It was assumed that human resource management in family enterprises is characterized by simplicity of systems and lack of complex instruments, and its unique characteristics depend on the scale of operation of the enterprise.

2. Unique characteristics of operation of a family enterprise

The definition of a family enterprise is not straightforward. This category includes small family enterprises as well as large companies controlled by a single family. Ł. Sułkowski (2012, p. 10) believes that there is no consensus as to the criteria for distinguishing family businesses, although the most frequently mentioned criteria include family ownership structure of the business, strategic control exercised by the family, participation of family members in management or involvement of more than one generation in management.

Many definitions of a family enterprise can be found in the literature. Family enterprises are a special case of family businesses and are companies run only by their founders (Astrachan et al., 2002, p. 45-58). Family enterprise is an economic entity in which the majority of the ownership structure and the management function of the whole entity remain in the hands of one family. According to Q. Fleming (2006, p. 105), a family enterprise is any enterprise in which two or more members belonging to one family work together in a business owned by one of them. B.S. Hollander and N.S. Elman (1988, p. 145) believe that every family business has two interactive, internally related and equally important elements, and an event occurring in one element can influence and shape the other element. It can be noted that, the most important criteria for considering a company as a family business are ownership, management, family involvement in the business, and family succession (Heck and Trent, 1999; Heck and Trent, 2002, p. 610).

Family enterprises have the ability to generate internal sources of financing for business growth. Family businesses are often the only place of work for whole families, thus constituting their only source of income (Sipa and Smolarek, 2015, p. 606). Such a solution strengthens the motivation of the family members involved in the activity of the business to be more active in efforts to ensure the development of the company.

The unique characteristics of the functioning of family businesses are, to a large extent, manifested in the way they are managed. First of all, it should be mentioned that this management is very often performed by members of one family, although there are models of family business management in which management issues are entrusted to people outside the family (Bartczak, 2018, p. 80). The development of a family enterprise requires individual competences of the entrepreneur (owner) (Wach, 2015). It depends on a number of elements, e.g. training and entrusting entrepreneurial competences, creating appropriate legal regulations, supporting infrastructure, and embracing opportunities and limitations of the cultural background of entrepreneurial activities. It should be noted here that although integration of the management and ownership spheres is one of the most important features of any family business, it happens that in many companies, due to the lack of appropriate skills and competencies among family members, business management issues are transferred to people outside the family (Sobiecki et al., 2013, p. 15). This practice is necessary and essential if a company wants to grow properly.

Family businesses also often struggle with succession issues. Generational change is one of the most important processes in family entrepreneurship, which determines the long-term perspectives of this type of enterprises (Mathews and Blumentritt, 2015, p. 15). Globally, succession is described as a process that involves transfer of management control from one manager or generation to the next (Ogundele et al., 2012). It includes all actions taken before and after the actual transfer of control (Shepherd, D. and Zacharakis, 2000). It provides continuity of leadership in key positions (Nnabuife and Okoli, 2017). In the family business environment, succession is described as the measures and procedures that result from the transfer of leadership from one family member to another (Sharma, et

all., 2001). It is a process in which there is a transfer of ownership and control of commercial infrastructure or factors of production built by a generation of a family to the next (Onuoha, 2012). It is often the case that family business owners are unaware of the crucial importance of early resolution of succession issues for the survival of their businesses (Duh, 2012, p. 216). The prospect of running a business for many generations is seen as an advantage of family businesses over non-family businesses. Given the 'average age' of family businesses, generational change occurs every 25 years (Cristiano, 2014). Each generation brings new business experience to both the company and the family, with the level of experience gained in the succession process being the greatest during the transition from the first to the second generation. This is partly because the first generation introduces many new operating principles, while the second and subsequent generations of owners contribute proportionately less value (Astrachan et al., 2012). Succession should include ownership and control of the business, as well as implicit social networks, leadership power, and entrepreneurship (Handler, 1994; Yuan, 2019, p. 976). According to E. Dalpiaz, et al. (2017) especially leaders of small and mid-size companies lack the skills necessary to develop and implement succession plan strategies.

According to the research carried out by the Polish Agency for Enterprise Development (PARP) family businesses constitute 36% of the SME sector in Poland. The share of family businesses in the sector decreases with the growth of the enterprise: family businesses are 38% of micro-enterprises, 28% of small enterprises, and 14% of mid-size enterprises. As the calculations exclude entities run as sole proprietorships with no employees (classified as family businesses in some countries) this indicator is relatively low compared to other countries. If such businesses were not excluded, the share of family businesses in all SMEs would be 78% (PARP, 2018). Moreover, in 92% of micro and small enterprises, the majority ownership is held by families, while in mid-size and large enterprises families hold minority ownership.

3. Human resource management in family SMEs

Companies in the SME sector are characterized by a high degree of heterogeneity, which means that there are no organizations where the whole process of personnel management looks exactly the same. In small businesses, managing people and performing the basic functions of human resource management are very different from large corporations. It needs to be pointed out that these enterprises often do not have the possibility to introduce modern instruments considered as manifestations of high quality human resource management. Competent human resources are of great importance in this regard. They play an important role in the growth of enterprises. One should keep in mind, however, that all applied solutions should be ordered and logically coherent at the same time.

Attempts to determine the unique characteristics of human resource management in small businesses may consist only in indicating certain factors and behaviours that shape the human resource policy that is characteristic for a given enterprise. The techniques and systems used are not very complex. This is usually because there is a lack of time, knowledge, or need to implement complex human resource management systems. Another characteristic is centralization. In most such enterprises, human resource policy decisions are made by the owner or one of the partners, who often exercises a dominant influence over the enterprise and its employees. Depending on his or her competence, this influence can be of different kinds. If his or her competence is high, this can be a strong point, but often strong influence of one person also means weak influence of others, in this case employees. Their knowledge, skills, creativity, experience, etc. will not be fully utilized, which leads to wasting human potential and is irrational. When the manager's competence is low, this can translate into aggression, anxiety, and lack of trust in employees (Oleksyn, 2014, pp. 128-130).

The human resource strategy of a family business, in addition to the essential role associated with the process of analysis and planning of employment, also links the growth of the business to the success of the representatives of the dominant family. In this case, human resource plans must take into account the impact of family ties on the business. It is often the case in family businesses that the human resource strategy is based on planning the balance between the interests of the family and the interests of the whole company. Staff selection, motivation, as well as development and improvement of employees should lead to an increase in the company's efficiency, while providing opportunities for success to members of the dominant family (Sulkowski, 2006, p. 20).

Family business owners and managers are often caught up in direct executive activities and, as a result, they lack the time and often the competence to manage the enterprise effectively. This affects the quality of human resource management, internal relations, job satisfaction, and consequently staff turnover. The evaluation process in small and mid-size enterprises is not very objective, which is a consequence of evaluating people for who they are and what they are like to others, rather than for work results. Thus, mistakes, lack of competence, or poor job performance of family members are often overlooked (Lansberg, 2002, p. 248).

Family businesses generally lack clearly defined compensation strategies. In small and mid-size family businesses, they are often treated as a purely operational category and the only long-term strategic consideration is to minimize the costs of wages and labour in general (Sokolowski, 2014, p. 214). To an insufficient degree, family businesses treat remuneration policy as a factor conducive to staff development and building the company's intellectual capital. There is a clear lack of awareness that the owner's intellectual capital alone may not be sufficient for the success of the company (Sokołowski 2012, p. 230).

Another characteristic of human resource management of small and mid-size family enterprises is low formality, in principle even enforced by law. Flexibility of operation means that procedures are created and changed in the course of operation of the company. This is also related to the fact that the range of tasks performed in each position is quite broad. This broad scope of duties in different positions involves the requirement that employees do what needs to be done at a given time, regardless of the position held in the company. This situation has two sides: on the one hand, it may cause work overload and lack of professionalism associated with lack of specialization, but on the other hand, it may allow the company to be flexible and respond quickly to changes in the environment, and provide employees with an opportunity for multidirectional development of their competencies.

In conclusion, it needs to be pointed out that although in small and mid-size family businesses one may find developed human resource management systems, minimalistic systems with extreme reduction of the number of functions prevail. Therefore, there is a need to professionally address the area of resource management, which appears rather spontaneously with the gradual increase in the size of the enterprise. When a business reaches a certain level of development and employs a certain number of employees, the effectiveness of the previous management methods decreases. A department focused solely on HR issues can create many more benefits. Initially, it deals basically only with the initial recruitment of new employees, but over time it expands its scope of competence, moving on to comprehensive management of all personnel-related issues in the company (the salary system, the non-wage benefits system, the incentive schemes, and regulations and policies in various areas). Its actions can and should eliminate problems associated with familiarity or the difficulty of separating the private and professional lives of family members working in the company (Stolarek, 2017, p. 33).

4. Research methodology

The research results presented in this paper were obtained during the project titled *New tendencies and challenges in human resource management of SMEs in the Śląskie Province*. The general objectives of the study included diagnosing the condition of human resource management taking into account its influence on the functioning of SMEs in a changing environment¹.

The study used a survey questionnaire composed mostly of closed questions. The questionnaire was sent to 2,000 small and mid-size enterprises from June to August 2019². The survey was conducted using the correspondence method (by mail). 422 companies participated in the survey. Stratified random sampling was used in the study. The verifiable form of operation of the enterprise was considered to be the main criterion. Subsequently, the research objects (employing 0 to 249 persons), with production activities or where these activities predominated, were randomly selected and questionnaires were sent

¹ The study was a continuation of the research conducted in 2015, 2016, and 2018.

² It was the author's intention that the sample selection should be based on principles consistent with the requirements of representativeness. The significance level was assumed to be $\alpha = 0.05$, while the possible error was assumed to be 0.07. The assumptions made resulted in a minimum sample size of 196. The survey return rate was then assumed to be approx. 10% and the original sample size was assumed to be 2,000 enterprises.

to them. In the next step, the feedback on the structure of the research sample in terms of basic characteristics, i.e. company size and form of business, was verified.

The study was conducted using the correspondence method (by mail)³. Due to the poor fit of the sample to the general population in the basic characteristics, the results of the study should be treated as a contribution to research on the topic presented herein. Due to lack of data, it was not possible to verify the characteristics considered important, such as sex, age, and education of the owner, from the point of view of representativeness of the sample in relation to the general population.

For the purposes of this paper, 172 entities classified as family businesses were accepted for analysis (the respondents checked the item 'family nature of the company' in the questionnaire). The study described herein constituted an attempt to answer the following questions⁴:

- How is human resource management conducted in manufacturing family SMEs?
- What are the unique characteristics of human resource management in manufacturing family SMEs?
- What barriers limit the implementation of human resource management instruments in manufacturing family SMEs?
- Do human resource management instruments impact manufacturing family SMEs growth?

One of the hypotheses proposed was that the unique characteristics of human resource management in small family businesses depends on their size. Other specific hypotheses proposed were the following:

1. The human resource management process in manufacturing family SMEs is characterized by simple procedures and lack of complex systems.
2. Lack of time and knowledge, and limited resources of manufacturing family SMEs require reduction of the human resource management systems used to a minimum.

Study area characteristics. Among the analysed businesses, micro enterprises employing 1-9 persons (including the owner) accounted for 84.9% of the indications, while businesses employing 10-49 persons were represented by 11.6% of the respondents. Mid-size businesses in the study constituted 3.5% of all the studied enterprises. On the other hand, the average employment in the micro enterprises group was 5.3 persons, in the small enterprises was 22.3 persons, and in the mid-size enterprises group was 125 persons.

39.0% of the surveyed companies were run by women and 61.0% by men. The owners of the businesses were mostly entrepreneurs with secondary education (45.9%) and higher education (38.4%). 15.7% of the business owners had basic vocational education. The largest group of business owners (40.7%) were entrepreneurs in the 40-49 age bracket, while the smallest group were those aged 60 and over (8.1%). There were 21.5% of those in the 50-59 age bracket, 18.0% of those in the 30-39 age bracket, and the remaining 11.6% were 29 years old and younger.

Manufacturing family SMEs came from a variety of industries with manufacturing as the dominant sector. In 70.3% of the cases, the company declared operations in a single industry and in 29.7% - in multiple industries. The largest group among the surveyed companies was composed of those established in the years 1990-2000 (41.3%). The largest number of businesses were established in 1994 (dominant - 1994). The businesses established between 2001 and 2010 constituted 20.3%, while 20.9% were established in 2011 and later. 17.4% of the surveyed companies were established in 1989 and earlier. The surveyed companies operated in different geographical markets. The local market accounted for 16.3%, regional markets - for 26.2%, the national market - for 25.6%, and foreign markets - for 32.0%.

³ The surveys were mailed to the randomly selected companies with a request to the business owner to fill them out. Then, in order to ensure a better return rate of the survey, telephone interviews were conducted during which, among other things, the purpose of the study was explained and the completed questionnaire was asked to be returned.

⁴ Due to the limited volume of the paper, not all the assumptions of the study are indicated, but only those on which the problems of this study were focused.

5. Evaluation of human resource management systems in manufacturing small and medium family businesses - an empirical approach

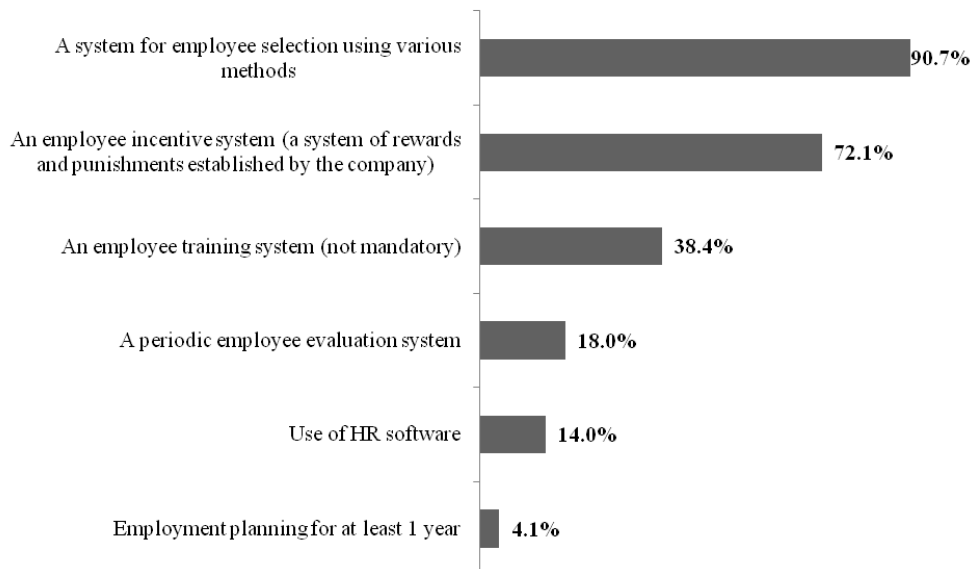
An analysis of the results of the study indicates the following actors of human resource management in small and medium family businesses should be distinguished:

- person(s) designated to deal with human resource matters (40.7%);
- external companies providing e.g. accounting and tax services (40.1%);
- a unit dealing with human resources issues, among other things (14.0%); and
- a unit dealing only with human resources issues (5.2%).

Depending on the scale of operations, one can see that in family micro enterprises human resource management is carried out to the greatest extent by a person appointed to deal with human resource issues and by external companies, whereas in mid-size companies (with more than 50 employees) this is done by a unit that deals with human resource issues among other things.

The most frequently used function of human resources management in Silesian small and mid-size family businesses is employee selection (90.7%) and the least frequently used one is employment planning (4,1%) - Figure 1.

Figure 1: Human resource management systems in manufacturing family SMEs



Source: prepared by the author.

Table 1 shows the results of the study on human resource management systems implemented by manufacturing family SMEs depending on their size (due to the fact that the respondents could indicate more than 1 answer, the results do not sum up to 100%). The data demonstrates certain differences between businesses of different scale of operation. As the size of the company decreases, these functions are used relatively less. Micro enterprises use employee selection procedures and a system of rewards and punishments to the greatest extent, but quite often they have no formal procedures, but only procedures applied and modified depending on the needs and preferences of the owner. They generally do not use employment planning. They relatively rarely train employees and rarely evaluate them. They also do not use human resource software.

Human resource management in manufacturing family SMEs is characterized by simplicity (93.0% of the indications⁵). For example, the employee selection system that uses diverse methods that was the most frequently indicated in the surveyed companies often involves an analysis of application documents and/or job interviews (or, less frequently, knowledge tests). More sophisticated selection

⁵ The respondents could select more than 1 characteristic.

tools are used relatively rarely. The ability to apply procedures and tools, the costs involved, and the ability to change the procedure in the course of work also appear to be important. The respondents were also asked about the reasons why they do not use formal human resource management systems (they could indicate more than 1 reason) - see Figure 2.

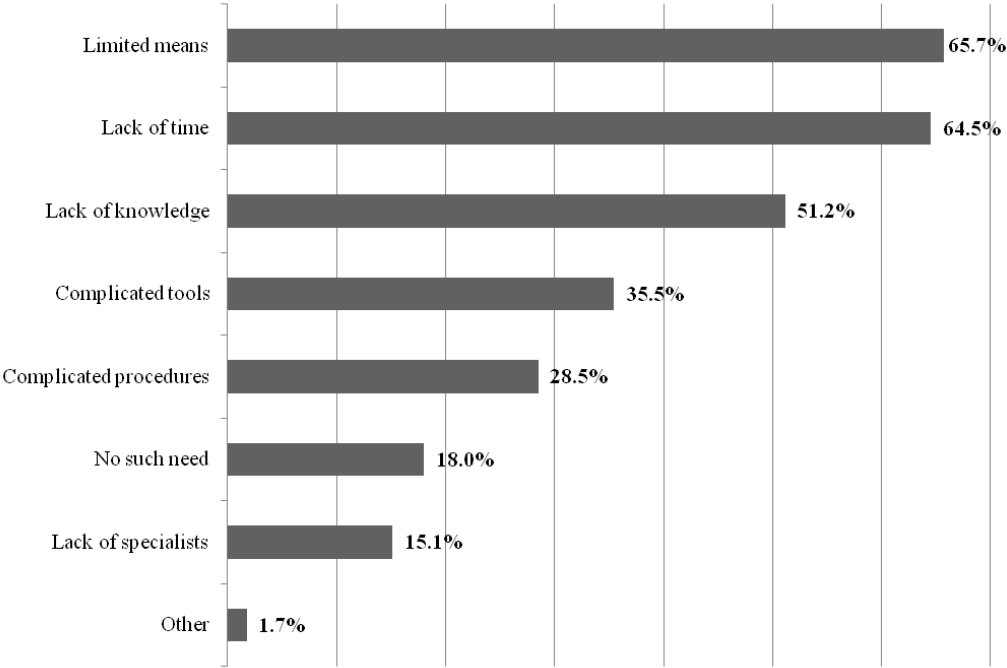
Table 1: Human resource management in small and manufacturing family SMEs versus their scale of operations

Human resource management systems	Number of employees (data in %) (number of entities in a given size bracket = 100%)		
	0-9	10-49	50-249
Staff selection system using a variety of methods	80.8	95.0	100.0
Employee incentive employees (system of rewards and punishments established by the company)	53.4	90.0	100.0
Employee training system (not mandatory)	15.8	80.0	100.0
Periodic employee evaluation system	9.6	55.0	100.0
Use of human resource software	1.4	75.0	83.3
A system for employment planning for at least 1 year in advance	0.0	20.0	66.7

Source: prepared by the author.

. The primary barriers they identified included limited resources, lack of time, and the owner’s lack of knowledge. Barriers that were identified relatively less frequently were too complicated tools, too complicated procedures, no need for human resource management procedures and tools, and lack of employees who specialize in this area.

Figure 2. Reasons for not using human resource management systems in family SMEs



Source: prepared by the author.

The owners of the surveyed companies were also asked whether the performance of human resource management functions in the company can result in an increase of growth possibilities of the company? This question was answered ‘yes’ by 57.6% of respondents and ‘no’ by 40.7%. The remaining 1.7% had no opinion in this regard. The next step of the study involved asking the following question: Does job satisfaction of your company’s employees matter to you? The affirmative answer to this

question was given by 66.3% of all respondents. On the other hand, job satisfaction of employees is not important for 31.4% of the surveyed entrepreneurs.

The remaining 2.3% had no opinion in this regard. Such results may indicate a change in the perception of some human resource management functions by small family business owners. Employee development and care for their satisfaction, which is the basic element of employee motivation, is slowly gaining importance. Similar trends can also be seen in other previous studies on human resource policies in small and mid-size businesses. According to B. Kamińska (2013, p. 56), 'it is increasingly possible to observe symptoms of favourable changes in the way employees are managed in the SME sector, which is dominated by family businesses'

6. Conclusions and recommendations

Modern companies require continuous learning and development, because employees do not lose the competencies they have acquired only if they are consistently improved and developed. Such an approach is more and more frequently observed in human resource management in small and mid-size companies, most of which are family businesses. It is possible to assume that the manner of functioning of each enterprise is individual and inherent to the given business, which is reflected in the company's identity and image which is conveyed to the environment (Dacko-Pikiewicz, 2019).

This paper describes human resource management systems in manufacturing family SMEs. An analysis of the research results has confirmed the hypotheses. The specific characteristics of human resource management in small family businesses depends on their size. Companies with larger scales of operation perform most of the human resource management, while smaller companies use these functions to a lesser extent. The most frequently used functions are employee selection and incentive and punishment systems, and the least frequently used one is employment planning. However, it should be noted that human resource management functions are often not performed through formal procedures. They are applied and modified according to the needs and preferences of the owner. As a rule, they are also characterized by simplicity and lack of complexity. The reduction of the human resource management functions used to a minimum is required due to lack of time and knowledge, and limited resources.

Creating and improving efficient human resource management systems is not an easy task. However, it is worth pointing out that it is one of the most important elements that determine the effectiveness of work in a given enterprise. Contemporary small and mid-size companies (including family businesses) often use outdated human resource management instruments, e.g. for motivation, and incompetently link them with work results. These factors are often associated with employee dissatisfaction, which deteriorates the atmosphere and the relationships among employees and contributes to poorer work performance.

Managing human resources in small and mid-size family businesses is a big challenge. The first step taken towards professionalizing HR is for the owner to realize that it is not possible for him or her to handle everything on his or her own and, therefore, some competencies need to be delegated to other people. The second step is to see the much broader opportunities offered by professional human resource management. The role of family members cannot be overestimated in this area. When it comes to human resource management, success is guaranteed by proper formation of private-business relations. It is impossible to run a family business successfully without separating personal relationships from business relationships. By professionalizing the relationships in place during the course of work, potential problems can be avoided or minimized. As a result, the place where a family member fulfils his or her professional duties ceases to matter much, because it simply depends on the competences and skills of the employee, and not on how close he or she is to the business owner. In view of the challenges associated with running a business, including a family business, family disputes should not be allowed to have a significant impact on the work atmosphere. It therefore becomes important to put in place appropriate procedures to make the way in which employees are evaluated and recruited more objective, so that no preference is given to employees who are family members. Also, appropriate incentive systems, based on solutions that are interesting and attractive to employees, always make it easier to achieve good financial results.

When considering the specific characteristics of human resource management in small and mid-size family businesses, attention should be paid to the number of employees and the resources that the

company can allocate to the implementation of this policy. There is no need to forcefully implement human resource management procedures that are considered a sign of quality human resource management. Often this is not even possible due to the lack of objective conditions for their implementation. Nevertheless, especially when a company wants to move from a small to a larger scale of operation, i.e. to grow, the process of human resource management, with particular emphasis on employee development, is particularly important and deserves a lot of attention. The right choice of instruments, not necessarily complicated, but adjusted to the type of tasks performed and the employees' value systems, may determine the company's success in the market.

In conclusion, it should be pointed out that small companies (also family businesses) should pay more attention to the fact that tools that they are already using should be put in order and combined into one logical whole, which may translate into effective human resource management in the area of its functions, i.e. employee selection, evaluation, motivation, as well as development and improvement. Such a procedure can lead to an increase in the company's efficiency and, in the long run, its growth.

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CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABLE SCM

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Abstract

This research examines the relationship between Corporate Social Responsibility (CSR) and Social Sustainable Supply Chain Management. Sustainable Development and CSR have been criticized for having contradictions in meaning, as some companies are not capable of developing the social dimension of sustainability. Social Sustainability has received less attention, both in research and practice, compared to the other pillars of Sustainability. However, it is an equally important dimension, as social responsibility, or the development of policies regarding the social aspect of sustainability are assets for a company. This carries the risk that some companies may try to take advantage by creating a fake social image. To address these issues, the paper suggests that stakeholder and legitimacy theories could enable companies to better understand and develop social responsibility, both internally and at the level of their Supply Chain. Finally, the paper suggests that Social Return on Investment (SROI) could be used not only to measure the social value inside the supply chain, but also to evaluate the social performance of the company, ensuring its integrity to all stakeholders.

Keywords: corporate social responsibility, social return on investment, social sustainability, sustainable development, sustainable supply chain management

JEL codes: M14, M15, Q01

1. Introduction

During the previous years, a significant change has been conducted in the perception regarding the improvement of the social performance of companies (UNSRID, 2002). This concept has many contradictions, as some support that the social performance of companies should be regulated by the government (Porter and Linde, 1995), while others believe that companies should be flexible to create and evaluate their own voluntary standards (Sauvant, 1999). Even though this concept concerns both practitioners and academics, it is only during the last years that major attempts have been made to clarify it and develop a framework to better understand how it affects the companies.

According to Carroll (1979) there are four basic company responsibilities, and these are: economic, ethical, legal, and voluntary, which could be also called as corporate social responsibility (CSR). CSR tries to bring a balance between different social responsibilities, towards a range of stakeholders (Moon 2007). Corporate Social Responsibility and sustainable development are different but related concepts. Their meaning is complex and often criticized of having contradictions, as some argue that organizations are not capable of social responsibility and others that environmental sustainability is not always associated with economic or social development (Moon, 2007). Therefore, sustainable development and CSR are ambiguous concepts (Gallie, 1955) and their meaning is often part of a discussion related to their application (Moon et al., 2004) in different business contexts.

Furthermore, their meaning is difficult to be generalized as firms have different social, environmental, and ethical impact in the society (Moon, 2007).

Nevertheless, it is considered an asset for an organization or a corporation to be socially responsible or have a policy about sustainable development. In order to achieve better financial profits, corporations have to recognize that they belong and operate inside a larger natural and task environment. Furthermore, in order to improve their image, gain competitive advantage and promote their supply chains, companies need to embody policies which are relevant to the society (Miles and Munilla, 2004). This also applies to supply chains, which are adopting CSR policies, as social responsibility issues are slowly gaining in importance (Murphy and Poist 2002). So, both individual firms and supply chains are gradually behaving in a socially sustainable manner (Joshi & Li, 2016).

As no one wants to have a reputation of being 'socially irresponsible', a danger arises that many companies may take advantage of a fake image. This means that they may develop the illusion of being sustainable (Moon, 2007).

To address these issues and better explain the relationship between CSR and the social dimension of sustainability, the paper aims to provide a theoretical base for future research. Two theories that explain the social dimension of the corporate environment are stakeholder and legitimacy theories. According to the literature, these are the most distinguished to explain a company's drives for socially sustainable behavior inside the supply chains (Mani et al, 2018).

Hence the objective of this paper is to analyze the relationship between Corporate Social Responsibility and the Social dimension of Sustainable Supply Chain Management and to examine how companies could take advantage of CSR practices and increase their social performance.

To better understand and analyze the concepts addressed in this paper, it was necessary to conduct an extensive literature review. A literature review gives information about the papers published, and the theories developed in the subject under examination. It also helps the researchers to support their argument in providing an original contribution (Pozzebon et al., 2011).

The steps, that were followed, include: searching for articles by keywords, narrowing the article selection by reading the abstracts, clarifying the meanings and the relationship among them, and identifying the gaps in the literature for future research.

The keywords that have been used in the search were: Corporate Social Responsibility (CSR), Sustainable Development (SD), Social Supply Chain Management (S. SSCM), Information Systems (IS) and Social Return on Investment (SROI). The search was conducted mostly in Scopus and Researchgate databases.

The extensive literature review, presented in the following section, enabled us to explain the main concepts and theories related to the subject of study. It also allowed us and develop a conceptual framework (presented in section 3) that shows the main factors enabling a company to increase its social performance.

2. Literature review

2.1 CSR

CSR enforces companies to adopt actions that are not required by the government but are for the good of the society (McWilliams and Siegel, 2001). CSR often forms the base to develop a framework of attitudes, policies, strategies, and relationships of the companies with their stakeholders, so as to address and develop ethical values, economic welfare, and compliance with legal requirements (Lehtonen, 2004). Previous studies support that CSR can insure and increase the financial performance of a company (Pirsch et al., 2007) and this is one of the reasons why CSR is necessary for the companies.

Nowadays, there is an increasing pressure on companies to think about their social impact (Gilbert et al. 2011). To better understand the social impact, a new set of standards [The Global Reporting Initiative (GRI)] has been developed, based on which companies are able to implement, plan, manage and report their corporate social responsibility (CSR) actions better (Waddock 2008). These standards are mainly voluntary (Brunsson et al. 2012), but there is a lot of pressure on companies from the society, to implement them (Vigneau et al, 2015).

However, over time the concepts of CSR and Social Sustainability are becoming closely related (Hutchins and Sutherland, 2008). According to Ingalens and Gond (2005) corporate sustainability is the basis for the development of CSR.

2.2 Social sustainable supply chain management

Seuring and Müller (2008, p.1700) define sustainable supply chain management as “the management of material, information, and capital flows as well as the cooperation among companies along the supply chain, while taking goals from all three dimensions of sustainable development”. In order to better explain the social dimension of the supply chains, Mani et al. (2018, p150) developed a definition, arguing that Supply chain social sustainability (SCSS) is “the management of social issues, including equity, safety, labor rights, philanthropy, and product responsibility, which affect the safety and welfare of the people in the supply chain”.

The social dimension is not the famous one among the pillars of sustainable development. Because of that, there are a few studies which include and examine the social dimension of the Sustainable SCM framework (Ahmadi et al., 2017a). Furthermore, although many cases of companies develop social initiatives, in order to deal with corporate sustainability, these initiatives have a short-term focus (Ahmadi et al., 2017b). As a result, these attempts are not capable to build capabilities or develop the resources needed so as to increase and improve the company’s social performance.

The research conducted by Amindoust et al. (2012), revealed that companies in their supply chains should take into consideration the health and safety conditions of their personnel, as well as other critical social criteria. According to Bai and Sarkis (2010) social sustainability could be divided into the categories of internal and external social criteria. Internal social criteria include all the health and safety factors, as well as the employment practices, while the external social criteria include the impact on local communities, stakeholders (with contractual agreements), and other stakeholders. In their research, Labuschagne et al. (2005) found out that the evaluation of social sustainability performance of a company could be achieved by focusing on stakeholder participation, external population, internal human resources, and macro-social performance.

2.3 Stakeholders theory

During the last years, most of the companies believed that their corporate responsibility was concerned only with their financial performance, that is the maximization of their economic profit. So, companies were not interested in environmental and social issues as these were non-financial measurable factors. However, things have changed, because shareholders realized that these non-financial factors affect their overall sustainability (Amosh and Mansor, 2018). Nowadays, stakeholders require from corporations to be more sensitive and careful to social and environmental issues (Duker & Olugunna, 2014).

Many theories have been developed in order to reveal the importance and motivation of the managers to disclose information. Among them, the most widely spread in the literature is the stakeholders’ theory (Amosh and Mansor, 2018).

According to this theory, all interested stakeholders and not just the direct ones should benefit from the existence of the corporations. According to Freeman’s definition (1983 p.89x), the stakeholders are defined as “those groups without whose support, the organization would cease to exist”. According to this theory, all stakeholders have the right to access information, which is related to environmental and social issues, no matter how powerful each stakeholder is (Ali & Rizwan, 2013). Finally, Amosh and Mansor (2018) after conducting a review of the literature, argued that there is a lack of extensive research examining the social pillar of sustainability.

2.4 Legitimacy theory

A main hypothesis of the “Legitimacy theory” is that the managers of a corporation, to maintain the successful function of their operations, must reassure that their organization appears to be operating in alignment with the community. In this way, the organization can earn the status of the “legitimate”. According to the legitimacy theory, firms are part of a broader social system and they do not have any

congenital right to resources (Deegan, 2019). So, firms have to earn this right and only a “legitimate organization” is able to maintain this right (Mathews, 1997).

A corporation which is not legitimate and does not comply with the expectations of the society will have important difficulties and problems during its operation, such as securing the necessary resources including labor. Moreover, the society may reduce the demand for its goods and services. So, legitimacy may be considered as an important resource of the organization, which could build on this in order to maintain its survival and create a competitive advantage (Deegan, 2019). According to the above, legitimacy may be considered as a “social contract” where the society plays an important role on how an organization should conduct its operations (Adler et al., 2018).

Evidence from a survey suggests that managers implement social and environmental disclosures in order to maintain the survival and profitability of their organization, rather than demonstrate proper responsibility (Deegan, 2019). Unfortunately, despite the existence and importance of the legitimacy theory, the disclosure of social and environmental information remains voluntary for managers. According to Gray and Milne (2015), this is a topic of confusion for many people who remain skeptical about the validity of the information that companies, and managers show to the different groups about their social and environmental goals.

3. Conceptual framework

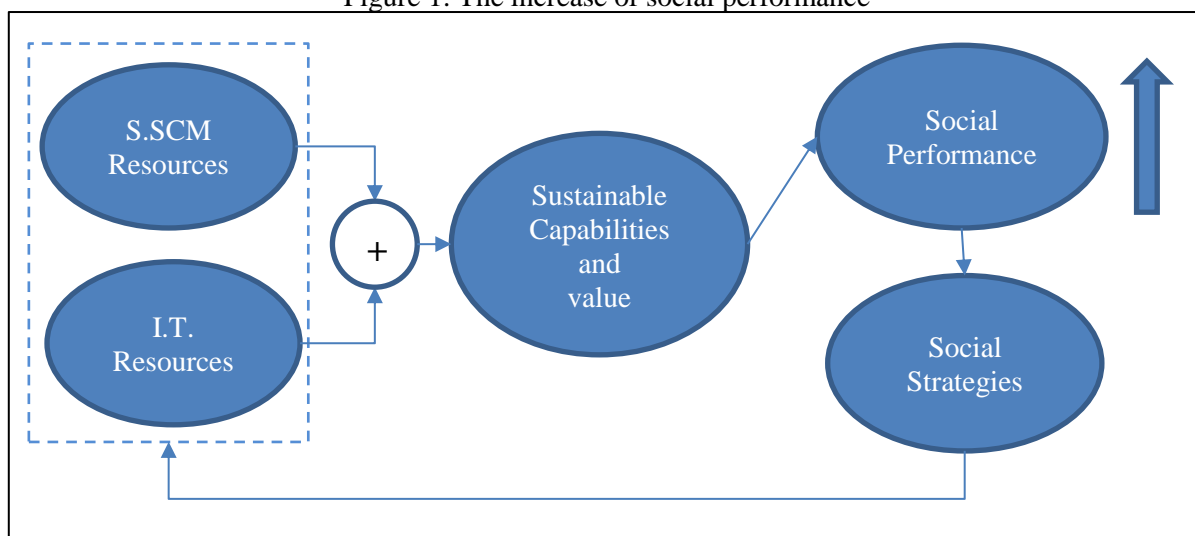
During the last years, companies increased their efforts to become more sustainable in order to improve operations’ handling, innovation management and strategic development. They also aimed at increasing their competitive advantage and improve their position to the market (Colbert and Kurucz, 2007). To examine and analyze the benefits from the adoption of sustainability, many studies have used the RBV Theory, as a theoretical background.

The RBV Theory states that a company could develop competitive advantage by obtaining and effectively developing its resources (natural, human, etc.), in such way that their combination could add value for the company and would be difficult to imitate (Barney, 1991).

According to Dao et al (2011), the adoption of sustainable strategies could help companies to develop sustainable values and obtain a sustained competitive advantage. Moreover, the combination of the HRM, SCM and IT resources allows companies to develop sustainable capabilities and increase their performance.

As this paper focuses on the social performance of a company, the developed framework shows the types of resources and capabilities that can lead to its increase.

Figure 1: The increase of social performance



According to the above conceptual framework, companies develop and use their own sustainable supply chain management and Information Technology resources, in order to make their processes more effective and efficient. The combination of the above resources can create sustainable

capabilities and in many cases sustainable value. Companies take advantage of these new capabilities and value in order to increase their social performance. Finally, companies are able to develop new social strategies in order to further exploit their resources and strengthen their position in the market.

The main concepts of this framework are further explained in the following sections.

3.1 Social sustainable supply chain management recourses

Efforts toward advancing the economic and the environmental pillar of sustainability have received more attention than social sustainability in the previous literature and in practice (Mani et al, 2018). This is restricting, as social sustainability practices can help to enhance the other aspects of sustainability (Mani et al. 2016), which are all needed to create a sustainable organization (Seuring and Muller, 2008).

Social sustainability is needed, because it could define how social issues could be managed and ensure the long-term survival of the organization. As mentioned before, the social dimension should not be limited to the internal operations of the company, but also expanded to the inter-organizational level including trading partners and different groups of organizations (Carter and Rogers, 2008).

To further examine and analyse social issues in the supply chain, it is important to understand not only to whom a firm needs to be socially responsible, but also which are the issues that must be addressed (Mani et al. 2016; Mani et al, 2018). Stakeholder theory explains that managers have fiduciary duties both to the corporation and to the shareholders (Donaldson and Preston, 1995). According to the theory, the firm needs to be socially responsible to all stakeholders, so as to achieve sustainable results (Sodhi, 2015).

Therefore, all partners (supply chain members) must operate in a socially sustainable manner so that social sustainability is truly operational across the supply chain (Carter and Rogers, 2008). If a supply chain partner has a strict social policy and its supplier or distributor makes decisions regardless of the social consequences, the results are not satisfactory. Therefore, the positive effects of a company which addresses community concerns and protects employees will undoubtedly be reduced by having a partner who ignores community concerns, avoids compensating and addressing issues, such as health and safety of workers (Dao et al., 2011).

A company that values sustainability will seek to collaborate with other companies that also adopt this philosophy. This will lead to a sustainable chain of business partners that integrate social issues into the decision-making process (Dao et al., 2011). In this way, the company could have the opportunity through Stakeholder's Theory to develop two important resources, those of transparency and respect to society and all the involved social groups.

3.2 Information technology resources

It is difficult to achieve an effective and sustainable supply chain without the use of information systems (IS), as they are the main element supporting the operation of the chain (Fiorini et al, 2017). Information Systems have the potential and the ability to contribute to the social supply chain management by making information stable and immutable. So, information cannot be modified without the approval of the authorized partners. For example, blockchain technology can detect and prevent corrupted individuals and organizations from seizing assets of people unfairly (Saberri et al, 2019). Moreover, the use of ERP Systems could help companies to improve the impact of stakeholder engagement, since it facilitates information sharing (Chofreh et al, 2020) and enables them to better evaluate social crises (Robert et al., 2008).

Nowadays, Information Systems provide supply chains with traceability, which helps sustainability through a better assurance of human rights. According to the legitimacy theory, every company must convince all stakeholders that it is legitimate. So, legitimacy may be considered as an important resource of the organization (when it has been conquered) and any company should build on this in order to maintain its survival and create a competitive advantage (Deegan, 2019). Information Systems have the power to develop the above resources inside the supply chain (those of legitimacy and transparency of information to society) and increase the social sustainability.

3.3 Sustainable capabilities and value

The sustainable capabilities that have been developed from the combination of the above resources refer to the ability of the company to integrate, build and reshape its internal and external capabilities to deal with the rapidly changing environment. These capabilities are not earned for a fee but are learned through time. They create patterns of behavior through which a company develops and modifies systematically the way it performs its processes, so that it can become more efficient. These capabilities can refer to specific processes or routines that combine, transform, or renew resources into new capabilities as the environment evolves (Mandal et al., 2011).

Therefore, capabilities are often developed over time, and are not easily acquired through the market. They are determined not only by the tangible and intangible basis of a company's resources, but also by the decisions made during its operation. Such a combination of capabilities can create skills that can be applied to people, functions, and organizational boundaries (Mandal et al., 2011).

So, when sustainable capabilities are developed from the above combination, the company is in position to create sustainability value to its stakeholders, which could enhance profitability and potentially gain a sustained competitive advantage (Dao et al., 2011).

3.4 Social performance and social strategies

The Social Impact and Social Performance derive from the sustainable value that has been developed from the collaboration of the above resources. The social performance can be measured with the use of the Social Return on Investment (SROI) model. This specific model uses the standards of GRI and tries to print into monetary units the social impact which derives from the policies of CSR (Maier et al., 2015). The purpose of this model is to turn the social pillar into a more understandable and manageable part of the company.

It should be noted that when the social performance is increased, it also increases the economic performance by pushing customers to choose the specific company (Maier et al., 2015). In this way, small and medium companies could be able not only to compete with bigger ones, but also to develop their own strategies, in order to achieve their goals and strengthen their position in the market.

4. Conclusion

There is a limited number of academic research and case studies in the field of Social Supply Chain Management and Corporate Social Responsibility. There is also limited literature examining how this combination could create value for the company and what is the derived social impact. This paper argues that there is a need for more academic research, especially in real case studies, in order to examine and analyze practices related to CSR and to the social dimension of SCM. To this end, it proposes a conceptual framework demonstrating how the combination of SSCM and IT resources can lead to sustainable capabilities that can increase social performance. By developing sustainable capabilities even Small and Medium companies can develop a social impact and Sustainable SCM strategies oriented to the social pillar of sustainability.

Finally, Social Sustainable supply chain performance is dependent on innovations and new technologies (Bag et al., 2020), which should be selected and used by companies and shareholders ensuring the availability of information and allowing the development of strategies.

Acknowledgement

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KNOWLEDGE MANAGEMENT IN SMALL AND MEDIUM-SIZED ENTERPRISES – WAY OF INCREASING THEIR COMPETITIVENESS

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Abstract

Knowledge has always played an important role in the life of mankind, but in the modern world its importance is growing immeasurably: the world is at a new stage of its development, which is based on the knowledge-based economy - the knowledge economy. Within the framework of this article, on the basis of the conducted research of the literature and the primary field research through an online survey of workers of SMEs of the Republic of Moldova, the author gives recommendations on creating a knowledge management process within these organizations, with the goal of increasing their level of competitiveness in the market. These measures imply the development of a knowledge management system (knowledge bases and technologies) aimed at accumulating knowledge, documenting it and optimal use; human capital management, which is the main component of the enterprise's knowledge system (knowledge creation, distribution within the organization, exchange with the external environment); as well as the creation of an organizational culture that promotes the dissemination, enhancement and renewal of knowledge in the enterprise.

Keywords: competitiveness, human capital management, knowledge based economy, organizational culture, small and medium-sized enterprises

JEL codes: L21, L26, M12

1. Introduction

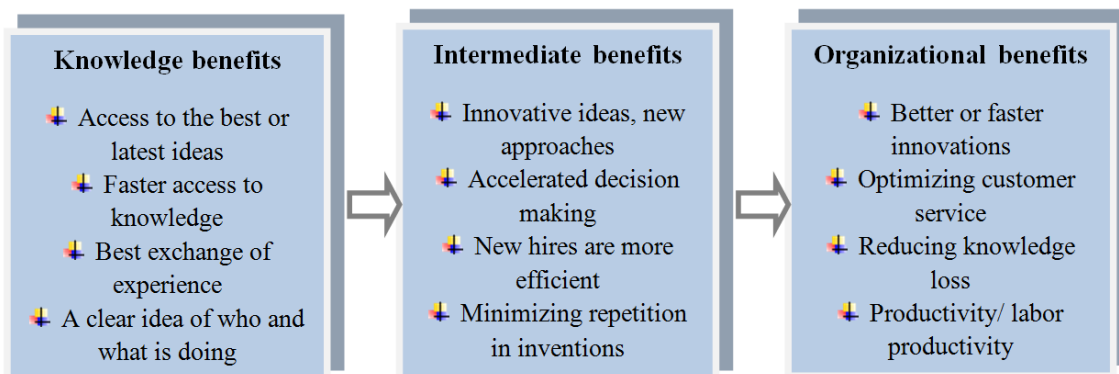
Although knowledge and innovation have always played a decisive role in economic development and growth, it is only against the backdrop of globalization and the technological revolution of recent decades that they become key factors of competitiveness. Currently, both developed and developing countries view their economic growth through the prism of an obligatory reference to knowledge, innovation and the stimulation of human capital.

The concept of "knowledge-based economy" was introduced to the scientific community by Peter Drucker in the book "The Age of Discontinuity" (1969). According to Drucker (1992), "knowledge" as "intellectual information" is fundamentally different from the term used in the "knowledge economy" or "knowledge-based activities." It is not just information or a collection of data. Information is transformed into knowledge only when it is used in the creative process, when it becomes, in economic terms, a factor of production. Thus, the emergence of the knowledge economy is not part of "intellectual history" but part of "technology history", which focuses on how people create the tools that will serve them. For the "knowledge economy", the applicability of knowledge, whether old or new, matters. It is also the imagination and ability of the person who uses them that are important, not the complex and original nature of the information itself.

Knowledge management is an area of theoretical and practical activity that began to form in the early 90s. XX century and received the greatest distribution in the format of the development of the knowledge economy. This concept was introduced by K. Wig (1993) and in a general sense means the systematic formation, renewal and application of knowledge in order to maximize the efficiency of enterprises. It is becoming profitable for a modern company to create, have, use knowledge, and it is important not only to own knowledge, but also to manage it. This gives organizations the opportunity to improve their decision-making process, as well as eliminate the problems associated with the lack of necessary information.

In fig. 1 presents the main advantages that the development of knowledge management brings to the company.

