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Faculty of Economics

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Liberec Economic Forum 2021

13th – 14th September 2021
Liberec, Czech Republic, EU

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Faculty of Economics

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Section I

Business and Innovations

Peter Balco, Peter Bajzík, Michal Gallo

Comenius University in Bratislava, Faculty of Management, Center for Management Development and Applied Research
Address of the Institution (Odbojárov 10 P.O.BOX 95, 820 05 Bratislava, Slovak republic) email: peter.balco@fm.uniba.sk; bajzik5@uniba.sk

The Sucess of SMART City in Region Leads Through SMART Universities

Abstract
The SMART services represent significant business potential and many of us perceive them intensively, especially with SMART CITY projects. One of the priority goals of these projects is to improve the quality of services to the population and ensure their accessibility. Despite the efforts made as well as the funds spent, the regions that tried this type of project failed or at least did not succeed. The euphoria that was many years ago has gradually disappeared and there is only a sporadic interest in engaging in such a project. As we realize the potential of SMART services in the future, we tried to look for reasons and causes for this condition. Data collection and analysis (Balco P, Košecká D, Bajzík P, 2021), which we did in 2019, says that one of the reasons for this situation is the education of future users, i.e., the population in this issue, as well as the lack of an environment for verifying pilot projects of this type. How to eliminate this problem or how to respond to this challenge is the topic of our contribution.

Key Words
SMART CITY, SMART university, SMART processes, SMART services

JEL Classification: C21, R13

Introduction

The aim of implementing smart solutions in cities is to improve the quality of life of their citizens. In order to achieve this objective, it is essential to provide efficiency and quality of services and continuously improve them. The concept of smart city is emerged in the 90's and overlap the ideas between the technology development and modern urban design (Albino, V.; Berardi, U.; Dangelico, 2015) and following the aim of delivering sustainable and efficient services for citizens. Caragliu et al. (2011) consider the smart city with the following characteristics: an enhanced administrative and efficiency by using the networked infrastructure, business oriented urban development, social inclusion of urban residents in public services, high-tech and creative industries as well as environmental sustainability as a main factors of smart city development. Discussions around smart cities are also focused on issues of technology, control, efficiency gains and large infrastructure upgrades, economic, operational, administrative, social aspects. The results of some research connect the smart city with smart economy, smart environment, smart governance. (Lazaroiu and Roscia 2012; Lee et al. 2014; Jong et al. 2015). Other researchers divide smart city into three dimensions: technology (hardware

and software infrastructures), population (creativity, diversity, and education) and institutions (governance and policy). Nam and Pardo (2011). The smart city goals are to ensure economic growth and create better employment opportunities, ensure efficient service delivery (such as transportation, water supply, telecommunication) (Dhingra and Chattopadhyay (2016). The SMART CITY is more than use of ICT (information and communication technology) for more efficiency the service delivery.

Deakin and Waer (2011) identify four factors which define smart city:

1. the application of electronic and digital technologies to communities and cities,
2. the use of ICT which help to transform life and working environments within the region,
3. the embedding of such Information and Communications Technologies (ICTs) in government systems,
4. the territorialization of practices that brings ICTs and people together to enhance the innovation and knowledge that they offer.

Other definition includes Frost and Sullivan (2014) which identified eight key aspects of smart city as: smart governance, smart energy, smart building, smart mobility, smart infrastructure, smart technology, smart healthcare, and smart citizen.

The similar characteristics of smart city can be found in the university environment. Universities as an autonomous environment are part of regional economic "eco-system" where SMART services with added value are important for regional development. SMART services in university also want to improve the quality of life for their students and staff members just as smart city for its citizens. University can be considered as a small model of smart city with the same or larger/smaller community with its government, organisation, university life, etc. Coordination of smart university can be easily manageable, but has the similar or common problems to any city: traffic, buildings, catering, green areas, waste, etc. The needs for city and university are similar: effective services, easy access to information, energy management, saving costs and further development.