Figure 1: Key benefits of implementing knowledge management



Source: Panikarova and Vlasov, 2015

The main purpose of this article is to develop recommendations for creating a knowledge management process within small and medium-sized enterprises of the Republic of Moldova, with the goal of increasing their level of competitiveness in the market.

The second paragraph of this work is devoted to the analysis of the current situation in SMEs of the Republic of Moldova in the field of the knowledge system. Primary data were collected by the author in the framework of the primary field study through an online survey of workers of SMEs of the Republic of Moldova in the period February-March 2021. Based on the results obtained, the main results were summed up and the main directions for further development and improvement were highlighted.

In the third paragraph, the main theoretical aspects of organizing and managing knowledge are considered, experience and current trends in western companies are presented, and three main areas of development and improvement of this process are highlighted.

In the conclusion, recommendations are given on the practical implementation of the knowledge management process in order to increase the competitiveness and efficiency of the company in the market.

2. Analysis of the current situation: knowledge management at the SMEs of the Republic of Moldova

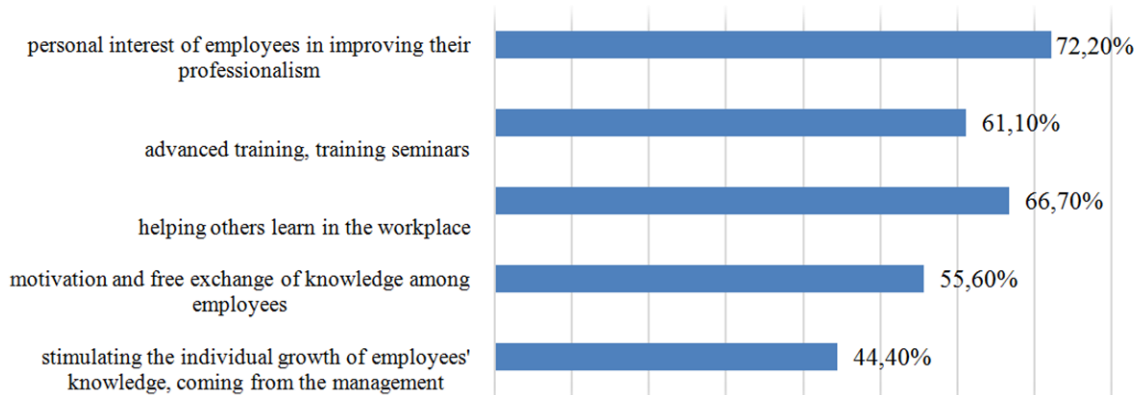
To improve knowledge management within organizations and firms, as well as develop practical recommendations based on the experience of western companies, the author of the article conducted a primary study to analyze the current situation in small and medium-sized enterprises in the Republic of Moldova. The data was collected by completing an online questionnaire between February-March 2021. The study involved 20 workers who carry out their professional activities within enterprises and firms from various fields of activity. Only 20% of respondents have been working for less than 1 year, 50% of employees have work experience of 3-5 years or more. Thus, the data obtained are quite objective, in our opinion, since, firstly, they cover various areas of activity, and, secondly, they reflect the opinion of people who are knowledgeable and committed to their organizations. In addition, 45% of respondents are middle managers (functional management) and 45% are executives who are directly involved in the implementation of the company's operating activities.

The purpose of this study was to determine the current state of the national small and medium-sized enterprises in the field of knowledge organization and management. Based on the results obtained, the following conclusions can be drawn:

1. The main driving force behind the development and acquisition of new knowledge is the personal interest of the employee (72.2%), which may be a condition for better performance of the assigned tasks, the requirements of the organization itself or the employee's career aspirations, his desire to increase wages or change jobs (Fig. 2). Also, many workers noted the practice of helping or teaching others in the workplace (66.7%).

Least attention is paid to stimulating the individual growth of employees' knowledge, coming from the management (44%) and creating an environment for the free exchange of knowledge (55.6%);

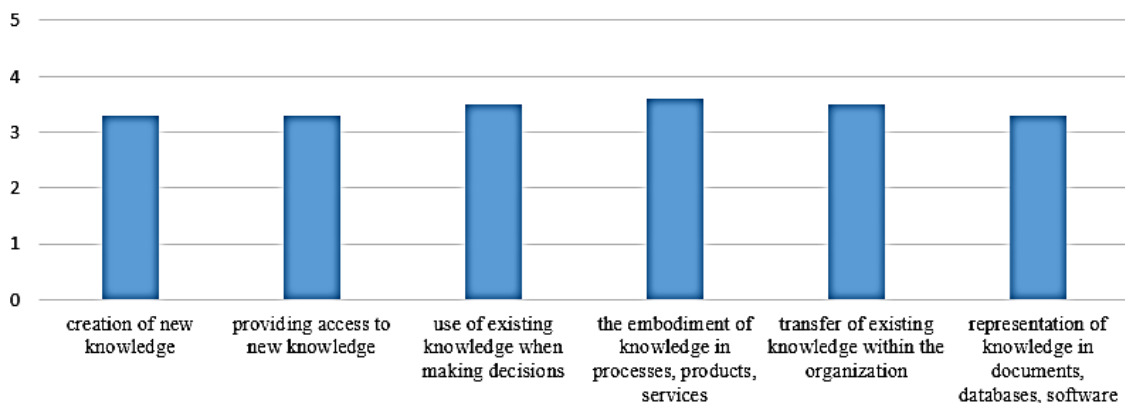
Figure 2: The main components of the knowledge system within organizations in RM



Source: own processing

- Regarding the system of knowledge exchange within the firm, based on the results obtained (Fig. 3), we can say that, on average, employees evaluate all components at a satisfactory level. However, in the context of individual firms, it is worth noting extremely low values in some - for example, public catering, pharmaceuticals, trade; and quite high in others – IT, transportation. An important role in this process is played by the top management of the company (for example, in the IT field it is a foreign company that operates on the territory of the Republic of Moldova), its interest and understanding of the interrelation of processes, as in the case of transportation.

Figure 3: Evaluation of the components of an organization's knowledge sharing

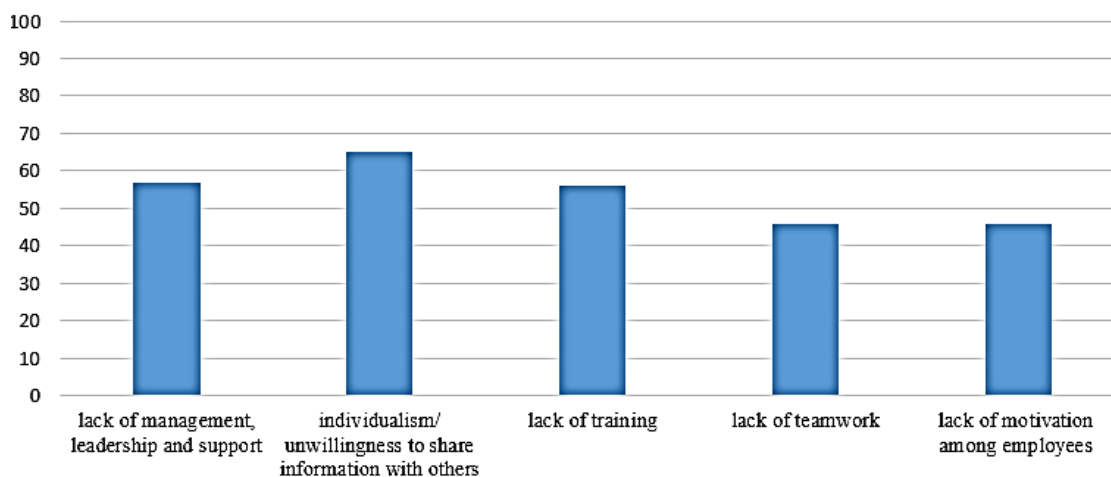


Source: own processing

- Among the main reasons that reduce the effectiveness of the knowledge management process in SMEs (Fig. 4), employees put individualism and unwillingness to share accumulated experience and knowledge in the first place. Thus, the free exchange of knowledge is perceived by employees as a threat, unwanted competition or a lack of understanding of the impact of this factor on the final results of the firm. Also, the reason for inefficiency, according to employees, is a lack of leadership and support from management, and a lack of training. It should be noted that workers in the IT companies, where the level of knowledge management is quite high, prioritize the lack of motivation of the employees themselves, their unwillingness to develop, grow and

improve their level of professionalism. Thus, we can conclude that even with the creation of a favorable environment and the proper level of motivation on the part of the company's management, development, interest and exchange of knowledge are largely determined and dependent on the employees themselves.

Figure 4: The main components influencing the effectiveness of the knowledge management process



Source: own processing

- Among the main reasons for introducing and managing knowledge within firms and enterprises, most noted an increase in the level of productivity of workers, the quality of goods and services, and a reduction in the time spent searching for information and making decisions (78% each).

Based on the results obtained, we can say that the knowledge management system at the enterprises of the Republic of Moldova is generally satisfactory, but there is a potential for growth and development, which contributes to an increase in the efficiency and competitiveness of national producers in the local and global markets.

3. Organization of the knowledge management process in the enterprise

Based on the practice of foreign knowledge management companies, it is necessary to organize the implementation of the following processes within enterprises:

- Creation of new knowledge;
- Providing access to new knowledge outside the organization;
- Using existing knowledge when making decisions;
- Embodiment of knowledge in processes, products, services;
- Representation of knowledge in documents, databases, software, etc.;
- Stimulating the growth of knowledge through organizational culture and rewards;
- Transfer of existing knowledge from one part of the organization to another;
- Measuring the value of intellectual assets and the impact of knowledge management on business results.

One example of the successful implementation of a knowledge management system is Toyota, which, thanks to the development of a network of knowledge exchange within the company, has been providing a competitive advantage over other car manufacturers for many years, primarily in the field of increasing productivity, as well as the speed of development and release of new car models. Toyota has succeeded in solving three major dilemmas in knowledge sharing (Hebibi, 2020):

- To motivate employees to participate and openly share useful knowledge (while avoiding competition between them);
- Not allow idlers (workers who learn from others, but themselves do not help others to learn);

3. Reduce the costs associated with finding and accessing various types of valuable knowledge.

It is worth noting that nowadays in many companies the knowledge management process has been reduced to several main categories, such as (Hebibi, 2020):

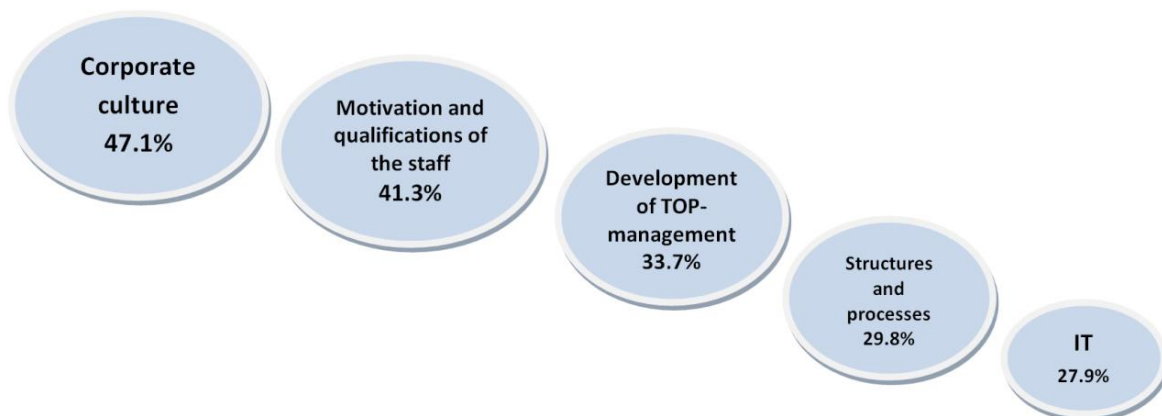
- Increasing productivity - using knowledge to identify best business practices, abandon ineffective activities to quickly solve innovative problems and find new ideas that will increase productivity, as well as improve the company's position in the market;
- The speed of response to problems and customer requests is, first of all, associated with the availability of the necessary knowledge where it is needed. Modern communications have revolutionized the speed of knowledge dissemination regardless of geographic location;
- Additional education - simple dissemination of knowledge via the Internet allows to carry out daily work on training employees (distance learning), which allows them, in turn, to apply the knowledge gained in the process of managing the company;
- Acquisition of new knowledge - in order to maintain competitiveness and adapt to the requirements of modern business, companies need to constantly improve the quality of corporate knowledge. Employee training is a classic, but not the only solution. Thus, a large number of downloads are carried out in order to acquire knowledge and technologies from other companies. Another very popular way is the use of consulting services, the purpose of which is to collect and sell knowledge about various sectors of the economy. Consulting services, as a rule, are used at key moments of the project, when the experience of specialists is needed in the shortest possible time.

Based on experience and analysis of the available information, the author of this article recommends that small and medium-sized businesses pay attention to 3 main areas:

1. *Creation and management of a knowledge management system* (knowledge bases and technologies on the basis of which they are implemented), aimed at the accumulation of knowledge, its documentation and optimal use. This element creates and organizes the memory of the organization;
2. *Human capital management* - the main component of the enterprise's knowledge system, aimed at creating knowledge, distributing it within the organization, exchanging it with the external environment;
3. *Creation of an organizational culture* that promotes the dissemination, enhancement and renewal of knowledge in the enterprise.

Next, each of the proposed directions will be considered in detail. In fig. 5, in turn, presents the results of a study conducted among 104 companies (Tuzovsky, 2005), regarding the key factors for achieving success in organizing the knowledge management process.

Figure 5: Five critical factors for success in knowledge management



Source: Tuzovsky et al., 2005

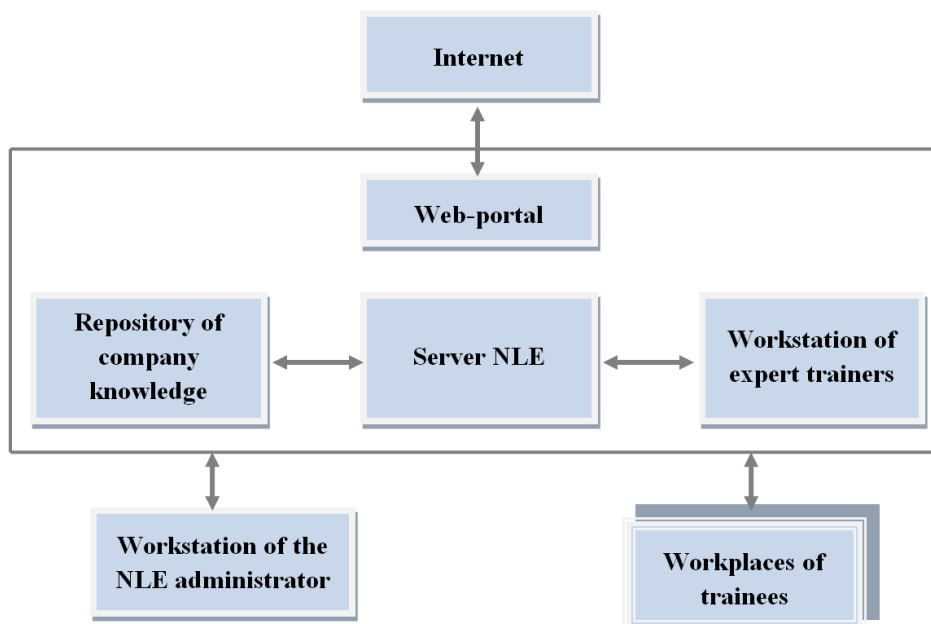
3.1 Establishing and managing a knowledge management system

Nowadays, almost all firms are striving to implement more horizontal and flexible structures with fewer hierarchical sublevels and a developed system of communication at all levels of the organization. The horizontal structure implies not only improved communication, but also the decentralization of the decision-making process, as well as the empowerment of workers.

This organizational structure can also improve employee performance metrics. Organizations that use flexible structures to engage their employees are more successful in identifying problems and can improve their performance and quality (Kafashpoor, 2013). A decentralized structure facilitates decision-making, reduces costs, improves supplier relationships, and provides better employee training. While some argue that mechanical structure has a positive effect on productivity and organic structure has a negative impact, Claver-Cortes et al. (2007) demonstrate that formalism, complexity, and decentralization have a positive effect on the company's performance and its competitive strategy. On the other hand, some studies show that organizational structure influences both efficiency and knowledge management. Also the implementation of successful knowledge management depends entirely on creating an environment in which knowledge creation and sharing is possible. Without a formal structure, members' efforts to improve the flow of knowledge can remain fragmented or inert (Kafashpoor, 2013). If the structure is flexible and flat and encourages and facilitates communication and teamwork, it contributes to the successful implementation of knowledge management (Cortes et al., 2007).

At the current level of development of information technologies and electronic distance learning systems, the optimal way to create a knowledge management system at an enterprise is to build a system of continuous corporate training for personnel based on the creation of a network learning environment (NLE). A block diagram of such a system is shown in Fig. 6.

Figure 6: Block diagram of the company's NLE



Source: Tuzovsky et al., 2005

The main elements of the NLE are:

- A repository of company knowledge, corporate memory, containing a structured set of explicit knowledge in the form of databases and knowledge with corresponding meta descriptions;
- Server of the network environment, containing rules and guidelines for rational management of the process of mastering knowledge;

- Web-portal of the company with developed access to international information resources;
- Workplace (or a set of workplaces) of expert trainers in various corporate programs;
- Workstation of the NLE administrator;
- Workplaces of trainees, the number of which can reach the total number of company employees connected to the corporate information system.

This kind of network learning environment, which develops along with the development of the corporate knowledge management system, allows:

1. Provide a massive and at the same time personalized training process for employees;
2. Provide a personal educational and personal cognitive trajectory for each employee, taking into account his intellectual abilities and individual knowledge needs;
3. Reduce the training time and, accordingly, the separation of specialists from production, taking into account the asynchronous nature of the interaction of employees with the NLE;
4. Reduce the total costs of the company for training, since the NLE, in fact, is just another subsystem of the corporate knowledge management system, created to meet the multipurpose interests of personnel.

Another important component of the knowledge management system at the enterprise is the leader and his role in the creation and functioning of the entire system. Managers and executives must demonstrate openness in the area of knowledge, because only if they believe that knowledge can be a strategic resource will they create the right conditions for it. Based on this, it is important for an organization to create an internal business culture that encourages these values. Otherwise, no matter how well-designed the organizational structure, employees will not have the desire and motivation to transfer the acquired knowledge, especially if they come to the conclusion that it can harm them, not benefit. Therefore, it is important and appropriate to create a knowledge-sharing environment that is encouraged and rewarded in some way. Based on this, the human factor and labor capital management, which will be discussed below, is vital, as employees are those who have the knowledge and those who must demonstrate and use their abilities appropriately.

3.2 Human capital management

According to a study based on a literature review and experience of experts in the field of knowledge management (Ganapathy, 2020), it was found that among the main problematic factors in both public and private enterprises are the following:

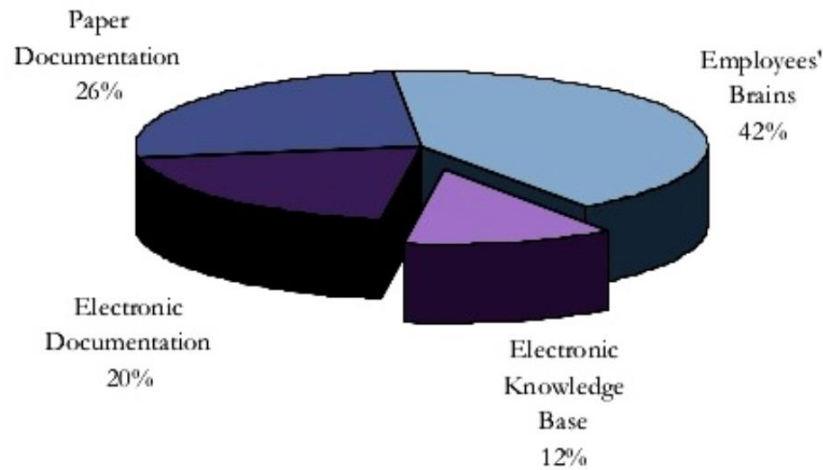
- Lack of management, leadership and support;
- Individualism;
- Lack of training;
- Lack of teamwork;
- Human behavior.

That is, a large proportion of the problems fall on employees, their lack of initiative, lack of motivation and unwillingness to develop, grow and improve their level of professionalism. At the same time, it is necessary to understand that the peculiarity of knowledge is that its power increases due to organized communication (merging, interaction) of people with different professions or fields of activity. Their joint participation in a project can generate many high-quality ideas that would otherwise be impossible. Adapting to trends, technological innovations and market and competition demands undoubtedly means acquiring new knowledge. In this process, those employees who are ready to change and accept new knowledge and experience play a decisive role.

Creation of databases, documentation and other methods of knowledge management is impossible without knowledge, experience, intuition, creativity of the company's employees. Therefore, within the organization, the human capital management process must be well thought out and built, including the creation of a favorable environment, professional and career growth, an effective system of motivation and rewards, a communication system, organization of creative processes, constant search and development.

Based on fig. 7, it can be seen that most of the knowledge (42%) is in the heads and minds of workers. K. Wiig (1993) divides knowledge into four levels: knowledge about the goal (idealistic knowledge); systematic knowledge; practical knowledge; automatic knowledge. Obviously, the company should be interested in improving and increasing efficiency in each of these areas.

Figure 7: Primary repositories of organizations knowledge



Source: Chakravarthy et al., 2015

New knowledge of staff can bring additional income to the company, therefore, in the end, it is profitable for the organization to invest in human capital. For example, TNT Express, the world leader in the international industry for express delivery of documents, parcels, goods, as well as logistics and international mail, noted the following with the start of the Investors in People program (Zaharova, 2016):

- The company's productivity has improved by 70%;
- Staff turnover decreased by 50%, people began to want to work;
- Customer satisfaction reached 98% (which is very high in the industry);
- Communication in the company has significantly improved.

Another important element of the human capital management system, which certainly needs to be paid attention, is training and mentoring. Training (coaching) and mentoring (education) have become very common methods of transferring knowledge in recent years. Apprentices often work with masters (mentors) and learn the craft through observation, imitation and hands-on work. All this is aimed mainly at improving the skills of individuals so that they can later perform tasks on their own. The process of accumulating mastery requires continuous practice from students until they reach the required level.

3.3 Building an organizational culture

Corporate culture is one of the most important factors in promoting effective knowledge management. There are many different definitions of this term from different points of view. "Corporate culture is a set of collective basic ideas acquired by an organization when solving problems of adaptation to changes in the external environment and internal integration, the effectiveness of which is sufficient to be considered valuable and passed on to new members of the organization as the correct system of perception and resolution of these problems" (Pokholkov and Chuchalyn, 2004). In the context of knowledge management corporate culture is an acquired way of perception, comprehension, thinking, shared and transmitted between members of the organization. Corporate culture includes elements such as (Tuzovsky et al., 2005):

- History, traditions, rituals, rules;
- Method of distribution and exercise of power;
- Degree of formalization and standardization of process management;

- Language of professional communication;
- Opportunities for creative expression of individuals and groups;
- A system for recording staff opinions.

In his study Kafashpoor (2013) highlights the main views of scientists on organizational culture. For example, Huang defines organizational culture as a pattern of basic assumptions that a community develops for external coincidence and internal integration. Hofstede as a general cognitive structure that acts as a guide for the perception, thought, and language of group members. Given that people rely on these basic guiding principles when making decisions, such values influence the behavior of the organization's members and the organization itself. Companies need to develop a culture of coping with environmental challenges and change that encourages people to manage knowledge. Organizational culture is the foundation of knowledge management as it teaches participants how to learn and how to share their knowledge say Gray and Densten. Based on the study of the relationship between organizational culture and success in knowledge sharing, it can be assumed that such elements of culture as trust, communication, information systems and rewards have a positive and significant impact on the exchange of knowledge in organizations. According to Shao, the hierarchical culture of explicit knowledge exchange and the group and rational culture of implicit knowledge exchange are interrelated. Also a positive culture can lead to improved employee productivity and efficiency, and cultural values influence people's propensity to perform well.

Based on this, the company needs to think over and write down its core values and principles, taking into account the attitude to the process of creating, sharing and developing knowledge within the company, the communication process and the creation of a favorable environment for an effective knowledge management process.

4. Conclusion

Knowledge management is not an easy job, but it is inevitable if a company wants to be successful in the marketplace. The correct use of corporate knowledge, its location and organization can be critical for generating new ideas and for the complex process of transforming knowledge into higher sales, profit or better position in the market.

Overall, knowledge management results in fewer errors and cost overruns, faster problem solving, more efficient decision making, lower research and development costs, increased employee autonomy, better employee relationships, and improved products and services.

In the age of corporate knowledge, competitive advantage is based on knowledge and seizing opportunities, which also require knowledge. The emphasis is on knowledge as a resource, and companies must provide (Hebibi, 2020):

- Innovation by encouraging the free expression of ideas;
- Improving of services provided to consumers;
- Increasing revenue through better placement of goods and services on the market;
- Reducing worker fluctuations by recognizing the value of employees, their knowledge and rewarding actions related to knowledge management;
- Improving of work operations and reducing costs by eliminating or reducing inefficient processes.

Based on the author's primary study of the knowledge management system in small and medium-sized enterprises, the following can be distinguished:

1. The main driving force behind the development and acquisition of new knowledge is the employee's self-interest, as well as on-the-job training. At the same time, in our opinion, companies should also pay attention to stimulating the individual growth of employees' knowledge and creating an environment for the free exchange of knowledge;
2. The main reason for reducing the effectiveness of the knowledge management process within small and medium-sized enterprises is individualism and unwillingness to share the accumulated experience and knowledge; free exchange of knowledge is perceived as a potential threat leading to unwanted competition. Based on this, companies need to

focus on creating an atmosphere of reliability and confidence, develop a motivational system for training and transfer of knowledge within the company;

3. Many employees do not fully understand the effects of the implementation and functioning of an effective knowledge management system - optimization of processes and structures, creation of a favorable environment for personal and professional development, and reduction of firm costs. At the top management level, it is necessary to convey this vision, inspire and motivate employees to develop, explaining the benefits that concern the employees themselves and the company as a whole.

As recommendations for knowledge management and, as a result, increasing the level of competitiveness in the market, companies need to pay attention to the development of three main areas - the creation and management of a knowledge management system, human capital management and the creation of an organizational culture that encourages and contributes to the development of an effective knowledge management process. In our opinion, targeted actions in these three directions will allow the company to reach a new level of development and strengthen its position in the market.

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IMPLEMENTATION APPROACHES IN RPA PROJECTS: NARRATIVE INQUIRY OF CZECH RPA EXPERTS

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Abstract

The aim of this paper is to layout different implementation approaches in the projects of Robotic Process Automation (RPA) implementation into the company without any previous experience and choose the right one based on the know-how of Czech external RPA consultants. The RPA is a technology of automating repetitive mostly back office tasks. The biggest difference compared to Workflow Management Systems (WfMS) and other automation tools is the way of how RPA operates – it works on the user interface without the need of changing the underlying systems. This difference brings new ways of using and implementing technology in the company to achieve operational effectiveness and it's the main topic of this paper. The main research strategy is the usage of a narrative inquiry as a source of rich datasets of experienced RPA consultants obtained by interviews. After analyzing data the author presents four implementation approaches that differ in client's involvement and strategic or tactic ways of implementing. Outputs from the research show that the natural growth approach is the best option for implementing RPA into the companies without any previous experience.

Keywords: five, implementation, implementation approach, interviews, narative inquiry, robotic process automation

JEL codes: M15

1. Introduction

The Business Process Management industry has evolved over the decades from more technological oriented domain – focus on Workflow management (WfM) to more business-driven approach with focus on process-oriented companies (Dumas et al., 2013). The downfall of WfM was rooted in inability to include the dimension of human resources and management (van der Aalst et al., 2003).

The main tools for advancement in Business Process maturity and achieving process orientation are BPMS or WfMS. According to Lawrence (1997) the WfMS is “a system that defines, creates and manages the execution of workflows through the use of software, running on one or more workflow engines, which is able to interpret the process definition, interact with workflow participants and, where required, invoke the use of IT tools and applications.” Its successor BPMS is defined by Chang (2006) as platform for design and implement integration of people, systems and data. This integration of legacy systems or their replacement by BPMS is often hardly feasible. RPA comes to fill this gap and to provide companies with agile tool for helping mostly back-office employees automate routine processes (Mendling et al., 2018)

Van der Aalst (2018) describes RPA as an umbrella term for tools that operate on the user interface of other computer systems in the way a human would do. RPA aims to replace people by automation done in an “outside-in” manner which means that the underlying Information System (IS) remains unchanged.

BPMS is more holistic tool and it focus more of phase of diagnosis and support managerial decision making. RPA is on the other side building on these systems and serve as a complementary product without the ambition of replacement of BPMS (Šimek and Šperka, 2019).

For the last two decades there were a lot of research about the ways and approaches toward BPM implementation (Rohloff, 2009; Vom Brocke, 2014; Batenburg and Waal 2014; Jeston and Nelis,

2008; Chang, 2006; Kettinger et al., 1997). But only a handful could be use for the purposes of RPA implementation because the ways and approaches are totally different - RPA didn't replaces current IS but builds on them. This different implementation approach is the topic of research present in this paper. Structure of the paper is as follows – firstly methods and research strategy will be decomposed including data collection and data analyzing methods. Then the results of narrative research are presented and finally the model of RPA implementing approaches is proposed.

1.1 Methods

The aim of this paper is to layout different implementation approaches in the projects of Robotic Process Automation (RPA) implementation into the company without any previous experience and choose the right one based on the know-how of external RPA consultants. This study is considered to have exploratory nature. The main research question is: „What is the best implementation approach to implement RPA into the company with the help of external RPA consultants?“

The research strategy carried out within this paper is a narrative inquiry, which examines the stories and experience of experts with the implementation of RPA in Czech companies in order to extract their know-how for the final part – proposition of a matrix of RPA implementation approaches. Concept of narrative inquiry from Braun and Clark (2006) was used to collect, analyze and evaluate data. As a respondents RPA consultants or companies which deliver RPA solutions were chosen. They are implementing RPA externally in cooperation with company staff members and management. The research for respondents was conducted online through LinkedIn and Google search. Author purposefully addressed the representatives of the Big 4 (Deloitte, Ernst and Young, KPMG, PwC), who are leaders in the CZ/SK environment in the RPA area. Through this research a database was created and potential respondents were contacted via email or LinkedIn direct message.

A total of 13 potential respondents were contacted and 10 of them came back with a response, with 1 subsequently withdrawing due to time constraints. In reality, therefore, 9 interviews were arranged.

Table 1: Introduction of Respondents

Respondent number	Company	Position	Practice in years	Role in the project
Respondent 1	Medium-size consulting co.	Director of the Automation Team	5	Project Manager
Respondent 2	Small IT company	Founder	2	Project Manager / Developer
Respondent 3	Large IT company	Automation Manager	4	Project Manager
Respondent 4	Small consulting co.	Owner	4	Developer
Respondent 5	Small automation company	Director	4	Project Manager
Respondent 6	Small consulting co.	Consulting Team Leader	7	Project Manager
Respondent 7	Global consulting co.	Team Manager	3	Business analysis / Developer
Respondent 8	Global consulting co.	Automation Team Leader	4	Project Manager
Respondent 9	Global consulting co.	Automation Team Leader	5	Project Manager

Source: author

1.1.1 Data collection

In-depth interviews were used to collect data from respondents. The main objective of the interviews was to obtain the narrative of a concrete RPA implementation project which was held by external consultant (respondent).

A general problem in conducting narrative interviews was the level of abstraction and therefore the specificity the respondents told their stories with. The researcher's role here was to direct the depth and level of detail to which the individual interviews were to be handled so that the data set was consistent and well analysable.

The interviews were conducted via an online call, as their scheduling was published for the period from 24/03/20 – 02/05/20, i.e. for the period of crisis in connection with the COVID-19 pandemic. The author agreed with the respondents on the possibility of using another online consultation if necessary – expanding narratives or obtaining additional information. After the interviews, transcripts were sent to check and possibly supplement or anonymise certain data or sequences.

1.1.2 Data analyses

In the phase of data collection, 9 interviews were conducted, which were recorded, and then transcribed for the purposes of content analysis.

Subsequently, a thematic analysis according to Braun and Clark (2006) was performed on the transcripts in the steps they propose in their methodology. At first, the author got to know the data more thoroughly and, although he conducted the interviews himself, it was necessary to read the resulting transcripts again. Furthermore, the process of generating code took place, which is part of the analysis, which aims to organise data (topics, patterns) into meaningful groups (Tuckett, 2005). Topics are clustered with codes that overlap or resemble. The author coded using the "revision/comment" function in the MS Word application, where he marked the parts of the narratives that fell under the given topic and added the topic to it, including a note. In the next phase – processing of topics, the relationships between topics and the ways in which the themes are crystallised and form an integral story of the data which is presented in next section.

2. Presentation of the Results of Narrative Research – Evaluation

Research shows that RPA enters companies in different circumstances and in different ways. Almost all of interviews/narratives (with the exception of respondent 2) address the approaches or strategic or abstract concepts of how to implement RPA. Specifically, these were different approaches to implementation chosen either according to the requirements of the client company or according to the method of implementation which the consulting or IT company focuses on. The so-called top-down implementation approach was often mentioned in interviews cf. bottom-up – from which positions did the initial impulse to implement within the internal environment of the client company arose. Respondents also differed in the setting of the business model – some are more concerned with development and administration, others, on the contrary, are more inclined to consulting activities and participating in the development and training of an internal team to transfer the competencies needed for automation.

In the following paragraphs, the individual approaches will be explained in more detail together with the arguments of the respondents. The biggest discrepancies and unclear results arose for top-down implementation approach argumentation vs. bottom-up. While respondents from larger consulting firms often criticise the bottom-up approach, other respondents indicate it as very relevant. However, with regard to this approach, according to Respondent 3, the situation is in the Czech and the Slovak market quite clear:

“... few companies start to think in such a way from the top, that they set a strategy and so on, they usually go from the bottom, and I see this basically in this Slovak-Czech market very often. I have one client who wants to go the other way around, when s/he really wants to go up and identify opportunities, take a consolidated approach, but 90% of cases and customers seem to try to automate one or two processes and then start thinking about how to build it all and so on. The problem is that an incredibly lot of those clients left, or maybe not clients, but an incredibly lot of suppliers and partners then left, because they just couldn't develop it there because it went from the bottom, so they didn't have a sponsor from the top and couldn't push it upwards.”

A similar situation occurs in other interviews, where they describe the frequency of such projects, and also specific narratives often show the bottom-up approach. Although this approach is criticised, they do not manage to incorporate client companies, with a few exceptions, into the project

strategically from the very beginning. As Respondent 5 describes the impulse for implementation most often arises at the middle management level.

"...most often it's not the board, that's true, but most often it's the high/top level and the like, where they get under the pressure of having to achieve some results. And they will start looking for ways of achieving them..."

Independently of Respondent 5, this method is elaborated by Respondent 6, who identifies this approach as correct, but only if its subsequent phase succeeds, and that is the successful presentation of the automation of partial processes to the top management of the company.

"Usually, whether those from middle management or the heads of those departments have a budget of their own, within which they can operate, and already within that budget we try to fit into the proof of concept, because at the moment when a proof of concept is done, and I can say that we haven't experienced a failed proof of concept, so then you can actually show the video, then you can show the results, you can calculate some statistics and business case, and you can go with this data up to the board or to top management and present the results."

Thus, it resonated among the respondents that this approach may be correct, but only in the short term. In the long run, it is important for the RPA initiative to be overseen by someone from top management who will have it in their goals and spread the burden on middle management, as this is the drive that will ensure that RPA develops in the company. This phase is, of course, associated with a much more comprehensive area, and that is the strategic umbrella and the model of RPA in the company, because as the Deloitte document (2018) describes, RPA projects, unlike traditional technology projects, are led by people from the "business" department, rather than IT, which creates pressure and uncertainty in the ways to organise and communicate the RPA initiative. Businesses are traditionally set up for an organisation associated with "heavyweight" automation solutions (BPMS, WfMS), so "lightweight" RPA solutions do not fit into existing structures and for full implementation it is necessary to achieve organisational change.

Respondent 5 adds a bottom-up approach counterargument:

"As soon as someone gets excited about it, it's usually such a local thing, and the bigger the company, the bigger the cry into the darkness, somewhere in the end it dies. It's a big coincidence when it finally goes all the way up, yeah it's very challenging, it works, but in practice it eventually dies on the fact that there are still so many levels among that enthusiastic team to get all the way up."

With a few exceptions, there is more agreement among the respondents. And this is the statement that the bottom-up approach does not exist or cannot be successful in the long run, because sooner or later the thing will get from the level of middle management to the management of the company (to the board) and the implementation from the top begins, when the strategy of implementation and operation of RPA in the company is created, in the form of an operating model (governance model – according to Respondent 9) or Center of Excellence - CoE (according to Respondents 3, 7, 8).

In the way of top-down implementation or vice versa, it is about motivation and so-called buy-in of stakeholders. The initial impulse may arise at the level of the company's board of directors (or another governing body of the company). According to the respondents (3, 7, 8, 9 – representatives of medium and large consulting companies), representatives of the client company's board of directors often talk about strategy with the top management of consulting companies and come up with possible strategic directions regarding digitization or digital transformation. The output of these debates is the initiation of an automation project through RPA, and thus the system implementation is approached from the top. Therefore, the support and buy-in of top managers is provided here, but it is necessary to approach it with caution when communicating down. On the other hand, the bottom-up implementation raises the opposite problem associated with obtaining a buy-in from the company's board of directors.

The method of implementation is therefore determined by the size of the client company, but also by the nature of the consulting firm, which may initially enter the various levels of management of the client firm. Respondent 6 records this fact well:

"...large system integrators will usually go for it like top-down, because they actually have contacts on the top floors of those companies. We are a small company, so our experience except for one case I would say is from bottom to top. We usually communicate with some middle management or with some kind of head of department, who are bothered by something and actually it bubbles from the bottom up."

On the other hand, authors have access to global consulting companies that have contacts to the top management of companies and, according to Respondent 7, regularly communicate with them and identify new opportunities. This statement was also confirmed by Respondent 9, who heads a global consulting firm and states:

"The goal for us is not to automate processes for the client, because we are (company name) we are not a software house. We don't produce software; our goal is consulting services... we do the first case and then we move on and bring new technology that fits into it. Alternatively, we work out how to simplify and optimise the automation process."

S/he also confirms that the partner and implementation approach are chosen according to the size of the company and the importance of the RPA project for the company:

"...it's a transformation for us, and that's why the projects are so big. Really big, yeah. We're just talking about that pharmaceutical company. So, the pharmaceutical company has poured just over \$ 50 million into the project over the past three years. For such a project, you need a company that can manage it..."

It is apparent from these differences that no single way of implementing RPA in the company can be applied, because the difference of these approaches is so high. On the other hand, it would not be beneficial to limit the proposed model (paper output) to only one approach, because different approaches may be applied (different benefit can be obtained) in different contexts, which results from interviews where there was no clear agreement on the correct choice of one approach.

"I can't say that moving from top to bottom or from bottom to top, that one is better and the other is worse. I would say that for different organisations, different procedures are correct, which, as in our experience, the top-down approach is a bit, as most expectations are set higher than the reality is. When you go from the bottom up, just as more is known about those processes and those expectations are usually set so that it turns out as either expected or even better. When you go from top to bottom, it is usually said here in that department we have 50 processes, and we believe that we can automate 30 percent. We have 150 people there, so we believe we will save 30% of those 150. And mostly, this simple arithmetic doesn't work."

The interviews also show that the implementation approach also varies according to the portfolio/focus of the consulting or IT company. In general, there were differences in the case where the company is more development-oriented and then strives more for development, implementation and subsequent management, which is associated with long-term cooperation. Another method was more focused on continuous training and involvement of internal employees of the client's company in the implementation process and gradual transfer of operation and further development of RPA to the hands of internal teams. This method was preferred by a global consulting firm (though not all of them). However, their main focus was on helping with project management and business transformation so that it could automate quickly and efficiently.

Respondent 1, representing a development company, mentions that 90% of their clients want to outsource RPA completely and only be able to monitor through the reporting panel (dashboard) how the robot works, how many transactions it processed, but have no ambition to enter into development and management. The client task in this method of implementation is to look for other opportunities for automation.

An internal or external way of implementing RPA has its advantages and disadvantages. According to Respondent 6, the most important is the very essence of external development:

"In my opinion it's easier for an external expert in the fact that if there is a client who spends some energy, finances, in short, funds to hire an external expert or an outsourcer, it doesn't matter who can do such a service, then the external person, who then comes to the company to the client, so it's easier in that usually the people are all waiting to start and waiting for something to happen... within those internal teams, when we are actually colleagues so nobody wants to talk to us very much, because "it's a nonsense, we don't know, we aren't sure"... and there is such an element that we have a little respect, we don't know what to expect from you yet, and on the other hand, the managers have driven us here, because they just probably pay a lot of money for you..."

Four comprehensive ways of implementation across RPA projects can be read from the data:

- **RPA outsourcing** – the client does not deal with implementation or development and subsequent management, only cooperates with the supplier, but does not have a dedicated internal team.

- **Joint implementation with subsequent internal operation** – this approach prevailed and according to the respondents is typical in RPA projects, by involving an external team in the initial implementation (often called PoC) also the employees of the client company and during the implementation they train them so that they will be subsequently able to develop other RPA robots internally. The services of the supplier company are then transformed exclusively into consultations, where they lead the creation of CoE and correct further expansion of RPA in the company.
- **Internal implementation with an external consultant** – this approach is similar to the previous approach; however, it is specific in the more important role of the internal team, which first goes through training, and then actual implementation takes place on the first processes under the guidance of an external guide/trainer /consultant.
- **External development** – in these situations, external experts are involved in the implementation, which usually concerns only part of the implementation process, and are not in charge of further expansion of RPA into the company. It may also happen that they are involved in larger projects as sub-suppliers of some sub-parts (development in many cases). Consulting activities are not usually the main core of the service.

Table 2 summarises the preferred implementation approaches that have emerged from data coding. In the case of service focus (development and administration vs. consulting activities), it is always a combination, so the company does not have to deal exclusively with development and management or only consulting activities, but in the evaluation the author looked for which approach was prevailing in the interviews. This is also true of the bottom-up vs. top-down implementation approach, when the author takes into account the opinion of respondents as to which of the approaches is better in their experience, which usually differs depending on which approach actually takes place with clients.

Table 2: Implementation approach used by respondents

Respondent number	Preferred implementation approach
Respondent 1	Bottom-up, RPA outsourcing
Respondent 2	External development
Respondent 3	Top-down, joint implementation with internal operation
Respondent 4	Bottom-up, external development
Respondent 5	Top-down, joint implementation with internal operation
Respondent 6	Bottom-up, internal implementation with an external consultant
Respondent 7	Top-down, joint implementation with internal operation
Respondent 8	Top-down, joint implementation with internal operation
Respondent 9	Top-down, joint implementation with internal operation

Source: Author

3. Proposed Implementation Approach

The interviews revealed 4 types of cooperation between the client and an external consulting company. The type of cooperation is not directly the implementation approach discussed in previous chapter but is closely related to it.

Internal development, internal maintenance – in the discussed narratives this method did not logically occur, because the subject of the research was the method of implementation with the help of an external consulting firm and the respondents were also representatives of the consulting firm.

External development, internal maintenance – this method occurred most often and the respondents also mentioned it (with a few exceptions – Respondent 1). The advantage of this method is that in order for the internal team to be in charge of maintenance, it must be thoroughly trained. As a

result, RPA gets into the structure of management or support processes of the client company and thus ensures viability and long-term operation. On the other hand, the risks are associated with insufficient training or transfer to the internal team, as well as further growth of RPA to the company, which may no longer be progressive if a clear plan is not set. The research shows that the departure of an external company after PoC/Pilot without the creation of a competence center (or at least assistance to it) will have a negative impact on the growth phase and will jeopardize the success of the entire RPA initiative.

Internal development, external maintenance – again, this is a less common method of implementation. According to the respondents, some companies will encounter RPA and initially intend to address the development through internal IT or another department. However, over time, they find that the method of implementation and the whole logic of RPA is so different that they invite an external entity to the project. On the other hand, it happens that the maintenance phase is planned to be carried out by internal forces, but after a short time a consulting firm is invited again, because the client company is not able to take advantage of all opportunities and its capacity is undersized. Thus, in practice, maintenance is often combined with the use of internal and external resources.

External development, external maintenance – specifically, Respondent 1's company is pursuing this business model and offers RPA as a complete outsourced solution. Accordingly, they also choose a clientele, which is mainly medium-sized companies, which do not have the ambition and resources to create their own RPA centres. The size of the client company therefore also affects which method of implementation will be chosen.

As described in previous section, there were large differences between the respondents in the implementation approaches, which are determined in both directions – i.e. from the position of a consulting company (the essence of the services offered, focus, strategy, etc.) and the client company (internal capacity, size, field, etc.). The proposed model should also reflect these variables. Now, a 2x2 matrix will be proposed, from which 4 different implementation approaches are based that can be encountered (within the researched issues – involvement of an external entity in the implementation). Figure 1 shows these approaches and they will be discussed further.

Each of the 4 implementation approaches is a combination of top-down vs. bottom-up and two types of cooperation used in research – external development and internal maintenance and external development and maintenance, which are the only ways that have occurred in narrative research.

Figure 1: Matrix of Implementation Approaches

Top-down	Bottom-up	
Natural Growth	Fade Away	external development and internal maintenance
Untapped potential	Small Victories	external development and maintenance

Source: author

The main determinant of bottom up vs. top-down implementation is the phase and time when the strategic coverage will enter the project, i.e. if even after the PoC phase the implementation is still not covered by the plan, strategy, competence center, but iterations on other processes still take place at the level of the department management without the necessary support, it is the bottom-up implementation. The latest phase, when the company's management (represented by top management) must enter the RPA automation project, in order to implement it from top to bottom, is immediately after the end of PoC, i.e. in the production phase, in order to be acquainted with the results and to be able to decide on the basis of objective benefits.

The four proposed implementation approaches are therefore as follows:

Fade Away – the risk of this approach has been described relatively clearly in narrative research. According to Respondents 3, 4 and 5, it often happens in practice that the automation project does not gain the support of the company's management, either from the start (the impulse for implementation arises at the middle management level) or after PoC and the project as such gradually disappears. This may be because PoC does not produce the desired results, but is usually due to misunderstandings, lack of communication or internal political motives. According to Respondents 5, 6 and 9, there is no unsuccessful PoC, or they have not encountered it during their practice. Thus, even after PoC, the project does not gain strategic auspices from the top and continues, it is only a matter of time before its sponsors stop having the energy to push it further without support, or this project may be halted by order.

Small Victories – the situation is more stable than in the previous approach, but again without the timely involvement of top management, the RPA project will remain only at the level of partial components of the company and therefore only automation of some processes is implemented, and small victories are achieved. The RPA projects managed in this way are again in the jurisdiction of the department, where the middle management decided to choose the path of fulfilling the KPIs through the RPA and pulled it into the company with the help of its own budget. This approach is typical for smaller consulting or development companies offering complete outsourcing, but at the same time do not have the capacity or business opportunities to reach the upper levels of corporate management. However, over time, the RPA initiative may be registered and may be given strategic protection and relocation to another quadrant in the matrix.

Untapped potential – similarly to the previous approach, the involvement of an internal team is not envisaged here, but only relies on the delivery of RPA solutions from an external entity. In this case, the patronage of the top management has already taken place, which has affected the scope of the project and its growth into the company. However, as Respondents 3, 6 and 7 describe, without the involvement of the internal team, the potential that automation could fulfil is not fully exploited and thus the individual life cycles of RPA are extended. Respondents also encountered a situation where they supplied (as representatives of a consulting firm) their own employees to work full-time for the client on RPA projects, which is similar to agency work, and in this case, it can be debated whether administration and maintenance is still in external or internal hands. The author considers this to be an internal solution of the situation, because even though they are external employees, they belong to the internal organisational structure and therefore behave as an internal team.

Natural Growth – the last implementation approach shows the optimal variant ensuring the development of RPA and overall successful implementation. The RPA initiative is covered immediately from the start or immediately after the PoC, and at the same time the internal team is involved in the maintenance (or full-time representatives of the consulting company, see the previous point). During or after PoC, a competence center or CoE is created, which takes on the role of RPA development and all other agenda around – administration, maintenance, communication, active collection of suitable candidates for RPA, prioritization, etc. The interviews showed that although this may not be the most common method of implementation in the conditions of the Czech Republic / Slovakia, the respondents more or less agreed that it is the most suitable. It certainly depends here also on the size of the company, but if it is not explicitly a global company (as in the case of Respondent 9), then it is most appropriate when the growth phase enters the implementation only after PoC. This will prevent excessive planning and lengthy preparatory strategic work, which according to some respondents (1, 5, 6) is not appreciated by clients and if it is carried out before the end of PoC, it is also premature, due to the staffing of the internal team, which will take shape only during training and application in PoC.

4. Conclusion

The aim of this paper was to layout different implementation approaches in the projects of Robotic Process Automation (RPA) implementation into the company without any previous experience and choose the right one based on the know-how of external RPA consultants. To fulfill this aim the narrative inquiry research strategy was used to gather insights into how RPA consultants implement RPA into the companies. More specifically what approaches are there and which one they considered to be the best. As one can see in the third part, there is no straightforward answer because there is a lot of variables which influence the decision of what approach company should take. But author could argue

based on the data, which approach is more favorable and considered to be more suitable for most cases. Surely it has to be the one approach using top-down direction, where the RPA implementation project is taken under wings of some member of top management (board of a company) at least right after PoC ends (based on the results). Only in that circumstances could RPA draw the full benefits and be considerable as a long-term driver or enabler of digital transformation. Another dimension of proposed model (2x2 matrix of RPA implementation approaches) was the dimension of internal or external development of RPA bots and their maintenance (operation). The right mixture of internal and external human resources is vital in achieving excellent results in the RPA journey. The recommendation for the RPA initiatives is to use external consultants to guide the way because the RPA technology is so different (it is business driven lightweight IT) it needs different organizational and communicational structures upon which RPA could be built. External consultants often help with design of competence center of CoE which takes on the role of scaling RPA throughout the company. The implementation approach “Natural Growth” shows according to respondents’ biggest perspective even when it is not so common in CZ/SK business environment. It combines the top-down way with external RPA development and internal RPA maintenance and operation. The contribution of this research is to show potential approaches of implementing RPA technology which is for a lot of companies still quite new and to outline the dimensions in which the decision makers should think about bringing RPA into their company. The biggest limitation of this research lie in the question of how to implement RPA into company if they would use for example the “Natural Growth” approach because this paper didn’t provide with any framework or concrete structure of steps. This process of implementation of RPA will be also a objective of future research.

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UTILIZATION OF EUROPEAN STRUCTURAL AND INVESTMENT FUNDS 2014-2020 AT THE NATIONAL AND REGIONAL LEVEL IN THE CZECH REPUBLIC

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Abstract

The European Structural and Investment Funds are an integral part of the Czech Republic, which helps both municipalities and cities, as well as business entities in individual regions. European Union funds are an important tool for implementing European economic and social cohesion. Using the funds are distributed funds intended to reduce economic and social disparities between the Member States and their regions. The aim of the article is to find out the situation between supported projects from the programming period 2014-2020 according to individual types of programs at the national and regional level (NUTS 3) in the Czech Republic. The author of this article focused on the comparison of the Operational Programs, area of intervention, collaboration, and total eligible expenditure allocated to the operation. Emphasis is then placed on a more detailed selection of the priority axis Protection and care for nature and landscape, which is part of the Operational Program Environment and the priority axis Improving public services and conditions for residents of the region, which is included in the Integrated Regional Operational Program. Within the given priority axes, the author of the paper also focused on regional comparisons at the NUTS 3 level in the Czech Republic.

Keywords: Czech Republic, European Funds, NUTS 3, Private Sources, Public Resources
JEL codes: N20, Q50, R10

1. Introduction

European structural and investment funds have been an integral part of the Czech Republic since 2004, helping both municipalities and cities, as well as businesses in individual regions. European Union funds are an important tool for implementing European economic and social cohesion policy. The funds allocate funds to reduce economic and social disparities between the Member States and their regions. The Operational Program is a basic strategic document of a financial and technical nature for a specific thematic area (e.g. employment, environment, etc.), which is prepared by EU member states. The Operational Program describes in detail the objectives and priorities that the Member State wants to achieve in the given area in the current programming period.

For the Czech Republic, they were funding approved by the European Commission under the current programming period amounting to almost EUR 24 billion. The purpose and goal of their use are to support economic growth and at the same time reduce social and economic inequalities between the states and regions of the European Union (i.e., cohesion policy). In the 2014–2020 programming period, common rules are set in the Czech Republic for five funds, which together form the European Structural and Investment Funds (ESIF). The basic overarching document for drawing funds from the European Structural and Investment Funds (ESI Funds) in the programming period 2014-2020 is the Partnership Agreement.

The aim of the article is to find out the situation between supported projects from the programming period 2014-2020 according to individual types of programs at the national and regional level (NUTS 3) in the Czech Republic. The article is conceived as follows, where the Introduction is followed by an overview of literary research, followed by the third chapter, namely Methodology. The fourth chapter is focused on the results of the article and at the end there is a draft Conclusion, which summarizes the essentials of the article. The motivation for writing the article is to deepen knowledge

in the Operational Programs financed in the programming period 2014-2020 in the Czech Republic. The author wants to focus primarily on selected axes and programs, associated with it and the amount of funds that were intended for the beneficiaries. A necessary part of this issue is the regional perspective at the NUTS 3 level, which are listed in the article.

2. Literature review

European Structural Funds provide EU Member States and regions with assistance to overcome structural deficiencies and to enable them to strengthen competitiveness and increase employment (Streimikiene, 2016). The project for the construction of a great Europe, reuniting the highest number of countries within its borders, to creating a framework for social conviviality and economic stability, calls for a huge political and economic effort on the part of the Member States which shape the European Union (EU) (Cordero Mestanza, 2005). With the purpose of reaching the desirable economic stability, the States in leading positions and enjoying a higher economic development have been required to commit themselves and make a substantial economic and political effort (Hughes, Sasse and Gordon, 2004). Such effort is reflected in the EU annual budget and the supply of Economic Structural Funds such as; the European Regional Development Fund (ERDF); the European Social Fund (ESF) (García Murcia, 2004); the Guidance Section of the European Agricultural Guidance and Guarantee Fund (EAGGF-Guidance), and the Financial Instrument for Fisheries Guidance (FIFG). Their common aim is for the less developed Members to be able to approach the EU average income levels (Fuente Cabero, 2004). However, there are clear differences between European countries; this yields a group with quite different dynamics and capacities for adapting to change in the global (and European) economic environment (see Fagerberg and Verspagen, 2014). Besides, the effects of the international economic crisis of 2008 triggered a clear divergence between European countries (see Bolea et al., 2018). In this sense, the phenomenon of integration and its consequences for the social, political, and economic characteristics of countries has been a central topic in the literature, and its evaluation continues to attract great academic interest (European Commission, 2007, 2015).

The regional development promotes the balanced development of the European Union and, similarly, in all member states is treated as an integral factor of the state's economic and social policy. Also, it promotes the growth model proposed by the Europe 2020 Strategy, including the necessity of meeting the societal challenges, and those related to employment in the regions and the Member-States. The appraisal of the implementation of the regional policy, whose goals and priorities were defined in the national and European strategic documents, calls for general and specific objectives and financial instruments of that policy (Antonescu 2014). The regional development is linked to the activities of the business. In general, entrepreneurship is considered to be an essential factor of economic growth in the European Union (EU) and not only there (Audretsch, 2001; Romero, 2011; Sternberg, 2012; Amaghous and Ibourk, 2013; HoltzEakin and Kao, 2003; Lukes, 2013; Sebestová et al., 2015; Rusu and Roman, 2017). In this connection and in the context of a cohesion policy, which aims at the stimulation of economic growth through various activities, the importance of promoting entrepreneurship policy has significantly increased. Verheugen notes that "Micro, small and medium-sized enterprises (SMEs) are the engine of the European economy. They are an essential source of jobs, create entrepreneurial spirit and innovation in the EU, and are thus crucial for fostering competitiveness and employment..." More flexibility when reacting to market changes and better implementation of innovation are the main, and frequently stated advantages of SME. Positive effects coming from the SMEs sector or entrepreneurship, in general, are very diverse. Also on this ground, the interest in regional analysis has moved from factors influencing the spatial distribution of companies to factors of creation and disappearance of companies and influence on economic growth (Mason, 1983). The significance of SMEs and their impact on the economic performance of regions has become a subject of many studies (Audretsch and Fritsch, 2002).

3. Methodology

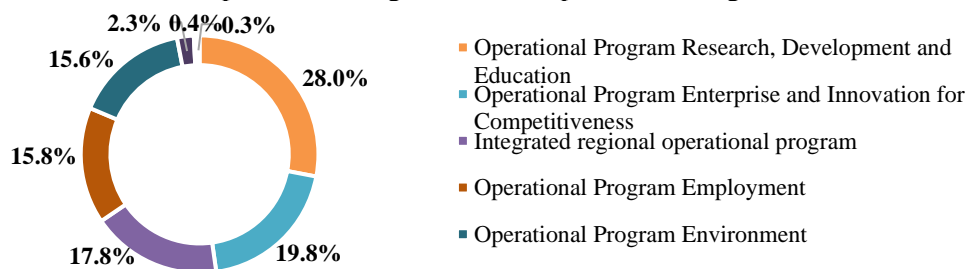
The mentioned part of the article is based on the methodology. The aim of the article is to find out the situation between supported projects from the programming period 2014-2020 according to individual types of programs at the national and regional level (NUTS 3) in the Czech Republic. The author of the article focused on the list of recipients of grant funds within the programming period 2014-

2020. In the list of operations (beneficiaries) all implemented projects/operations in the period, 2014-2020 are listed. Only projects with a legal act on the provision/transfer of support are included here. The list of operations contains mandatory requirements arising from Regulation (EU) No. 1303/2013 of the European Parliament and the Council. The given list of recipients of financial support is fixed as of 31. 1. 2021, when it was found that 60,598 projects were supported. The list of operations was then selected according to the name of the program, the name of the priority axis, the name of the NUTS 3, the area of intervention, the Union co-financing rate, and the eligible expenditure. Emphasis is then placed on a more detailed selection of the priority axis Protection and care for nature and landscape, which is part of the Operational Program Environment and the priority axis Improving public services and conditions for residents of the region, which is included in the Integrated Regional Operational Program. From the results obtained, the author of the article wants to find out the focus of the given funds between NUTS 3 regions and its amount of financial support co-financed by the Union, as well as the use of public and private funds for supported projects implemented in the Czech Republic, which seeks to improve and reduce individual regions. All data on the beneficiaries were obtained from the DotaceEU website (dotaceeu.cz).

4. Results

The first part of this chapter will focus on a general comparison of the results obtained. First, the author focused on the names of programs (Operational Programs), which were implemented in the programming period 2014-2020. As already mentioned, as of 31. 1. 2021, 60,598 projects were recorded. Most beneficiaries from the given programming period were mainly from the Operational Program Research, Development, and Education, with a relative frequency of 28%. Another most frequent recipient of subsidy funds was from the Operational Program Enterprise and Innovation for Competitiveness. The number of beneficiaries was 19.8% of the relative frequency and in absolute frequency, it was 11,970 supported projects. The third most numerous group consists of beneficiaries from the Operational Program: Integrated regional operational program, where 10,758 projects were supported in absolute terms as of the given date. In relative frequency, this is 17.8% of supported projects. The above results are shown in the figure below (Figure 1).

Figure 1: The structure of Operational Programs in the Operational Program 2014-2020



Source: DotaceEU; own processing

The next figure (Figure 2) pays attention to the absolute and relative frequency within the supported projects according to individual NUTS 3 regions in the Czech Republic. Table 1 focuses on the abbreviations of NUTS 3 regions according to CZ-NUTS with official names.

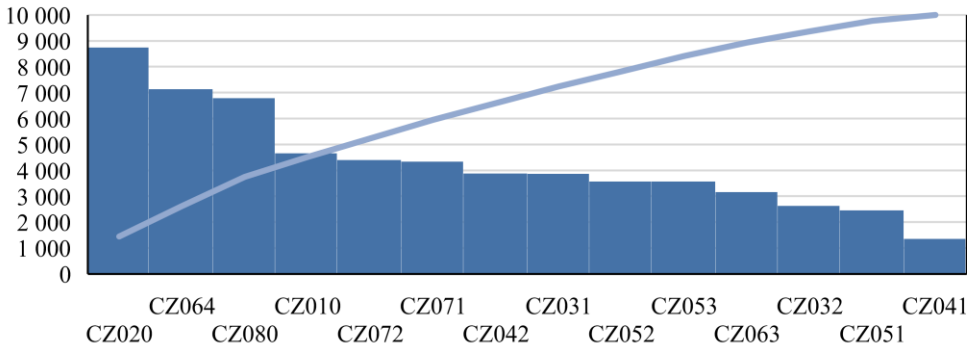
Table 1: NUTS 3 regions in the Czech Republic

NUTS 3 Code	Name of the Region	NUTS 3 Code	Name of the Region
CZ010	Prague	CZ052	Hradec Králové Region
CZ020	Central Bohemian Region	CZ053	Pardubice Region
CZ031	South Bohemian Region	CZ063	Vysočina Region
CZ032	Plzeň Region	CZ064	South Moravian Region
CZ041	Karlovy Vary Region	CZ071	Olomouc Region
CZ042	Ústí nad Labem Region	CZ072	Zlin Region
CZ051	Liberec Region	CZ080	Moravian-Silesian Region

Source: CSO, own processing

As can be seen from the figure below (Figure 2), the most supported beneficiaries are mainly from the Central Bohemian Region, with a relative frequency of 14.44%. The second most numerous group consists of beneficiaries from the Pilsen Region in a relative share of 11.78%. The third group consists of beneficiaries from the Moravian-Silesian Region in a relative frequency of 11.20%. On the other hand, the least beneficiaries are mainly from the Karlovy Vary Region, where the relative frequency of supported beneficiaries is 2.24%. It is important to note that we must take into account the size of the region, their population, as well as the number of municipalities and the number of businesses that affect the number of beneficiaries in regions.

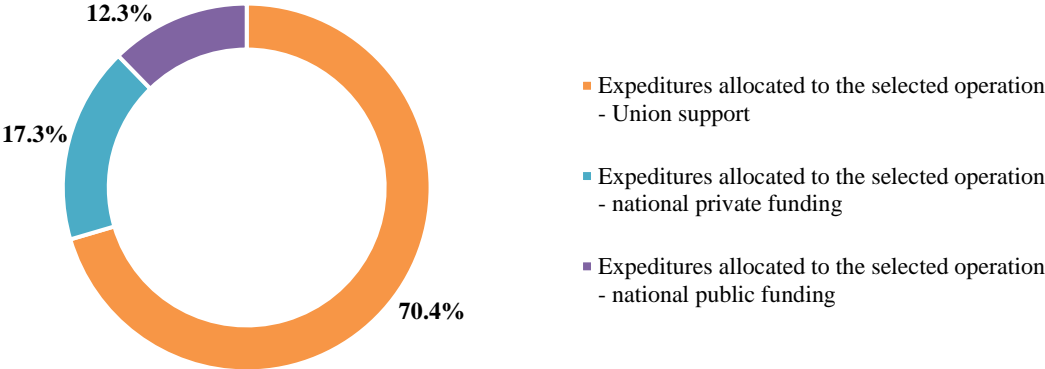
Figure 2: Operational Programs by individual NUTS 3 regions



Source: DotaceEU; own processing

The following figure (Figure 3) shows the total eligible expenditure allocated to the operation in CZK, both from the Union contribution, public resources of the Czech Republic, national private resources, and private resources. As is evident from the figure, the largest amount is mainly from Union funds, at a relative frequency of 70.4%. The second most numerous group consists of total eligible expenditure from private sources. This group consists of 17.3% in relative share. The last group consists of funds from public sources for beneficiaries in a relative frequency of 12.3%. The total eligible expenditure allocated to the operation as of the above date was CZK 772,436,828,335.44.

Figure 3: Total eligible expenditure for operation

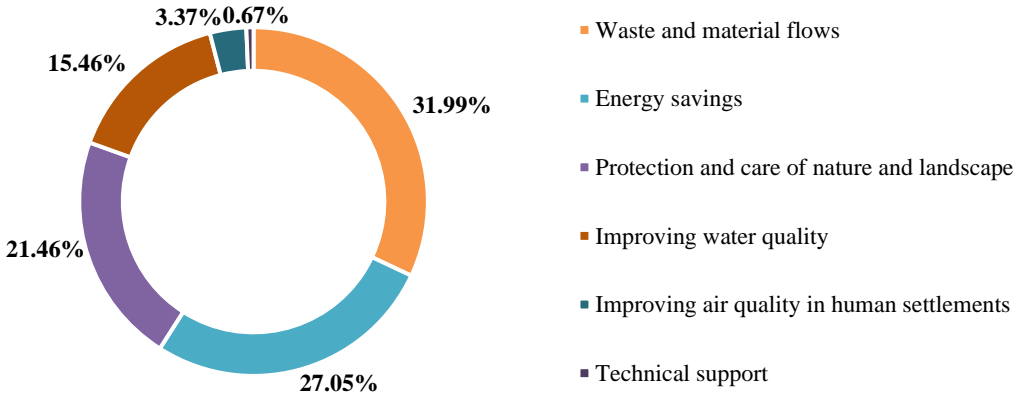


Source: DotaceEU; own processing

The next part of the chapter (second part) will focus on the priority axis Protection and care for nature and landscape, which is part of the Operational Program Environment and the axis Improving public services and conditions for residents of the region, which is included in the Integrated Regional Operational Program.

Figure 4 focuses on the names and relative shares of priority axes within the Operational Program Environment. A total of 9,453 beneficiaries were supported under the given Operational Program. Most beneficiaries are within the priority axis Waste and material flows, with a relative frequency of 33.99%. The second group consists of beneficiaries from the Energy Savings axis. 27.0% of beneficiaries were supported on this axis. The third most numerous groups of beneficiaries are from the priority axis Protection and care for nature and regions, with a relative frequency of 21.46% and in absolute terms, it was 2,029 supported beneficiaries.

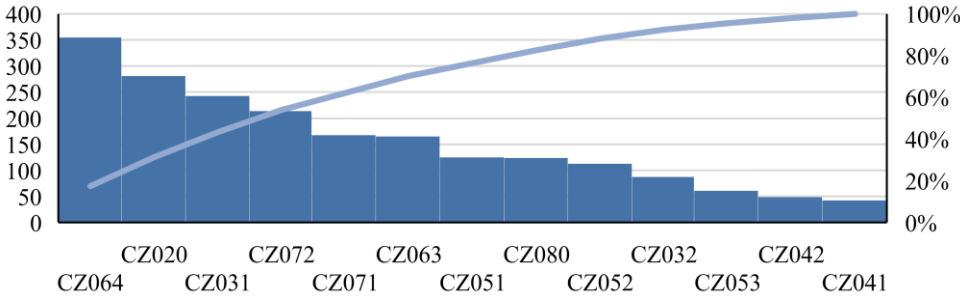
Figure 4: Priority axes of the Operational Program Environment



Source: DotaceEU; own processing

The author of the paper also focuses mainly on the priority axis Protection and care for nature and landscape, where 2,029 projects were supported. The situation is also related to the figure below (Figure 5), which focuses on the regional number of supported beneficiaries from a given axis in absolute and relative terms. The picture then shows that the largest part of the beneficiaries from the South Moravian Region, with a relative frequency of 17.5%. The second most numerous group consists of recipients from the Central Bohemian Region in a relative frequency of 1 to 8%. The third most numerous group consists of projects supported by the South Bohemian Region in a relative frequency of 12%. The fewest beneficiaries are from the Karlovy Vary Region, where 2.1% of projects from the given axis within the Operational Program were supported in the given programming period.

Figure 5: Regional distribution of the number of NUTS 3 beneficiaries within a given priority axis



Source: DotaceEU; own processing

Table 2 pays attention to the areas of the priority axis, which were supported within the relative and absolute frequency. As can be seen from the table, the largest share of beneficiaries is within the area of Protection and Restoration of Biodiversity, Nature Protection and Ecological Infrastructure in a relative frequency of 95.8%.

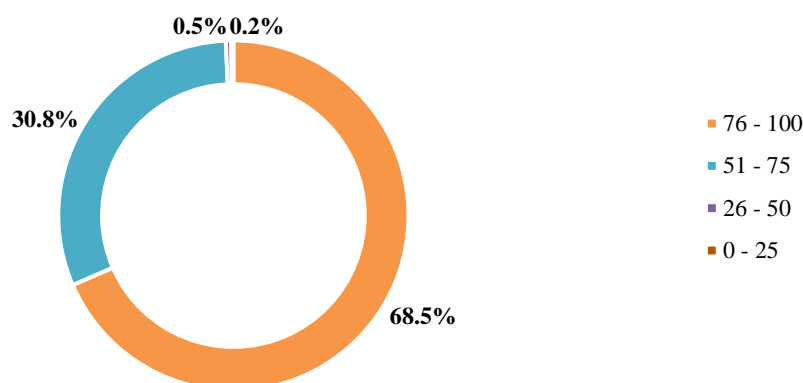
Table 2: Intervention field of supported beneficiaries within the given primary axis

	Relative frequency	Absolute frequency
Protection and restoration of biological diversity, nature protection and ecological infrastructure	95.8%	1,943
Protection, restoration and sustainable use of Natura 2000 sites	4.2%	86

Source: DotaceEU; own processing

Figure 6 shows the relative shares of the Union co-financing rate within a given beneficiary in the context of supported projects in a given priority axis. The results show that the highest frequency is in the range of 76% - 100% of the co-financing rate. In absolute frequency, there are 1,390 recipients. Another group consists of beneficiaries, where the co-financing rate was from 51% to 75%. For this option, the absolute frequency was 625 recipients. The following two groups were of low relative frequency and therefore will not be commented on here.

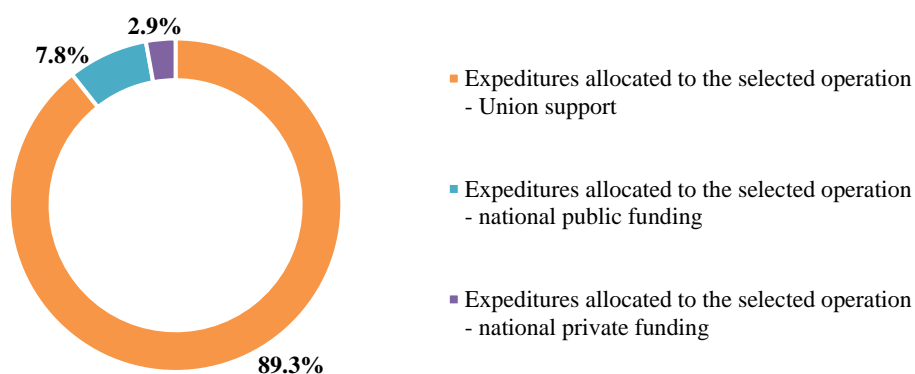
Figure 6: Co-financing rate of beneficiaries of the given priority axis



Source: DotaceEU; own processing

Related to the above figure (Figure 6) is the figure below (Figure 7), which pays attention to the total eligible expenditure according to the given options. The largest relative share is in the total eligible expenditure allocated to the Union operation, at 89.3%. If we focus on the absolute value expressed in CZK, then the stated value is 9,061,752,098.29 CZK. Another group consists of total eligible expenditures from public sources, with a relative frequency of 7.8%. The last part consists of expenditure allocated to the operation from private sources, where the relative share was 2.9%.

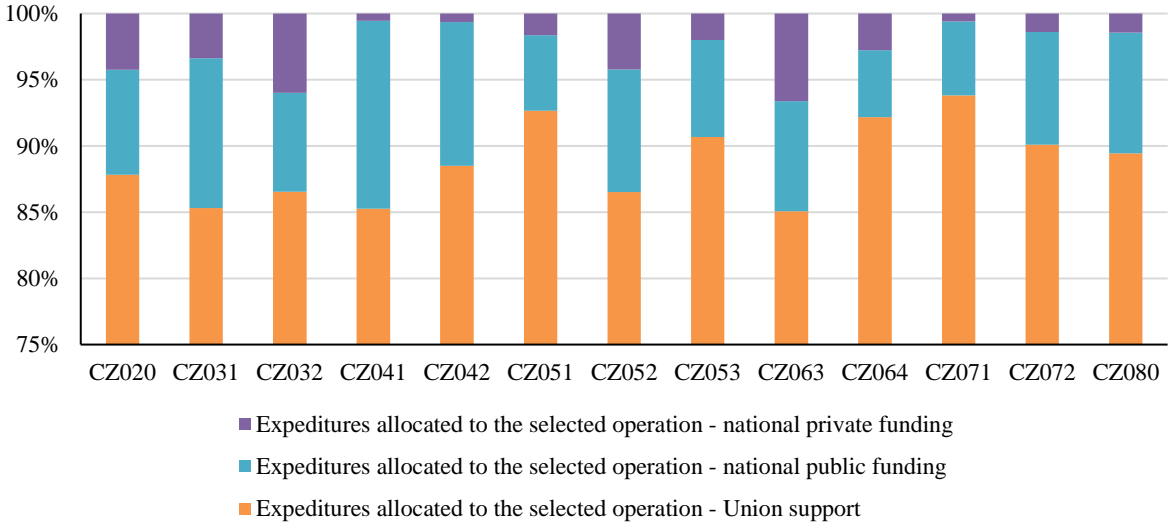
Figure 7: Distribution of eligible expenditure by priority axis



Source: DotaceEU; own processing

If we look at the distribution of total eligible expenditure within individual regions within a given priority axis, then the results show us different results. All regions are characterized by a high level of total eligible Union expenditure. The largest total eligible expenditure from the Union was in the Olomouc Region (93.8%). Among other regions, where the highest frequency was in the Liberec Region (92.6%) and the South Moravian Region (92.2%). It was found that other regions also showed large relative shares of this option. In the region that showed the largest relative share of total eligible expenditures within public resources, it was in the Karlovy Vary Region (14.2%). The highest relative frequency of total eligible expenditures from private sources was in the Vysočina Region (6.6%). More detailed results are shown in the figure below (Figure 8).

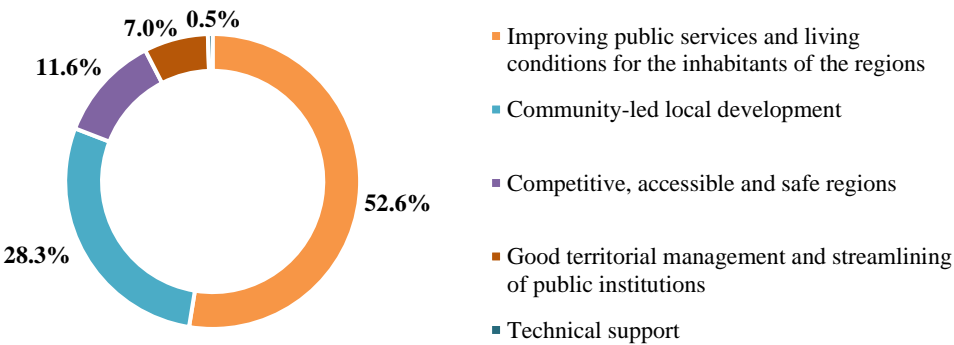
Figure 8: Distribution of total eligible expenditure by NUTS 3 regions in the Czech Republic



Source: DotaceEU; own processing

The next part of the chapter will be devoted to the axis Improving public services and conditions for the inhabitants of the region, which is included in the Integrated Regional Operational Program. There are five priority axes in the given Operational Program, where the total number of beneficiaries within the given axes reaches an absolute value of 10,758 beneficiaries. The mentioned axis (Improvement of public services and conditions for the inhabitants of the region) was approved by 5,655 beneficiaries, within a relative frequency of 52.6%. The second group consisted of the Community-led local development axis with a relative frequency of 28.3%. The next group consists of Competitive, accessible, and safe regions (11.6%). The other axes had small relative shares and will therefore not be commented on here. The results are shown in the figure below (Figure 9).

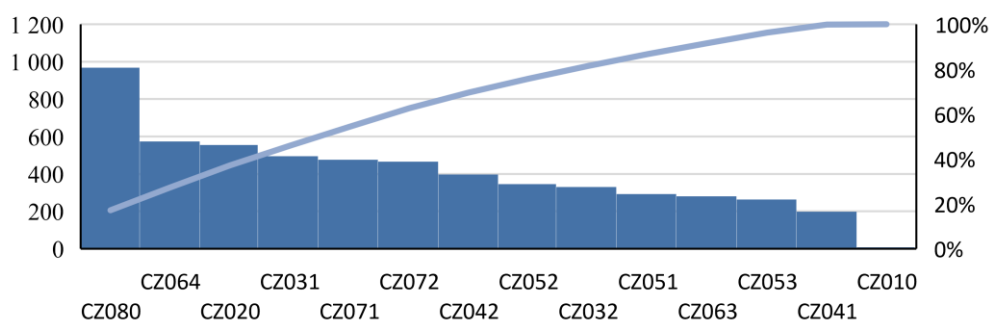
Figure 9: Priority axes of the Operational Program Environment



Source: DotaceEU; own processing

The next figure (Figure 10) shows the absolute and relative frequency within the priority axis Improving public services and conditions for the inhabitants of the region according to individual NUTS 3 regions in the Czech Republic. As can be seen from the figure, the most beneficiaries within the axis are the Moravian-Silesian Region, with a relative value of 17.1%. The South Moravian Region (10.2%) is the second region where it was found that there is the second largest number of recipients of the application for a given axis. The fewest applications are registered in the capital city of Prague (0.1%) and the Karlovy Vary Region (3.5%).

Figure 10: Regional distribution of the number of NUTS 3 beneficiaries within a given priority axis



Source: DotaceEU; own processing

The following table (Table 3) shows the absolute and relative frequency of the areas of intervention of a given axis. The largest share was in the area of intervention Energy efficient renovation of the existing housing and housing stock, demonstration projects, and support measures, with a relative frequency of 48.3%. The second most numerous groups in the area of Educational infrastructure in the field of school education (primary and general secondary education), where the relative share was 26.1% of the given axis. The smallest areas of intervention within the beneficiaries were in Health infrastructure (3.0%). The number of beneficiaries during the programming period was 167.

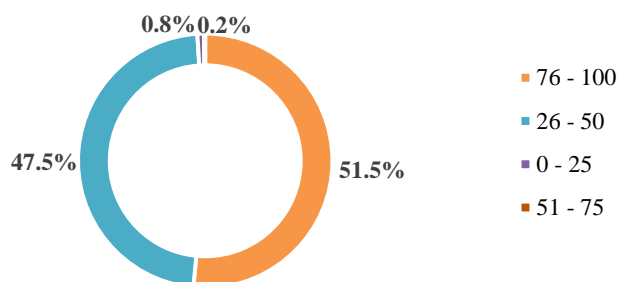
Table 3: Intervention field of supported beneficiaries within the given primary axis

	Relative frequency	Absolute frequency
Energy efficient renovation of existing housing and housing stock, demonstration projects and support measures	48.3%	2.733
Educational infrastructure in the field of school education (basic and general secondary education)	26.1%	1,475
Housing infrastructure	7.1%	403
Other social infrastructure contributing to regional and local development	6.6%	371
Infrastructure for early childhood education and care	5.7%	320
Support for social enterprises (small and medium-sized enterprises)	3.3%	186
Health infrastructure	3.0%	167

Source: DotaceEU; own processing

The following figure (Figure 11) will focus on the Union co-financing rate in percentage terms. It is clear from the given figure that the largest co-financing rate is from 76% - 100%, with a relative frequency of 51.5%. The next group consists of a rate from 26% - 50%, where the share was 47.5%.

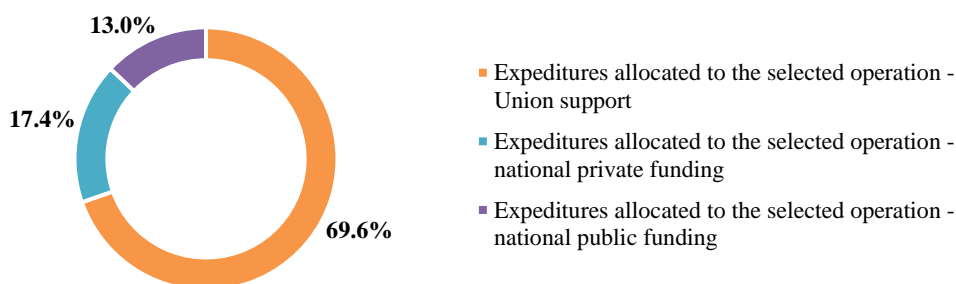
Figure 11: Co-financing rate of beneficiaries of the given priority axis



Source: DotaceEU; own processing

The author of the paper further focused on the total eligible expenditure in the context of the axis. The figure below (Figure 12) shows that the largest share is in the total eligible expenditure from the Union, with a relative frequency of 69.6%. The second group consists mainly of expenditures from private sources (17.4%). The last group consists of public resources within the co-financing. The relative frequency of the group was 13.0%. The total funds amount to CZK 67,422,804,571.43 in the context of the given axis in the given programming period.

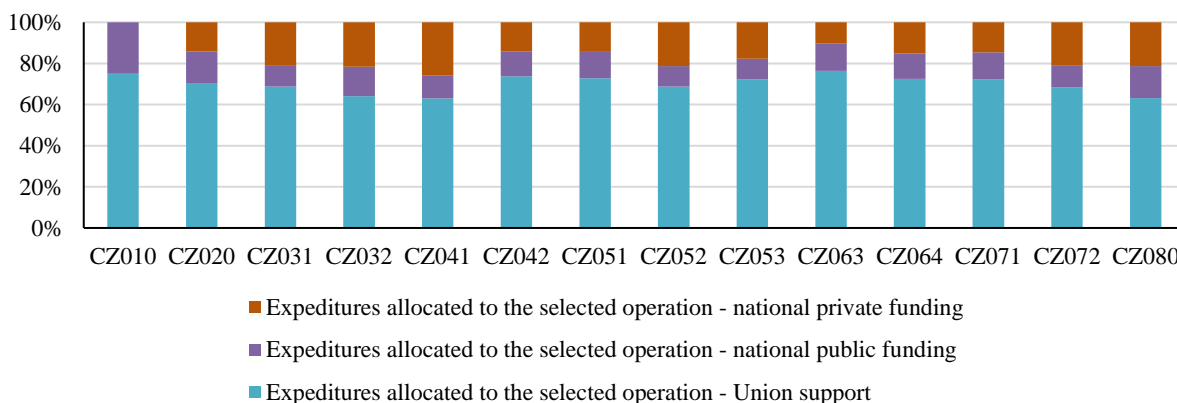
Figure 12: Distribution of eligible expenditure by priority axis



Source: DotaceEU; own processing

Figure 13 shows the total eligible expenditure by group according to regional distribution. The figure shows that the largest share of total eligible expenditure in all regions is Union funding, in all regions. The largest share of these expenditures from the Union is mainly in the Vysočina Region (76.4%). The same share is recorded in the Karlovy Vary Region (63.0%). The second group consists of private resources supported for the operations. The largest share, in this case, is mainly in the Karlovy Vary Region (25.9%) and the least in the Vysočina Region, if we do not take into account the share in the capital city of Prague, where no funds were recorded under the option. The third group consisted of eligible public expenditure on the operations. Here, the largest share was mostly in the capital city of Prague (25.1%) and the lowest relative frequency was recorded in the Pardubice Region (9.9%).

Figure 13: Distribution of total eligible expenditure by NUTS 3 regions in the Czech Republic



Source: DotaceEU; own processing

5. Conclusion

This article focused on the Operational Programs within the Operational Period 2014-2020 in the Czech Republic. The aim of the article was to find out the situation between supported projects from the programming period 2014-2020 according to individual types of programs at the national and regional level (NUTS 3) in the Czech Republic. Emphasis was then placed on a more detailed selection of the priority axis Protection and care for nature and landscape, which is part of the Operational Program Environment and the priority axis Improving public services and conditions for the region's inhabitants, which is included in the Integrated Regional Operational Program.

It was found from the article that the largest part of the beneficiaries is within the Operational Program Research, Development and Education, with a relative frequency of 28%. Another most frequent recipient of subsidy funds was from the Operational Program Enterprise and Innovation for Competitiveness. Of the relative frequency, the number of beneficiaries was 19.8%. The total eligible expenditure allocated to the operation as of 31. 1.2021 they amounted to 772,436,828,335.44 CZK.

The author also focused on a more detailed comparison of the axes. It was found that a total of 9,453 beneficiaries were supported under the given Operational Program. For this axis (Protection and care of nature and landscape), 2,209 beneficiaries were supported. Most recipients are from the South Moravian Region. The second most numerous group consists of beneficiaries from the Central Bohemian Region. The total eligible expenditure under the axis amounted to CZK 9,061,752,098.29. Another axis in the paper was Improving public services and conditions for the inhabitants of the region, which is included in the Integrated Regional Operational Program. There are five priority axes in the given Operational Program, where the total number of beneficiaries within the given axes reaches an absolute value of 10,758 beneficiaries. This axis (Improvement of public services and conditions for the inhabitants of the region) was approved by 5,655 beneficiaries. Most beneficiaries within the given axis are from the Moravian-Silesian region. The South Moravian Region is the second region where it was found that there is the largest number of recipients of the application for a given axis. The total funds amount to CZK 67,422,804,571.43 in the context of the given axis in the given programming period.

Operational Programs are essential in every EU Member State as they allow the use of private and public sector funds in the process of modernization, competitiveness, and other areas. Furthermore, Operational Programs help to reduce differentiated differences between individual regions in the Czech Republic.

The mentioned article provided information on the number of beneficiaries in individual Operational Programs and their selection for the given priority axes together with the amount of financial provided. It can be said that EU funds for individual beneficiaries under the given Operational Programs and Axes are an important part of how to contribute to the development and reduction of disparities between regions or EU countries. It was found from the article that without EU funding of the programs, not so many projects would be supported. This article needs to be developed in other areas and directions, in all NUTS 3 regions, where a deeper analysis will be needed. The benefit of the article is a certain insight and selection of the number of programs and beneficiaries in the given programming period, which was mentioned above, it will be necessary to expand and analyse in more detail in the future. Another benefit, according to the author of the article, is a view of the numbers of beneficiaries in selected axes from a regional perspective in relation to the level of financial support from the EU, public and private sources.

Acknowledgment

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DOES MANAGEMENT OWNERSHIP MAKE EARNINGS MORE KINKY?

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Abstract

Prior empirical research documents a “kink” in the earnings distribution, meaning that empirical distribution of reported earnings is discontinuous around a threshold such as zero. Results of these studies show an unusually high frequency of firms with small positive earnings and an unusually low frequency of firms with small negative earnings in comparison to the normal distribution. This phenomenon is usually considered as evidence of accounting manipulation or earnings management practice. Firms that would report a small loss, manipulate earnings to report a small profit and firms that would report a large profit, decrease earnings to evade paying tax. The aim of this paper is analyze discontinuity of earnings distribution for firms owned by managers. We find evidence that earnings distribution of firms with managers’ equity ownership have more pronounced zero-earnings discontinuity. Namely, if managers participate in ownership, they might more often use accounting techniques in order to maximize firms’ net cash flows by evading tax payments. Empirical analysis is conducted on the sample of 32,346 firms from Croatia, Slovenia and Serbia in 2017.

*Keywords: earnings distribution, earnings management, management ownership
JEL codes: M41*

1. Introduction

Reported earnings are considered to be the single, most important information from financial statements. Therefore, managers can abuse their discretion in the financial reporting process in order to influence the distribution of wealth and maximize their own expected benefits in comparison to other stakeholders. Flexibility in the choice of accounting policies and the use of estimates allow opportunistic behavior of managers in determining the net financial result in reported financial statements. Namely, the accounting rules contained in the accounting standards (IAS /IFRS and US GAAP) provide managers a choice between different accounting policies and/or the possibility of subjective estimates that directly affect the reported earnings. The set of accounting rules is determined ex ante and is generally accepted

by all parties, and within this defined set of accounting rules there must be a certain level of freedom of choice because it is simply not possible to prescribe accounting rules for every possible situation (Fields et al., 2001). In addition, the choice of accounting policy can be important information for decision-making to users of financial statements. Managers may use discretion when choosing accounting policies to increase the wealth of all parties or to increase the wealth of one party. If the managerial choice of accounting policy is primarily aimed at ex post increasing one's own benefits through the redistribution of wealth from other parties, then such behavior is called opportunistic (Watts and Zimmerman, 1990). Managers' compensations in publicly traded firms are frequently related to reported earnings either directly or indirectly via share prices. Therefore, managers have the incentives and the ability to manage earnings, and the vast empirical evidence suggests that they frequently do so (Guttman et al., 2006).

Discontinuities in earnings distributions at zero have been widely cited as evidence of accounting manipulations (earnings management) (Gilliam et al., 2015). The discontinuity or kink means that too few firms report small losses and too many firms report small profits in comparison to smooth, bell-shaped distribution. Firms that would report a small loss, manipulate earnings to report a small profit and firms that would report a large profit, decrease earnings to evade paying tax. Managers engage in these activities because they perceive private benefits from doing so (e.g. maximizing private compensations related to reported earnings) or they act as agents in value transfers among stakeholders (e.g. maximizing value of the firm by minimizing the present value of corporate tax) (Garrod et al., 2007). In the first case, managers will have incentive to increase reported earnings in order to maximize private compensations that will lead to decrease in the value of equity held by owners and to the conflict of interests between managers and owners. In the second case, managers will have incentive to lower reported earnings in order to reduce cash outflows through corporate tax payments that will lead to maximizing the value of the firm.

The aim of this paper is to analyze discontinuity of earnings distribution for private firms in which managers are ultimate owners. Namely, when manager and owner are the same person, management behavior can only be motivated by increasing the firm value and not by opportunistic behavior (Fields et al., 2001). We assume that earnings distribution of firms with managers' equity ownership will have more pronounced zero-earnings discontinuity. Namely, if managers are owners, they will use accounting techniques in order to manage earnings downward and to reduce tax payments, without significant incentive to opportunistically manage earnings upwards. Therefore, in our unique research setting there are no confronting motives for increasing and decreasing earnings, which will result in more pronounced evidence of earnings management. We expect that firms will more frequently practice earnings decreases in order to decrease the tax base. Our hypothesis is empirically tested on the sample of 32,345 large and medium-sized firms from Croatia, Slovenia and Serbia in 2017.

Most prior studies were mainly focused on the earnings distributions of publicly traded firms and there is lack of reliable empirical evidence on earnings distribution kinks of private firms owned by managers that do not have significant manager-owner conflicts of interests. This paper tries to fill that void.

The rest of the paper proceeds as follows. Section 2 presents brief summary of previous research on the discontinuities in earnings distributions. Section 3 describes the research design, sample, and variables measurement. Section 4 provides empirical results and paper ends with concluding remarks.