1. Processes in university environment

Universities play a significant role in the development of region and knowledge transfer that directly contributes to the creation of the social and economic stability. These subjects in process of globalisation and current trends must modify existing business models to reflect new requirements. The new business approaches require support of latest IT solutions, which are emerging along with changes of management, and are rapidly changing the face of higher education and research. For universities, entering of these changes means excessive pressure, but for competition increases they must look for solution how to their reforms to implement in line with regulations and requirements of stakeholders. Universities are often criticized for their inability to respond promptly to a dynamically evolving environment including the modification of business process and portfolio services. In this context, a university must therefore be perceived as an undertaking in which certain business processes take place. Business

processes can be characterized as a set of tasks or activities that are interconnected. These processes lead to a specific product or, as in our case, to a service. Processes that take place in university environment can be divided into two major categories:

1. core business process, including education and research
2. support processes for core business process

In general, we can say that the "3P" model which includes people management, performance management - by using of tools, process management is part of the university environment. These "3Ps" are related to the general management system of the university, which helps to define a clear policy and goals of the university and it reflect the highest administrative structure. This category includes staff involved in the teaching process. At the latest level, there is the educational process itself, which includes the administration of the curriculum, the education itself, the creation, development, and management of subjects, as well as the accreditation of the specialization. During the educational process, students are evaluated what is considered in the output. All previous levels lead to measurements, analyses, monitoring and student feedback. At the end of this cycle, the student becomes a university graduate. This view is, of course, very simplified, but sufficient for our needs. The education that works in an environment that is intelligent and uses intelligent devices and tools can be defined as SMART. As we can see for ourselves, new technological trends are widely accepted in schools and especially in universities. In many cases, universities have successfully adapted to 21st century trends. Universities not only in Europe, but also in Slovakia use technologies such as cloud computing (data storage accessible from anywhere in the world under certain conditions- most prominently the need to connect to the Internet), grid computing (a method of performing calculations that uses multiple computers to achieve the services in separate locations), next generation network services (NGN) and portable devices. All these technologies are integrated with applications in highly interactive frameworks, and it can therefore be stated that SMART universities already exist. However, SMART universities are not just about facilities, but also about people and processes and their access to information, (see Fig. 1)., "Knowledge management" is a fundamental pillar of SMART universities ". Other publications evaluate SMART universities only in terms of the use of modern technological solutions. In this context, the use of radio frequency identification (RFID) or high-frequency, contactless data exchange technology (NFC) is mentioned. The fundament approach in process of building smart university solutions, it is essential to focus on strengthening efficiency and innovation. Such type organizations try to make the environment more attractive to support the arrival of new resources, i.e., investors, companies, talents, and others. This way, it is possible to achieve the growth of the whole eco system in a sustainable way. One of the effects of supporting and creating a more attractive business environment is an increase in competitiveness, which also leads to an improvement in the economic situation. Cities use digital technology and various SMART approaches to achieve optimal economic prosperity, which leads to favorable preconditions for the functioning of all stakeholders. This smart development is a priority for national governments, as they condition the creation of new businesses, jobs and, finally, SMART universities. Smart solutions also include smart organizations, i.e., universities that rationally use the importance and potential of technology to achieve higher productivity of people. Through technology, universities focus on activities and resources that are exposed, leading to increased quality.

All equations must be numbered. Their number must be in brackets, alligned to the right border. A link or a comment to the equation must be included in the text and explanation of all variables must follow.

$$CoLI_r = \frac{\sum_{i=1}^{N} p_{ir} q_i}{\sum_{i=1}^{N} p_{ia} q_i} = \sum_{i=1}^{N} \frac{p_{ir}}{p_{ia}} \frac{p_{ia} q_i}{\sum_{i=1}^{N} p_{ia} q_i} = \sum_{i=1}^{N} \frac{p_{ir}}{p_{ia}} w_i \qquad (1)$$

where p_{ir} is the price and q_i is the quantity of goods or services i consumed in a region r, p_{ia} stands for the mean price, in this case the average price of the 36 cities in 2011.

The text must include links to tables (see Tab. 1) and figures (see Fig. 1).