2. Literature review

Burgstahler and Dichev (1997) were among the first authors that described and empirically analyzed zero-earnings discontinuity. Their research provided empirical evidence that earnings decreases and losses were frequently managed away, more precisely, that 30% to 44% of the firms with small negative pre-managed earnings used discretion to report positive earnings. They provided two theories that could explain empirical findings. First theory is that managers avoid reporting losses to decrease the costs from transactions with stakeholders. Second explanation is provided by prospect theory and assumes that increase in value is greatest when the increase in wealth moves the individual from a loss to a gain relative to a reference point. Burgstahler and Dichev (1997) paper has been widely discussed in the literature and the discontinuity has been dominantly interpreted as evidence of earnings

management to avoid small losses (e.g. Degeorge et al, 1999; Guttman et al, 2006; Roychowdhury, 2006; Garrod et al., 2007; Jacob and Jorgensen, 2007; Burgstahler and Chuk, 2017, Lee et al 2017).

However, a number of studies argues that earnings management is not the cause of the earnings discontinuity. Dechow et al. (2003) discuss five explanations for the kink in earnings other than earnings management: managers' real actions to improve performance; the sample selection bias because of exchange listing preferences for profitable firms; the possibility that the kink is driven by the scaling of earnings with market value; the impact of accounting rules and accounting conservatism; the role of financial assets. Beaver et al. (2007) suggest that the asymmetric effects of income taxes and special items can contribute to a discontinuity even in the absence of discretion. Furthermore, some research papers did not find evidence of discontinuities at zero in earnings distributions (e.g. Durtschi and Easton, 2005) and some researchers claim that zero-earnings discontinuity has disappeared soon after passage of the Sarbanes-Oxley Act (Gilliam et al, 2015).

Most international studies on zero-earnings discontinuity are focused on developed, market-oriented countries. However, there are only a few previous papers that have used a sample of firms from bank-oriented, countries of Central and Eastern Europe. Vuko et al. (2011) provided evidence on discontinuity around zero in distribution of reported earnings and earnings changes of firms listed on Croatian capital market. Degiannakis et al. (2019) also analyzed earnings distribution of Croatian listed firms and have found that distribution of scaled earnings and changes in earnings show high frequencies of small positive earnings and small increases in earnings while the frequencies of small losses and small decreases in earnings are less frequent. Further, they have demonstrated that these discontinuities are likely due to discretionary accruals.

Earnings management in private firms is different in comparison to public firms due to various institutional factors. Bao and Lewllyn (2017) argue that firm ownership predictors along with national institutional dimensions significantly explain variation in earnings management behavior. Coppens and Peek (2005) analyzed earnings distributions of private firms in eight European countries and have found that private firms also avoid small losses. Burgstahler et al. (2006) examined how capital market pressures and institutional factors shape firms' incentives to report earnings. They have documented that private firms exhibit higher levels of earnings management. Garrod et al. (2007) examined earnings management on the sample of small Slovenian private firms and found evidence that firms manage earnings downward to reduce current period corporate tax.

Prior research regarding the impact of management ownership on earnings management has shown mixed evidence and generally has not used zero-earnings discontinuity as a proxy for earnings management. For example, Alexander and Christina (2017) and Susanto et al. (2019) provided evidence that managerial ownership does not have effect on earnings management. However, other papers argue that managerial ownership has a positive (e.g. Ruan et al., 2011) or negative (Alves, 2012) impact on earnings management. Furthermore, O'Callaghan et al. (2018) stated that this relationship has non-linear U-shaped pattern and Saona et al. (2020) found evidence that there is an inverse U-shaped relationship between managers' ownership and the earnings manipulation.

When analyzing previous research regarding zero-earnings discontinuity, following conclusions can be derived. First, previous research mostly explain the kink in earnings as evidence of earnings management but several studies offer different explanations. Second, majority of prior studies on this topic are performed on public firms in common law countries such as United States, United Kingdom or Australia. Third, there is generally a lack of research regarding the impact of management ownership on earnings discontinuity.

3. Sample description and research design

3.1 Sample description

Empirical research is conducted on the sample of large and medium sized, active firms from Croatia, Serbia and Slovenia with available financial data for 2016 and 2017. Respectively, the final sample consists of total of 32,346 firms. Data was gathered from BvD Amadeus database. Firms from Croatia, Serbia and Slovenia were selected because these three countries have similar institutional framework and similar financial reporting regulatory framework. Namely, these countries apply national financial reporting standards that are almost completely aligned with the provisions of IFRS (Novak and

Valentinčić, 2017; Šodan and Aljinović Barać; 2017; Obradović, 2018) which makes results comparable with previous research that is mainly conducted on the samples of listed companies that apply IFRS.

Our main variable of interest, net income (earnings) is deflated by book value of total assets at the end of the previous year. In accordance with previous research (e.g. Burgstahler et al. 2006), to mitigate the influence of outliers and potential data errors we adopt the method of winsorizing; i.e. for any observation above the 99th percentile or less than 1st percentile we assign the same value of scaled net income at these 99 or 1 percentile.

Table 1 presents summary statistics of net income in 2017 scaled by total assets in previous year.

Table 1: Summary statistics of net income in 2017 deflated by total assets in previous year (ROA)

Ultimate owner*	Mean	Max	Min	N	SD	Median
Not manager	0.071	1.352	-0.481	9509	0.197	0.035
Manager	0.111	1.352	-0.481	14147	0.218	0.057
Total	0.095	1.352	-0.481	23,656	0.211	0.049
Country						
Croatia	0.097	1.352	-0.481	12284	0.228	0.042
Serbia	0.096	1.352	-0.481	11452	0.201	0.053
Slovenia	0.098	1.352	-0.481	8610	0.197	0.052
Total	0.097	1.352	-0.481	32,346	0.211	0.049
Size						
Very Large	0.019	1.341	-0.481	947	0.132	0.014
Large	0.080	1.352	-0.481	3564	0.166	0.051
Medium sized	0.102	1.352	-0.481	27835	0.217	0.050
Total	0.097	1.352	-0.481	32,346	0.211	0.049

Notes:*Ultimate owner is the person who owns minimum of 50.01% of firm's equity.

Source: author's calculations

As it can be seen from Table 1, most firms in the sample are medium sized, firms are equally distributed by country and mean return on total assets (net income scaled by total assets) are almost the same in all three countries. However, mean return on total assets is much higher in firms where manager is also firm ultimate owner in comparison to other firms. Performed statistical test also confirms that firms where manager is also a firm owner, return on total assets is significantly higher (Table 2).

Table 2: Two-sample t test with equal variances

N1 (Man.-not Owner)	N2 (Man.- Owner)	Mean1 (Man.-not Owner)	Mean2 (Man.- Owner)	dif	St Err	t value	p value
9509	14147	0.071	0.112	-0.041	0.003	-14.6	0.000

Source: author's calculations

Additional analysis of liquidity and solvency for the firms in the sample is presented in the Table 3. Results from the table indicate that firms' characteristics are relatively similar across countries in the sample.

Table 3: Summary statistics of firms' liquidity and solvency

	Mean	Max	Min	N	SD	Median
Current ratio						
Croatia	2.634	26.008	0.032	12168	3.863	1.435
Serbia	2.462	26.008	0.032	11384	3.713	1.366
Slovenia	1.479	26.008	0.032	8814	3.296	1.479
Total	2.511	26.008	0.032	32.366	3.664	1.421
Solvency ratio						
Croatia	38.557	98.821	-50.305	12115	31.863	37.753
Serbia	43.170	98.821	-50.305	11248	31.533	43.178
Slovenia	42.711	98.821	-50.305	8892	27.440	41.713
Total	41.311	98.821	-50.305	32.255	30.662	40.841

Notes: Current ratio is calculated by dividing current assets by current liabilities. Solvency ratio is calculated by dividing equity and other shareholders' funds by total assets. Both variables are winsorized, i.e. for any observation above the 99th percentile or less than 1st percentile the same value at these 99 or 1 percentile is assigned.

Source: author's calculations

3.2 Research methods

In order to test our assumptions regarding the discontinuity in earnings distributions, we employ three methods: histogram analysis; Garrod et al. (2006) statistical test of discontinuity (smoothness); and Leuz et al. (2003) ratio of small profits and small losses. Analyses are performed on two subsamples: subsample of firms where managers are ultimate firm owners and other firms.

Histogram analysis of earnings distribution uses earnings (deflated by total assets in previous year) interval width of 0.005 (0.5%) which is consistent with previous studies (e.g. Garrod et al., 2007; Gilliam et al., 2015).

To statistically test our hypothesis we use Garrod et al. (2006) modified test of smoothness. In contrast to Burgstahler and Dichev (1997) test of smoothness that assumes normal distribution with mean 0 and standard deviation 1, Garrod et al. (2006) test does not require any assumption regarding the underlying distribution of the sample. In addition, Garrod et al. (2006) test is stricter than Burgstahler and Dichev (1997) test and requires stronger evidence to support the distribution kink (Garrod et al., 2007).

The first step in Garrod et al. (2006:10-12) methodology is to define the probability (p_i) that an observation will fall into interval i as the arithmetic average of two adjacent intervals:

$$p_i = \frac{\tilde{X}_{i-1} + \tilde{X}_{i+1}}{2N} \quad (1)$$

where \tilde{X}_i denotes the actual number of observations in interval i and N is the total number of observations.

After that, test statistic is calculated as:

$$\tau_i = \frac{\tilde{X}_i - E(X_i)}{\sqrt{\text{var}(X_i)}} \quad (2)$$

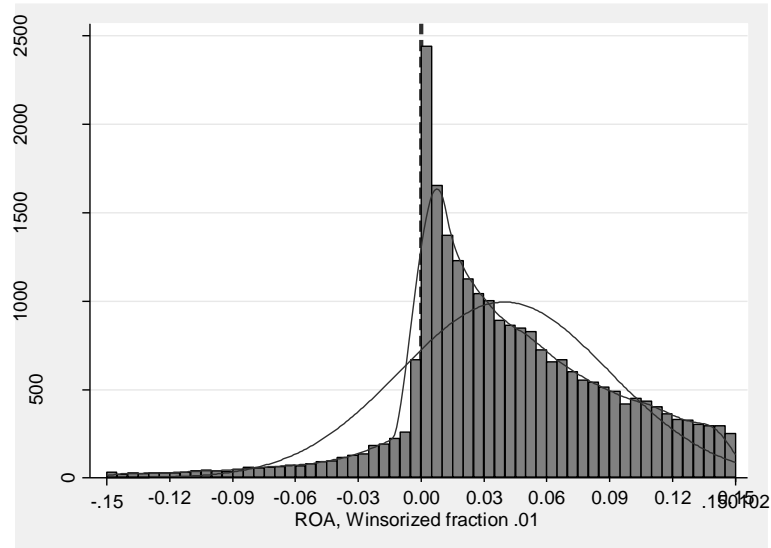
Under assumption that events are independent, the random variable X_i will be distributed binomially with parameters (N, p_i), therefore $E(X_i) = N \cdot p_i$ and $\text{var}(X_i) = N \cdot p_i \cdot (1 - p_i)$. Finally, authors have determined the critical significant values of τ -statistic by use of the Chebyshev inequality. Garrod et al. (2006) reported that at the levels of significance of 1%, 5% and 10% critical levels of τ -statistic are ± 10 , ± 4.4721 and ± 3.1632 , respectively.

Third measure of discontinuity is Leuz et al. (2003) ratio of small profits and small losses. An observation in the sample is classified as a small profit if earnings scaled by lagged total assets are in the range $[0, 0.01]$ and an observation is classified as a small loss if earnings scaled by lagged total assets are in the range $[-0.01, 0)$.

4. Results

The distribution of firms by deflated earnings in the whole sample is graphically presented by histogram on the Figure 1. The values in the earnings-levels are limited to the interval $(-0.15, +0.15)$ for presentational parsimony.

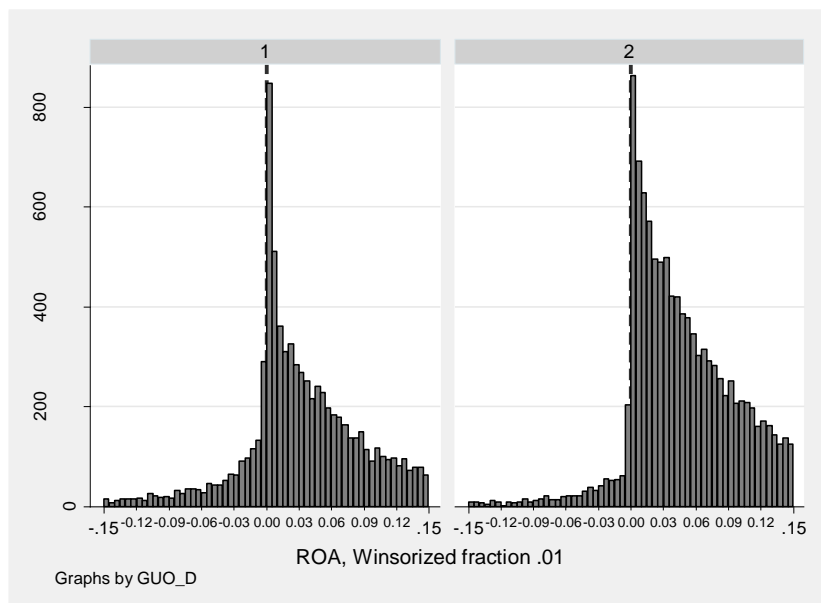
Figure 1: Distribution of firms by earnings deflated by lagged total assets



Notes: lines on histogram represent normal-density plot and kernel density plot of distribution
Source: author's calculations

Figure 1 shows a clear discontinuity in the distribution in earnings around zero which is consistent with the theory that reported earnings are manipulated to meet the zero benchmark. After that, we want to analyze differences in earnings discontinuity between sample of firms where managers are ultimate owners and the sample of other firms (Figure 2).

Figure 2: Distribution of firms owned by managers (Panel 2) and other firms (Panel 1)



Notes: This figure shows histograms of earnings scaled by lagged total assets. Panel 1 shows subsample of firms not owned by managers and Panel 2 shows subsample of firms owned by managers.

Source: author's calculations

As assumed, Figure 2 provides evidence that earnings kink around zero is even more pronounced in the subsample of firms owned by managers. Although discontinuities in earnings distributions on Figure 1 and 2 are visually evident, we still need to perform statistical tests to prove their significance.

Table 4 presents actual frequencies, expected frequencies and calculated Garrod et al. (2006) statistical test of discontinuity (smoothness) for the subsample of firms that are not owned by managers. Results provide evidence that discontinuities in earnings intervals around zero are statistically significant at the level of significance below 1%. In the interval (partition) to the left of zero frequency of firms (254) is significantly lower than expected (501) and in the interval (partition) to the right of zero frequency of firms (871) is much higher than expected (386).

Table 4: Statistical test of discontinuity for subsample of firms not owned by managers

Scaled earnings intervals	X_i	p_i	$E(X_i)$	$var(X_i)$	τ_i	$ \tau_i $	Sig.
(-0.02, -0.015)	98	0.010675221	102	100.4164651	-0.39917	0.39917	>10%
(-0.015, -0.01)	115	0.012042491	115	113.1211348	0	0	>10%
(-0.01, -0.005)	131	0.019404712	185	180.9198307	-4.01468	4.014678	<10%
(-0.005, 0)	254	0.052692469	501	474.6010728	-11.3379	11.3379	< 1%
(0, 0.005)	871	0.040544804	386	369.8699779	25.21838	25.21838	< 1%
(0.005, 0.01)	517	0.064997897	618	577.8313	-4.20166	4.201659	<10%
(0.01, 0.015)	365	0.043331931	412	394.1472444	-2.36738	2.367383	>10 %
(0.015, 0.02)	307	0.036600757	348	335.2629365	-2.23919	2.239191	>10 %

Notes: Table shows only 8 earnings intervals (partitions) surrounding zero

Source: author's calculations

Statistical test of zero-earnings discontinuity for subsample of firms owned by managers indicate even more pronounced kink (Table 5). Namely, three intervals surrounding zero are showing statistically significant discontinuity and the difference between observed and expected frequencies in the interval (partition) to the left of zero is relatively higher than in previous table.

Table 5: Statistical test of discontinuity for subsample of firms owned by managers

Scaled earnings intervals	X_i	p_i	$E(X_i)$	$var(X_i)$	τ_i	$ \tau_i $	Sig.
(-0.02, -0.015)	54	0.003675691	52	51.80886407	0.277861	0.277861	>10 %
(-0.015, -0.01)	50	0.004205839	60	59.2497526	-1.29914	1.299142	>10 %
(-0.01, -0.005)	65	0.007952216	113	111.6053757	-4.54359	4.543585	<5%
(-0.005, 0)	175	0.033222591	470	454.3853821	-13.8392	13.83916	< 1%
(0, 0.005)	875	0.030889941	437	423.5010956	21.28369	21.28369	< 1%
(0.005, 0.01)	699	0.05297943	750	709.791917	-1.91428	1.914276	>10 %
(0.01, 0.015)	624	0.044956528	636	607.4076483	-0.4869	0.486902	>10 %
(0.015, 0.02)	573	0.039655051	561	538.7535166	0.516995	0.516995	>10 %

Notes: Table shows only 8 earnings intervals (partitions) surrounding zero

Source: author's calculations

Finally, we compute our third measure of discontinuity, Leuz et al. (2003) ratio of small profits and small losses (Table 6).

Table 6: Ratio of small profits and small losses

Ownership	Scaled earnings intervals frequency		Leuz et al. (2003) ratio
	(-0.01, 0.00)	(0.00, 0.01)	
Managers not owners	385	1388	3.61
Managers owners	240	1574	6.56

Source: author's calculations

Results support our main assumption that if managers participate in ownership, they will use accounting techniques in order to maximize firms' net cash flows by evading tax payments. Namely, ratio of small profits and small losses is almost two times higher in the sample of firms owned by managers indicating that managers more frequently manipulate earnings if they participate in ownership.

5. Discussion and conclusion

The previously described results of discontinuities in earnings distributions indicate that private firms in Croatia, Serbia and Slovenia manage earnings to avoid losses. When benchmarking the results for private firms owned by managers against the results for other private firms, we conclude that earnings kink (i.e. earnings management) is even more pronounced when managers are firm owners. In situation when manager and owner are the same person, there are no agency conflicts between managers and owners, so there should be less motives and incentives for manipulations. However, if managers are also firm owners they might not have incentive to opportunistically manage earnings upwards, but they will have strong motives for managing earnings downwards and reducing current tax payments. Consequently, there are no confronting effects of motives for increasing and decreasing earnings, which can cause more pronounced evidence of zero-earnings discontinuity.

Our results and conclusion differ from those that did not find evidence of a discontinuity at zero (Durtschi and Easton, 2005) or those claiming that the discontinuity around zero earnings has disappeared (Gilliam et al, 2015). Besides, previous studies are mainly focused on the earnings distributions of publicly traded firms and there is generally a lack of reliable empirical evidence on earnings distribution of private firms owned by managers. Previous studies regarding the impact of management ownership on earnings management commonly used other proxies for earnings management and not zero-earnings discontinuity proxy (Ruan et al., 2011; Alexander and Christina, 2017; O'Callaghan et al., 2018; etc.). These studies have found mixed and inconsistent evidence on the impact of managerial ownership on earnings management. O'Callaghan et al. (2018) argue that if opportunistic earnings management is motivated by managers' efforts to increase their proportion of firm's cash flows at the expense of shareholders, then the incentive for this behavior will be inversely related to managerial ownership. They assume that managers who own high percentage or all of the firm's equity will not have incentive for earnings management. However, their results based on discretionary accruals proxy for earnings management suggest that firms with both high and low levels of managerial ownership engage more in accounting manipulations in comparison to firms with intermediate levels of managerial ownership. Accordingly, our results based on earnings distribution proxy also indicate that when managers are ultimate owners there might not be agency conflicts between managers and shareholders, but there will be strong incentives to manage earnings that influence third parties such as tax authorities.

This paper has several contributions. First, the analysis provides empirical evidence of pronounced discontinuity around zero earnings despite the fact that recent studies claim that zero-earnings discontinuity has disappeared in years after 2002. Second, previous studies on the impact of managerial ownership on the earnings management have provided inconsistent evidence. This paper provides evidence of higher level of earnings management in firms where managers are ultimate owners by using earnings discontinuity measure of earnings management that has not been used in this type of research before. Third, the empirical results could provide better understanding of earnings management characteristics in specific institutional setting with less developed capital markets, weak legal

enforcement, bank-oriented and with low level of investor protection. Results and conclusions derived from this paper could help researchers, auditors, standard setters, investors and other financial statement users to better understand and recognize accounting manipulation attempts.

Although results should contribute to the existing academic literature, the empirical research is limited to the frame of specific institutional setting of three countries and to the sample of large and medium-sized companies, so the generalization of the results and conclusions should be taken with caution.

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CORPORATE SOCIAL RESPONSIBILITY: ENVIRONMENTAL AND GENDER ISSUES

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Abstract

The aim of this paper is to explore corporate social responsibility practices (CSR) and employees' perception of different CRS's elements, especially gender equality and environmental issues. The focus of analysis is whether men and women perceive differently the existence of discrimination in employment and promotion opportunities within the company? Also, the difference in perception of company's environmental corporate social responsibility in relation to the type of position and level an employee holds is analyzed. Empirical analysis is conducted on a sample of 40 employees of Croatian automotive components manufacturer. Questionnaire with close-ended questions is used. The results show that there is no relationship between respondent's gender and perception of the existence of discrimination in employment and promotion opportunities. At the same time, all female respondents have stated that it is easier for a men in Croatia to get a management position, while such statement is supported by 45% of male respondents. Regarding environmental CSR, the results show that there is statistically significant relationship between attitude towards company's engagement in environmental CSR and respondent's hierarchical level. Managers tend to perceive company's involvement in CSR activities to be high, while employees on non-managerial positions perceive it to be low or moderate. Possible explanations for these results and managerial implications are presented.

Keywords: corporate social responsibility (CRS), environment, gender equality

JEL codes: M14, M51

1. Introduction

Although inconsistencies regarding the exact definition of corporate social responsibility (CSR) have slowed down progress of the field (McWilliams et al., 2006) and understanding the antecedents and consequences of this process (Orlitzky et al., 2011), in this article we adopt the view that corporate social responsibility (CSR) refers to company's actions that appear to further some social good and go beyond the profit goals and law (McWilliams and Siegel, 2001). The concept of CSR is present in cases

when a company, in addition to strictly prescribed obligations, incorporates care for the environment and society in the decision-making system. Organizations that incorporate CSR into their business model consider the interests of wider society and social community in which they operate and are focused on the future and potential social problems at the micro and macro level, which creates significant added competitive value that sets it apart from other organizations and companies operating in its industry or market segment (Quien, 2012). The globalization of the economy and growing pressures from stakeholders have increased the interest in CSR concept (Rahbek and Pedersen, 2015). Although CSR efforts can be strategic, altruistic, or coerced (Husted and Salazar, 2006), in majority of situations the demands from multiple stakeholders lead managers to use resources for CSR (McWilliams, Siegel, 2001). According to Sacconi (2019), CSR is a multi-stakeholder model of corporate governance.

CSR is multidimensional, it refers organizations' efforts to deal with a different social and environmental problems, and can include initiatives from voluntary programs and partnerships to mitigate the environmental impact of industrial plants and production methods (Rondinelli and Berry 2000) to marketing initiatives that promote social welfare and environmental benefits (Roberts 2003; Szmigin et al. 2007). Also, companies are increasingly addressing the gender equality agenda and including it within their CSR programs (Grosser, 2009).

Lately, level of the analysis of CSR has moved from an investigation of the macro social effects to an organizational level analysis of CSR, and its impact on organizational processes and performance (Lindgreen and Swaen, 2009). Significant body of research has proven that investments in CSR and communication of these activities might improve employees' attitudes (Greening and Turban, 2000, Turban, 2001, Backhaus et al., 2002). For example, Stites and Michael (2011) highlight the importance of employees as a relevant stakeholder for CSR and show that employees' perceptions of CSR are significantly related to effective organizational commitment, which may result in positive organizational outcomes.

Following recent trends in CSR research, in this article, the employees' view of CSR implementation in an organization is analyzed, with a focus on gender and environmental issues. Managerial view of CSR activities and the understanding of CSR within a company is compared to non-managerial employees' point of view to detect possible differences and area for improvement.

The following section presents the theoretical background of two concepts analyzed: gender issues in CSR and environmental CSR, as well as theoretical propositions and hypothesis. Subsequent sections present empirical analysis and results.

2. Theory and hypotheses

In order to explore employees' perception of CSR with relation to their characteristics, the concept of environmental corporate social responsibility is explained and the difference in perception of the company's environmental CSR between employees on different hierarchical levels is elaborated. Also, gender issues within CSR are discussed, as well as possible difference in their perception with relation to the gender of respondents.

2.1 Environmental corporate social responsibility

Environmental CSR tries to reduce the damaging effects of business' processes on the environment. Environmental responsibility is a prerequisite not only for socially responsible corporation, but also for a successful one. That is why dealing with environmental impact management is an extremely important part of business strategy. These activities may focus on energy use, water use, waste management, and use of pesticides, air pollution, wildlife habitats, and litter prevention (Kottler, Lee, 2005). The advantage of a company that invests in green technology is that these kind of activities give their products a higher value. One of the key factors in a sustainable development of social communities today is the rational use of energy and renewable resources with less negative impact on the environment. Accordingly, the use of renewable energy sources is growing, which causes the needs and requirements for new equipment and plants. Environmental impact management is performed in compliance with all applicable laws, regulations, standards and permits related to environmental protection. This implies that companies accept and act according to a written code of ethics, and that they require their employees to adhere to ethical and legal guidelines and ultimately to develop a long-

term tradition of ethical behavior in the company. Ultimately, the company must ensure that each of its employees knows and respects the relevant laws, guidelines and norms. Human resource management activities can be especially efficient in motivating employees to behave in pro-environmental way (Zibbaras et al., 2012). Empirical studies of CSR have largely ignored the place of the corporate leader in implementing CSR initiatives (Lindgreen and Swaen, 2011), but the role of the managers in leading and promoting pro environmental behavior is crucial (Szmigin et al., 2007). On the other hand, it is also important not to restrict involvement in environmental management to managers, but to include other employees as well (Bunge et al. 1996, Renwick et al. 2013, Hanna et al., 2000, Remmen and Lorentzen 2000). Based all previously said, in order to validate the environmental CSR in the analyzed company, and the attitude of managers as well as other employees towards company's environmental CSR, the following hypothesis is formed:

H1: There is no difference in perception of the company's environmental CSR between employees on different hierarchical levels.

It is assumed that, if employees perceive company to be successful in dealing with environmental concerns, and if there is no difference in attitude towards company's environmental CSR between different hierarchical levels (managers and non-managerial staff), it could indeed be concluded that analyzed company behaves responsible in pro-environmental way. Also, this analysis will unable deeper understanding of attitude and involvement of managers and non-managers in environmental CSR.

2.2 Gender issues in CSR

Discrimination against disadvantaged individuals or groups is question related to corporate social responsibility. Majority of these issues has to do with employment opportunities, pay, training and promotion (Gill, 2015). The findings from the study conducted by Rosati et al. (2018) suggest that male employees are to some extent more trusting and satisfied with CSR performance female employees. Equal opportunities legislation has narrowed the pay gap between men and women from around 29% in 1975 to 16% or even 10% today. Majority of this change was obvious very quickly in the 1970s, after the Equal Pay Act was implemented. Since mid-1990s the pay gap and other indicators of gender equality remained fairly stable and unchanging across Europe (Hakim, 2011). In 1960 the average pay gap between men and women in the US was 40% while after 2000 it dropped to 20% (Blau and Kahn, 2003). According to Hakim (2011) further big changes in employment patterns and relative earnings seem unlikely. The debate about pay gap raises the question of company's responsibility towards people who experience disadvantage. Although most of the countries have successful methods and systems for combating or suppressing discrimination, sometimes discrimination in the workplace is still present. The existence of the so-called glass ceiling is often based on different prejudices, irrational and mostly negative attitudes and double standards. Therefore, the company should establish laws and regulations in order to promote gender equality, and define and regulate the method of protection against gender discrimination in employment. Also, equal opportunities for career and workplace advancement should be created. From all previously elaborated hypothesis H2 is developed:

H2: There is no relationship between perception of employment and promotion discrimination existence and the respondent's gender.

It is assumed that in a company where gender related CSR exists and is implemented, the men and women will perceive that their employment and promotion opportunities are equal, and there will be no difference between men and women in that perception.

3. Methodology

3.1 Data collection and measures

The survey is conducted in August 2020 among employees of Croatian automotive components manufacturer. Data is collected using a written questionnaire with close-ended questions. Before distributing survey, interviews with employees from different organizational unites are conducted in order to understand their familiarity with the meaning of the CSR concept and perception of CRS activities within the company. Based on the information collected through interviews, it is decided that

besides management, only administrative staff will be participating in survey, due to their familiarity with CSR concepts. Still, 5% of respondents stated that they are not familiar with concept of CSR. Out of 50 distributed questionnaires, 40 questionnaires are completed. The company has 1531 employees in Croatia, of which 812 are employed in plant where survey was being conducted, that means that around 5% of employees from this plant participated in the survey. But in reality the response rate is much higher since only managers and administrative staff are included in the population.

In the first part of the questionnaire information about respondents' general characteristics (age, gender, position in the company, level of education, and years of work experience) are collected. The second part of the questionnaire examines the level of corporate social responsibility within the company (level of general CSR implementation, level of ethical behavior and degree of CSR implementation in different CSR dimensions that is presented in Table 1). Finally, in the third part of the survey questionnaire, questions are offered to employees to express their views and opinions on the actual application and presence of the concept of CSR in the company in relation to environment and gender equality. Data is analyzed using IBM SPSS Statistics 25 and hypotheses are tested using Chi-square test and Fisher's exact test (Bind and Rubin, 2020). Fisher's exact test was used where there are contingency tables with structural zeros and/or 2X2 contingency tables (Cochran, 1954, Fleiss et al., 2003, West and Hankin, 2008).

3.2 Analysis and results

After overview of the sample characteristics, respondents' answers regarding the level of CRS implementation and the types of CRS company uses are presented. Prior to hypotheses testing, actual CSR activities of the company are presented and employees' attitudes toward environmental CSR and discrimination in a company are discussed.

Areas of socially responsible behavior that are in the focus of analyzed company are: positive economic impact on community, health and safety of employees and environmental protection. Positive economic impact on the community is manifested through stable and sustainable economic growth, the employees are enabled to work with dignity, partners and suppliers are provided with growth, development and employment opportunities, small and medium-sized enterprises are encouraged and there is positive impact on the growth of living standards of the population. Environmental protection of analyzed company is manifested through the responsible use of resources and waste disposal, the use of the latest technology that is environmentally friendly, as well as the use of renewable energy and green materials.

Out of 40 respondents, 37.5% are top managers, 37.5% belong to middle and lower management, while 25% of them are employees without managerial responsibilities. Regarding respondents' gender, out of 40 respondents that participated in the survey, 52.5% of them are male, while 47.5% are female. The highest percentage of respondents belong to the age group of 36-45 years, 35% of them, followed by the age group of 26-35 years, which includes 27.5% of respondents. The age group of 46-55 years includes 25% of respondents, while only 12.5% of them are over 56 years old. 47.4% of respondents have 20 or more years of work experience, 22.5% of respondents have 10-20 years of work experience, and 17.5% of respondents have 5-10 years of experience, while 12.5% have 1-5 years of experience. Regarding the level of education, 95% of respondents have tertiary level of education, while 5% of them have secondary education level.

Before analyzing employees' perceptions of company's CSR activities, their understanding of the CSR concept was analyzed. 95% of respondents stated that they are familiar with the meaning of the corporate social responsibility concept. Regarding the level of corporate social responsibility within the company, 90% of respondents perceives their company to be socially responsible. In relation to the question "Do you think that your company is more competitive, applying the concept of CSR in relation to other business entities in the market?" the majority of respondents (45%) thinks that their company is slightly more competitive, 12.5% of respondents thinks that competitiveness with regard to CSR implementation is above average competitive, while only 2.5% thinks that the company is not more competitive in implementing CSR principles. In answering the question "Do you think that your company sets high standards of ethical behavior for all its employees?" 52.5% respondents' answered positive, while 47.5% respondents have given the negative answer. The majority of respondents, more precisely 70% of them, answered that they fully agree with the fact that the company will employ a

person aged 18-25 rather than a person aged 40-45, while 30% answered that they do not agree with that statement at all. In Table 1, employees' perception of company's effort in implementing different CSR activities is shown. The answers regarding the extent of implementation of different CSR activities are evaluated on Likert 5 point scale.

Table 1: Implementation of different CSR activities

	N	Mean	Median	Mode	Std. Dev.	Min	Max
Decision making and managing ethics (is there Code of ethics?)	40	3.38	3	3	.868	1	5
Socially responsible investing (investing in organizations that implement CSR practices)	40	3.28	3	3	.933	1	5
Environmental awareness (green management, energy efficiency, use of renewable energy sources)	40	3.63	4	4	.952	1	5
Transparency and CSR reporting	40	3.53	4	4	.933	2	5
Partnerships and networking (cross-partnerships with organizations that promote CSR practices)	40	3.13	3	3	.966	1	5
Community involvement (philanthropic activities, sponsorships, scholarships, donations)	40	3.03	3	3	.947	1	5
Work relations (relationships with colleagues and superiors, job security, possibilities for training and advancement)	40	3.23	3	4	.862	1	4
CSR implementation	40	3.31	3.36	3.43	.703	1.86	4.86

Source: authors

According to the results from Table 1, respondents believe that the company applies CSR to the greatest extent in the field of environmental awareness (average score 3.63), while in terms of community involvement (average score 3.03) they believe that CSR is applied the least. Since these elements are evaluated on a 5 point scale, it means that this difference is not so significant and that employees perceive company's CSR efforts to be above-average, but not exceptional.

3.3.1. Relationship between attitude about environmental CSR and hierarchical level within a company

In this part, environmental CRS, which according to the respondents is the element of CRS that is most developed in a company, is analyzed. When asked are there any laws or regulations in your company related to sustainable development and environmental protection, 97.5% of respondents answered affirmative. When asked whether the company rationally consumes limited environmental resources (electricity, water...) that contribute to sustainable development, the majority of respondents (77.5%) answered affirmative. The majority of respondents, 37.5%, believe that the company sometimes allocates funds for environmental management, while the same percentage, namely 7.5% of respondents, decided to answer "never" and "always". Next, the attitude toward environmental awareness and corporate responsibility is examined. The largest part of employees, 52.5% of them believe that the company has moderate environmental awareness (meeting consumers' requirements for safe and environmentally friendly products), 25% believe that the company has high environmental awareness (considering the requirements of the local and wider community) while 22.5% believe that the company has relatively little concern for environmental issues (compliance with product safety laws and laws related to pollution).

Table 2 presents the structure of the sample according to the attitude toward environmental CSR, with regard to the position (hierarchical level) in the company. Top managers generally believe that the company has moderate or high environmental awareness, while employees without managerial responsibilities generally believe that the company has moderate or low environmental awareness. In order to investigate if there is significant relationship between the perceptions of company's environmental CRS and employee's hierarchical level, the Fisher exact test is used. The results shown in Table 2 indicate that there is no statistically significant relationship between attitudes about environmental CSR with respect to the employees hierarchical level in the company at a significance

level of 5% ($p=0.057>0.05$), but that the relationship is statistically significant at 10% level ($p=0.057<0.1$).

Table 2: Fisher's Exact Test – environmental CSR and employee's hierarchical level

		Position			Total	Fisher's Exact Test	Exact Sig. (2-sided)
		Top management	Middle and lower management	Non-managerial staff			
Level of environmental CRS	Low environmental CSR	0	5	4	9	8.798	.057
	Moderate environmental CSR	9	7	5	21		
	High environmental CSR	6	3	1	10		
Total		15	15	10	40		

Source: Authors

In Table 3 the attitudes towards company's rationality in consumption of limited environmental resources (electricity, water...) with regard to the position in the company are presented. All top managers consider that company uses limited resources rationally, while the same is considered by 11 out of 15 middle and lower managers. Regarding the attitude of employees without managerial responsibilities, 50% of them thinks that environmental resources are not being used rationally. In order to test if there is significant difference in attitude toward rationality in resource in relation to respondents' position within a company, Fisher's exact test is used. The results presented in Table 3 indicate that there is a statistically significant relationship between attitudes about the rationality in using limited resources with respect to the position of employees in the company ($p=0.009$) at a significance level of 1% ($0.009 < 0.01$).

Table 3: Fishers' Exact Test – rationality in resource usage and hierarchical level

		Are environmental resources being used rationally?		Total	Fisher's Exact Test	Exact Sig. (2-sided)
		Yes	No			
Position	Top management	15	0	15	9.144	.009
	Middle and lower management	11	4	15		
	Non-managerial staff	5	5	10		
Total		31	9	40		

Source: Authors

According to the results from Table 2 and Table 3, there is statistically significant relationship between attitudes about company's environmental CSR and respondent's hierarchical position within a company and there is a statistically significant relationship between attitudes about rational spending of limited resources in relation to the position of employees in the company, which means that hypotheses H1 can't be accepted.

One of the possible explanations for this result could be that employees on higher hierarchical levels have better understanding and knowledge about environment CSR activities that company undertakes, i.e. that they are more involved in these kind of activities. If this is true, managers should understand that restricting involvement in environmental CSR to managers is not advisable, and that including other employees as well is crucial for the success of environmental CSR activities (Bunge et al. 1996, Renwick et al. 2013, Hanna et al., 2000, Remmen and Lorentzen 2000), since employee's perceptions of CSR are significantly related to effective organizational commitment (Stites and Michael, 2000). Also, the fact that managers tend to give high evaluations to company's environmental CSR could lead to conclusion that they understand that promoting pro environmental behavior is crucial (Szmigin et al., 2007), but also that maybe they could be positively biased when evaluating their company's environmental involvement.

3.3.2. Relationship between respondents' gender and attitude toward discrimination in employment and promotion

Out of 40 respondents, 80% of them have male superior, while 20% have female superior. The majority of respondents, 35% of them believe that discrimination in employment and promotion occurs sometimes, 27.5% that it occurs often, 20% rarely, while 17.5% believe that it never happens. None of the employees has decided to answer "always".

According to Table 4, more female than male employees perceives that discrimination in employment and promotion exists often, while more male than female respondents perceive that discrimination never or rarely occurs. To analyze if attitude toward discrimination in employment and promotion opportunities is related to gender, Chi-square test is used (Table 4). The results presented in Table 4, show the relationship between the observed variables is not statistically significant. Based on that, hypothesis H2 stating that there is no relationship between attitude toward existence of employment and promotion discrimination and respondent's gender, can be accepted.

Table 4: Chi-square test – gender in relation to employment and promotion discrimination

		Employment and promotion discrimination				Total	Chi-square Test	Exact Sig. (2-sided)
		Never	Rarely	Sometimes	Often			
Gender	Male	5	5	7	4	21	2.5102	.473
	Female	2	3	7	7	19		
Total		7	8	14	11	40		

Source: authors

In order to further investigate the attitude toward discrimination in a workplace, the respondents are asked to evaluate if it is easier for a men in Croatia to get a management positions than women (Table 4). The majority of them (72.5%) thinks that it is easier for men in Croatia to get a management positions than women, while 27.5% answered that that they don't agree with this statement. It is interesting to note that all female respondents (100%) stated that it is easier to get a management positions for men than a women in Croatia, while the same opinion is shared by 45% male respondents. 55% of male respondents believes that it is not easier for a men to get a management position than a women. To see if there is statistically significant relationship between attitude towards this issue and respondent's gender, Fisher's exact test is used (Table 5).

Table 5: Fisher's Exact Test - gender and managerial positions

		Is it easier for a men to get a management position?		Total	Fisher's Exact Test	Exact Sig. (2-sided)
		Yes	No			
Gender	Male	10	11	21	11.226	.000
	Female	19	0	19		
Total		29	11	40		

Source: authors

The results of Fisher's exact test indicate that analyzed relationship is statistically significant at a significance level of 1% ($p = 0.000$), so there is statistically significant difference in men's and women's opinion weather it is easier for a men in Croatia to get a management positions. One possible explanation of these results could be that respondents perceive gender discrimination in wider society to be bigger issue then discrimination in their own company.

4. Conclusion

The application of the concept of CRS is becoming increasingly popular and has become a generally accepted practice around the world. The reason is that there are benefits from CRS for all stakeholders involved. CRS gives company the opportunity to stand out from competitors since most consumers prefer products/services created with ethical and environmental awareness. Although successful companies around the world have recognized the importance of CSR, they are not all equally

successful in implementing it. To successfully implement the concept of CSR, it is important to understand what it actually represents.

In Croatia, being socially responsible is not as widespread as in the world, and it represents a newer business practice. Companies in Croatia must first understand the true meaning of CSR and what effect it would have on their consumers. In order to increase the level of awareness of the importance of CSR, Croatian Chamber of Commerce (HGK) and the Croatian Business Council for Sustainable Development (HR PSOR) have launched certain projects to reward companies that are most successful in implementing CSR. These projects have proven to be relatively successful, as the number of registered companies in the CSR category continues to grow. CSR practices in Croatia are reflected in areas such as quality and safety of the workplace, environmental protection, consumer satisfaction and investment in the local community. The concept of CSR in Croatia is mostly related to large companies because their business practice is more prominent and noticeable compared to small and medium companies.

In the empirical part of this paper, the aim is to investigate whether the focal company has applied the concept of CSR in operating its business, and to what extent. Out of 40 respondents, 90% of them perceived that this company is behaving in socially responsible way. Also, they perceive that company applies CSR in the field of environmental awareness to the greatest extent. The first hypothesis assumes that there is no relationship between perception of the company's concern for the environment and employee's hierarchical position. However, the research results show that there is a statistically significant relationship between attitudes about environmental awareness and corporate responsibility with respect to the position of employees in the company and there is a statistically significant relationship between attitudes about rational spending of limited resources with respect to the position of employees in the company. This could be due to the fact that managers are more involved in pro environmental activities and have better overview of such activities. However, it is not recommended to limit involvement in environmental CSR to managers, and for the success of environmental CSR activities it is important to include other employees (Bunge et al. 1996, Renwick et al. 2013, Hanna et al., 2000, Remmen and Lorentzen 2000, Stites and Michael, 2000). The second hypothesis assumes that there is no relationship between respondent's gender and their perception of employment and promotion discrimination. The results of the research show that this hypothesis can be accepted. However, when asked if it is easier for men in Croatia to get into management positions than women, all female respondents have answered "yes", while only 45% of male respondents finds it is easier for a men in Croatia to get into management positions than for a women.

Also, it should be noted that research was conducted during Covid-19 pandemic (August 2020), which might have had influence on the respondents' answers. This could especially have impact in the part related to gender equality and women's satisfaction and perception of equality, since according to Alon et al. (2020) the discussion so far shows that the Covid-19 pandemic is likely to place a disproportionate burden on women. Moreover, as Arntz et al. (2020) state, Covid-19 pandemic might potentially induce negative effects for women's future career prospects. With relation to environment, according to He and Harris (2020), Covid-19 pandemic offers a great opportunity for businesses to shift towards more genuine CSR and contribute to address environmental challenges.

The contribution of this research includes highlighting the importance of all employees' participation in CSR efforts and showing disproportion in view of CSR efforts between managerial and nonmanagerial staff in a company. Also, the gender issues in CSR are discussed and the issues regarding difficulties women face when trying to get to management position are presented.

Limitations of this research include quite small sample which is based only on administrative staff and management of one company. More generalized conclusions could be derived from the analysis that would include larger sample and the data from multiple companies. Also, questionnaire as a data collection method has its own disadvantages since it can sometimes lead to biased observations.

Future research could include secondary data describing expenditures for CSR activities, as well as wider sample of the analyzed companies. The majority of CSR research focuses almost exclusively on large publicly traded corporations (like the company from this research), and it is not clear what CSR means and how is implemented in companies with different ownership structure (Lee, 2008), which is also something that could be analyzed in future articles.

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OPTIMIZING THE AMOUNT OF EQUITY AS AN IMPORTANT TOOL FOR THE SUSTAINABILITY OF BUSINESSES

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Abstract

Equity represents the own resources for each business entity, which it has at its disposal for a long time, i.e., during the entire period of the business existence. One of the items of equity is also the economic result, which may have the character of a profit or a loss. Achieving profit, or rather the effort to maximize the value of the business, which affects the achievement of profit, is one of the main goals of business entities. A business that is not just about making an immediate profit but is trying to provide certain values in the long run, is considered as a sustainable business. The aim of the paper is to identify the items that have the greatest impact on the amount of equity and the sustainability of businesses operating in the field of tourism in the Slovak Republic, while marginally analysing the impact of the COVID-19 pandemic on the sustainability of these businesses. Based on descriptive statistics of selected statistical indicators, such as minimum value, maximum value, mode, median, arithmetic average, we identify the minimum, maximum, average, most recurring and mean value of equity and its individual items. Using Pearson's correlation coefficient, we assess the dependence of equity and its individual items, as well as the dependence between profit or loss and other equity items.

Keywords: CSR, economic result, equity, own resources

JEL codes: K22, M14, M41, Z32

1. Introduction

In connection with the implementation of the business activity, it is necessary for start-up entrepreneurs to have a certain amount of assets at their disposal, the amount and structure of which depend on the specific business activity. At the same time, entrepreneurs must distinguish from which sources the business property of company were financed. When it comes to the structure of resources, it is a decision to what extent to use individual types of financial resources, i.e., to what extent to use extraneous capital and borrow or what volume of own resources to use so that the total composition of capital is optimal. Optimizing resources of financing is one of the most demanding and lengthy processes, which requires a lot of effort from the business. At the beginning of the business, the structure is always dominated by own resources invested in the business by the partners as equity. The only reliable data provider in the correct assessment of the development of capital invested by owners in the business should be accounting (Procházka and Pelák, 2016). Hrinková and Manová (2017) state that if the entrepreneur does not have enough of his own resources, he can try to obtain a silent partner.

Šlosárová (2015) presents two aspects of looking at the resources of the business assets. The first aspect is the origin of the assets, within which the resources of assets are divided into own and

extraneous. According to the second, from a legal point of view, the resources of assets represent claims of third parties against the business entity of two types:

- legal claims of various creditors of the business entity, such as banks, employees, suppliers, the state, etc.),
- claims of the owner or owners of the business assets.

1.1 Own resources from the accounting point of view

Own resources are long-term resources existing in the business during the entire period of business activity and the business still has them at its disposal. In accounting by own resources, we mean the equity, which is indirectly defined in Section 2(2) of Act no. 431/2002 Coll. on Accounting as amended in the Slovak Republic (hereinafter referred to as the „Accounting Act”) as the difference between assets and liabilities. The difference between assets and liabilities is specified in the Order of the Ministry of Finance of the Slovak Republic 23054/2002-92, which lays down details on accounting procedures and the general chart of accounts for entrepreneurs accounting in the double-entry bookkeeping system as amended (hereinafter „accounting procedures”) in Section 59(1), where it precisely defines that the difference between assets and liabilities represents equity. If the value of the liabilities exceeds the value of the assets, a negative equity is created, which means that the assets are financed only by external resources representing liabilities (Srnišová, 2018).

According to Máziková et al. (2016), equity in terms of the time of entry into the business can be divided into two basic parts, the first is the part invested in the business at its inception (initially invested capital) and the second part is related to the very existence of the business, which consists of internal resources, external resources and resources created by the business own activities. The equity of the business has its structure, while its individual components are specified depending on the legal form of business (Müllerová and Šindelář, 2014). The most important component of equity is the share capital, which is according to Section 58(1) of Act no. 513/1991 Coll. on the Commercial Code in the Slovak Republic as amended (hereinafter referred to as the „Commercial Code”) a monetary expression of the sum of monetary and non-monetary deposits of all shareholders in the business. The amount of the contribution of individual partners determines their property and non-property rights (Ondrušová, 2014). According to Šlosárová (2019), shareholders' deposits in a broader sense consist of contributions to the share capital, surcharges related to the creation of the statutory reserve fund through shareholders' surcharges over above the contributions to share capital, contributions to other capital funds and share premium representing a specific capital fund. In addition to share capital, the equity of business entities consists of the following components (Šlosárová et al., 2016):

- *capital funds* created from various resources that flow into the business entity from an external environment (statutory reserve fund from capital deposits, assets received free of charge from shareholders, etc.),
- *valuation differences* that arise in connection with the revaluation of certain types of assets and liabilities according to the Accounting Act,
- *funds created from profit*, including both statutory reserve funds, whose obligation to create is conditioned by the Commercial Code and funds created in accordance with the decision of the competent authority of the business entity (statutory fund, etc.),
- *economic result from previous years*, which may take the form of profit or loss from previous periods,
- *profit or loss for the accounting period after tax* determined by comparing revenues and expenses as of the date on which the financial statements are prepared, and two situations may arise. The first is a situation where revenues are higher than expenses and the economic result is profit. The opposite is the case when the expenses are higher than the revenues and the business entity has achieved economic result in the form of a loss.

The main objective of business entities is to achieve economic result in the form of profit. To determine the economic result together with its distributable part, the starting point and criterion is to understand the business assets of the accounting entity, therefore one of the most important tasks of the financial analysis should be a detailed analysis of the development of business assets (Šlosárová,

2014). Pakšiová and Kubaščíková 2014 state that the decrease in the business assets of the accounting entity may be related to the reported loss but also to a higher profit distribution than the sum of the achieved distributable profit.

Making a profit is sometimes considered a counterproductive indicator (Lovciová, 2018), so business entities seek to maximize the value of the business that is affected by making a profit. The generated profit belongs to the main internal resources of financing the business (Pakšiová 2017).

1.2 Sustainability of businesses

The business ability to create added value, return on invested capital or return on inputs determine the financial performance and financial health of the business (Pražák, 2019). A business that is not just about making an immediate profit but is trying to provide certain values in the long run, is considered as a sustainable business.

Pakšiová (2016) states that sustainability and sustainable development are related to the knowledge of the unsustainability of uncontrollable growth of population, production, pollution and the like in an environment of limited resources. According to Yang (2020), businesses need to address the issue of sustainability in social and environmental responsibility, but also in an effort to successfully increase their sustainable profitability. Sustainable development and adaptability in the context of the growing globalization of the economy are crucial in setting goals and deciding on day-to-day problems as well as on the future direction of business (Pakšiová and Oriskoová, 2019). According to Ulbrich 2016, a sustainable development is characterized by purposeful human activity aimed at introducing such practices in business that respect the environment. Sustainability is the process by which changes in the environment are balanced, especially the use of resources and investments with human needs and aspirations (MacGregor Pelikánová, 2019). According to Weidinger et al. (2014) sustainability expects businesses to adopt sustainable entrepreneurship as a business model aimed at recognizing and enhancing economic, environmental and social values. Sustainability is related to the business ability to meet its needs without compromising future generations (Profant, 2019, Maldonado-Erazo et al., 2020). The application of corporate social responsibility can be considered as a basic precondition for sustainable development (Baronet and Tremblay, 2015; Lombardi et al., 2010), which greatly influences social, ecological and economic aspects (Peters et al., 2014; Muñoz et al., 2021). In the beginning, corporate social responsibility was understood in terms of the responsibility and obligations of the entrepreneur to society (Pavlik et al., 2010).

Sustainability is transferred to the triple bottom line responsibility, which means that not only economic performance, but also environmental and social impacts are important in assessing the economic result (Sheth et al., 2011). The triple bottom line concept is composed of three equally important and interconnected pillars of responsibility, each of which must be maximized to achieve long-term viability. The first pillar consists of people, respectively healthy communities, strong relationships with suppliers, authorized employees, healthy relationships with customers necessary for the viability of business, which includes investors who are able and willing to invest in business. The second pillar is the planet, where the company seeks, among other things, to identify ways to alleviate some of the problems caused by past activities, such as climate change, pollution, overcrowded landfills, etc., which affect the business performance on both cost and revenue. The last pillar is the profit that the business must generate together with the cash flows to maintain solvency and continue its activities (Swallow, 2009). At present, profit could rather be described as an increase in a business wealth, given the strict understanding of profit as an accounting variable, defined as the difference between revenues and expenses.

2. Model and data

The aim of the paper is to identify the items that have the greatest impact on the amount of equity and on the sustainability of businesses operating in the field of tourism in the Slovak Republic, while marginally analyzing the impact of the COVID-19 pandemic on the sustainability of these businesses. The subject of the research is a sample consist of all businesses operating in Slovakia in the field of tourism in 2014-2018, which have published financial statements and their subject of business is from two divisions of the classification of economic activities: 55 – Accommodation and 56 – Restaurant and

hospitality activities. In terms of legal form of businesses, limited liability companies formed the largest group of businesses. There are only limited liability companies included in the sample of businesses, specifically 6,924 businesses in 2014, in 2015 we analyzed 7,153 businesses, in 2016 there were 7,516 businesses, in 2017 we analyzed 8,051 businesses, and in 2018 the highest number of businesses were analyzed, namely 8,673.

We consider that the relevant data sources for our research are the financial statements of individual businesses for the monitored period of 2014-2018, which are publicly available on the website of the register of financial statements maintained by the Ministry of Finance of the Slovak Republic (Register FS, 2020) and for external users. An additional source of information is Finstat, which synchronizes information about businesses at regular intervals together with data published in the register of financial statements. In addition to the financial statements, Finstat provides more structured information in the form of tabular outputs.

In the research we use statistical methods, specific elements of descriptive statistics of equity and profit or loss for the accounting period after tax (minimum value, maximum value, median, arithmetic average). Table 1 presents selected elements of descriptive statistics of equity (E) and profit (+) or loss (-) for the accounting period after tax (P/L) analyzed by the sample of limited liability companies in Slovakia for the period of 2014-2018.

Table 1: The selected elements of descriptive statistics of equity (E) and profit (+) or loss (-) after tax (P/L) of a sample of limited liability companies in €

Elements of descriptive statistics	2014	2015	2016	2017	2018
Min E	-13,833,541	-13,915,455	-13,947,195	-13,954,397	-13,960,569
Max E	32,378,400	101,276,000	106,091,000	115,349,000	122,922,000
Median E	2,358	3,041	3,548	4,040	3,961
Average E	10,931	55,420	65,428	71,224	73,139
Min P/L	-12,819,135	-24,829,389	-9,302,515	-5,187,658	-3,164,843
Max P/L	2,387,339	2,113,150	43,652,770	11,318,699	7,573,000
Median P/L	-503	-503	-480	-480	-335
Average P/L	-12,361	-12,377	-6,582	-2,753	-7,218

Source: prepared by the authors based on the data from the register of FS for the accounting period of 2014-2018 (Finstat, 2020)

Within statistical methods, we use Pearson's correlation coefficient, through which we assess the impact of equity on its individual items. Pearson's correlation coefficient is currently one of the most important and most used correlation coefficients. The estimation of the theoretical value of the Pearson correlation coefficient is the selection Pearson correlation coefficient Hendl (2015) acquiring different values from the interval $<-1;1>$ (Hinkle et al. 2003). According to the resulting value of the Pearson correlation coefficient, we can assess the different types of correlation, while in the case of limit values it is an ambiguous determination of the category:

- very high correlation: 0.90-1.00 (-1.00 to -0.90),
- high correlation: 0.70-0.90 (-0.90 to -0.70),
- medium correlation: 0.50-0.70 (-0.70 to -0.50),
- low correlation: 0.30-0.50 (-0.50 to -0.30),
- very low or no correlation: 0.00-0.30 (-0.30 to 0.00).

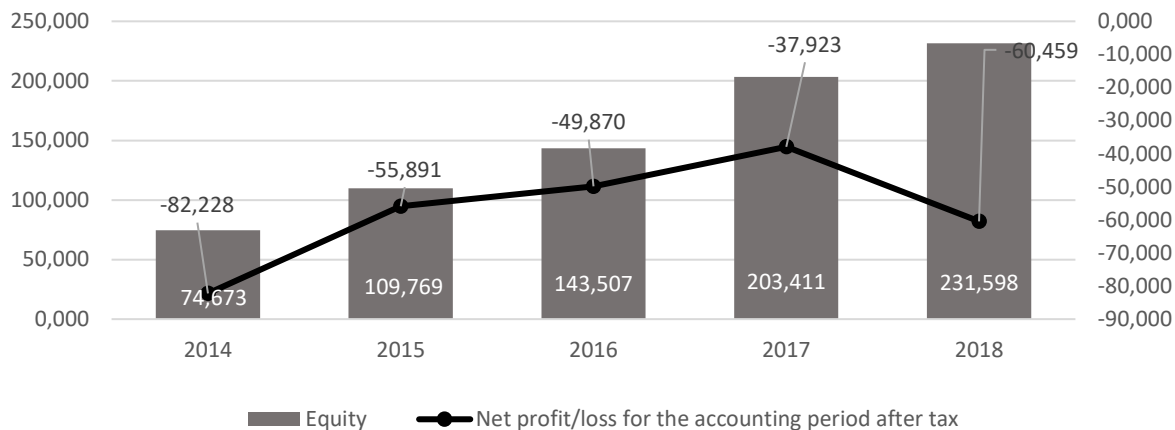
If the values of the Pearson correlation coefficient are positive, we speak of a positive correlation, otherwise, if the value is negative, we speak of a negative correlation. The value of the Pearson correlation coefficient equal to zero indicates a zero dependence of the investigated variables.

3. Results

As already mentioned, the main goal of any business entity is to make a profit, or rather to try to maximize it to create the maximum value of the business. The analyzed limited liability companies included in our sample achieved a cumulated economic result in the years 2014-2018 in the form of a loss, which decreased until 2017, respectively gradually balanced. In 2018, the loss increased again

by €22,536. In 2014, limited liability companies achieved the highest loss. Although limited liability companies made losses during the monitored period, the total amount of equity is growing every year, which is mainly due to the annual increase in the number of businesses (Figure 1).

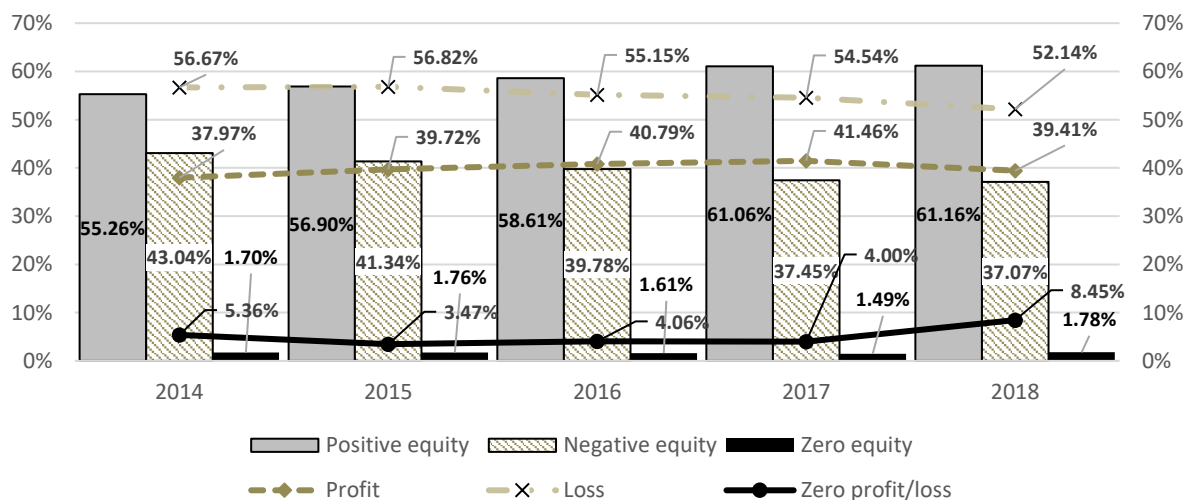
Figure 1: The analysis of profit or loss for the accounting period after tax and equity in limited liability companies in thousands of €



Source: prepared by the authors based on the data from the register of FS for the accounting period of 2014-2018 (Finstat, 2020)

In the monitored period of 2014-2018, in average more than half of limited liability companies reported positive equity, with the most in 2018, when 61.16% (5,304) limited liability companies reported positive equity. On average, for the whole period 40% (3,031) of limited liability companies reported negative equity during the monitored period, of which in 2014 the most limited liability companies reported negative equity. The remaining limited liability companies, on average to 2% (128), reported zero equity during the monitored period. In terms of the nature of the economic result, it can be said that in the monitored period an average of 39% of limited liability companies (3,058) show a profit, an average of 55% (4,209) of limited liability companies show a loss and the rest representing an average of 6% (396) of limited liability companies show zero economic result (Figure 2).

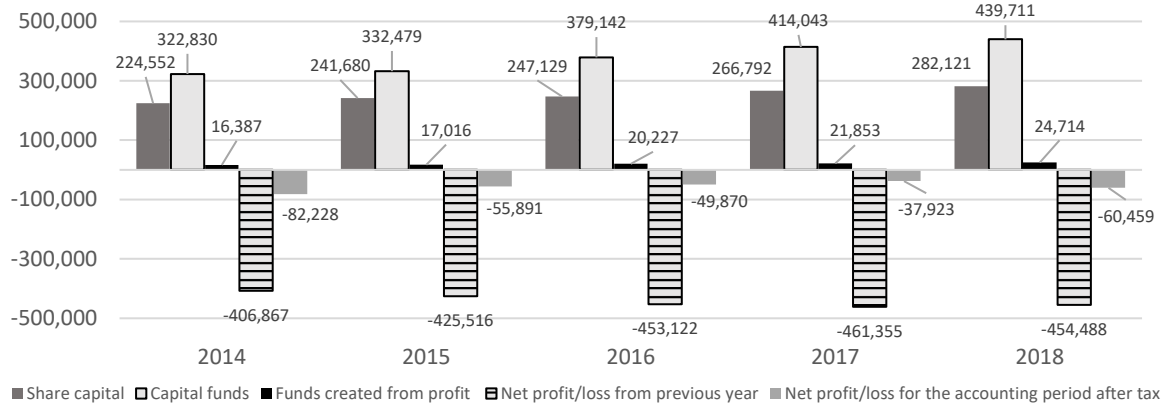
Figure 2: The structure of equity and profit or loss for the accounting period after tax of limited liability companies in %



Source: prepared by the authors based on the data from the register of FS for the accounting period of 2014-2018 (Finstat, 2020)

Profit or loss for the accounting period after tax represents only one of the items of equity, therefore its negative value may not have the most significant impact on the total amount of equity. In view of the above, it is necessary to analyze other items that are part of the equity, namely the share capital, capital funds, funds created from profit and profit or loss from previous years (Figure 3). In this figure there are cumulated sample values of indicators.

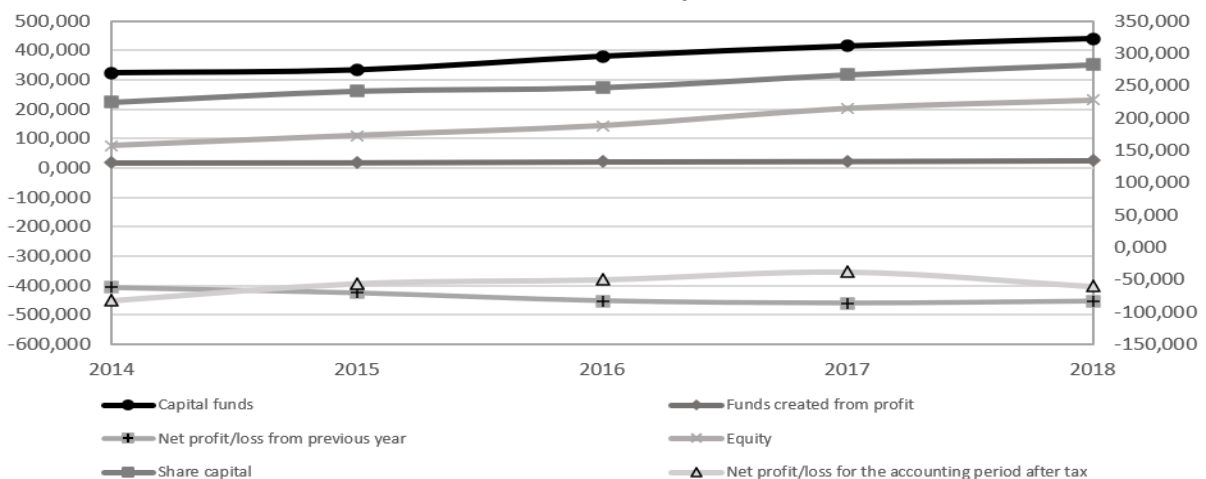
Figure 3: The analysis of individual items of equity in limited liability companies in thousands of €



Source: prepared by the authors based on the data from the register of FS for the accounting period of 2014-2018 (Finstat, 2020)

Based on Figure 3, it can be stated that the largest item of equity is made up of capital funds, which reached an average value of 377,641 thousand € in the monitored period of 2014-2018, while their value increases every year. It follows from the above that the value of equity is positively affected mainly by owners' contributions, which have a different form than the share capital obligatorily formed by limited liability companies. Equity is also positively affected by the share capital, the amount of which in the monitored period reached an average value of 252,455 thousand € and its amount increases every year as the number of limited liability companies included in the sample increases. The value of equity in the monitored period is negatively affected by the profit or loss from previous years in the form of loss from previous years and the profit or loss for the accounting period after tax in the form of loss for the current accounting period, which in the monitored period reach negative values.

Figure 4: The relationship between equity and its individual items in limited liability companies in thousands of €



Source: prepared by the authors based on the data from the register of FS for the accounting period of 2014-2018 (Finstat, 2020)

Pearson's correlation analysis carried out on a sample of limited liability companies operating in the tourism sector confirmed a very high positive correlation between equity and share capital as well

as between equity and capital funds and the current between equity and funds created from the profit. In all cases, the correlation coefficient reached the same value, specifically 0.99. There can be a high negative dependence between equity and the profit or loss from the previous years, which means that in the case of a decrease in the economic result of previous years in the form of loss, there is a linear increase in equity, which means an increase in own resources. The value of the correlation coefficient in this case is equal to -0.88. Based on the value of the correlation coefficient 0.60, a medium dependence can be stated between equity and the profit or loss for the accounting period after tax (Figure 4).

At the end of 2019, the first reports from China on the coronavirus appeared, which had a negative impact on business both in Slovakia and around the world, which still significantly affect the tourism industry (Grmelová, 2020) whether by restricting movement, introducing restrictive precautionary government of the Slovak Republic or due to the natural fear of people. At the time of the pandemic, the analyzed sectors are among the most affected by the restrictions. There are a total of 15,660 businesses directly affected by the coronavirus operating in Slovak Republic with a lot of businesses operating in the field of hospitality (3,933) from our sample and all affected by restrictions (Finstat, 2020). In this sector we could expect strong impact pandemic to financial situation of businesses for 2020. Revision of this impact is important topic for future research.

4. Conclusion

Equity belongs to the business own resources, which have been in the business for a long time. Equity can be acquired in two ways, through the contributions of shareholders who have invested in the business before the very beginning of the business, or the business will create it itself during its existence. The structure of equity is different in each type of businesses and depends on the legal form and type of the business. The most important component of equity is the share capital, which is compulsorily formed in certain legal forms of business in accordance with the Commercial Code.

The aim of the paper was based on the development of equity to identify the items that have the greatest impact on the amount of equity and on the sustainability of businesses operating in the field of tourism in the Slovak Republic during 2014-2018.

The analysis shows that the amount of equity in limited liability companies operating in Slovakia in the field of tourism reached positive values during 2014-2018, while the amount of equity increased every year. At the same time, it can be stated that during the period under review, the analyzed limited liability companies achieved the economic result in the form of a loss.

The economic result is only one of the items of equity, therefore it is necessary to focus attention on its other items, which caused an increase in equity. In the monitored period, the highest part of equity was accounted for by capital funds, which had a positive effect on the amount of equity. Through the increase in capital contributions, equity is replenished through additional shareholder contributions, which means that investors in the analyzed sector believed in the future and were willing to take business risk.

At the turn of 2019 and 2020, the coronavirus spread from China to the whole world, so it is not possible to predict further future effects, respectively impacts on the activities of the analyzed limited liability companies, as the situation is constantly changing. At present, due to the worsening of the pandemic situation in Slovakia and around the world, the tourism industry in the Slovak Republic is one of the most endangered sectors of industry. If entrepreneurs operating in the tourism industry want to continue doing the business, they should seek to increase their own resources, for example by making additional contributions from partners or by acquiring a silent partner.

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THE IMPACT OF FEMININE MANAGEMENT ON BANKS FINANCIAL PERFORMANCE: EVIDENCE FROM ROMANIA

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Abstract

The paper aims to highlight the impact of female management defined as the rate of female form the top management team (TMT) of an entity on the financial key performance indicators (KPIs) of Romanian system banks. The analysis was conducted on 13 Romanian banks witch gather more than 70% of the total Romanian banking systems assets for the period 2010 – 2019. We find significant statistically bonds between the female representation in top management team and return on assets (ROA) and return on equity (ROE). Our findings suggests that an increasing of 10% of the female gender members of the Boards` entities could generate more than 0.5% increasing of the ROA and 0,03% of the ROE index. Moreover, empirical findings contribute to the literature of gender diversity and of economic performance of banks and our conclusion is that a more gender balanced management can generate better outcomes for banking institutions.

Keywords: bank performance, decision-making, female management, gender diversity

JEL codes: L25, M14, J16, G21, D81

1. Introduction

Evolution of the mankind and globalization generates a necessity for standardization and equalization in all aspects. Keohane and Nye (2000) categorizes the globalization effects on three dimensions: economic, political and social. In a holistic approach we can state that globalization can be assimilated worldwide with diversity and diversification.

To determine the rate of globalization, according to Potrafke (2015), the most popular instrument is the KOF index defined by Dreher (2006) who evaluate the impact using equal proportion in all three dimensions. Using the same index Dreher (2006) determined that globalization promotes economic growth. Anyway many voices sustained that on the long run globalization will generate negative effects like diluted national identities, losing most of the local traditions and others.

The economic globalization is a two way sward for national economies of the world: opportunities for business externalization and increasing of exports on one hand, on the other hand the

migration of the plants to countries where the cost of labor is smaller. This second aspect generates a tendency to maintain inequality on national incomes, moreover inequality between the poorer and the wealthier and last but not least maintaining the gender gap.

2. Related literature

Gender aspects in all the spheres of knowledge are lately very debated and studied. Biases and the tendency to discriminate regarding the gender appurtenance are being combated and attempts are being made to reduce their effects. In economical and managerial field the problem of gender is debated in order to determine the motives of appearance and the modalities in which organizations, or even nations, can reduce the gender pay gap by one hand and to eliminate the glass ceiling.

Nowadays the inequalities between genders are measured and revised by multiple organizations and lots of effort is made to reduce or even to close the gap in all domains like mobility, workplace, payment, marriage, parenthood, entrepreneurship, assets, pension and others (World Economic Forum (WEF), Organization for Economic Co-operation and Development (OECD), World Bank Group, Gender Equality Commission (GEC) of Council of Europe (EC), United Nations (UN)).

In this regard the studies (Adams and Ferreira, 2004; Heilman, 2012; Cumming et al., 2015; Garcia-Meca et al., 2015; Frias-Aceituno et al., 2012; Proenca et al., 2020; Graafland, 2020; Fernando et al., 2020; Delgado-Pina et al., 2020) provides multiple correlations between gender diversity and implicit gender gap in the workforce, economic performance, corporate social responsibility, risk, and efficiency in order to empower women.

On the other hand, other papers have found a negative or null relationship between the proportion of women on the board of directors and performance (Khatib et al., 2020; Nguyen et al., 2020). To measure diversity gender studies use a series of indicators presented in Table no. 1.

Table 1: Analysis of indicators that measure gender diversity in the literature

Variables	Examples of studies
Percentage of female members in total group members	Tu et al., 2015; Shafique et al., 2014; Shukla et al., 2020; Stefanovic and Barjaktarovic, 2020; Misra, 2020
The presence of women measured with a dummy variable	Jabari and Muhamad, 2020; Brahma et al., 2020; Palvia and Vahamaa, 2020; Wachudi and Mboya, 2012; del Prete and Stefani, 2020
Blue index (Hirschman-Herfindal index)	Porcena et al., 2020; Jiang et al., 2020; Owen and Temesvary, 2018; Kilic and Kuzey, 2016
Shannon index (SIN)	Gordini and Rancati, 2017; Proenca et al., 2020
Actual number of women on board	Liu et al., 2020; Shafique et al., 2014

Source: author's own work

The Blau index reflects the probability that two members of any established population belong to different categories/groups. If the value of the indicator (can vary between 0 and 1) is small then the variety within the group is small or the members of the population belong to the same group. If the value of the indicator is high, then the distribution is equal for groups (Solanas et al., 2012).

The Shannon index assumes that all groups are represented in a sample if the samples are formed randomly - a variable that reflects heterogeneity (Baumgärtner, 2006).

Liu et al. (2020) in their study used as blue variables for women on the board the Blau Index, the actual number of women on the board and the percentage of women in total members of a group and made the correlation matrix. It was observed that the correlations between the three variables were very high (0.94 and 0.99 respectively at a confidence level of 0.01), concluding that the most relevant for the analysis is the use of the percentage of women.

The paper aims to determine if the feminine presence in banks' board can affect the financial results of the entity. Also we seek to fill the gap of the literature regarding the main determinants of banking performance. In this regard we study the Romanian banking system and influence of gender diversity/female representation in the top management team (TMT) upon economic performance.

Moreover, for the present study analyzing the effects of female representation in top management, the use of an index that reflects heterogeneity would not be relevant, as would the use of the total number of women on the board. Also, the use of a dummy variable to reflect the presence

of women in management positions is not applicable, in the case of the sample in the study conducted only one bank does not have female members in management positions.

3. Model and data

3.1 Sample

The main objective of our research is to identify the impact of female representation in top management on financial performance. In this respect we used Bureau van Dijk (BvD) Orbis database containing business and financial data of 16 Romanian banks. Regarding that most of the mandates related to the boards of directors of Romanian banks are 4 years, we selected from the database only the entities who have records older than 5 years in order to be able to follow the possible variations in the sphere of diversity within these councils. So the final sample consists of 13 Romanian banks (presented in table 2), for which we used financial information for period 2010 – 2019. Considering the fact that total assets of the selected banks represent around 71% of the total value of assets for 2019 of the Romanian banking system according to National Bank of Romania (NBR), we consider that the sample is representative.

Table 2: Selected banks and period

Bank	First year	Last year	# years
Alpha Bank	2013	2019	7
Banca Romaneasca	2013	2019	7
BCR	2010	2019	10
BRD	2011	2019	9
BT	2010	2019	10
Credit Agricole Bank	2011	2019	9
Credit Europe Bank	2011	2019	9
Garanti	2013	2019	7
Idea Bank	2014	2019	6
Libra internet Bank	2013	2019	7
OTP Bank	2013	2019	7
UniCredit	2013	2019	7
Vista Bank	2014	2019	6

Source: author's calculations

3.2 Measurement of variables

DEPENDENT VARIABLES

In order to quantify the financial key performance indicator (KPI) of a bank we use three main indicators found in economic literature and in prior gender diversity studies, like return on assets (ROA), return on equity (ROE) and impaired loans on gross loans (NPL).

ROA (return on assets) is an indicator which incorporates the accounting performance of a bank, and the efficiency of using a bank assets in order to make profit. He is calculated as the ratio of income before extraordinary items, interest expense, and taxes, to the total assets. It is index that can show the management's ability to distribute and use shareholders assets. If the ROA is high, the management uses wisely the resources. This index is used in many qualitative studies regarding financial performance and diversity (Erhardt et al., 2003; de Andres and Vallelado, 2008; Adams and Ferreira, 2009; Pathan and Faff, 2013; Pucheta-Martinez et al., 2016; Andrieş et al., 2020)

ROE (return on equity) is an index calculated as the ratio of income before extraordinary items, interest expense, and taxes, to the total equity. This indicator shows us if the company has excessive debts and how much profit can the company generates regarding the equity (Pathan and Faff, 2013; Talavera et al., 2018; Shettima and Dzolkarnaini, 2018, Andrieş et al., 2020).

NPL (impaired loans on gross loans) – this indicator is in opposite to the first, but in the end it is a proxy for a bank performance, highlighting its level of credit risk. The level of NPL indicates the

asset quality (a high NPL can indicate a lower profitability) (Altavilla et al., 2018; Detragiache et al., 2018; Elekdag et al., 2020, Andrieş et al., 2020).

INDEPENDENT VARIABLES

We measure the composition of the board of directors by using the proportion of female gendered members in board of directors - Female (%), this being the main variable for our analysis.

Also we defined a set of control variables to account the *size*, *capital structure*, *asset structure*, and *board size* of the entities analyzed as *bank specific variables*.

As macroeconomic indexes we used *GDP Growth (%)* and *Inflation rate* as variables, the definitions and determination means are presented in Table 3.

Table 3: The situation of the variables used

Variables	Used symbol	The variable definition	Determination means
Dependent variables			
<i>Return on assets</i> (*)	ROA	Is an profitability index witch shows how profitable a company regarding the total value of the assets	Ratio between the profit and assets value for each bank and each year.
<i>Return on equity</i> (*)	ROE	Is an performance index with shows the profitability of an entity regarding the total value of the equity	Ratio between the profit and equity value for each bank and each year.
<i>Non-performing Loans</i> (*)	NPL	Is an index for risk exposures.	Ratio between the impaired loans and gross loans value for each bank and each year.
Independent variables			
<i>Female (%)</i> (*)	Female (%)	The percentage of the women in the total number of the boards' members	Ratio between the female members in board and total number of board's directors for each bank.
<i>Bank size</i> (*)	Bank size	The size of the bank regarding the level of total assets	Natural logarithm of total assets value for each bank and each year
<i>Capital Structure</i> (*)	Capital Structure	The indicator who shows the way that organization founds her operations or growth	Ratio between the equity and assets value for each bank and each year.
<i>Asset structure</i> (*)	Asset structure	The proportion of each assets type (fixed, current, etc.) which shows the strategy of the entity regarding earnings using assets.	Ratio between the loans and assets value for each bank and each year.
<i>Board size</i> (*)	Board size ()	The number of the boards' members	Natural logarithm of number of board's directors for each bank and each year.
<i>GDP Growth</i> (**)	GDP Growth	The index for economic activity of a country.	The difference between the value of the current year GDP and the GDP level of the previous year divided GDP level of the previous.
<i>Inflation rate</i> (**)	Inflation rate	The rate determined by the consumer price index (CPI) in one year.	The rate between the variations of the CPI in one year compared to the value of same index of the previous year.

Source: (*) - authors calculation based on information from Orbis

(**) - Eurostat

3.3 Empirical strategy

Our multiple regression model based on unbalanced panel data for period 2010 – 2019 for the 13 selected banks use as empirical setup the PLS (panel least squares) method. The model was adapted after various studies found in the literature (e.g., Ghosh and Ansari, 2018; de Andres and Vallelado, 2008; Pathan and Faff, 2013; Andrieş et. al., 2020), as follows:

$$Performance(t,i) = a_0 + a_1 \cdot Female(t,i) + a_2 \cdot Bank\ variable(t,i) + a_3 \cdot Macro\ variable(t,i) + Error(t,i) \quad (1)$$

where,

- Performance (t,i) = the dependent variable showing ROA/ROE/NPL for bank i , and year t
- Bank variable (t,i) = the proxy variables for bank's characteristics (size, capital structure, asset structure and board size) for bank i , and year t
- Macro variable (t,i) = the proxy variable for macroeconomic situation (GDP growth and inflation rate)
- a_0 = Fixed effect to control the omitted variables at bank level
- a_1, a_2 and a_3 = the discriminant coefficients
- Error (t,i) = error term

3.4 Descriptive statistics and correlation matrix

The descriptive statistics for selected variables are presented in Table 4 for the analyzed period. At a first glance, it can be observed that the female representation in the TMT is around one third. Despite this, there are banks such as BCR having around 69% females in board, while on the other side, we have Vista bank with 0 women in board.

Table 4. Descriptive statistics for analysed variables (entire period)

Variable	Obs.	Mean	Median	Std. Dev.	Max.	Min.
Female (%)	101	33.8%	33.3%	16.7%	69.2%	0.0%
ROE	101	0.7%	6.4%	26.2%	58.6%	-207.5%
ROA	101	0.3%	0.6%	1.7%	5.1%	-9.4%
NPL	98	8.1%	7.5%	4.1%	19.8%	1.5%
Bank size	101	14.81	14.65	1.38	16.95	12.55
Capital Structure	101	10.7%	10.3%	2.7%	21.1%	3.6%
Asset structure	101	60.4%	61.6%	8.3%	77.1%	41.0%
Board size	101	2.35	2.20	0.72	3.95	1.39
GDP Growth (%)	101	4.0%	4.2%	1.8%	7.3%	-3.9%
Inflation rate	101	2.1%	1.3%	2.3%	6.1%	-1.5%

Source: author's calculations

Our regression models will capture the impact of female representation in top management over the financial performance. By testing the stationarity of selected variables using Unit root of Levin et al (2002) test for panel data presented in table 5, we obtain that all series are stationary.

Going further, in table 6 we are presenting the correlation matrix across the selected variable. Overall, the highest correlation recorded is between Bank size and Board size of 0.57. In order to prevent multicollinearity between independent variable, we will estimate different regression models, to not include both of them in the same regression model.

Table 5. Unit root test for panel data – Levin et al (2002)

Variables	t-test	p-value
Female (%)	-12.87***	0.0000
ROE	-5.68***	0.0000
ROA	-2.60***	0.0046
NPL	-5.68***	0.0000
Bank size	-6.80***	0.0000
Capital Structure	-15.62***	0.0000
Asset structure	-2.27**	0.0116
Board size	-11.66***	0.0000
GDP Growth (%)	-7.66***	0.0000
Inflation rate	-4.73***	0.0000

Source: author's calculations

*, **, *** - Indicates significant at the 0.1 level, 0.05 level and 0.01 level.

Table 6. Correlation matrix

	Female (%)	ROA	ROE	NPL	Bank size	Asset structure	Capital Structure	Board size	GDP Growth (%)
ROA	0.12								
ROE	0.16	0.91							
NPL	0.12	-0.32	-0.33						
Bank size	0.53	0.38	0.26	0.28					
Asset structure	0.07	-0.24	-0.11	-0.34	-0.29				
Capital Structure	-0.15	0.29	0.25	-0.02	0.14	-0.08			
Board size	0.56	0.05	0.05	0.33	0.57	-0.07	0.19		
GDP Growth (%)	-0.19	0.17	0.12	-0.36	-0.13	-0.05	0.06	-0.17	
Inflation rate	0.09	0.02	0.03	-0.08	0.16	0.03	0.20	0.11	-0.30

Source: author's calculations

4. Results

For each dependent variable (ROE, ROA and NPL) we will estimate 3 regression model. Model 1 will not include bank size and board size, model 2 will include only bank size, while model 3 will include only board size. Estimation results are presented in table 7.

Table 7. Regression models estimation

Variable	Model 1 ROE	Model 2 ROE	Model 3 ROE	Model 1 ROA	Model 2 ROA	Model 3 ROA	Model 1 NPL	Model 2 NPL	Model 3 NPL
Constant	-0.3014 (0.2346) ^a	-0.8088* (0.4224)	-0.2195 (0.2404)	-0.0040 (0.0149)	-0.0657** (0.0261)	0.0010 (0.0153)	0.2184*** (0.0329)	0.1353** (0.0607)	0.1954*** (0.0324)
Female (%)	0.3493** (0.1536)	0.2092 (0.1811)	0.5061*** (0.1887)	0.0210** (0.0097)	0.0039 (0.0111)	0.0306** (0.0120)	0.0222 (0.0222)	-0.0041 (0.0274)	-0.0268 (0.0267)
Capital Structure	2.5505*** (0.9585)	2.2714** (0.9726)	2.9944*** (0.0037)	0.1882*** (0.0610)	0.1543** (0.0600)	0.2156*** (0.0639)	0.0616 (0.0610)	0.0076 (0.1379)	-0.0766 (0.1371)
Asset structure	-0.2667 (0.3020)	-0.1131 (0.3186)	-0.3052 (0.3016)	-0.0452** (0.0192)	-0.0265 (0.0196)	-0.0476** (0.0192)	-0.1746*** (0.0427)	-0.1461*** (0.0458)	-0.1605*** (0.0411)
Bank size		0.0330 (0.0229)			0.0040*** (0.0014)			0.0054* (0.0033)	
Board size			-0.0628 (0.0444)			-0.0038 (0.0028)			0.0184*** (0.0060)
GDP Growth (%)	1.9250 (1.4580)	2.0527 (1.4526)	1.6711 (1.4615)	0.1658* (0.0928)	0.1813** (0.0897)	0.1502 (0.0931)	-0.9481*** (0.2053)	-0.9372*** (0.2036)	-0.8832*** (0.1978)
Inflation rate	0.0162 (1.1541)	-0.1086 (1.1509)	-0.0352 (1.1487)	-0.0029 (0.0734)	-0.0181 (0.0711)	-0.0061 (0.0731)	-0.3753** (0.1633)	-0.3981** (0.1625)	-0.3622** (0.1565)
R-squared	0.1295	0.1483	0.1476	0.1982	0.2614	0.2139	0.3040	0.3236	0.3683
No. of cases	101	101	101	101	101	101	98	98	98

Source: author's calculations

^a – (standard errors in parentheses)

*, **, *** - Indicates significant at the 0.1 level, 0.05 level and 0.01 level

We can notice that for both ROA and ROE, we are obtaining positive coefficient for Female (%). According to table 6, one percent increase in Female (%) variable generates an increase in ROE by about 0.3% (Model 1) to 0.5% (Model 3). Similar impact was highlighted also for ROA (Model 1 – 0.02%, while for Model 3 we have 0.03%)

Furthermore, we see that the coefficients for NPL regression models are negative (except model 1), which means that an increase in number of women in board of directors will imply a decrease in NPL. Despite this, they are not statistically significant.

In order to check the model robustness we re-estimate all models by excluding the variable “Female (%)” and the results are presented in table 8.

Table 8. Regression models estimation - robustness check

Variable	Model 1 ROE	Model 2 ROE	Model 3 ROE	Model 1 ROA	Model 2 ROA	Model 3 ROA	Model 1 NPL	Model 2 NPL	Model 3 NPL
Constant	-0.1443 (0.2290) ^a	-0.9603** (0.4022)	-0.1615 (0.2471)	0.0054 (0.0145)	-0.0686*** (0.0246)	0.0045 (0.0156)	0.2282*** (0.0314)	0.1387** (0.0560)	0.1925*** (0.0323)
Capital Structure	2.2626*** (0.9705)	2.0286** (0.9512)	2.2269** (0.9929)	0.1709*** (0.0616)	0.1497** (0.0584)	0.1691*** (0.0630)	0.0406 (0.1334)	0.0131 (0.1323)	-0.0329 (0.1300)
Asset structure	-0.2593 (0.3085)	-0.0438 (0.3135)	-0.2553 (0.3107)	-0.0447** (0.0195)	-0.0252 (0.0192)	-0.0445** (0.0197)	-0.1727*** (0.0426)	-0.1479*** (0.0440)	-0.1648*** (0.0409)
Bank size		0.0472** (0.0193)			0.0042*** (0.0011)			0.0051* (0.0026)	
Board size			0.0071 (0.0371)			0.0003 (0.0023)			0.0147*** (0.0048)
GDP Growth (%)	1.4955 (1.4768)	1.9247 (1.4509)	1.5464 (1.5077)	0.1400 (0.0937)	0.1789** (0.0890)	0.1426 (0.0957)	-0.9786*** (0.2030)	-0.9342*** (0.2015)	-0.8726*** (0.1975)
Inflation rate	0.2376 (1.1747)	-0.0681 (1.1524)	0.2322 (1.1810)	0.0103 (0.0745)	-0.0173 (0.0707)	0.0101 (0.0750)	-0.3632** (0.1629)	-0.3983** (0.1616)	-0.3740** (0.1561)
R-squared	0.0821	0.1362	0.0825	0.1593	0.2604	0.1595	0.2965	0.3234	0.3611
No. of cases	101	101	101	101	101	101	98	98	98

Source: author's calculations

^a – (standard errors in parentheses)

*, **, *** - Indicates significant at the 0.1 level, 0.05 level and 0.01 level

At a first glance we are able to see that in the regression models for which “Female (%)” has a significant impact (ROE and ROA – model 1 and model 2) the R squared considerable decreased when re-estimating the models by taking out this variable. On the other hand, for the rest of the models, in which the impact is not statistically significant, the R-squared remained almost the same. Moreover, the significance of the other variables remains.

We obtained results that accede previous literature which highlight the positive impact of female representation in top management on banks' financial performance. Among studies that reveal a positive impact of female representation in management on the financial performance of banks we can mention Dezso and Ross, 2012; Pathan and Faff, 2013; Reinert et al., 2016; Andrieş et al., 2020; Ouni et al., 2020; Mazzotta and Ferraro, 2020; Jabari and Muhamad, 2020; Khatib et al., 2020; Nguyen et al., 2020 and others.

5. Conclusions, limitations and discussions

The main purpose of this paper has been to determine the impact of female representation in top management on banks financial performance from the Romanian banking system. We used a sample of 13 banks who gather more than 70% of the total Romanian banking systems assets. Data used in the study were processed after information provided by business and finance database Bureau van Dijk (BvD) Orbis and it contains financial data form 2010 – 2019.

Our findings suggests that an increasing of 10% of the female gender members from the top management team of the entities could generate more than 5% increasing of the ROA and 0,3% of the ROE index. Moreover, empirical findings contribute to the literature of gender diversity and of economic performance of banks and our conclusion is that a more gender balanced management can generate better outcomes for banking institutions.

While our study promotes gender diversity and provides empirical proofs in this direction, the paper does not analyze if there is a critical mass of the female gender members in TMT in order to generate more financial performance. Furthermore the female management of the entities were debated only from the gender diversity point of view.

Other studies (Proenca et al., 2020; Menter, 2020) concluded a U-shape evolution of the board gender diversity and financial performance and it is stated an approximate 20 percent of the female members that a TMT should adopt towards to generate the maximal rise of the financial performance. We argue if the benefits of the female management are only in terms of financial performance or it could be other non-financial KPI that are positively related like turnover or even retirement rate, training knowledge achievement rate, internal promotion/external hires rate, salary competitiveness ratio, etc.

Thinking further, it should be taken into consideration the possibility that the female element from the board can be determined using feminine characteristics (soft skills) and if these are trained by male managers can generate the same results as the present one. In this regard it could be profiled an androgynous model of manager and a list of skills that he should possess in order to generate the maximum results for an entity.

Supporting the pervious hypothesis, it can be observed a difference between results in the literature (Nguyen et al., 2020) regarding the influence of the gender diversity an implicit of the females in the top management positions. The differences could be explained regarding the organizational culture (OC) point of view. The level of the Masculinity dimension defined by Hofstede et al. (2005) is different from one county to another, dimension witch is mostly based on the soft skills that a nation naturally adopt according to explanations delivered in Hofstede et al. (2010). Moreover, according to the indexes and reports stated in the preamble of the paper and referring to the fact that these national OC are addapting, developing and changing an cross-cultural aproach of the suitable set of manager characteristics should be adopted.

Regarding the fact that the wold as we know is developing and changing so fast (see the Covid-19 pandemics and the necessity to adopt mesures asocieted to feminist view – work/life balance, dedication, empaty, etc.; the evolution of technology and artificial intelgence witch intoduced many robots the industries) the single characteristics that are not replaceable and will be appreciated in the future seams to be the soft skills.

Posits like „think manager – think male” are not current any more and becames slowly not only “think manager – think qualified person!” as Schein and Davidson (1993) proposed but more „think manager – think adaptive and soft skilled” (Heilman, 2012; Braun et al., 2017; Fernando et al., 2020).

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THE INTERNATIONAL ACCOUNTING REFERENTIAL USED IN THE SMES FINANCIAL REPORTING: THE CASE OF ROMANIA

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Abstract

The application of IFRS for SMEs has been the subject of various real debates, so that internationally this standard has been adopted, but at the level of the European Union it has been rejected, as it is considered difficult to implement and that it generates additional costs. As an EU member state Romania has not adopted this standard, and the main objective of this paper is a comparative analysis between the national accounting framework (OMFP no. 1802/2014) and IFRS for SMEs, the goal of the article being that of identifying the fundamental differences that affect the level of convergence and the way in which these can be amended to harmonize. A qualitative analysis of the content of the two standards was performed, and for the case of property, plant and equipment (tangible assets), the level of convergence between the two standards was evaluated, by means of the matching coefficient which involved the award of scores based on the differences and similarities identified. A number of similarities, but also many differences were identified, including in relation to: intangible assets, property, plant and equipment, capitalization of borrowing cost, productive biological assets and real estate investments, inventories, deferred taxes and presentation of financial statements. Regarding the property, plant and equipment, we identified an average level of convergence between the two standards.

Keywords: convergence, harmonization, IFRS for SMEs, national accounting framework

JEL classification: M41

1. Introduction

Globally, small and medium-sized enterprises are considered the "backbone of the global economy", their activity holding more than 90% of the results of an economy. That is why, I can say that I agree to the idea supported by the research literature (Albu and Albu, 2010), namely that "bigger does not always mean better", as the maintenance of the smaller size of the company may offer multiple advantages including strength or even the recording of growth in the context of an economic crisis.

Several major changes have taken place over the five years when the project for the development of SMEs standard has been carried out. One of them refers to the replacement of the SME term with the term "private entities", due to the fact that the standard defines SMEs as "entities that are not publicly liable and publish general financial statements for external users", however in the end, the term SME was again used.

The IFRS for SMEs was drafted on the basis of the simplification of the complete IFRS, hence of course resulting in major differences that would help SMEs in reporting their financial statements. There were many reactions both during the project and after the publication of the standard.

Thus, due to the interest shown by researchers and specialists in the field of accounting, the topic is subject to real debates and is of particular importance especially for practitioners and researchers (Albu and Albu, 2010; Masca, 2012; Buculescu and Velicescu, 2014; Buculescu and Stoica, 2016; Bonito and Pais, 2018), who continue to comment on the fact that EU member states reject the adoption of this set of standards and specify the main factors that determine this.

The refusal to adopt results in different financial reporting of the SMEs, which means that investors, especially foreign ones, will not have available comparable information on their financial statements. Therefore, the research topic aims to determine the main differences between the national

accounting standard and IFRS for SMEs. We also want to identify the level of convergence between the two standards regarding intangible assets.

Last but not least, the research will contribute to the enrichment of the research literature and will generate a better understanding of the reporting differences of SMEs that have emerged as a consequence of the accounting standard used. In addition to the introductory part, the paper also contains a section that refers to the literature review, one in which the research methodology is presented, another in which the results are discussed, and the conclusions of the paper are summarized in the last section.

2. Literature review

Divided opinions were generated during the drawing up of the standards draft, as well as after the adoption thereof by some countries, some considering that full adoption will never be possible in the EU (Masca, 2012).

Among the existing reactions worldwide, we mention the most important ones. According to Pacter (2007), “The CFA Institute does not support the IASB's proposal to create a different set of standards for SMEs. Investors make decisions by comparing alternative investments. If there are various forms of IFRSs issued by the IASB, including IFRS for SMEs, it will be difficult for analysts to determine exactly which one to apply. The CFA Institute represents the points of view of investors in more than 130 countries around the world.” Then, Jones and Slack (2008) supports the development of this standard and considers it as a contribution to the globalization of financial reporting standards. According to this, the standards will be particularly useful to a large number of countries where the process of setting standards or local reviews are ongoing. The IASB's initiative to develop a standard for SMEs is appreciated by MEDEF. It is considered that it could be useful for the international development of companies, but only for those that want it. In any case, according to this organization, the presentation draft does not meet the needs in terms of the drawing up and use of the financial statements of SMEs. It was considered that the IFRS for SMEs draft was not sufficiently simplified and that it would not be suitable for a large part of SMEs. MEDEF urged the IASB to thoroughly review the draft and adapt it to the needs of SMEs (Buculescu, 2015). Jermakowicz and Epstein (2010) show that KPMG supported the development of the standard for SMEs. According to them, all entities would have access to achieve a high level of financial reporting taking into account the cost-benefit ratio. The IASB has supported the application of IFRS for SMEs, as it believes that this standard is specifically designed to meet the needs and opportunities of small and medium-sized enterprises and represents a complex set of high-quality financial reporting principles.

Schiebel's (2008) statistics showed that the opinions of EU accountants and auditors are in favour of developing a separate standard for SMEs (77% of those surveyed). At European Union level, the European Commission also held a meeting in 2010 to see stakeholders' views on IFRS for SMEs. The meeting was attended by 105 people from 29 countries, including 25 EU members, and the answers obtained were different. Quagli and Paoloni (2012) analysed the answers received and classified them as follows:

Table 1: Opinions on IFRS for SMEs (by categories)

Answer	Users of statements	Those who draw up the statements
Yes	12	24
No	10	52
I don't know	0	5
No answer	2	0
Total answers	24	81

Source: Quagli and Paoloni, 2012

The main arguments that supported the implementation of IFRS for SMEs were: ensuring the international comparability of financial reporting and using a common accounting communication system; optimization of financial reporting and harmonization that will determine the participation of foreign investors and the development of entities.

The arguments against the implementation of IFRS for SMEs mainly concerned the following aspects: the connection between taxation and accounting and the systematization of the standard for

SMEs in relation to the possibilities and needs of small enterprises; making the reporting process more difficult and increasing the cost of drawing up financial statements, instead of reducing the burden of administrative reporting.

From this survey it is clear that in terms of percentage, users of financial statements prefer IFRS for SMEs, while those who draw it up do not support this standard. That is why the European Commission rejected the adoption of the SME standard at EU level, but agreed that member countries that are faced with challenges in relation to the European Directives should adopt IFRS for SMEs as a national reporting standard for private entities. Non-EU countries have already adopted IFRS for SMEs, but Romania as an EU member state has not yet adopted this standard.

There are many works that present the advantages and the disadvantages of implementing the standard for SMEs, but few present studies on the opinion of Romanian practitioners about the application thereof in Romania. Deaconu et al. (2009) support the need for simplification of the financial reporting of SMEs, but consider it inappropriate to implement IFRS for private entities due to the cultural variety and diversity of accounting systems. Bunea et al. (2012) note that professional accountants show the need for more simplified accounting systems for SMEs and the preference for European directives, not for IFRS for SMEs. Lapteş and Popa (2012) show, following their analysis, that most Romanian accounting professionals do not perceive IFRS for SMEs as an alternative for optimizing financial reporting.

Following a study conducted in 2014 (Buculescu, 2015), based on the distribution of questionnaires on the application of IFRS for SMEs to CECCAR (Association of Chartered Certified Accountants) members, the following results were obtained (90 valid answers): most CECCAR professionals consider that at national level the standard for SMEs may be a solution for the financial reporting of SMEs, but they consider that the choice should be optional, otherwise considered to represent an additional cost; accountants have a good attitude towards Romanian regulations, although some of them feel the need for certain improvements but especially for simplifications regarding the financial reporting of SMEs; one can see an appreciation of the adequacy of national regulations to the needs of SMEs; Romanian accountants use IFRS to a small extent, and more than half of them have heard of the SME standard; accountants also consider that the main information required by managers /owners is the fiscal one.

These reactions of CECCAR members show that they consider as favourable the application of IFRS for SMEs only on an optional basis. Given the disadvantages of the costs involved and the link between taxation and accounting, which create obstacles to the implementation of IFRS for SMEs, professional accountants should also consider the opportunity on SME financial reporting, namely the participation of investors and the assurance of comparability.

Following an analysis conducted based on the issuance of 126 questionnaires to SMEs in Romania, regarding their perception of the rules applicable in financial reporting, Cătălin Albu (2013) found the following aspects: most SMEs consider that their reporting is not too detailed; most of them consider that the current accounting regulations are oriented towards the needs of the tax authorities; more than half of them consider that the application of current accounting regulations is not expensive; more than half of them believe that financial statements should be much more relevant, more comparable and more tailored to the needs of its users.

It can be appreciated that SMEs have had these reactions because they are more inclined to detailed rules than to simplified principles and regulations. This is perhaps because they consider the state (through the tax authorities) as the main user of the information they present and somehow want to reduce the possibility of being fined, respectively penalized by the tax authorities. Given that professional accountants dealing with SME accounting are paid less, although they are required to report in more detail, the costs of penalties that SMEs would face if they failed to comply with the tax legislation would far exceed the former, which is why it is considered that in the analysis performed SMEs had this reaction to consider low costs.

3. Methodology and data

The main objective of the research carried out is a qualitative analysis of content able to compare Romanian national accounting regulations (represented by OMFP no. 1802/2014) with IFRS for SMEs, as well as the assessment of the level of convergence between the two standards through the matching

coefficient which involved scoring depending on the differences and similarities identified for tangible assets.

The identification of the main differences was done by analysing all the aspects presented in the two accounting reporting standards. Thus, the research results highlight the main differences that affect the comparability of the accounting information presented in the financial statements.

The use of the matching coefficient used by Albu et al. (2012) resulted in the establishment of a level of convergence for tangible assets.

4. Results and discussions

In the implementation of the standard for SMEs in Romania, several aspects must be taken into account, among which: the Romanian accounting system, its development and characteristics, the attitude of SMEs, users of financial statements as well as of professional accountants. Therefore, there are several factors that influence the compatibility of accounting regulations: accounting differences in presentation, book keeping, perception and interpretation, different accounting principles and the social, economic and cultural environment.

Following the comparative analysis between OMPF no. 1802/2014 and IFRS for SMEs we will further present the fundamental differences between national accounting regulations and IFRS for SMEs, which affect the level of convergence and how they can be amended in order to get harmonized.

First of all, the definition and recognition of small and medium enterprises represents a main difference between the two accounting standards. The difference is given by the presence of quantitative criteria (grouped by size) in the OMPF no. 1802/2014, and of qualitative criteria (private entities) within IFRS for SMEs.

4.1 Intangible assets

The capitalization of development expenditures is not presented in the IFRS for SMEs, and this is a favourable thing, especially since this capitalization of development costs would result in additional costs, because SMEs do not have the necessary resources to determine whether the project is viable, which is in antithesis to the standard's role of reducing costs. Indeed, this is an issue that affects the level of convergence between the two accounting standards, but what would be useful for SMEs is to minimize costs.

4.2 Tangible assets (PPE)

During the analysis of the theory regarding the tangible assets, we identified that both standards present the same definitions. In the OMPF no. 1802/2014, the recognition part is not so developed and differences may occur because those who draft the financial statements will look for the recognition criteria in the tax law. In this case, "a fixed asset" is recognized if it is used for more than one year and its value exceeds the legally established value (2,500 lei/510 euros). It is also considered that the fiscal approach is an encouraged behaviour, because in the chart of accounts, the account called "inventory items" is recognized from a fiscal point of view as that asset which does not meet at least one of the two conditions of the fixed assets. In order to ensure a high level of convergence, OMPF no. 1802/2014 should define more clearly these recognition criteria, taking into account the provisions present in the tax law.

Regarding the revaluation of tangible assets, according to IFRS for SMEs, although the first standard issued in 2009 did not specify the revaluation, currently this represents like in the OMPF no. 1802/2014 the alternative treatment for the subsequent valuation of tangible assets. I support the presence of the alternative treatment in the IFRS for SMEs because given that increases or decreases in prices can take place in different markets sometimes, the information could be relevant for users of financial statements and if SMEs want to change from applying the OMPF no. 1802/2014 to IFRS for SMEs and vice versa it would be much easier for them.

Regarding the depreciation of tangible assets in Romania, most entities use the method required by the tax authorities, respectively they depreciate them based on the accelerated method (which is not specified in the SME standard), and in many cases depreciation is calculated according to the fiscal

duration and not to the accounting one, not having two expenses with depreciation that would generate deferred taxes. In order to achieve a harmonization of regulations, it is considered that OMFP no. 1802/2014 should leave to the discretion of the entity the method of depreciation of fixed assets, respectively the one that best shows the way in which it is expected that the economic benefits will be consumed.

4.3 Capitalization of borrowing costs

Although, in the SME standard, capitalization of borrowing costs should be recorded as expenses of the period, SMEs should have the option to choose whether or not to capitalize borrowing costs that are directly related to a purchase, construction or manufacture of long-lived assets. First, they could support them for a more concentrated or appropriate reflection of the costs of long-lived assets, and a disadvantage would be the higher reporting costs that would represent a problem for them. Thus, at the level of SMEs, depending on the considerations regarding the minimization of costs, it will be decided whether to apply the borrowing cost capitalization, thus using accounting policies appropriate to their needs. This optional application would lead to a higher level of convergence.

1.4 Productive biological assets and real estate investments

The method of presentation of biological assets and real estate investments is best provided in the IFRS for SMEs, respectively it claims that in the balance sheet the presentation thereof should be separated from tangible assets. The reasons for this are considered to be the following: biological assets are assets that not every entity can own, but only those that carry out specialized activities, as they require a treatment different from that of tangible assets; real estate investments have a different purpose than that of fixed assets, respectively to increase the value of equity, and when the transfer takes place in and from the category of real estate investments certain differences should be registered, which does not happen in the case of the OMFP no. 1802/2014. As a result, more correctly and better for ensuring the level of convergence would be for the normalizer to mention separate positions for them and not to assimilate it to tangible assets.

4.5 Inventories

Regarding the inventory-specific accounting policies, in addition to those mentioned for fixed assets, those that most affect the level of convergence between the two accounting standards are the exclusion of certain elements from the category of stocks and the absence of the LIFO method for ending balance in the inventory account. The lack of this method benefits SMEs, as in inflationary conditions this results in the presentation of inventories at lower values (the assessment is made at the input cost of the oldest purchases) and in the reduction of the result, caused by the high value of expenditures in terms of discharge. Given the cost considerations of SMEs, they do not use this method and that is why it is considered that the specification of this method should also be waived at the level of the OMFP no. 1802/2014.

4.6 Deferred taxes

Currently, OMFP no. 1802/2014 does not make any clarification regarding the calculation of deferred taxes. Although deferred tax recognition is a complex process, SMEs should recognize deferred income tax because it can provide meaningful information to users of financial statements, and the process of waiting for the deferred tax deduction does not affect the value of the company. The fact that these are not presented in the OMFP no. 1802/2014 only confirms that there is a preference only for the basic rules of the complete international standard and a significant influence of the fiscal rules.

4.7 Presentation of financial statements

We found that each standard presents financial statements differently. The reporting requirements of the IFRS for SMEs are much more complex, representing a strong point, but they do

not differ in terms of the size of enterprises, which will make it difficult for micro-entities to report as opposed to large enterprises for which this reporting will be useful. In order to ensure compatibility between the two standards and at the same time a facilitation for small businesses, it is considered that size should also be a criterion for defining the coverage area of the standard.

These represent the finer aspects in relation to which OMPF no. 1802/2014 and IFRS for SMEs show differences. By overcoming these differences, however, we can find many similar issues that result in a high compatibility (convergence) between the provisions on the definition of concepts, qualitative characteristics of information, accounting principles, accounting policies, both standards having the International Financial Reporting Standards (IFRS) as common source.

It is considered that the implementation of IFRS for SMEs in Romania would result in: an increase in comparability and quality of financial reporting, an increase in financial and investment opportunities through investments made by foreign investors in our country and a decrease in costs (especially of the costs generated by taxation).

In addition to this analysis of the formal convergence between the two accounting standards, which after the analysis is estimated to be at an average level, an analysis of the opinions of professional accountants on the usefulness of applying the standard for SMEs instead of the OMPF no. 1802/2014 is also required.

4.8 Regulation compatibility analysis - Case study for tangible assets

In this case study, the level of convergence of accounting definitions and policies for tangible assets between national regulations (OMPF no. 1082/2014) and IFRS for SMEs was analysed. According to the convergence measurement methodology used by Albu et al. (2012), the most important elements of tangible assets were identified in order to assess the level of convergence. Therefore, considering the structure and main elements of both accounting standards, the main problems that a professional accountant would face are: definition and recognition, scope, components of tangible assets, depreciation and impairment thereof. Thus, a number of 26 topics related to tangible assets were identified.

In order to measure the level of compatibility the following types of convergences were chosen:

- Type I. Full convergence
- Type II. Absence of convergence
 - Type II.1. Substantial convergence
 - Type II.2. Substantial divergence
- Type III. Divergence /Incompatibility

For these types of convergence, according to the matching coefficient scores between 1 - Full Convergence and 0 - Divergence have been awarded, respectively:

Table 2: The method of score award

Score	Result	Explanation
1.0	Full convergence	No difference between the two standards.
0.5	Substantial convergence	Substantial convergence between both standards, the same result being obtained.
0.25	Substantial divergence	Substantial divergence between both standards, a different result being obtained.
0.00	Divergence	Contradictory placement of the elements

Source: author's processing after Albu et al., 2012

Next, the scores and the type of convergence were awarded based on the previous analysis, respectively on the differences identified for tangible assets, between the two standards.

Summarized these differences refer to:

- *Definition and recognition.* Considering that both IFRS for SMEs and OMPF no. 1802/2014 have taken over and are in accordance with the provisions of the International Financial Reporting Standards, there are no significant differences, the only one being the one referring to the criteria for recognizing tangible assets. Thus, in our country, for the recognition of tangible assets, the fiscal rule is also taken into

account, which refers to the minimum input value of tangible assets in the amount of 2,500 lei (510 euros).

Table 3: Award of scores and of the convergence type for definition and recognition

Elements	I. Full convergence	II.1. Substantial convergence	II.2. Substantial divergence	III. Divergence
Definition	1			
Recognition			0.25	
Derecognition	1			

Source: author's processing after Albu et al., 2012

Table 4: Award of scores and of the convergence type for purpose and components

Elements	I. Full convergence	II.1. Substantial convergence	II.2. Substantial divergence	III. Divergence
Land and buildings, technical facilities and means of transport, furniture and office equipment	1			
Biological assets and agricultural products				0
Real estate investments				0

Source: author's processing after Albu et al., 2012

- *Purpose and components.* The most important differences refer to the non-specification within the OMFP no. 1802/2014 of the treatment and accounting policies for biological assets and agricultural products and real estate investments, which are classified as tangible assets. IFRS for SMEs does not include it in the category of tangible assets, having different treatments that are presented in separate sections (Section 16-for real estate investments and Section 34-for biological assets).

Table 5: Award of scores and of the convergence type for measurement criteria

Elements	I. Full convergence	II.1. Substantial convergence	II.2. Substantial divergence	III. Divergence
General principles on cost (excluding the cost of indebtedness)		0.5		
The cost of borrowing				0
Expenses included in tangible assets	1			
Purchase cost			0.25	
Production cost			0.25	
Measuring the cost in case the payment is delayed			0.25	
Capitalization of subsequent expenses	1			

Source: author's processing after Albu et al., 2012

- *Measurement criteria.* The components of the purchase cost are the same in both standards, the only exception being represented by the cost of indebtedness which in terms of national regulations must be included in the purchase (production) cost of tangible assets with a life-long cycle. Instead, the IFRS for SMEs identifies these indebtedness costs as expenses that must be recognized by the entity at the time they occur. If they are purchased on the basis of contracts in which payment is deferred, according to the tax treatment in our country, interest expenses are non-deductible expenses that affect the tax result, instead in the case of IFRS for SMEs if payment is delayed beyond the normal credit term, the cost is the updated value of future payments, and the interest expense is an expense of the period recorded in account 6681- *Expenses with payment deferral over the normal credit terms*. Another difference refers to the

fact that IFRS for SMEs does not specify explicit elements that make up the production cost of tangible assets.

Table 6: Award of scores and of the convergence type for depreciation

Elements	I. Full convergence	II.1. Substantial convergence	II.2. Substantial divergence	III. Divergence
Useful life	1			
Residual value				0
Accruals for depreciations			0.25	
Linear method	1			
Degressive method		0.5		
Accelerated method				0
Method based on production units	1			

Source: Author's processing after Albu et al., 2012

- *Depreciation and depreciation methods.* The main difference regarding the depreciation of tangible assets between the two standards refers to the residual value present only in the IFRS for SMEs, as this affects mainly the method of calculating the depreciable value. In terms of common depreciation methods, the only one that is present only in the OMFP no. 1802/2014 and not the standard for SMEs is the accelerated method. Regarding the degressive method, in our country it is imposed for certain fixed assets and not allowed for others according to the Tax Code, and in the case of IFRS for SMEs the depreciation method will be used depending on the manner in which it is assumed that the depreciation will generate economic benefits, as this needs to be applied consistently, except when a change in estimate occurs.

Table 7: Award of scores and of the convergence type for further valuation

Elements	I. Full convergence	II.1. Substantial convergence	II.2. Substantial divergence	III. Divergence
Subsequent cost-based valuation	1			
Revaluation method	1			
Recognition of impairment	1			
Impairment indices	1			
Recoverable amount and book value				0
Recognition and measurement of impairment for a cash-generating unit				0

Source: Author's processing after Albu et al., 2012

- *Subsequent valuation and impairment.* Regarding the recoverable amount, a notion which was not presented in the national regulations, it is the one through which the existence of the adjustment of the value impairment for the tangible assets within the IFRS for SMEs is determined. OMFP no. 1802/2014 specifies that the adjustment for impairment is determined at the end of the year at the time of the inventory. Also, a notion that is not presented in the national regulations is that of “cash-generating unit”, in relation to which the IFRS for SMEs displays a different treatment from that of tangible assets.

Finally, after analysing these differences, in order to calculate the level of convergence we used the formula of a weighted arithmetic mean, as follows:

$$\text{Convergence level for tangible assets} = (12 \cdot 1 + 2 \cdot 0.5 + 5 \cdot 0.25 + 0 \cdot 7) / 26 = \mathbf{0.5481}$$

Following the analysis carried out, an average level of compatibility regarding the treatment and accounting policies for tangible assets, provided by OMPF no. 1802/2014 and IFRS for SMEs was found.

5. Conclusions

Following the analysis carried out, it can be stated that at the level of the European Union, the adoption of the standard for SMEs is rejected because it is considered difficult to implement and because it generates additional costs. At international level, this standard is accepted, and from the reactions presented it is understood that it offers advantages in simplifying the financial activity of a SME and in leading to the development thereof by attracting investors with initiative.

The overall picture of IFRS for SMEs shows the appreciation thereof at the international level, but a rejection at the level of the European Union, being considered difficult to implement and generating additional costs that make administrative reporting difficult. If we have noticed what is happening worldwide, it is necessary to see also what is happening at the national level. In order to achieve this and to identify the level of convergence between the two accounting references, the main differences identified were analysed, in relation to which opinions were expressed with the purpose to amend them or not, so as to ensure a higher level of convergence, because the identified one is an average one. Among the differences identified between the accounting regulations provided in the OMPF no. 1802/2014 and IFRS for SMEs, we shall mention the following: the set of financial statements and the structure thereof, the failure to specify the fair value measurement of intangible assets resulting from a purchase as part of a group of enterprises or from a purchase by means of government subsidies, the failure to define the residual value and cash-generating unit, the absence of recoverable amount, the classification of real estate investments and biological assets in the category of tangible assets, the presence of the accelerated depreciation method, the absence of a requirement to compare the sale price with the fair value in case of leases, the absence of the valuation of financial instruments at fair value for the drawing up of individual statements (allowed only in consolidated financial statements), the recording of financial reductions as income for the period, capitalization of interest, allowing the use of the LIFO method, absence of performance conditions for recognition of subsidies and last but not least the absence of deferred taxes. The average level identified is the cause of the connection between accounting and taxation, which gives rise to obstacles that prevent the material convergence substantiation, especially since in Romania, in practice, fiscal rules often prevail over accounting ones, and in the case of SMEs accountants are mainly focused on providing fiscal information.

The opinions of professional accountants from Romania also participate in supporting this average level of convergence. The results of the analysis show diverse and divergent opinions from which we inferred the following conclusions: there is a good attitude towards Romanian regulations, the simplification of the financial reporting of SMEs is supported (something that IFRS for SMEs does not do in the case of small enterprises, as they have to draw up the complete set of financial statements, as compared to OMPF no. 1802/2014, which due to the classification of entities by size allows simplifications for them). Mostly, following the analysed reactions, one can see an average level of compatibility between the two standards, but the professionals consider the application of IFRS for SMEs in Romania to be useless.

Through the case study presented for tangible assets, we identified an average level of formal convergence between the two references. We calculated the result using the matching coefficient, which involved scoring according to the differences and similarities identified.

Considering firstly: the accounting differences in presentation, as well as those between the accounting principles and policies within the two standards which show an average level of compatibility between the two standards, secondly: the opinions of professional accountants who represent an important influence on the general opinion and which also express an average level of compatibility between the two standards and thirdly: the case study for tangible assets which comes to show that at the level thereof the compatibility is average between the two standards, an average global level of compatibility between the two standards is found.

Although theoretically this level of convergence is considered to be average and the application of the SME standard should be as easy as possible, one is aware at the same time that there are practically many important issues that prevent the implementation of IFRS for SMEs, of which tax laws and the practices of professional accountants (for example: minimum value for tangible assets, inventory items, accelerated method, etc.).

Even if IFRS for SMEs were applied in Romania, it would still not ensure a full application, respectively a material convergence, because it is considered that it is possible that entities may continue

to use tax rules to the detriment of the accounting ones. Regarding the application of IFRS for SMEs Gîrbină et al. (2012) states: "Since Romania is a member state of the European Union, IFRS for SMEs cannot be applied at national level, and the international harmonization of accounting can be achieved only by eliminating the differences between national and standard regulations." This sentence best describes the case where a high level of convergence would be achieved.

It is obvious that the application of IFRS for SMEs could be an option for the financial reporting of Romanian SMEs that do not draw up financial statements only for tax purposes and for domestic users.

This research brings certain contributions through the elements and ideas identified at the theoretical and practical level, respectively at conceptual level: identifying and debating the differences between the two accounting standards; at a practical level: the presentation of three methods for assessing the degree of convergence and the investigation and for highlighting the convergence level for the accounting regulations of tangible assets.

The limitations of this study are represented by the calculation method used for tangible assets, respectively the matching coefficient, which can be subjective and by the large dimensions of the two financial reporting standards that make the identification of differences difficult and slow.

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THE ROLE OF CORPORATE VALUES AND CORPORATE CULTURE IN THE UNTYPICAL TIMES OF THE COVID-19 PANDEMIC

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Abstract

The COVID-19 pandemic struck the world last year, having brought significant changes not only to our lifestyles, but also to values that have reshaped along with this atypical change. In 2020, corporations were, regardless of their profit, sustainability, number of employees and competitiveness, all exposed to uncertainty, which in turn resulted in the initiative to reassess the definition of their footing within companies, in their corporate values and corporate culture, as well as in society as a whole. The basis of this paper is the decision to maintain companies' strategic position on the market prior to the pandemic. The maintaining has been defined on a legislative and regulatory basis, by market positioning and corporate values, the latter being, just as human lives, stricken by the pandemic. This paper will examine the viability of establishing corporate culture as the instrument for optimization of all resources during lockdown, along with the implementation of the corresponding principles of corporate management, notably in the area of corporate culture. The purpose of the suggested correspondence is to initiate the creation of a company's strategy and to define significant corporate values upon implementing a new working model in companies that were forced to switch to remote working. Thus, corporate culture and corporate values, which are by that fact less noticeable, have a dominant impact on the type of response that companies apply to the pandemic and to the organization of business conduct during lockdown.

Keywords: company strategies, corporate culture, corporate values, crisis, principles of corporate management

JEL codes: M14

1. Introduction

The COVID-19 pandemic has undoubtedly changed the world we live in, our lifestyle, the way we work, our habits and priorities. Unsafety and uncertainty have awoken repressed fears and increased the stress levels in our modern-day circumstances, as challenging as they already are. Many corporations were forced to pay more attention to certain (human and business) values to lessen the negative impacts

of the pandemic on business. One of the greatest challenges is definitely lockdown, forcing many organisations to conduct business processes from the safety of people's homes. The main objective of this paper is to examine the adaptation of Croatian companies to working from home during the first lockdown caused by the Covid-19 pandemic. Auxiliary objectives, considering certain core values, were to analyse the effects of the Covid-crisis on Croatian companies' organisational culture and the benefits of Croatian companies' employees working from home. The aim of this paper is to illustrate the impact the Covid-19 pandemic has made on the change of two essential core values in Croatian companies – responsibility and togetherness.

2. Organisational management in a crisis: what happens when existing models are not suitable in practice?

The Covid-19 pandemic has had a strong impact on the business world. The existing business models are brought into question, and structural transformation, as well as the protection of people and their safety, is an imperative to be met in a very short period of time (Katavić et al, 2020). Unsafety and uncertainty have become the only anchor we witness. A research on the effects of the Covid-19 pandemic on small and medium enterprises has demonstrated how the existing gap between these organisations is growing bigger and bigger, and crisis is better managed by the companies adapted to digital transformation (according to Katavić et al., 2020,). Although every crisis is at the same time an opportunity for a new start, both in the organisational and in the broader social context, this is possible only with the strengthening of organisational culture, organisational resilience, as well as with more thorough strategic planning (Katavić et al., 2020). However, how to focus both on keeping jobs and maintaining the company's growth and development is what Lim et al. (2020) wonder, stating that it is crucial to analyse the strategic, physical, financial, human and organisational resources of a company. Adaptation to new circumstances is one of the most frequently mentioned phrases in the public discourse, but the response to the crisis differs depending on the cultural patterns of individual countries (Andrijauskienė and Dumčiuvienė, 2017), as well as the development of state and organisational resilience and implementation of good practice examples (An and Thang, 2020). Cox (2020) is inclined to agree with them, adding that the Covid-19 pandemic is in general an indicator of the West's vulnerability in such and similar global crises.

3. Organisational culture takes a Covid test

Working from home has become a trendy expression thanks to the development of IT, but it has also made a big impact on the change of working scenery. Most authors agree that this was the only possible solution to keep jobs, because it saves the employees' time. However, it should be stressed that every organisation, regardless of the line of business, needs to have a clearly defined strategy in line with their core values focusing on the realisation of goals. This is important to finally measure a company's growth and development. Even in the 4.0 computer age, every company which clearly defines the role and significance of corporate culture needs to define their own capabilities for the digital transformation to take shape and, in turn, transform the organisational structure, organisational system and organisational values. Organisational climate is an invisible force behind the people performing actions. In creating organisational values during and after the Covid-19 pandemic, in order to achieve the set goals, it is necessary to apply critical thinking, creativity, communication and collaboration.

3.1 Striking a balance between work and private life as the biggest challenge

The global lockdown has forced employers all over the world to move on to online communication, whilst email and digital platforms like Zoom, Teams and Skype have suddenly become the dominant communication channel. Working from home has certain advantages (a more comfortable atmosphere, smaller expenses for the employer, ensuring a balance between work and private life) and disadvantages (a lack of interpersonal communication, physical and mental health issues, digital fatigue), but Begović (2020) as the main downside mentions the necessity to regulate such work, which is still unrecognised in legislation and as such allows employers to make their employees available after hours.

At the same time, employees during a crisis expect the management to communicate with them, therefore the messages need to be diverse, consistent and consensual to guarantee understanding and adaptation to the given circumstances (Sanders et al., 2020). Earlier research has confirmed that the employee behaviour positively correlates to commitment, engagement and perception of physical and mental well-being (Hewett et al., 2018; Wang et al. 2020, based on Sanders et al. 2020). Simultaneously, socially responsible behaviour requires ongoing leaning on organisational values to achieve a better connection with the social community (Lee, 2020), which is possible only through a good communication strategy, relying on empathy and soft skills which put the employees as the most valuable stakeholders in a company into the limelight (Grmuša and Tomulić, 2017).

3.2 Human resources in an organisation – taking care of employees has never been more important

The pandemic has had an impact on the rise of mental health risk factors, such as fear, depression and anxiety, confirming a difference in how men and women respond to stress exposure. Women also proved to be much more susceptible to negative emotions, but also more conscientious in adhering to epidemiological measures (Buljan Flander et al., 2020; Matthewmann and Huppertz, 2020; Pillay and Barnes, 2020). Entrepreneurs need to be aware of the negative impacts of the pandemic, but always ready for action, since modern-day business is more than individual action; it is about building a relationship with the community, says Ertel (2021). The pyramid of human needs and motivations set by Abraham Maslow (2021) becomes crucial in the analysis of human resource motivation. Listening and hearing one's employees, discussing about personal and organisational values, has never been more important, with a single purpose: to strengthen the employees.

Corporate culture focuses on the person and personality, teamwork, building trust, respect, openness, and the necessary prerequisites for realization: delegation of responsibilities, decentralization of decision-making, autonomy in carrying out business activities, and encouraging innovation and creativity. The requirements of the corporate culture that need to be established as an instrument for achieving better use of all resources during the "lockdown", and which contribute to the preservation of the corporate culture during the "lockdown" are:

- defining a system of values and norms, i.e. the principles of socially responsible behavior that will develop a productive work climate at home;
- defining and creating a stimulating work environment at home in which individuals will be able to fully exploit their potentials and adapt them to private obligations;
- defining management methods aimed at achieving efficiency;
- defining the concept of adaptation in the context of specific working conditions, which implies that the organization meets the needs of the present, while preserving corporate values.

The pandemic has undoubtedly increased the stress trigger intensity and accompanying disorders (see 2020, 1). Some of the basic needs and related concerns refers to individual and family safety, occupational safety and health of the employees. Fears, depression, anxiety, anger and a lack of confidence among people have highlighted the need to care for our mental health (Matias et al., 2020). Besides, a potential exposure to virus at work increases the importance of taking care of human resources within a company's strategic plans.

Isolation, complementary loneliness and social distancing have become the leading challenges in daily life, with an impact on the change of existing models of interpersonal communication (De Vito, 2016; Reardon, 1998), both on the individual and on the organisational level.

4. Research methodology

In order to examine corporate values, responsibility and togetherness, and the adaptation of the organization and employees to work at home, while it is necessary to preserve corporate values defined before the Covid-19 pandemic, Croatian companies created and conducted research regardless of their size. The questionnaire in this empirical research served as the main instrument for collecting primary data, and was sent to the responsible persons and the company manager (President of the Management Board, General Manager or manager of the company in the basic meeting). The research covered

the whole of Croatia, by random selection. In addition to basic data on the company (area of operation of the company, number of employees, ownership structure, decision-making level, etc.), the survey questionnaire also contained these thematic units: basic corporate before the Covid-19 pandemic, adjustment of work at home, organizational value - responsibility, organizational value - community, employee welfare.

Organisational culture and organisational values are a complex multidimensional concept to be analysed in this paper through organisational values, responsibility and togetherness and their impact on the well-being of all the employees, as well as the organisation itself. The questionnaire was divided into four parts. The first was meant to categorise companies and therefore strived to gather data about their essential characteristics, such as the company size, business, ownership structure and core values.

The second part of the questions referred to the latent variable or responsibility in Covid-19 pandemic. In this part all the variables were presented in a random order to reduce bias.

All the latent variables of responsibility, as well as the variables of togetherness and benefit for all the employees and the company were measured on a Likert scale from 1 to 5, 1 being the lowest possible option expressing total disagreement, and 5 being the highest possible option expressing total agreement.

4.1 Objectives

The main objective of this paper was to examine the adaptation of Croatian companies to working from home during the first lockdown in the Covid-19 pandemic, and the auxiliary objectives were to explore the effects of the Covid-crisis on Croatian companies' organisational structure and to analyse the benefit of Croatian companies' employees working from home.

4.2 Hypotheses

The Covid-19 pandemic has reshaped the world in different ways. Presented as a global pandemic, the effect it will have on the future of corporate cultures, core values and organisational structures is extensively speculated, both for enterprises and their employees. Hence, the research hypotheses launching the process are logical.

Hypothesis H1: Most Croatian companies have adapted well to working from home during the first lockdown caused by the Covid-19 pandemic.

Hypothesis H2: Togetherness as a core value of corporate culture has not been damaged by the Covid-19 pandemic.

Hypothesis H3: Employees claim that working from home has contributed to better connection between team members compared to working in the office.

Hypothesis H4: Employees consider their benefit of working from home to have deteriorated due to a bigger workload and the constant obligation to be available to their superiors.

4.3 Method and sample

The empirical part of the research was conducted via an online questionnaire on a sample of 214 companies. The instrument was composed as a Likert scale similar to the educational sector research conducted by Bezjak et al. (2020) and three categories of questions (adaptation to working from home, organisational culture and employee benefit) the interviewees answered.

The data was gathered in December 2020 in businesses in the Republic of Croatia, members of the Croatian Employers Association (HUP), and processed using suitable statistical methods. Whether other, positive characteristics were developed during that short period of time, were remain subject to further research, but current trends in the development of the Covid-19 pandemic do not indicate this on a hypothetical level. The said characteristics can be said to 'paint' well the core values of Croatian companies during the Covid-19 pandemic.

Furthermore, the research results need to be considered in relation to the fact that the research was conducted in between two earthquakes which have caused severe damage to Croatian cities and enhanced the perception of danger, unsafety and potential danger to benefit.

4.4 Interpretation of the research results

As pointed out, one of the more important goals of this research was to determine the effects of the Covid-19 pandemic on the dimension and structure of organisational culture concepts, its core values, which have been jeopardised by a swift shift towards the digital. Furthermore, in order to enable a more precisely analysed, empirically valorised concept in the examination of core values and their success, a research was conducted in companies in the Republic of Croatia.

Table 1: Sample structure

Organisation's industry field	
Trade	19.16 %
Public sector	7.94 %
Personal and other services	20.09 %
Production	17.76 %
Financial services	0.47 %
Media	1.40 %
Pharmaceutics	0.93 %
Tourism, health (dental tourism)	0.93 %
International project management	0.47 %
Healthcare, social welfare	0.47 %
Communications	4.67 %
Event industry	0.47 %
Hospitality	2.80 %
Transport and communications	3.28 %
Information technology	10.76 %
Finances and accounting	1.87 %
Construction	0.47 %
Marketing and promotion	0.93 %
Creative industry	0.47 %
Insurance	1.87 %
Print	0.93 %
Energy	0.93 %
Non-hazardous waste management	0.93 %
Decision making level – management level	
Highest level (CEO, board member, COO)	50.94 %
Senior management level (executive manager, department, sector, unit manager, counsel)	17.29 %
Middle management level (service, project manager)	8.88 %
Middle to junior management level (department manager)	17.75 %
Junior level	5.14 %
Company ownership structure	
Company mostly or fully foreign-owned	70.09 %
Company mostly or fully state-owned	29.91 %
Company size	
Micro – up to 10 employees	40.26 %
Small – from 11 to 49 employees	20.02 %
Medium – from 50 to 249 employees	9.81 %
Large – over 250 employees	29.91 %

Source: Research data by authors

The answer to the question of individual dimensions and internal structure between responsibility and togetherness, and their impact on the benefit of all the employees during the pandemic is the conducted research. The answer to the question of individual dimensions of core values during the Covid-19 pandemic was t-tested. For overview of the values see Table 2 and Table 3.

In line with the presented operationalization, a questionnaire has been made to encompass the mentioned 32-unit scale and other organisational and individual interviewee characteristics, related to the adaptation of companies to working from home during the first lockdown.

The research was conducted in 217 companies in Croatia, and 3 answers were excluded from the questionnaire, i.e. answers from three companies were not considered because the questionnaire was not filled out correctly.

Table 2. Results of independent t-tests for differences in components from the working from home standpoint scale

Dependent variable	Group	M	SD	n	t	df	p	d
Component 1a – Switching to the digital environment was well prepared.	minimum conditions suitable	0.22	1.06	825	2.498	157.1	.014	.359
	full customization requirements	-0.13	0.88	117				
Component 2a – The employer provided all the employees with minimal home working conditions.	minimum conditions suitable	0.17	0.88	85	2.056	202.1	.041	.286
	full customization requirements	-0.11	1.07	117				
Component 3a – In work from home the employer enabled flexible working hours.	minimum conditions suitable	0.28	0.92	85	3.688	191.5	<.001	.507
	full customization requirements	-0.21	1.01	117				
Component 4a – The organisation provided additional training for employees' easier adaptation to the new circumstances.	minimum conditions suitable	-0.04	1.00	85	-.290	176.0	.772	.041
	full customization requirements	0.00	0.97	117				
Component 5a – During work from home the organisation paid special attention to IT security.	minimum conditions suitable	0.01	0.97	85	.280	189.6	.780	.030
	full customization requirements	-0.02	1.05	117				

Source: Research data by authors

Note: Groups of questions refer to the answers to the question Moving to the digital environment was well prepared. During work at home, the employer provided flexible working hours. Asked questions about the adjustment of work from home, the respondents gave grades from 1 to 5, with a grade of 1 being the lowest possible grade, and a grade of 5 being the highest possible grade.

The sample included companies from different businesses, technologies etc. to verify whether organisational culture is affected by different objective factors for which literature claims a hypothetical connection. The most represented businesses in the sample are: personal and other services – 20.9 %, trade – 19.16 %, production – 17.76 %, IT – 10.76 %, whilst other businesses were equally distributed.

In terms of the business decision making level, the most represented in the sample was the highest level (CEO, board member, COO) – 50.94 %, senior management level (executive manager, department, sector, unit manager, counsel) – 17.29 %, middle to junior management level (department manager) – 17.75 %. Mostly or fully foreign-owned were 70.9 % of the companies and 29.91 % were mostly or fully state-owned.

Among the 214 companies included in the research, 40.26 % were micro businesses (yearly revenue ≤ 2 mil. €), small companies (yearly revenue ≤ 10 mil. €) employing between 11 and 49 employees were 20.02 % and large companies (yearly revenue ≤ 50 mil. €) with over 250 employees were 29.91 %.

Before the pandemic Covid-19 as the core values of the company develop social responsibility (34 % of respondents), unity (29 % of respondents), reliability (12 % of respondents), security and protection (11 % of respondents), capacity (9 % of respondents) and (5 % of respondents) declared regularity in the execution of obligations.

Table 2 features the ways the Croatian companies adapted to the new, changeable, uncertain, complex and ambiguous work from home. The Covid-19 pandemic has made an impact on the change of the organisational climate and on the swift adaptation to working from home and the uncertainties of the future.

Table 3. The results of independent t-tests of the samples of differences between clusters of mostly foreign-owned companies and mostly state-owned companies

Dependent variable	Cluster	M	SD	n	t	df	p	d
Ownership structure	Cluster 1	2.46	1.06	64	2.250	129.9	.026	0.326
	Cluster 2	2.16	0.75	150				
The organisation conducted an internal research about the change of the organisational culture value during the pandemic.	Cluster 1	2.55	1.07	64	-3.528	158.3	<.001	0.496
	Cluster 2	3.06	0.98	150				
During work from home many virtual meetings were organised with the employees, maintaining a continuity of good internal communication.	Cluster 1	4.08	0.98	64	3.243	165.7	<.001	0.458
	Cluster 2	3.61	1.04	150				
My organisation unequivocally communicates responsibility as one of its core values.	Cluster 1	4.08	0.98	64	2.723	167.1	.007	0.384
	Cluster 2	3.69	1.06	150				
Responsibility as one of the core values was deemed number 1 in my company during the Covid-19 pandemic.	Cluster 1	2.78	1.28	64	3.128	134.5	.002	0.457
	Cluster 2	2.24	1.06	150				
Component togetherness 1a – Involvement of all employees contributed to creating an atmosphere of togetherness during work from home.	Cluster 1	0.55	0.55	62	8.032	216.9	<.001	1.028
	Cluster 2	-0.32	1.06	140				
Component togetherness 2a – The organisation continues to communicate plausibly on all the strategically important decisions.	Cluster 1	0.46	0.90	62	5.748	177.9	<.001	0.793
	Cluster 2	-0.27	0.96	140				
Component togetherness 3a – Togetherness is a value clearly communicated to business partners.	Cluster 1	0.28	0.88	62	3.441	190.9	.001	0.469
	Cluster 2	-0.17	1.03	140				
Component togetherness 4a – The organisation has conducted an internal research on employee satisfaction with work from home during the pandemic.	Cluster 1	-0.04	1.09	62	-0.434	152.1	.665	0.061
	Cluster 2	0.02	0.95	140				
Component togetherness 5a – Togetherness as a value has significantly increased during the pandemic.	Cluster 1	0.59	0.64	62	8.350	218.8	<.001	1.094
	Cluster 2	-0.34	1.02	140				
Component welfare of employees 1b During work from home the organisation continued to take care of the employees' social and psychological benefit.	Cluster 1	0.17	0.97	80	1.890	170.9	.060	0.265
	Cluster 2	-0.10	1.01	122				
Component welfare of employees 2b – Stress level during work from home was lower than at the office.	Cluster 1	0.17	0.92	80	1.947	181.4	.053	0.270
	Cluster 2	-0.10	1.03	122				
Component welfare of employees 2c - All throughout work from home the employees had the HR manager of the company's psychologist at their disposal.	Cluster 1	0.11	1.06	80	1.206	152.9	.230	0.172
	Cluster 2	-0.06	0.96	122				

Source: Research data by authors

Note: M – mean, SD – standard deviation, n – subgroup size, t – Welch's t-test value, df – degrees of freedom, p – statistical significance, d – Cohen's d effect size.

Aware of the fact that every new situation demands time, employers have therefore enabled flexible working hours ($t=3.668$), making it possible to work independently and to shape time around one's private and business demands. Furthermore, in a short period of time business doing had to be transferred to the digital environment ($t=2.498$), without additional training in new situations ($t= -0.290$), which points to a series of trials and errors, unmentored learning, but with a certain amount of IT safety ($t=0.280$).

As evident from Table 3, the first factor refers to organisational value – togetherness – consisting of units related to togetherness and clear communication about employee responsibility to the employees, as well as about company responsibility in their action, points to the fact that such companies embraced working from home and organised it much more easily, and inevitably and quickly turned to the future and development, market orientation thanks to digital platforms, their own creativity, and the dominance of economic criteria in decision making during a crisis. Ambitious and high goals, dynamism and changes, readiness to take risks, stability, predictability and systematic behaviour and action are visible from the following results: during work from home many virtual meetings with employees were organised, maintaining the continuity of good internal communication ($t=2.723$), responsibility as one of the core values was in my organisation a top priority before the Covid-19 pandemic ($t=3.128$).

Another togetherness-related factor, pointing to interpersonal relationships, the sort of relationships developing (trust, harmony, informality and friendship), stimulation of collaboration and team work, participation in decision-making, openness to new ideas and suggestions, professional expertise, was confirmed in the following values: engagement of all the employees contributed to creating an atmosphere of togetherness during work from home ($t=8.032$), the organisation continued to communicate trustworthily on all the strategically important decisions ($t=5.748$), togetherness as a value significantly increased during the pandemic ($t=8.350$).

The last cluster refers to the employee benefit which is positive by all the units, but with exceptionally low t-values. The values: the organisation during work from home continued to take care of the employees' social and psychological benefit ($t=1.890$); the stress level of working from home was lower than at the office ($t=1.947$) and the employees had at their disposal the HR manager or the company psychologist throughout the working from home ($t=1.206$); all lead to conclude that all the employees' daily life was shaken, and that the social contact and the feeling of safety, a 'return to the normal' was jeopardised by the pessimistic information on the spreading of the virus, the number of sick and dead people, the pending vaccination and a whole series of negative news, with extremely few positive information which would enhance and positively impact the feeling of benefit.

The research found that most Croatian companies develop responsibility and togetherness as fundamental determinants of corporate values even before the Covid-19 pandemic, and that most respondents adapted to work at home in a very short period of time (Hypothesis H1 is confirmed). The analysis of the obtained results showed that the corporate value, community was not disturbed under the influence of the pandemic, but the engagement of all employees contributed to the creation of an atmosphere of community (Hypothesis H2 is confirmed). Hypothesis H3 Employees point out that working at home has contributed to greater connectivity among team members compared to working in the office has been proven through particles The engagement of all employees has contributed to creating an atmosphere of togetherness at home ($t = 8.032$) communicates with business partners ($t = 3.441$) and the hypothesis is proven. Hypothesis H4 Employees rate their own well-being at work worse due to the large amount of work and the need for constant availability to superiors. However, their own well-being is rated lower because of the amount of stress they are exposed to. According to the obtained research results, it can be concluded that the level of stress is higher during the "lockdown".

5. Conclusion

The key implications of this paper is that organisations need to make a positive impact on respecting core values and the established organisational system, as well as on all the employees. The set core values should not be jeopardised by the Covid-19 pandemic, but rather should integrate the aspects of information and communication and core value system crisis management. With the aim of surviving the Covid-19 pandemic, the organisations are obliged to create a positive organisational climate, promoting health, strengthening the employees' identity, develop and direct team culture.

The results of the conducted research should inspire organisations in the Republic of Croatia and beyond to see themselves as a vital part in the fight against the current pandemic and to invest extra effort in the promotion of core values, development of responsibility and togetherness, which should strengthen the affective outcomes of the Covid-19 pandemic.

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DOES CORONAVIRUS CHANGE BUYERS' PREFERENCES AND INDUCE CONSUMER ETHNOCENTRISM – THE NEED FOR STRATEGIC REORIENTATION?

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Abstract

The coronavirus pandemic (COVID-19) has affected global supply chains and usual flow of goods and services. Also, buyers' behavior seems to be affected as well, what implies the need for strategic reorientation of both domestic and multinational companies. This paper explores whether the buyers' preferences in Croatia have changed and how coronavirus did affected their attitudes towards foreign products and did it induce consumer ethnocentrism. Also the buyers' awareness of the benefits for the local economy when buying domestic products is analyzed. We have conducted online survey among Croatian buyers and done frequency analysis and Pearson's Chi-square test. Finally, we have analyzed data on type of shopping structure considering given group of products. Our results show that buyers are aware of benefits of buying domestic products and awareness rises with the level of education. However, no signs of consumer ethnocentrism development due to coronavirus can be observed. Considering change of habits, results of our analyses show that there are no general changes in habits. Still, regarding demographic characteristics women tend to change their buying habits due to coronavirus. Finally, data on structure of retail turnover in stores by type imply that buyers' prefer more online shopping, especially regarding clothing and footwear sector. The obtained results can be used by firm's decision makers to better adapt their business model to the needs of their consumers.

Keywords: coronavirus, buyers' preferences, consumer ethnocentrism, online shopping, strategy

JEL codes: L1, M30, F23

1. Introduction

Consumer attitude can be defined as the feeling of benignity or undesirability that an individual has towards an object (Gutić and Sandrić, 2010). Ajzen (2005) defines attitude as “a mental and neural state of readiness organized through experience, exerting a directive or dynamic influence upon the

individual's response to all objects and situations with which it is related." Consumer attitudes consist of three elements: cognitive information, affective information, and information related to the consumer's past behavior and future intentions. In other words, an attitude consists of thoughts or beliefs, feelings and behaviors, or intentions toward a particular thing. Attitudes and preferences of buyers are influenced by certain factors, such as social influence, risk inclusion, materialistic attitude, value for money, brand awareness and many others (Anić, 2010). These factors can be divided on internal and external factors. The first refers to the physical properties of the product such as durability, quality and performance, while the second refers to non-physical characteristics such as price and the "Made in" label (Ayob and Wan Hussain, 2016), that was proven to make consumer ethnocentrism even stronger (Bernard et al., 2020).

Both factors affect the purchase of foreign and domestic products. In our research we include coronavirus as an additional factor that affects buyers' preferences, their ethnocentrism and type of shopping.

Therefore, on the basis of the qualitative primary research conducted on Croatian buyers via online survey the aim of this paper is to analyze the effect of the coronavirus pandemic on buyers' preferences, to detect potential development of consumer ethnocentrism and to identify whether demographic characteristics play a role in abovementioned possible changes. Besides, based on structure of retail turnover data we will also try to perceive the possible change in type of shopping. In this context we raise two main questions:

1. How has the coronavirus pandemic affected buyers' preferences and preferred type of shopping?
2. What is the attitude of consumers towards foreign products and do consumers know the importance of buying a domestic product for the local economy?

The rest of the paper is organized as follow. After introduction, literature review on consumer ethnocentrism and on economic consequences of corona virus is presented. Third section explains methodology of the research. Fourth section presents and discusses results of the research, while the last section summarizes the main findings of the paper.

2. Literature review

Buying domestic products positively affects local industry and employment boosting economic activity and ultimately increasing national gross domestic product (Shuman, 2000). Besides, buying local helps the local economy, helps build thriving communities, is better for the environment, is form of ethical consumerism, encourages innovation and means better quality (Hyatt, 2016). Also, it has a positive impact on the domestic economy due to multiplier effect. Studies show that the multiplier effect of a locally owned enterprise is two or three times greater than that of a non-local one. Shifting just 20 percent of Detroit's food consumption would result in an increase in revenue of nearly half a billion dollars, including more than 4,700 new jobs and an additional \$ 20 million in taxes on the city's business annually (Shuman, 2000). On the other hand buying foreign products could damage local economy by creating unemployment (Shimp and Sharma, 1987), creating trade deficit, job losses and eroding domestic expertise (Monacelli and Perotti, 2010).

There are a solid number of papers that research on the buyers' preferences and consumer ethnocentrism. According to Li (2008) there are two main streams of research on consumer attitudes towards foreign products. The first refers to the influence of the country of origin on consumer attitudes, and the second direction refers to the basic factors of attitudes towards foreign products, such as the influence of hostile attitudes towards a particular country. Empirical data show that negative attitudes towards the origin of the country can arise from a number of sources, such as the belief that certain products are of poorer quality and due to a hostile feeling. At the same time, consumers may have a strong sense of patriotism and therefore feel that it is wrong, almost immoral to buy a foreign product. Our assumption is that coronavirus might have, due to political and economic circumstances, induced the sense of patriotism and therefore consumer ethnocentrism.

Regarding Croatia, we point out the research of Anić (2010), who collected primary data using consumer survey via telephone in March 2009. According to the results of the survey Croatian buyers preferences towards domestic retailers versus foreign retailers do not differ significantly. Wanninayak and Chovancová (2012) using 108 completed questionnaires conducted a study between consumer

ethnocentrism and attitudes towards foreign beer brands in the Czech Republic. The research was conducted in the Zlin region of the Czech Republic. The results of the research indicate negative preferences towards foreign beer brands. Moreover, Czech buyers residing in the region of Zlin are motivated to buy a local brand of beer because of negative impacts of foreign products to the local economy and employment. Karoui and Kemakhemb (2019) conducted research on a sample of 152 individuals in Tunisia and have shown that the relationship between consumer ethnocentrism and the consumer's willingness to purchase domestic products is less evident in developing than in developed countries. Moreover, consumers in developed countries prioritize more local products over foreign manufactured ones. Jin et al. (2015) have incorporated in their model country development status and have found on the sample of 2655 younger generation consumers that product country image differs between the perceptions of the home country and those of a foreign country. Moreover, they have shown that there is difference between product country image in developed and developing countries, what can be related to consumer ethnocentrism and cosmopolitanism. Ayob and Wan Hussain (2016), based on data collected on 296 university students in Malaysia, have found that consumers' buying decisions are still largely influenced by evaluations based on country of origin. Namely, foreign products from developed countries are perceived as superior in quality and as a brand image. On the other hand, local products are perceived as being less expensive. Additionally, Akbarov (2021) pointed out that consumer ethnocentrism differs across product categories and that demographic feature such as gender, marital status and personal income moderate this effect. Similarly, Prince et al. (2020) have shown that gender, but also individuals' personal values and moral foundations have effect on the formation of consumer ethnocentrism. Taking into account the relationship between crisis and ethnocentrism De Nisco et al. (2016) have investigated effect of economic animosity on consumer ethnocentrism in relation to perception of Germany during the Euro crisis. Their results showed that economic animosity does not affect the perceived level of general country image and product beliefs.

Aljukhadar et al. (2021) have introduced the class level in consideration and have shown that there is difference regarding consumer ethnocentrism. Namely, lower-class consumers are less affected by ethnocentrism, but generally show less shopping intentions toward foreign retailers. Finally, Casado-Aranda (2020) have revealed that highly ethnocentric consumers experience a greater degree of activation in brain regions linked to self-reference and reward when considering to purchase domestic products and a greater activation in brain regions related to risk in the case of foreign products. This result implies that buying domestic products acts positively on the individual, while buying foreign products makes individual unpleasant due to risk exposure.

The COVID-19 pandemic has abruptly halted the global economy, causing shocks in supply and demand. Beginning in January 2020, country after country suffered a new virus outbreak, each facing epidemiological shocks that resulted in economic and financial shocks. How quickly and to what extent will national economies recover after the end of the pandemic will depend on success in controlling the coronavirus and on exit strategies, as well as on the effectiveness of policies designed to address the negative economic effects of the coronavirus. The impact of coronavirus on the global economy expands beyond 2020. According to the forecasts of the International Monetary Fund (2020) GDP per capita at the end of 2021 in most countries is expected to remain lower than in December 2019. Emerging markets and other developing countries, in addition to facing difficulties in coping with their own coronavirus epidemics, have suffered additional shocks from abroad. It can be predicted that the global economy after the coronavirus will be characterized by higher levels of public and private debt, accelerating the digitization process and less globalization. Over the long term, the deep recessions caused by the pandemic are expected to leave permanent scars on lower investment, erosion of human capital and fragmentation of the global trade and supply chains. In such circumstances companies need to adapt their business model to the given circumstances and the needs of their consumers. Namely, the impact of the coronavirus pandemic on buyers' behavior is unquestionable, and panics shopping, stockpiling and online shopping have become the norm in 2020, as people around the world have learned to live in "new normal". As buyers' behavior and preferences change as the pandemic evolve, companies from a leadership and business perspective explore the ways how to approach their customers in the "new normal" and how to adapt their business models.

Many governments have taken strict public health measures to limit the spread of the COVID-19 pandemic. These public health measures have caused serious economic disruptions that affect companies' decisions. Governments have also taken significant economic policy measures to prevent or

mitigate the economic consequences of the pandemic crisis. The impact on trade flows and economy will depend on the success of these responses in public health and economic policy and will definitely affect companies' performance. In such a circumstance it is important to adapt in order to minimize negative consequences on both domestic and foreign companies. Besides, foreign companies could play an important role in providing support to economies during the economic recovery after a pandemic. Namely, evidence from last financial crises has shown that foreign-owned subsidiaries, including SMEs, can show greater resilience during crises thanks to their relations and access to the financial resources of their parent companies (Alfaro and Chen, 2011). Multinational companies are generally larger, more productive, and are mostly oriented towards research and development (R&D). Therefore it is interest of the state to control potential consumer ethnocentrism in a country.

3. Sample description and Methodology

3.1 Sample description

The aim of the research was to study buyers' preferences towards group of products regarding their country of origin, to detect possible reasons of domestic products preferences, to identify the level of consumer ethnocentrism and to see whether buyers are aware of buying domestic products impact on local economy. Besides, we have scrutinized buyers' characteristics such as gender, age and education level regarding abovementioned preferences. Therefore, we have conducted online survey among Croatian buyers and done frequency analysis and Pearson's Chi-square test of the independence of selected responses.

Table 1 presents details of sample characteristics. As it can be seen from Table 1 a little more female respondents have participated in a survey. Most of the respondents have at least secondary education (58.8%), while neither has only basic education. Regarding age, most of the respondents were young people (18-24). There were only 1.8% 60+ respondents and 6.6% respondents aged 45-59. We can observe that due to age distribution our sample is not the most representative and therefore our results should be taken with caution. The most of the respondents were young people, students with monthly income less than 4400 HRK (HRK - Croatian kuna, approximately 584 EUR). The majority of respondents are from Splitsko-dalmatinska county (58.8%), town of Zagreb (14.5) and Dubrovačko-neretvanska county (13.6). The rest of respondents are from other parts of Croatia.

Table 1: Sample characteristics

Demographic features	Count	Percent
<i>Gender</i>		
Female	131	57.5
Male	97	42.5
<i>Age</i>		
18-24	95	41.7
25-35	89	39
36-45	25	11
46-59	15	6.6
60+	4	1.8
<i>Education</i>		
Basic	0	0
Secondary	134	58.8
Tertiary	94	41.2

Source: author's calculations

3.2 Research methodology

Regarding online survey among Croatian buyers we have applied random sampling technique. The survey was conducted among Croatian buyers using the online survey, with 228 respondents participating in the study. The survey was conducted in September 2020 and participation in the survey was voluntary and anonymous. The survey consisted of 21 questions, six of which related to the

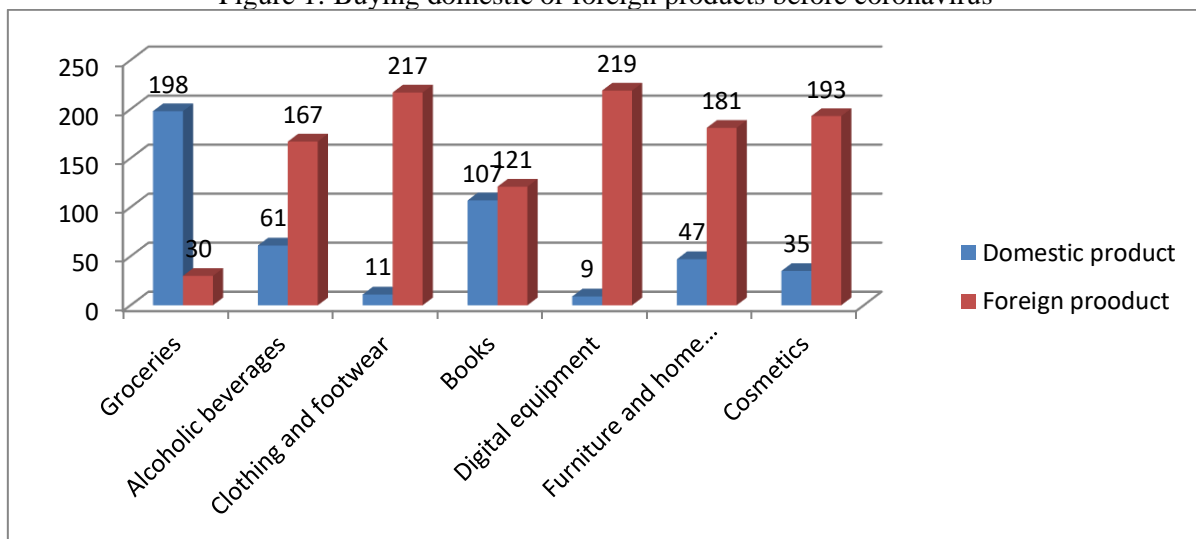
characteristics of the respondents and 15 related to the subject of this research. In several questions the Likert scale was used in order to examine the attitudes of respondents.

For evaluation of our categorical data we have used Pearson's Chi-square to analyze if there is a significant relationship between certain demographic features of the sample (gender, age and level of education) and the change in buyers' habits due to the coronavirus pandemic. The null hypothesis for this test is that there is no relationship between these demographic features and change in buyers' habits as well as preference towards domestic products. The alternative hypothesis is that there is a relationship between these variables. Besides respondents perception of subject matter was presented in figures and discussed. Finally, we have analyzed data on type of shopping structure considering given group of products.

4. Results

Our respondents were firstly asked to indicate whether they were buying more domestic or foreign products for several product groups before coronavirus pandemic. According to the survey results presented in Figure 1, we cannot observe any signs of consumer ethnocentrism. The only domestic product that is significantly preferable are groceries as the most of the respondents (196) have indicated that they were buying more groceries from domestic production. On the other hand foreign products are more represented in other groups of products: alcoholic beverages, clothing and footwear, digital equipment, furniture and home equipment and cosmetics. The preference towards books is relatively equally presented with only 12 respondents preferring foreign authors in contrast to domestic ones.

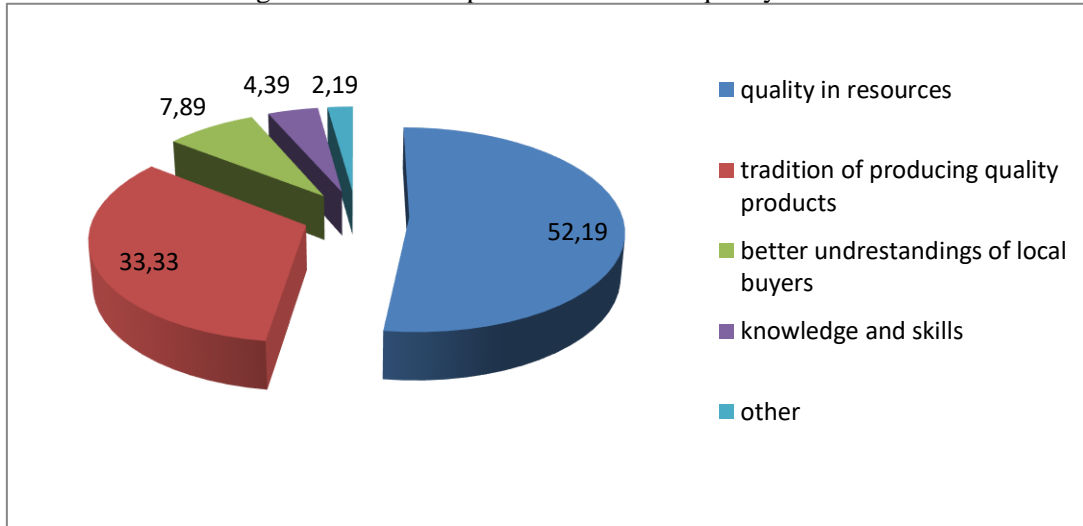
Figure 1: Buying domestic or foreign products before coronavirus



Source: survey results

Moreover, respondents were asked to denote whether they find that domestic products have higher degree of quality in comparison to foreign products. The majority of respondents (62.9%) consider that domestic products are of better quality than foreign, 9.8% considers vice versa, while 27.2% could not give an estimation. Regarding these results we can find indications of ethnocentrism among Croatian buyers. Respondents that consider domestic products of better quality were additionally asked to identify reasons of better quality of domestic products. As Figure 2 shows the mostly noted attitude was "quality in resources" (52.19%) and "a tradition of producing quality products" (33.33%). Less of 10% of respondents think that reason is "better understanding of domestic consumers" (7.89%) and that "knowledge and skills are of better quality than foreign ones" (4.38). Besides proposed answers respondents have stated their own reasons: domestic products are distributed faster and the production is still relatively small and therefore domestic products are of better quality.

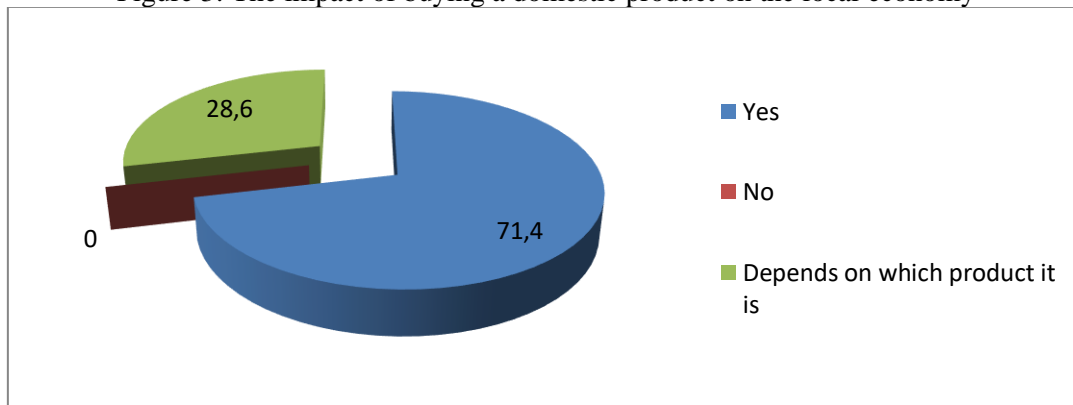
Figure 2: Domestic product is of better quality due to?



Source: survey results

Additionally, the respondents were asked to indicate the importance of buying domestic products for local economy. As Figure 3 shows 71.1% of respondents finds that it is good to buy a domestic product, while 28.5% of respondents find that it depends on the product itself. Neither respondent finds that it is negative.

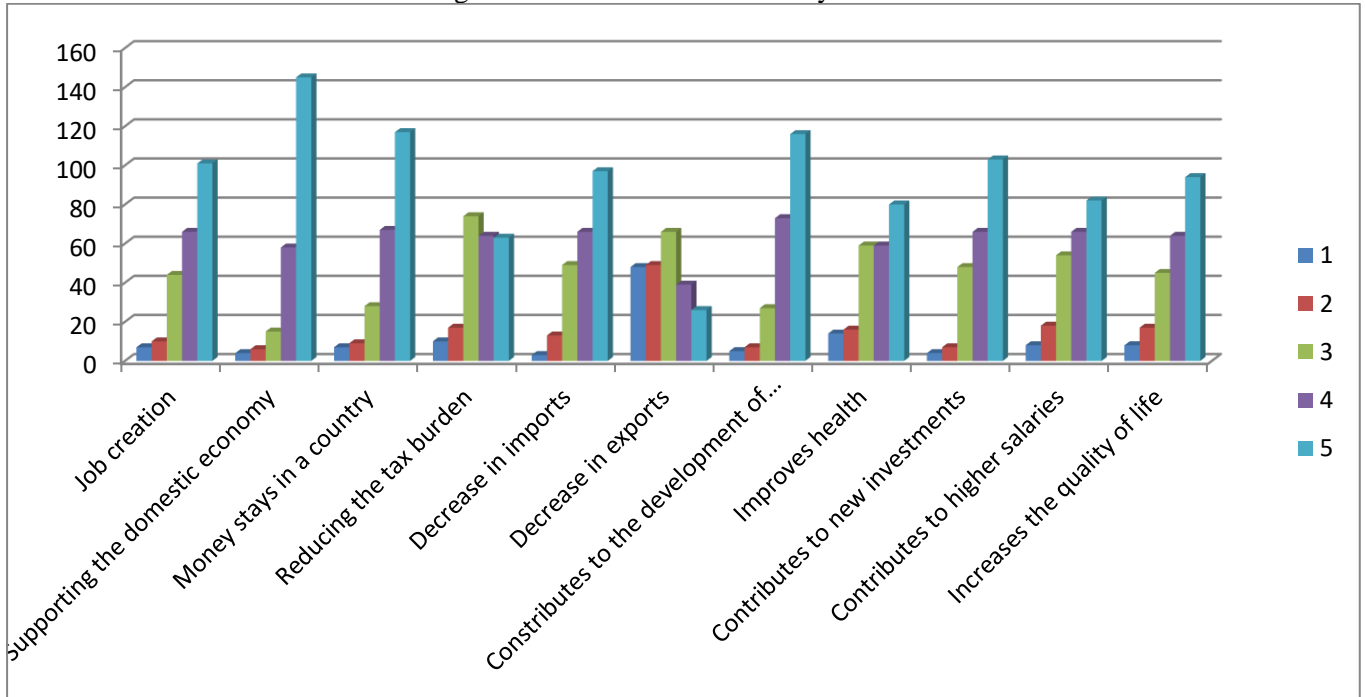
Figure 3: The impact of buying a domestic product on the local economy



Source: survey results

Figure 4 presents the results of the Likert scale (1: strongly disagree; 2: mostly disagree; 3: neither agree nor disagree; 4: mostly agree; 5: strongly agree) where respondents were asked to note how much they agree with the statement regarding the effect of buying domestic products on particular aspect of the local economy. According to the results, most of the respondents find that buying domestic products positively affects local economy, especially supporting the domestic economy and contributing to the development of the domestic economy and new investments. The respondents only neither agree nor disagree on the effect on tax burden. It is important to mention that Croatian economy is small open economy that depends on trade relations to other countries and regarding significant group of domestic products Croatia have high import dependency rate. Namely, the rate of import dependence of investments as well as of exports is approximately 40% (Mikulić, 2018). This implies that an increase in investments and imports would also contribute to increase in imports. However, the perception of respondents is contrariwise. Still, due to the fact that survey sample presents general population and that given observation is more an expert knowledge this result can be considered as expected.

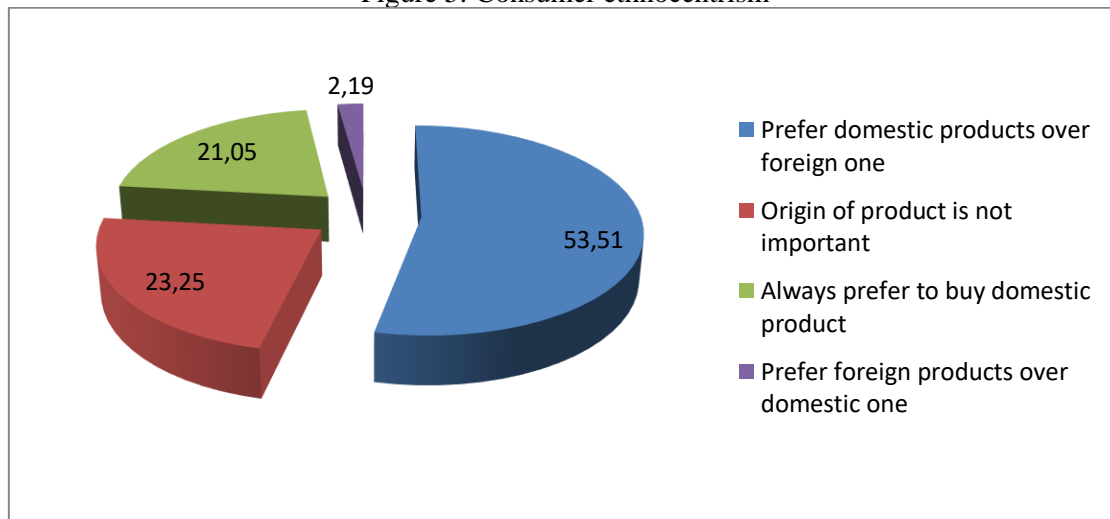
Figure 4: Effect on local economy



Source: survey results

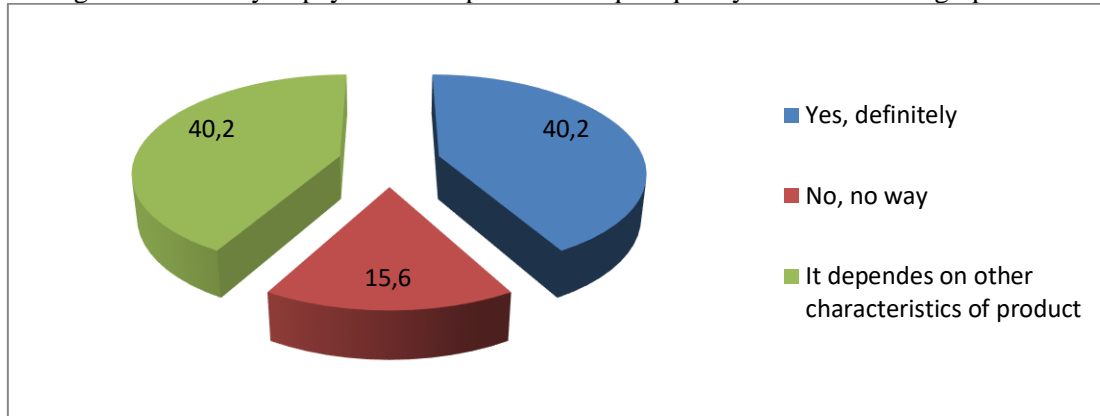
Figures 5, 6 and 7 reveal the level of consumer ethnocentrism and buyers' preferences. Figure 5 shows that most of the respondents prefer domestic products (53.51%) or always prefer to buy domestic products (21.05%), while only 23.25% indicated that the country of origin is not important. Moreover Figure 6 reveals that 40.2% of the respondents are ready to pay more for domestic product of equal quality as foreign product.

Figure 5: Consumer ethnocentrism



Source: survey results

Figure 6: Would you pay domestic product of equal quality more than foreign product?

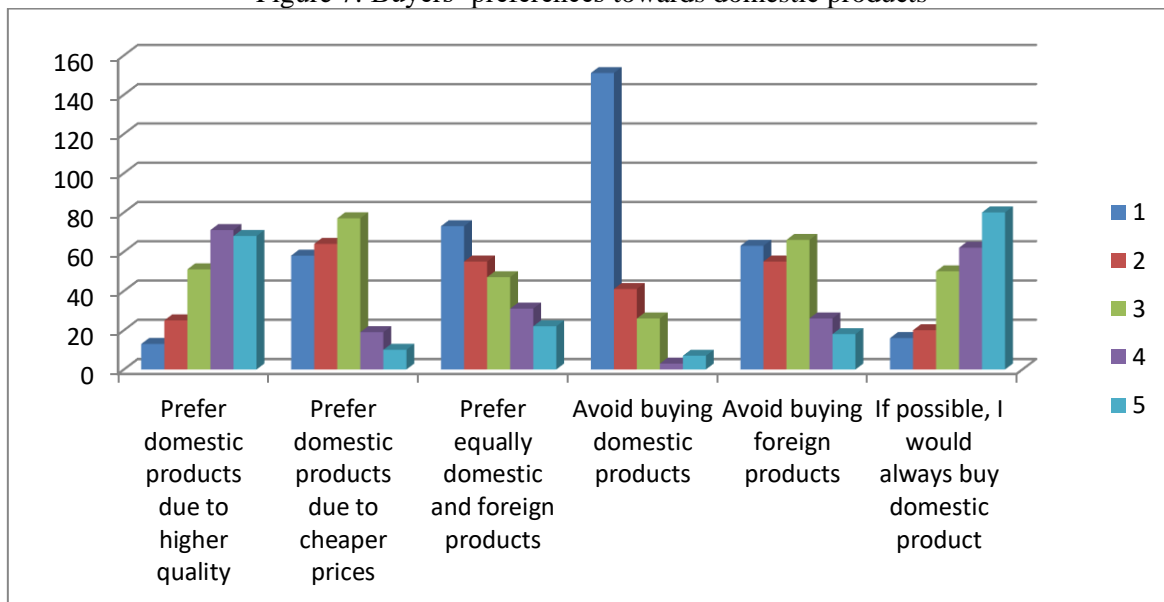


Source: survey results

Figure 7 presents the results of the Likert scale where the level of agreement with the statement regarding buyers' preferences in relation to origin of a country was estimated. The Figure shows that respondents strongly disagree with the statement "I avoid buying domestic products" and neither agree nor disagree, strongly disagree and mostly disagree with the statement "I avoid buying foreign products". Also, the result show that buyers would always prefer domestic product if it is of equal quality as foreign. We also find that preference is mostly related to perceived greater quality of domestic products.

In the next question, the respondents were asked to indicate domestic and foreign products. Respondents have shown that they are mostly familiar with the listed domestic and foreign products. Still three out of nine products of Croatian origin were mostly marked as foreign: cheese Ovidur, cosmetics Skintegra and mobile phone Noah. This result questions the awareness of buyers regarding the knowledge of domestic products. Besides, given results might be of interest to producers of abovementioned products.

Figure 7: Buyers' preferences towards domestic products

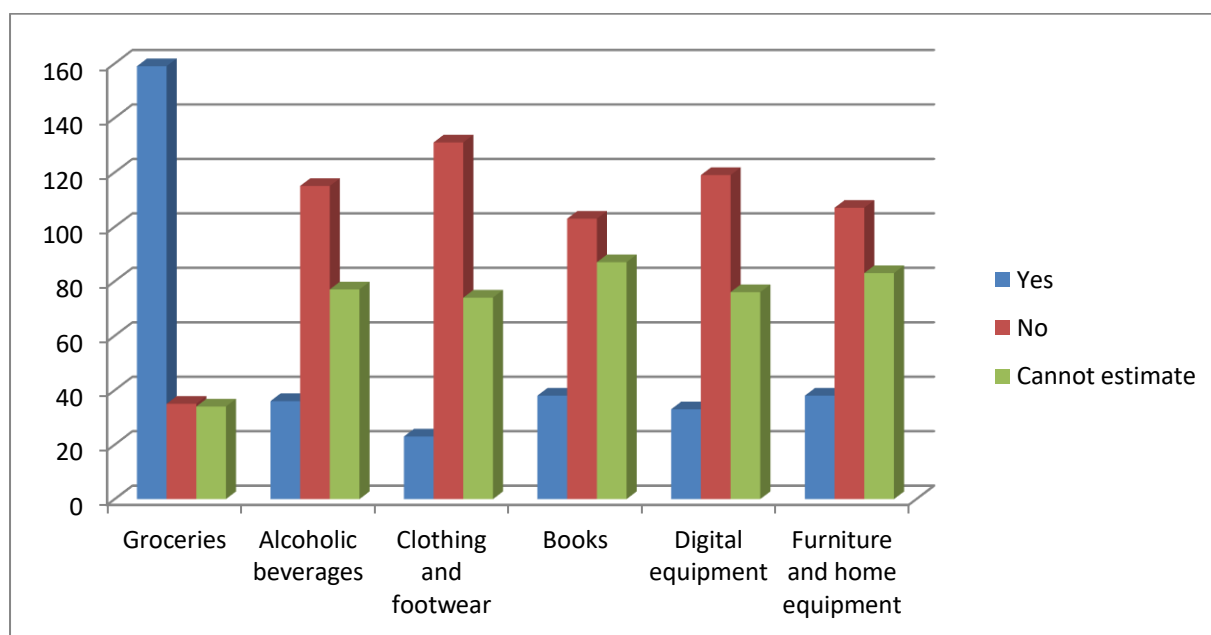


Source: survey results

Figure 8 reveals respondents opinion on the effect of coronavirus on the buyers' preferences regarding the affinity to buy domestic products. According to the results the coronavirus only had positive effect on consumption of groceries that are of Croatian origin. This result shows that

coronavirus, besides groceries, which were already denoted as preferable, generally did not induce consumer ethnocentrism.

Figure 8: The impact of the coronavirus pandemic on selected groups of Croatian products



Source: survey results

Respondents were also asked to estimate how did the coronavirus changed their habits, more precisely, did they pay more attention to the price of the product. Interestingly, the majority of respondents (61.4%), believe that their habits have not changed, while 35.1% of respondents think that they pay more attention to prices than before. Similarly, respondents have examined their attention to the country of the product origin. The majority of 170 respondents (74.6%) examined that their habit of paying attention to the origin of the product remained the same during the coronavirus pandemic. Only 22.8% of respondents think that they pay more attention to the country of origin of the product than before and only 2.2% of respondents think that they pay less attention to the country of origin of the product than before. This also confirms that coronavirus did not induce consumer ethnocentrism. Regarding general change of buyers' habits during a coronavirus pandemic according to the results of the survey, 44.3% (101) of respondents believe that their habit has not changed, 31.6% (72) of respondents believe that consumer habits have changed and 24.1% (55) of respondents are not sure whether they have changed or remained the same.

Additionally we have tested whether there is a statistically significant relationship between respondents' demographic features (gender, age and education level) and the change in buyer's habits due to the coronavirus pandemic. Table 2 shows the results of Pearson Chi-square test.

Table 2: Change in buyers preferences in relation to characteristics of buyers

Demographic features	Chi-square value	df	Contingency Coefficient	Sig
<i>Gender</i>	6.834	2	0.171	(0.033)*
<i>Age</i>	13.346	8	-	(0.100)
<i>Education level</i>	0.981	2	-	(0.612)

*p < 0.05

Source: author's calculations

According to the results of Pearson Chi-square test there is no relationship between age or education and change in buyers' habits due to the coronavirus pandemic and therefore the contingency coefficients for these variables are negligible. However, there is statistically significant relationship

between gender and change in buyers' habits due to the coronavirus pandemic, but with a weak contingency coefficient. The detailed frequency of respondents about a change in buying habits due to coronavirus is given in Table 3.

Table 3: Change in buying habits due to coronavirus by gender

	Change in buying habits due to coronavirus						Total
	Yes		No		Not sure		
<i>Gender</i>	Count	%	Count	%	Count	%	
<i>Men</i>	24	24.74	42	43.30	31	31.96	97
<i>Women</i>	48	36.64	59	45.04	24	18.32	131

Source: author's calculations

Table 4 presents the results of analysis of relations between the attitude towards buying domestic products and characteristics of buyers. According to the results of Pearson Chi-square test it can be assumed that the level of education is related to the attitude towards domestic products. This relationship is statistically significant ($\text{sig}=0.043<0.05$), with a weak contingency coefficient. There is no statistically significant relationship between gender or age and the attitude toward domestic products.

Table 4: Attitude toward domestic products in relation to characteristics of buyers

Demographic features	Chi-square value	df	Contingency Coefficient	Sig
<i>Gender</i>	1.552	2	-	(0.460)
<i>Age</i>	6.508	8	-	(0.590)
<i>Education</i>	6.280	2	0.164	(0.043)*

* $p < 0.05$

Source: author's calculations

The more detailed analysis regarding the level of education is presented in Table 5. It can be seen that the amount of respondents that doesn't prefer domestic product is negligible (1). Table also shows that 79.79% of respondents with tertiary education prefer buying domestic product in relation to 64.92% of respondents with secondary education.

Table 5: Preference towards domestic products by buyers' education level

	Doesn't prefer buying domestic products		Prefers buying domestic products		Depends		Total
	Count	%	Count	%	Count	%	
<i>Secondary education</i>	1	0.75	87	64.92	46	34.32	134
<i>Tertiary education</i>	0	0	75	79.79	19	20.21	94

Source: author's calculations

Finally, regarding the structure of retail turnover in stores by type, some expected and some unexpected changes can be observed. The first group includes a large increase in turnover in Internet and mail trade (26% in November 2020) and in pharmacies (3.6%) and computer equipment, books and similar items (6.1%). Decline in the turnover of motor fuels and lubricants (14%) is not surprising as well, because people drove less and fuel was cheaper than in 2019. Also, sales in non-specialized grocery stores grew (3.7%). On the other hand, surprisingly large drop of 21% of clothing, footwear and leather goods in shops can be observed what might be explained by increase in online and mail order stores. Finally, turnover in audio and video equipment, furniture, electrical and other household products has increased by 3.5% (Šonje, 2021).

5. Discussion

The above results show that coronavirus did not induce consumer ethnocentrism, but it has affected buyers' preferences and preferred type of shopping. Still due to low level of sample representativeness our results should be taken carefully in making general conclusions. Namely, there

was a lack of elder respondents (1.8% 60+ and 6.6% aged 45-59) and most of respondents (41.51%) were young people (18-24) whose monthly income is not high.

The survey results showed that Croatian customers always prefer or prefer (74.56%) buying domestic products over foreign one. This result is to some extent in line with the definition of consumer ethnocentrism by Li (2008) who, among others, defines consumer ethnocentrism as a strong sense of patriotism and feel that it is wrong to buy a foreign product. Still, Croatian customers, except groceries, are buying more foreign products than domestic ones before as well as after coronavirus started. So we cannot suggest that Croatian customers are ethnocentric. This is in line with previous research of Anić (2010) who proved that Croatian buyers' preferences towards domestic retailers versus foreign retailers do not differ significantly.

Moreover, Croatian customers are aware of pros when buying domestic products regarding positive effects on local economy, especially supporting the domestic economy and contributing to the development of the domestic economy, what is in line with Shuman (2000) and in some sense Monacelli and Perotti (2010). Moreover, the results of Pearson Chi-square test showed that the level of education is related to the attitude towards domestic products. Similar results were given by Akbarov (2021) who proved that personal income affects consumer ethnocentrism level. Possible explanation could be that buyers with higher level of education have broader knowledge and insights about the impact of domestic products on national economy due to higher level of education. Regarding other demographic characteristics the results of Pearson Chi-square test have shown that there is statistically significant relationship between gender and change in buyers' habits due to the coronavirus pandemic. Potential explanation is that women are generally more responsible and behave more precautionary regarding family budget. Considering consumer ethnocentrism gender was also proved in previous research of Akbarov (2021) and Prince et al. (2020).

Analyzed data, regarding the structure of retail turnover in stores by type, show large increase in turnover in Internet and mail trade (26%) and in pharmacies (3.6%) and computer equipment, books and similar items (6.1%) as well as large drop of 21% of clothing, footwear and leather goods in shops. These results imply a warning to companies in clothing and footwear sector that it is of the utmost importance to reorient their business strategies towards more online shopping. This also applies to computer equipment, books and similar items sector.

Several implications emerge from our research. Firstly, online shopping provides retailers' opportunities to attract more customers and increase companies' revenues. Secondly, as Croatian buyers have consumer ethnocentrism sentiment, this can be considered as an opportunity for domestic economy in overcoming crisis period. Thirdly, as one third of respondents are also prone to pay more for domestic product of even level of quality as foreign one, local managers should target their strategies towards quality perception of buyers and should improve communication strategy of national pride as a marketing tool. Finally, the results imply that foreign companies do not have to be worried of buyers' preferences regarding the country of origin.

6. Conclusion

The coronavirus pandemic has affected buyers' preferences and behavior that induced the need for strategic reorientation of companies regarding the type of shopping and possible development of consumer ethnocentrism. Our research suggests that buyers prefer more online shopping than they used to prefer before corona crisis. This is especially noticeable in clothing, footwear and leather goods and to some extent to audio and video equipment, furniture, electrical and other household products. Our results have also shown that regarding gender women perceive that their buying habits have changed what might also be related to the type of shopping. Thus, online shopping provides retailers' opportunities to make better decisions and attract more customers and increase companies' revenues.

Even though economic crisis might be regarded as a trigger for development of consumer ethnocentrism, our research suggests no such signs. The given result can be even more accentuated as Croatian people, according to survey results, declare themselves as ethnocentric consumers. Namely, they prefer to buy domestic product over foreign one and believe that the domestic products are of better quality than the foreign ones. Still, the only sector where consumers prefer more to buy domestic products after corona crisis is the groceries sector, where consumer ethnocentrism was already present. The affinity to buy domestic products in other sectors cannot be observed. This result shows that

coronavirus did not induce consumer ethnocentrism. Still, due to high level of young respondents in our sample, the results should be taken with caution. Additionally, there is statistically significant difference between men and women in impact of coronavirus on buying habits, implying that women are generally more responsible regarding family budget and the country of the product origin.

The results of this work can be used by producers of domestic products, as Croatian buyers have consumer ethnocentrism sentiment and passion for domestic products which can represent an opportunity for the national industry, which can help to boost domestic economy and overcome crisis period. Moreover, one third of respondents are also prone to pay more for domestic product of even level of quality as foreign one. This result can be useful for local brands, so managers should target their strategies towards quality perception of buyers. Besides, better communication of national proudness can be useful tool in marketing strategies when targeting adequate group of buyers.

From a managerial standpoint, the results of this research suggest that foreign companies do not have to be worried of buyers' preferences regarding the country of origin. This result might also be of interest for companies selling foreign products. Our results also reveal increasing turnover in online shopping, what implies more online marketing and selling. Also, the results show that buyers with higher education level are more likely to favor domestic products in relation to foreign products. Possible explanation is that buyers with higher level of education have better understanding and broader knowledge and insights about the impact of domestic products on national economy due to higher level of education.

Finally, our results should be taken with caution because of the low level of representativeness of the sample, which is the main limitation of our research. Namely, there was a lack of elder respondents (46+) and most of respondents (41.51%) were young people (18-24) whose monthly income is not high. Therefore better distribution of respondents in this regard should be implemented in similar research. Considering future research we propose exploring the effect of coronavirus on importance of online shopping regarding individual product group.

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DECISION MAKING IN THE STRATEGIC PLANNING OF RETAIL ENTERPRISE: PERSPECTIVE OF CZECH RETAIL SMES

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Abstract

Management and thinking are strategically considered very important for managers working in organizations in the performance of their main duties. A key component of strategic planning involves the development and implementation of specific business strategies. Companies have adopted an effective strategic management approach to continually improving and changing their products and services. Various empirical studies have been done to investigate the relationship between strategic planning and enterprise success with varied conclusions. The aim of this paper is to evaluate the strategic planning in selected small and medium-sized enterprises in the Czech Republic. In this research study, strategic planning was investigated as a factor influencing the business success of retail small and medium-sized enterprises. The research was carried out in the Czech Republic between October 2018 and January 2020. The strategic planning in Czech retail small and medium-sized enterprises has been researched with the method of oral questioning, and the main instrument was a questionnaire.

Keywords: decision making, retail SMEs, strategic planning, strategy

JEL codes: O31, O32

1. Introduction

The success of a business doesn't happen by accident, it requires careful thought and planning. Business performance, innovativeness, proactiveness, risk-taking, competitive aggressiveness, and competitive scope and autonomy are the crucial factors to ensure the success of the business (Arshad et al., 2014). The objective of this paper is to evaluate the strategic planning in selected small and medium-sized enterprises in the Czech Republic. The ambition is to answer the central research question: "How affect strategic planning achieve business success"? In this research study, strategic planning is investigated as factors influencing the success of entrepreneurial activities of retail enterprises. The study is based on primary data collected from a recent survey of Czech retail small and medium-sized

enterprises. The relationships are analyzed using relevant regression techniques. The paper is organized into three parts. The first part of the paper outlines selected theories dealing with strategic planning, and business strategy. The second part of the paper aims to present and then interpret the results of the survey carried out among Czech retail small and medium-sized enterprises. Finally, the last section provides the conclusion of the research and offers a discussion of the most important implications. The results of the analysis are discussed, and further recommendations are provided for managers in the last section.

Although we use the only small country, the Czech Republic, as a sample to validate our theoretical proposals, our study is in the field of business studies because it focuses on the impacts of strategic planning on the success of business activities. This paper offers several contributions to strategic planning research and attempts to answer calls for studies that span across the disciplines. In particular, the paper pays attention to the key role of strategic planning for achieving business success in retail business. We offer a new angle on a business theory by focusing on the effects of strategic planning on the success of business activities in markets. Our study helps to advance the theoretical development of the role of strategic planning in the entrepreneurial activities of retail enterprises.

2. Theoretical Framework

In the most widely used text in this area, strategic planning is defined as a deliberate, disciplined effort to make decisions and actions that shape and manage what an organization or other entity does, what it does, and why it does it (Bryson, 2011). Strategic planning is a set of managerial decisions and actions, and these decisions determine the long-term performance of business entities and company strategy (Peleckis, 2015; Tseng and Hung, 2014; Şentürk, 2012). The main goal of strategic management is strategic thinking and management of business operations and processes without blind involvement in strategic planning to create strategic planning for the organization. The strategic management of an organization can formulate, deploy, and plan a business strategy through strategic thinking. (Lončar, 2017) George et al. (2019) suggest that strategic planning should be part of standard management approaches in today's organizations. The formalities of strategic planning processes are important for increasing the performance of an organization. Strategic planning is particularly effective in increasing an organization's effectiveness, but it should not necessarily be done in the hope of increasing efficiency. Mankins and Steele (2006) state that the strategic planning process must be designed to enable management to discover as many hidden strategic opportunities as possible and to make more specific strategic decisions. The transition to strategic planning focused on strategic decisions increases the quantity and quality of strategic decisions, also, the quality of strategic dialogue between management and managers of business units improves.

Grünig and Kühn (2008) define the relationship between strategic planning and strategy, emphasizing that strategic planning is a systematic process that defines the way to guarantee the permanent accomplishment of the company's overriding goals and objectives. Based on strategic planning, strategies are created that are understood as documents or long-term managerial guidelines guaranteeing the permanent accomplishment of the company's overriding goals and objectives. Hill et al. (2015), on the other hand, argue that valuable strategies often emerge from deep within the organization without prior planning. All available definitions of strategic planning emphasize long-term time as its basic characteristic by company strategy, company mission, and vision.

Formal strategic planning follows the rationalist view that top management develops the company's vision and translates it into a formal plan of goals and activities that are systematically implemented throughout the company over time (Grant, 1991). It is perceived as a formalized regular process of strategy formulation, implementation, and control, and usually involves a logical sequence of activities designed to translate top management goals to middle and lower levels. Without formal planning, the organization's intent could be misunderstood by stakeholders, the organization's intent could be unclear to employees, organizational intelligence and resources could be misused, and the sum of the organization's efforts could yield suboptimal results or deliver optimal results and results that do not directly or indirectly contribute to the existence of the organization. (Simerson, 2011) According to Johnsen (2019) planning, and in particular formal strategic planning, is often criticized by scientists and practitioners as unnecessary when the environment is uncertain and turbulent, and as the organization's resources are exhausted from other important management tasks.

Greenley (1986) noted that strategic planning has potential advantages and intrinsic values that eventually, translate into improved company performance. The development of strategic planning greatly helps to clarify organizational planning and thus provides market leaders instructions on how to operate a business successfully (Mallya, 2007). Strategic planning is a widely accepted approach to management in today's organizations. It is based on its popularity, provided that it is a successful practice in public and private organizations, which has positive consequences for the performance of the organization. However, strategic planning has been criticized for being too rational and hindering strategic thinking. (George et al., 2019) Several studies have shown a strong positive relationship between formal strategic planning and company performance. The effect of formal strategic planning on the company's performance is fully mediated by the company's innovation. Thus, performance increases only when formal planning efforts are focused on the flexibility and recovery of the company. This finding is of particular importance as it emphasizes that formal planning systems must provide appropriate response mechanisms to adapt to changes in the environment (Globocnik et al., 2020) According to Morimura and Sakagawa (2018), retail enterprises need to increase their capabilities in terms of understanding customers' existing needs, discovering latent needs, developing a differentiated strategy, and operationalising it quickly.

Central to organizational survival and performance in the face of an ever-evolving technology environment, fluctuating demand, and supply chain disruption is a dynamic capability framework that requires a firm to deliberately build, expand, or modify its resource base. The ability to perceive the market and seize opportunities by modifying or reconfiguring product or process portfolios is essential for a lasting competitive advantage. A lower ability to perceive and act because of emerging opportunities could cause strategic "insensitivity," strategic myopia, trapped resources, and management mediocrity (Ojha et al., 2020). The effectiveness of the strategic development plans is important to achieve a competitive advantage for the enterprises (Sertysilisik 2006). One of the fundamental questions in the field of business performance is how companies achieve and sustain competitive advantages and pursue the success of the business. A fundamental premise in management literature is that the application of strategic planning leads to improved company performance and competitiveness. According to Aaltonen and Ikävalko (2002), the outcome of all of the company's operations and strategies is company performance.

With the increase in competition, the competitive advantage becomes even more important for the sustainability of the companies. The essence of optimal strategic planning making is to build a market position strong enough and an organization capable enough to produce successful performance despite potential competition and internal difficulties. A successful company continually reinvents strategies to gain better performance and competitive advantages in today's dynamic competition. When a company has a permanent competitive advantage, its resources and capabilities are durable, hard to identify, and hard to copy.

Strategic decisions involve a change of major kind since an organization operates in the global business environment. In a globally competitive environment, strategic planning is essential for enterprises to develop competitiveness and market potential. Strategic decisions deal with harmonizing organizational resource capabilities with the threats and opportunities. Ritala et al. (2018) examine the diversity of sustainable business models adopted by the companies. To be competitive in the twenty-first century, companies need to continuously improve and perform an excellent standard of the quality of their products.

Therefore, in the context author propose:

Hypothesis 1: Strategy (a) and strategic objectives (b) are positively related to business success.

Hypothesis 2: External environment (a) and internal environment (b) are positively related to business success.

Hypothesis 3: Change of strategy (a), communication of strategy (b), and improvements of strategy (c) are positively related to business success.

3. Methodology

The analysis is based on the data from a standardized empirical study, which comprises research questions on the management of Czech retail enterprises. To analyze the management of Czech retail

enterprises, some questions of the impact of strategic planning on the business success of Czech retail enterprises we asked in the survey. The objective of the paper is to investigate the effect of strategic planning in Czech retail enterprises on their business success. The research was carried out in the Czech Republic between October 2018 and January 2020.

3.1 Sample and Procedure

The strategic planning in Czech retail enterprises has been researched with the method of oral questioning, and the main instrument was a questionnaire. The research design is based on the collection of primary data from top managers of selected Czech retail enterprises. The sample consisted of 362 Czech enterprises which are located in the Czech Republic. The enterprises under research were selected with the method of non-probability purposive sampling, or more precisely by assumption and occasional selection. The enterprises included in the study are incorporated in the Czech Republic, and all of them are private enterprises.

The structured questionnaire contained two fields of varying degrees of complexity relating to the area of strategic management. The questionnaire consists of closed, semi-closed, and open questions. The questions are based on information offered via personal communication with selected business and university experts, any by former researchers. In some questions, simple and complex scales were used, mostly the Likert-type scale (5 = strongly agree to 1 = strongly disagree). The questionnaire was pre-tested for instrument validity with 20 participants-managers who were asked to respond to the items measuring the theoretical construct. These participants were also asked to identify any ambiguities that may reveal in the questionnaire draft. Based on their feedback, some minor changes in wording were made.

Due to a relatively low response rate in email surveys in the Czech Republic, and because most Czech managers fear that revealing the corporate data is putting their organizations at security risks, it was necessary to make use of a high level of personal involvement consisting of telephone calls, personal distribution of and collecting questionnaires. First, telephone calls were placed to general managers or CEOs of the Czech retail enterprises to explain the purpose of the study and to request their participation, after those questionnaires were hand-distributed to the general managers and CEOs. Trained research assistants helped the managers and CEOs complete the questionnaire, and explained any items that the respondents wished to have clarified. This procedure resulted in 400 matched questionnaires, of which 38 were eliminated because some responses were incomplete. Thus 362 (a response rate of 90.5%) questionnaires were used in the subsequent data analysis and statistical processing. The representativeness of the research sample was verified by using the criterion of territorial representation of businesses in the present research. The representativeness of the research sample was also verified by a chi-square test. Based on the level of significance $\alpha = 0.05$, the p-value accounted for 0.128.

3.2 Variables and Measurement

The *dependent variable* business success was measured by subjective ratings. We asked the respondents to evaluate the present enterprise performance and its performance 3 years ago, relative to other retail enterprises in the same industry, using a five-item, five-point Likert type measure adopted for this study. The question was “The present enterprise strategy can be characterized as successful and fulfilling enterprise objectives, and enabling the achievement of long-term sustainable competitive advantage and had a positive impact on turnaround over the last 3 years: (1=totally disagree; 5=totally agree)”. The Cronbach’s α of this measure was 0.84. The mean rating by top managers was 4.02, with a standard deviation of 0.819.

The *independents' variables* (strategy, objectives, external environment, internal environment, change of strategy, communication of strategy, improvements of strategy) were measured by subjective indicators included using a five-item, five-point Likert type measure adopted for this study (1=totally disagree; 5=totally agree).

Guided by current research and empirical evidence, we have included several *control variables*. Among the enterprise-level determinants of performance, the enterprise’s size and enterprise age are the two widely used demographic characteristics of enterprises. Therefore, we include enterprise size (which

is measured as the natural logarithm of the number of employees) and enterprise age (in years). Statistical organizations classify enterprises by a wide range of variables such as sales revenues and the number of employees. This research study follows the conventional European idea that the size of enterprises is defined according to EU norms. An enterprise, which has 1 to 9 employees and 2 million euros of turnover per year, is referred to as a microenterprise. An enterprise, which has 10 to 49 employees and at most 10 million euros of turnover per year, is called a small enterprise. An enterprise, which has 50 to 249 employees and at most 50 million euros of turnover per year, is called a medium enterprise. An enterprise, which has more than 250 employees and more than 50 million euros of turnover per year, is called a large enterprise. In line with this, we classify our research sample by the number of employees so that 35.9 % of the sample consists of microenterprises and 37.4 % small enterprises, and 26.7 % of medium ones. The average enterprise age of the respondents is 17 years.

3.3 Data analysis

The data obtained from the empirical research on a selected sample of 362 retail enterprises were processed by SPSS. The analysis began by examining the correlation between variables. All variables were screened to reveal their distribution through Pearson correlation coefficient deviations for the variables (Tab 1). Table 1 presents the summary statistics of all variables, and correlations for the variables. Correlations were obtained from the Pearson Correlations Matrix are shown in Table 1, the values indicating intercorrelations among the predictor's variables were low, ranging from 0.255 to 0.823 ($p < 0.05$), thus indicating the independence of the variables used for measuring the predictors. Since the descriptive data revealed a promising variation as well as the correlation among the variables included in the model, the results seem to support the hypotheses.

Table 1: Descriptive Statistic and Correlation Analysis

	mean	SD	1	2	3	4	5	6	7	8	9	10
Success	4.03	0.792	1									
Size	42.29	55.701	-0.057	1								
Age	17.29	20.874	0.022	0.245**	1							
Strategy	4.24	0.700	0.504**	-0.063	0.085	1						
Objectives	4.28	0.734	0.419*	-0.020	0.058	0.613**	1					
External env.	3.98	0.848	0.335**	0.005	-0.256**	0.296**	0.305**	1				
Internal env.	3.89	0.821	0.323	0.007	-0.054	0.411**	0.364**	0.430**	1			
Changes	3.77	0.957	0.316*	-0.068	-0.172*	0.321**	0.160*	0.389**	0.181**	1		
Communication	3.44	0.995	0.227	-0.069	0.015	0.313**	0.199**	0.237**	0.245**	0.393**	1	
Improvements	3.81	0.941	0.367*	-0.012	0.140*	0.370**	0.399**	0.318**	0.350**	0.372**	0.323**	1

Significance level: * $p < 0.05$; ** $p < 0.01$

Source: own research

The second phase of research includes the analytical methods: Hierarchical Regression Analysis and Factor Analysis. We used hierarchical moderated regression analysis (ordinary least-square OLS regression techniques) to test hypotheses. The factor analysis has been carried out due to the specification of factors affecting the impact of strategic planning on the business success of retail enterprises.

4. Results

Hierarchical regression has been used to test the hypotheses with business success as the dependent variable. We tested the impact of strategy, objectives, external environment, internal environment, change of strategy, communication of strategy, and improvements of strategy on business success of retail enterprises, controlling for enterprise size, and enterprise age. Before testing the hypotheses, multicollinearity in the dataset we controlled. For this purpose, the VIF values for the independent variables we calculated. In our analysis, the VIF values were all below 1.1, which is a relatively low and acceptable level. Consequently, there is no reason to believe that there is any major multicollinearity in the regression that could lead to misinterpreting or overestimating the final model and its predictive ability. The results of the analyses are presented in Table 2.

We entered the control variables as the first block, Model 1. The regression equation in Model 1 is not statistically significant ($F = 1.844$, $p > 0.05$). Model 1 in Table 2 shows that none of the selected

control variables is not significantly associated with the business success of Czech retail enterprises. The independent variables (strategy, objectives) were entered into the regression as the second block, Model 2. The incremental explanatory prediction on business success was significant in the regression, ΔR^2 was 0.287. The regression equation in Model 2 is statistically significant ($F = 33.989$, $p < 0.01$). The independent variables explain 30.1 % of the variance in Model 2. The multicollinearity test showed that the VIF of independent variables in the final model ranged from 1.089 to 2.154 and the factor of tolerance range from 0.764 to 0.918. These values indicate no serious problems with multicollinearity. Hypothesis 1 claiming that the strategy (a) and objectives (b) are positively related to business success was supported.

Table 2: Regression Results for Business Success

	Model 1	Model 2	Model 3	Model 4
Size	0.002(0.001)	0.001(0.001)	0.001(0.001)	0.001(0.001)
Age	-0.002(0.002)	-0.003(0.002)	-0.002(0.002)	-0.002(0.002)
Strategy H1a		0.472(0.068)**	0.407(0.070)**	0.355(0.072)**
Objectives H1b		0.196(0.063)*	0.146(0.063)*	0.133(0.064)*
External environment H2a			0.166(0.050)*	0.111(0.052)*
Internal environment H2b			0.060(0.052)	0.050(0.052)
Changes H3a				0.092(0.045)*
Communication H3b				0.010(0.039)
Improvements H3c				0.104(0.048)*
Model R ²	0.014	0.301	0.336	0.348
ΔR^2	0.014	0.287	0.035	0.012
F	1.844	33.989**	26.346**	19.438**

^a Unstandardized coefficients are reported, with standard errors in brackets. The changes in R² in Models 2-3 are in comparison with the value of R² in the model to their left.

Value of Durbin-Watson is 1.936

Significance level: * $p < 0.05$; ** $p < 0.01$

Source: own research

The independent variables (external environment, internal environment) were entered into the regression as the third block, Model 3. The incremental explanatory prediction on business success was significant in the regression, ΔR^2 was 0.035. The regression equation in Model 3 is statistically significant ($F = 26.346$, $p < 0.01$). The independent variables explain 33.6 % of the variance in Model 3. The multicollinearity test showed that the VIF of independent variables in the final model ranged from 1.180 to 2.355 and the factor of tolerance range from 0.864 to 0.950. These values indicate no serious problems with multicollinearity. Hypothesis 2 claiming that the external environment (a) and internal environment (b) are positively related to business success was partially confirmed.

The independent variables (changes of strategy, communication of strategy, improvements of strategy) were entered into the regression as the fourth block, Model 4. The incremental explanatory prediction on business success was significant in the regression, ΔR^2 was 0.012. The regression equation in Model 4 is statistically significant ($F = 19.438$, $p < 0.01$). The independent variables explain 34.8 % of the variance in Model 4. The multicollinearity test showed that the VIF of independent variables in the final model ranged from 1.280 to 2.365 and the factor of tolerance range from 0.764 to 0.958. These values indicate no serious problems with multicollinearity. Hypothesis 3 claiming that the changes of strategy (a), communication of strategy (b), and improvements of strategy (c) are positively related to business success was partially confirmed.

The factor analysis draws on 7 specified factors as shown in Table 3. The factors are based on information offered due to personal communication with selected experts from business and universities and based on previous researches. Respondents expressed their opinion for the importance of each criterion by using the five-point Likert Scale (5 = strongly agree to 1 = strongly disagree). The reliability of the measurements was acceptable (Table 3). The total reliability reached the value of $\alpha = 0.781$, standardized item $\alpha = 0.789$

Table 3: Evaluation of Choice Factors

Criterion (α)	mean	rank
Strategy (0.743)	4.25	2
Objectives (0.762)	4.29	1
External environment (0.755)	3.91	3
Internal environment (0.764)	3.85	4
Changes (0.759)	3.72	6
Communication (0.764)	3.43	7
Improvements (0.727)	3.73	5

Source: own research

Varimax rotation was performed. Seven factors with eigenvalues greater than 1 were extracted. The factors loading greater than 0.5 are shown in bold. The results of the factor analysis are shown in Table 4.

Table 4: Factor analysis

Items/Factors	1	2
Strategy	0.770	0.278
Objectives	0.840	0.062
External environment	0.468	0.438
Internal environment	0.705	0.155
Changes	0.085	0.811
Communication	0.127	0.755
Improvements	0.339	0.740
Eigen-value	3.108	1.116
Percentage of variance explained	44.400	15.940
Cumulative percentage of variance explained	44.400	60.339

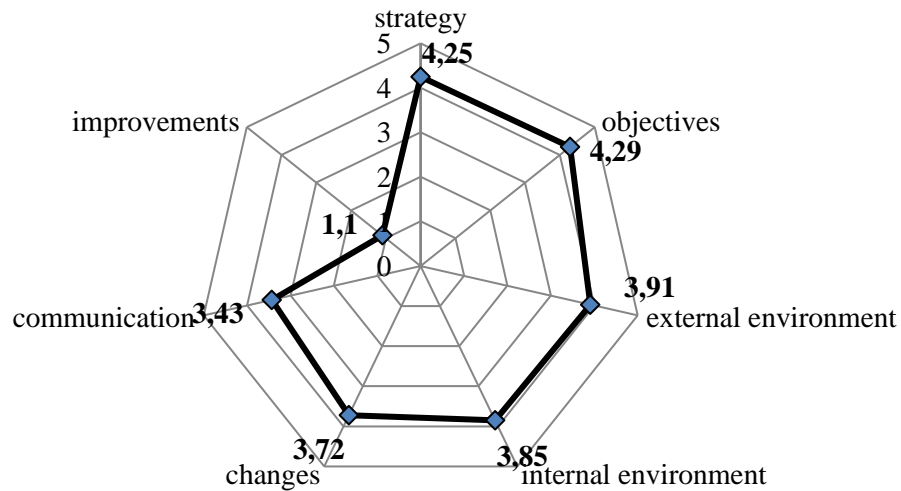
Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 14 iterations

Source: own research

Factor analysis extracted six factors with an eigenvalue greater than 1. Along with the observed loadings, this indicates the convergent and discriminant validity of these constructs. The factor loadings structure was employed to determine the factor scores of each company on the seven constructs. All the scale items loaded highly on factors they represented and weakly on other factors. The six factors accounted for 60.3% of the total variation in the sample. Those six factors determine the significant factors influencing the impact of strategic planning on success.

Factor 1 “internal factor” is connected with basic tools of strategic planning (strategy, objectives, internal environment). Factor 2 “strategy factor” describes operations and working with company strategy (changes, communication, improvements).

Figure 1: Significant Factors for Strategic Planning



Source: own research

As shown in Figure 1, the greatest influence the significant factors influencing the impact of strategic planning on success.

5. Conclusion

We can say, that there is a significant relationship between strategic planning and the business performance of small and medium-sized enterprises. According to Chaffee (1985), strategic planning is the determination of the primary long-term goals of the enterprises, and the adoption of courses of action and allocation of resources necessary for carrying out these goals. We can state that this statement was also confirmed by Czech retail companies.

The study contributes to our understanding of the relationships between strategic planning and business success. Our study informs enterprise performance research by examining the effects of selected factors on the relationship between strategic planning and business success. We hypothesized that there are positive relations between strategy and objectives, and business success. The first hypothesis was confirmed. The second hypothesis that the external environment and internal environment to have positive relationships with business success was confirmed partially. The third hypothesis concerning the relationship between the change of strategy, communication of strategy, and improvement of strategy and business success was partially confirmed.

It is important to note some of the limitations of the research. First, the findings may apply mostly to medium-sized companies and large enterprises. The authors do not claim that the results would apply to microenterprises and small enterprises. Moreover, the research model can be redesigned by adding some other variables which are taught to antecedents of business strategy and company performance.

Several other implications also emerge from the research study findings. For business researchers, the results suggest that investigation of the decision-making process in a single activity provides the best and multifaceted picture of multinational managerial decisions. The paper contains information on the entrepreneurial activities of Czech companies. There appear to be some potential areas for further research work such as performance in the Czech market. The research could be focused on activity located in one region of the world with a good deal of variation regarding market size, growth rates, levels of development, openness, tax rates, and other features.

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SOCIO-COGNITIVE PERSPECTIVE OF OPPORTUNITY EVALUATION : THE IMPACT OF SOCIAL NETWORK AND POSITIVE ILLUSIONS ON OPPORTUNITY EVALUATION

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Abstract

Scholars urge to develop thinking-to-doing link in entrepreneurial cognition research for decade. Beside cognitive predispositions, individuals need to leverage their social capital to progress with a new opportunity. Social network may not only enhance progress in new venture creation, but it also impacts cognitive biases of an individual. Therefore, the purpose of this study was to examine the impact of social network and secondly the impact of cognitive biases – positive illusions on opportunity evaluation. Third purpose of the study was to examine the mediating effect of positive illusions on the relationship between social network and opportunity evaluation. Hypotheses were tested on the sample of 154 students (N females= 126, N males = 28). Most of the participants did not have experience with family business (N=93), although few had experience with business of one or both parents (N= 61). Multiple linear regression showed that just unrealistic optimism for common negative events predicts opportunity evaluation. Results showed marginal support for negative relationship between social network and positive illusions, even though social network did not significantly predict any positive illusions. Since a path of the hypothesized mediation model was not statistically significant, no mediating effect of positive illusions was found. Impact of other dimensions of social capital on cognition and opportunity evaluation may be scrutinized in further studies.

Keywords: opportunity evaluation, positive illusions, social network, strong ties, weak ties

JEL codes: D91, G41, D81

1. Introduction

Not only beginners, but also experts in certain domain may be the subject to cognitive biases and heuristics (Kahneman and Tversky, 1974). A special category of cognitive biases are positive illusions that cause better perception of individual and the world around him/her (Jefferson et al., 2017). Unrealistic optimism, overconfidence, and the illusion of control falls under this category of cognitive biases – positive illusions (Jefferson et al., 2017). Many studies have shown the positive impact of positive illusions on risk-taking in business, decision to start a venture (Simon et al., 1999; Keh et al.) or on business performance (Carr and Blettner, 2010; Hmieleski and Baron, 2010). Even though effect of positive illusions on decision to start a venture is quite examined, research concerning the role that social capital plays in the development of cognitive biases and its effect on opportunity decision to start a venture is not extensively examined.

Zhang et al. (2017) in their review of studies examining cognitive biases emphasized the role of social capital in cognitive biases studies. Zhang et al. (2017) state that social capital is an antecedent of cognitive biases. Among social capital, predominantly structural holes in network of entrepreneur were examined (Zhang et al., 2017). De Carolis and Saporito (2006) theoretically proposed model that structural holes predict illusion of control and network ties predict representativeness bias. De Carolis and Saporito (2009) found out that extent of entrepreneur's social network increase illusion of control. However, other positive illusions beside illusion of control were not examined. The importance of social capital research strengthens the literature of the de-biasing strategies, which presents advice or consultation from experts as reducing cognitive biases (Baker and Ricciardi, 2014). On the other hand, social network increase the chances of meeting similar people (Parker, 2009) and thus it is questionable to which extent those individuals provide feedback which is optimizing biased beliefs of an individual. Therefore the purpose of this study is threefold: 1.) The first purpose is to examine the effect of positive illusions on opportunity evaluation, 2.) The second purpose is to examine the effect of social network on positive illusions, 3.) Third purpose is to examine mediating effect of positive illusions on the relationship between social network and opportunity evaluation.

1.1 Social capital in general and social capital in business domain

Social capital is defined as *network engagement, norms and trustworthiness leading to economic and/or political benefit* (Lee, 2009). Lee (2009) consider social capital as multifaceted and therefore deciphers its three dimension: structural social capital, relational social capital and cognitive social capital. Structural social capital focus on diversity of social networks of business actors. Lee (2009) decipher bonding social capital that entails strong ties within groups of like minded individuals, whereas bridging social capital is much weaker linkage between individuals in heterogenous groups. Research concerning structural social capital was focused on network size centrality and network constraints among actors. For example, size of network was calculated by sum of ties in a network of an individual. Relational social capital refers to exchange of best practice among business actors. Relational capital entails norms of trust, obligation, expectation and identity. Research concerning relational social capital is occupied with trust as a norm. The last dimension of social capital is cognitive social capital. Cognitive social capital refers to intellectual capability gathered via exchange of knowledge and resources.

Social capital in business domain was frequently linked to performance. Metaanalysis of Stam, Arzlarian and Elfring (2014) quantitatively revealed that social capital positively impacts business performance. In terms of effect sizes, predominantly network diversity strongly affected performance and structural holes and weak ties affected it to a lesser extent. Metaanalytical findings of Stam et al. (2014) emphasize personal network in bridging social capital and simultaneously emphasize that distinct networking strategies are needed as well, however author predominantly examined effect of network on growth and profit business indicators. Brüderl and Preisendörfer (1998) found that network success hypothesis is valid. Social network support and diverse social networks increased the probability of survival and growth of newly formed businesses.

1.2 Social capital, cognition and business creation

Access to resources in personal network not only impact objective business performance, but enable entrepreneur to identify opportunities or gather resources (Stam et al., 2014). Thus, social capital impacts business creation.

De Carolis and Litzky (2006, 2009) theoretically proposed and tested impact of social capital on progress in business creation. Beside the effect of social capital on progress in business creation, also effect of social capital on cognitive bias was examined in the study of De Carolis and Litzky (2009). De Carolis and Litzky (2009) found that social network, measured by number of supporting organisation and associations, impact progress in new venture creation and also illusion of control. Illusion of control mediated the relationship between social network and progress in new venture creation.

Table 1: Overview of social network dimensions measured in the business domain

Source	Variables	Social network methods
Yang and Zhang (2015)	Social network (network size, tie strength, structural hole), cognition (risk propensity, illusion of control), risk recognition outcomes	Network size = contact with 4 actors, Network tie strength = frequency of contact with 4 actors, Structural holes = bridging role of entrepreneur in network
DeCarolis and Litzky (2009)	Social network, relational capital, illusion of control, risk propensity, progress of new venture	Social network= amount of organizations and associations, Relational capital= extent to which aforementioned organizations facilitated start, consult ideas or provide valuable information
Lin, H. (2018)	Social network (mean score of network size, structural holes, link strength, network heterogeneity), overconfidence, illusion of control, risk perception, representativeness	Network size= initials of 10 people, who are source of knowledge for individual, Structural holes = circles of people who know each other from list, Link strength= interaction, affection and history of interaction, Network heterogeneity = four network questions designed by Lin (2018)
Parker (2009)	Self-serving bias, overoptimism, diverse social network or network consisted of similar individuals	Self-serving bias is component that hinders learning and ensure that biased expectations (optimistic or pessimistic) persist. If aforementioned assumption would not be true, optimism and tendency of individual to meet individuals with same opinions would evaporate

Source: own edition

Yang and Zhang (2015) examined social network (network size, tie strength, structural hole) and its effects on cognition and risk recognition in new ventures. Risk recognition was measured by identification of risk in diverse areas of own business.

Cognition were represented by one cognitive bias, specifically illusion of control and risk propensity. Yang and Zhang (2015) found that impact of social network on risk recognition is reduced for entrepreneurs with high level of cognitive biases, while for entrepreneurs with low cognitive biases the relationship is significant. Lin (2018) linked social network (score of network size, structural holes, link strength, network heterogeneity) to cognitive biases, like overconfidence and representativeness, and risk perception. Lin (2018) found that social network have positive effect on cognitive biases and cognitive biases have negative effect on risk perception. On the contrary, Parker (2009) questioned positive effect of social network on business performance. Parker (2009) discusses that cognitive biases like self-serving bias or unrealistic optimism occur among individuals in the business domain. Parker (2009) assumes that broadening of social network would increase chances of meeting person with similar beliefs and if the team composition is based on similarities between individuals, individual may not receive unbiased feedback from those team members. Therefore, Parker (2009) suggests that external consultants should actively encourage founder to create the team consisted of individuals with contrary beliefs to his/her own.

Hypothesis 1: Individuals with higher positive illusions evaluate opportunity more positively.

Hypothesis 2: Individuals with higher social network will exhibit more positive illusions.

Hypothesis 3: Positive illusions mediates the relationship between social network and opportunity evaluation.

2. Methodology

Participants completed the survey online, via Google form. Data were collected from September until the end of October 2021. Instrument was sent primarily to email addresses of students of humanities at one university. Data were collected also from other students of social sciences and humanities in Slovakia. Participants were informed about the purpose of the study at the beginning of the survey and they could withdraw from the study in accordance with APA principles.

2.1 Participants

Data were gathered from participants studying in Central Slovakia Region via Google Form from September 2020 until the end of October 2020. Convenience sampling was applied and data were gathered from students, that are not entrepreneurs and they are primarily non-economics students in bachelor studying degree. Students in a bachelor studying degree are acquiring knowledge in a certain domain and may start to think about their career, potentially entrepreneurial career. Therefore, the sample is homogenous primarily due to region, non-entrepreneurial occupation and primarily non-economics studies.

Due to mistakes in loss aversion method, eleven participants were extracted from the original sample. The sample consists of 154 participants (N females= 126, N males = 28). Average age in the sample was 22.73. Age of the 87% of the sample ranged from 17 to 24 (Min = 17, Max = 49). Most of participants finished high school education ($N = 116$), then bachelor degree ($N=34$) and finally master degree ($N = 4$). Students from the education faculties are most frequently represented in the sample ($N=132$), then students of economics and management are frequent ($N = 15$) and finally students of arts ($N = 4$) and students of natural sciences ($N = 3$). Most of the participants do not have experience with family business ($N = 93$), albeit few have or had mother entrepreneur ($N = 15$) or father entrepreneur ($N = 46$).

2.2 Methods

SOCIAL NETWORK

Social network is divided to strong and weak ties according to interview questions constructed by Brüderl and Preisendörfer (1998). Example item of strong ties is “I receive support from parents, friends, relatives, partner“. Example of weak ties is “I receive support from acquaintances, former employers, former co-workers, business partners”. Respondents evaluate their support from weak and strong ties on a five-point Likert scale with answers ranging from (1) no support to (5) full support. Support from weak and strong ties was calculated by average.

POSITIVE ILLUSIONS

The question on estimating the number of correct answers compared to the objective accuracy of the extended version of the cognitive reflection test was used to measure overconfidence (Toplak et al., 2014). Unrealistic comparative optimism was measured by the adapted slovak version (Čavoјová, 2016) of a questionnaire by Kruger and Burrus (2004) consisted of 28 life events with different frequency (common / rare) and valence (positive / negative). Number four (average) was subtracted from answers of respondents and then the score was averaged for each subscale. A scale from Podoynitsina (2008) consisting of five items was used to measure the illusion of control. Score was created by average (Podoynitsina, 2008). The items focus, for example, on *an individual's belief in the accuracy of the prediction of future market development*.

OPPORTUNITY EVALUATION AND EXPLOITATION

The scale for measuring opportunity evaluation followed a case study of a risky business plan created by Keh et al. (2002). A 3-item scale by Keh et al. (2002) was used to evaluate the feasibility and desirability of business opportunity. The score from each item was summed according to Keh et al. (2002). The respondent states the extent to which, in his/her opinion, the opportunity is worthy of realization (*"I consider business plan to be an opportunity"*).

CONTROLS

Age and gender are control variables in this study.

2.3 Results

Since the data were mostly ordinal, correlations were examined via Spearman correlation coefficient. Correlations between variables, means and standard deviations are displayed in the Table 2. Mediation effects were tested via three regression models. Model 1 included positive illusions – unrealistic optimism for common positive and common negative events, unrealistic optimism for rare positive and rare negative events, overconfidence and illusion of control as dependent variables and strong and weak ties as independent variables. Model 2 encompassed opportunity evaluation as dependent variable and strong and weak ties as independent variables. Model 1 and 2 tested first and second hypothesis. In model 3 opportunity evaluation was regressed on ties (strong, weak) and positive illusions (unrealistic optimism, overconfidence, illusion of control) at the same time. Model 3 tested mediation effect and third hypothesis. Mediation effect is supported when the effect of independent variable on dependent variable after adding mediator to the model is no longer significant.

Table 2: Means, standard deviations and correlations between variables

	M	SD	1.	2.	3	4.	5.	6.	7.	8.	9.	10.	11.
1. Opportunity evaluation	10.51	3.51	1.00										
2. Illusion of control	3.68	1.07	-.205*										
3. Over-confidence	1.71	1.94	-0.07	0.11	1.00								
4. Rare negative	-1.88	0.86	-0.06	0.01	-.187*	1.00							
5. Rare positive	-2.08	1.12	-0.02	0.11	-0.12	.418**	1.00						
6. Common negative	-0.27	0.88	-.200*	0.03	-0.14	.440**	0.11	1.00					
7. Common positive	-0.28	1.04	-0.15	0.07	-0.03	0.08	.502**	.227**	1.00				
8. Weak ties	2.21	0.95	-0.01	0.12	-.185*	-0.01	-0.05	0.04	-0.05	1.00			
9. Strong ties	3.32	1.01	-0.06	0.12	-0.08	-0.11	-.159*	-0.03	-0.13	.626**	1.00		
10. Age	22.73	5.49	0.01	-0.10	-0.11	-0.07	.233**	-0.06	.405**	-.204*	-.296**	1.00	
11. Gender			-0.03	0.15	0.08	0.15	-0.03	-0.04	-0.04	0.13	.276**	-.195*	1.00

Notes. Spearman correlation coefficient are displayed in the table 1, Unrealistic optimism for rare negative events, rare positive events, common negative events, common positive events, * $p < .05$, ** $p < 0.01$.

Table 3: Results of regression with positive illusions as dependent variables

	1 a		1 b		1 c		1 d		1 e		1 f	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Strong	-0.13	-1.29	-0.14	-1.35	-0.12	-1.16	-0.15	-1.45	0.02	0.21	0.08	0.76
Weak	0.04	0.36	0.13	1.28	-0.05	-0.44	0.08	0.81	-0.14	-1.36	0.06	0.54
<i>F</i> -stat.	1		1.06		1.79		1.06		1.26		1.13	
<i>R</i> ²	0.01		0.01		0.02		0.01		0.02		0.15	
<i>Adj. R</i> ²	0		0		0.01		0		0		0	

Notes. Model 1 a = Dependent variable is unrealistic optimism for common positive events, Model 1 b = Dependent variable is unrealistic optimism for common negative events, Model 1 c = Dependent variable is unrealistic optimism for rare positive events, Model 1 d = Dependent variable is unrealistic optimism for rare negative events, Model 1 e = Dependent variable is overconfidence, Model 1 f = Dependent variable is illusion of control, β = standardized regression coefficient, *t* = *t*-test, strong = strong ties, weak = weak ties, **p* < .05, ***p* < 0.01.

Table 4: Results of regression with opportunity evaluation as dependent variable

	H1 (Dependent variable: opportunity evaluation)		Model 2 (Dependent variable: opportunity evaluation)		Model 3 (Dependent variable: opportunity evaluation)	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Strong			-0.114	-1.029	-0.128	-1.164
Weak			0.019	0.181	0.041	0.396
Common positive	-0.125	-1.162			-0.134	-1.199
Common negative	-0.183*	-1.940			-1.191*	-1.983
Rare positive	0.040	0.331			0.027	0.219
Rare negative	0.052	0.484			0.052	0.46
Overconfidence	-0.09	-1.118			-0.098	-1.181
Illusion of control	-0.173*	-2.174			-0.157	-1.918
Age			-0.011	-0.126	0.013	0.147
Gender			-0.025	-0.290	-0.015	-0.180
<i>F</i> -stat	2.423		0.451		1.642	
<i>R</i> ²	0.09		0.012		0.103	
<i>Adj. R</i> ²	0.053		-0.015		0.040	

Notes. **p* < .05, ***p* < 0.01

Table 2 shows that illusion of control (*p* < 0.05) and unrealistic optimism for common negative events (*p* < 0.05) correlates with opportunity evaluation, however neither weak ties nor strong ties correlate with opportunity evaluation. Weak ties correlate with overconfidence (*p* < 0.05) and strong ties correlates with unrealistic optimism (*p* < 0.05), specifically unrealistic optimism for rare positive events. Relationship between variables were further tested via regression models. Table 4 contains that illusion of control and unrealistic optimism for common negative events did predict opportunity evaluation. Therefore, first hypothesis was partly supported. Table 3 displays that strong and weak ties did not predict any positive illusions. The first model was not statistically significant. Thus, second hypothesis was not supported. Table 3 shows that neither second model (*R*² = 0.011, *Adj. R*² = - 0.002) nor third model (*R*² = 0.103, *Adj. R*² = 0.040) was statistically significant. Since significant *a* and *c* paths of hypothetical mediation model were not found, mediation effect was not detected. However, it is important to note that unrealistic optimism for common negative events did predict opportunity evaluation in third model (β = -1.191, *p* < 0.05). Control variables (age, gender) did not predict opportunity evaluation.

2.4 Discussion

De Carolis and Saporito (2009) distinguish two research streams concerning entrepreneurial opportunities. First is concerned with the role of networks in facilitation of new venture creation and second is focused on cognition. From the above mentioned two streams of research, research that links individual cognition and social network is more scarce. Social cognitive theory assumes that environment of an individual

impacts behavior and cognition and even though this assumption was applied in new venture creation domain (De Carolis and Litzky, 2009), social cognitive theory did not find support in this study. Social network did not correlate with opportunity evaluation in this study. Social network did not affect opportunity evaluation and thus feasibility and desirability to start a venture with business opportunity. Network – founding link proposed by Brüderl and Preisendörfer (1998) was not confirmed in this study. Social network did not prove to affect new venture creation, although personal not business related social network was measured. Results are contradictory to the results of De Carolis and Saporito (2009) that confirmed the effect of relational capital embedded in network on progress with new venture. Thus, social network (relational capital) directly related to the business contacts and resources and support derived from these circles impact new venture creation. Support from strong ties and weak ties may not provide such a network support to individual that it enables him or her to act on business opportunity.

Furthermore, domain specificity may play a role in relationship between social network and positive illusions and also between positive illusions and opportunity evaluation (Weber and Nasic, 2010). De Carolis and Litzky (2009) found that social network (relational capital) did not only predict new venture progress, but it also did predict illusion of control. Results may suggest that business related social network is related mostly to positive beliefs that individual is subject to in business domain.

Results of this study also favor the assumption that social network is not biasing the judgment of an individual about feasibility and desirability of opportunity, since business opportunity was risky. If the social network would increase positive evaluation of risky opportunity, chances for success would be reduced. Therefore, the network - success link proposed by Brüderl and Preisendörfer (1998) did not prove to be invalid in this study.

Negative coefficients showed that strong ties embedded in the network of an individual are negatively related to unrealistic optimism for common positive events of an individual. Weak ties were negatively related to overconfidence of an individual, thus overestimated belief about own knowledge. Relationship between illusion of control and social network was not supported by data in this study, which is contradictory to the results of De Carolis and Litzky (2009), that found that illusion of control is predicted by social network and relational capital. This study provides support for the effect of cognitive biases – positive illusions on opportunity evaluation in accordance with the study of Keh et al. (2002) and Simon et al. (1999). Illusion of control and unrealistic optimism were related to opportunity evaluation. Multiple linear regression (including control variables, independent and mediating variables) revealed that unrealistic optimism did predict opportunity evaluation. So, individuals who were overly optimistic did evaluate opportunity more positively and considered opportunity as suitable for founding a business. This study adds to the current body of results about effect of unrealistic optimism on decision to start a venture (Kannadhasan et al., 2014).

This study has several limits. First limit is that the equal distribution of men and women was not maintained in the sample. Generalizability of results is reduced by that most represented in the sample were students of humanities from one university. Sample could be also more homogenous regarding age. With age can experience of individuals increase and it may enable someone to feel more capable of entrepreneurial career beside social and weak network factors. However, the results of this paper shed light on the necessity of examination of other network concepts and its effect on entrepreneurial intention. From a practical point of view, similar studies may lead to higher awareness about the need to develop an even closer link between entrepreneurial supporting programmes and students in region. Not only students may not perceive sufficient support, but also starting entrepreneurs are not sufficiently informed about supporting programmes in Central Slovakia Region (Slovak Business Agency, 2018). Therefore, this study stresses the need of raising awareness about supporting networks in all regions of Slovakia.

Third limit are general methods for measuring positive illusions. Future studies may measure not only general positive illusions but also domain specific positive illusions. Another limiting factor may be that social capital is multifaceted and methodology used in the previous studies is heterogeneous. Previous studies hypothesized that professional and social network impact venture growth (Ostgaard and Birley, 1996). Others assumed that networks are especially important among nascent entrepreneurs (Davidsson and Honig, 2003) and that networks impact venture foundation (Brüderl and Preisendörfer, 1998). Ostgaard and Birley (1996) examined size of social and professional network of entrepreneur by asking about number of membership of entrepreneur or asking about extent to which people entrepreneur talked to facilitated certain areas of business (customers, market information, product and service development, etc.) or about hours that entrepreneur devotes to maintaining networks. Another methods for measuring social network were not so detailed. Davidsson and Honig (2003) considered bonding strong ties as very important and measured it by individual responding if parents ever owned a business. Thus, future studies should grasp multifaceted nature of social capital to a greater extent and include other dimensions of social capital to the study.

3. Conclusion

This study stress the need to further examine impact of different dimensions of social network on venture creation and on cognitive biases - positive illusions. Negative coefficient between social network support and positive illusions like overconfidence and unrealistic optimism suggests that social network may not increase positive illusions of an individual. Support from weak ties (e.g. acquaintances, former coworkers) was in negative relationship with overconfidence, that was measured by estimation of own performance. Estimate of individual was compared to real performance and higher difference signifies higher overconfidence. Another important result is that support from strong ties (e.g. partner, relatives) was in negative relationship with unrealistic optimism for rare positive events. Even though positive illusions were not measured in domain-specific business domain, the direction of the relationship shed some light on the relationship between positive illusions and social network. In accordance with extant business literature, results favor assumption that social network does not bias judgment of an individual, although the relationship should be examined further.

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