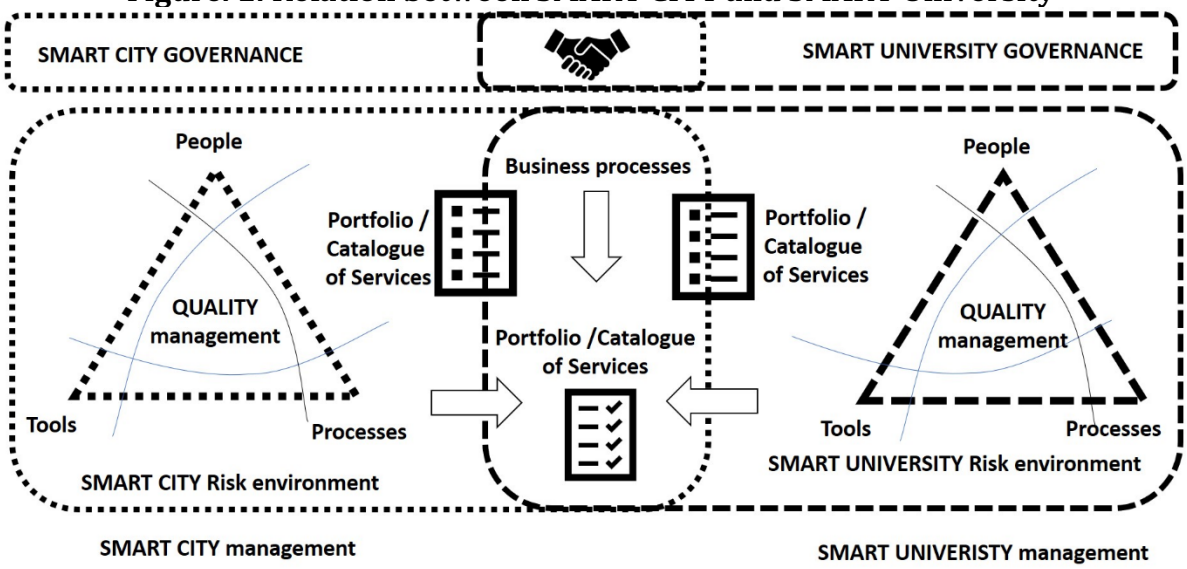
Tab. 1: Basic statistic characteristics in the sample of nominal and real NDHI

Indicator	Standard deviation	Mean	Median
Nominal NDHI	20 125	202 266.34	202 427.73
Real NDHI	14 102	196 166.20	195 479.84

Source: authors' calculations in eViews 8.1

If they provide a better or easier understanding, the figures can be full-color images.

Figure. 1: Relation between SMART CITY and SMART University



Source: authors' processing

2. Scope of research and applied research methods.

The aim of our research was to identify the list of services, SMART services that are preferred by the university environment and to identify their relationship to services that are preferred by representatives of cities and municipalities in Slovakia. In order to achieve the above objectives, the following conditions have been formulated:

1. can we create a catalogue of smart solutions that can be used by cities as well as universities?
2. what services would students welcome, if any?

We collected data for the research through a questionnaire created by us. This was divided into the following three areas:

1. general issues (age, gender, work experience of students).
2. the second part of the questionnaire concerning study programs.
3. the third part, concerning support services.

In addition to the questionnaire, we also used our already performed analyses, which we carried out in Slovakia in order to determine the readiness of cities and municipalities in order to implement SMART solutions. From the point of view of analytical methodologies, we applied textual analysis and description methodology. The methodological tools implemented in the research included: desk research, questionnaire analysis and analysis of a large number of research reports.

3. Experimental results and discussion

The research was carried out by an online structured survey based on a questionnaire, which in 2019 was attended by 876 students from three universities. 486 students were from Comenius University in Bratislava. The subject of the survey was to find out which changes according to students will lead to an increase in the quality-of-service provision at the university and to link these data with the already conducted survey, which identified the interest of Slovak cities and municipalities in implementing SMART services. Here we want to point out that the project was created for the Covid 19 pandemic and therefore the outputs are not influenced by the experience of virtual education and services. After obtaining sufficient data, the questionnaire was processed, evaluated and created in the catalogue of services. We chose students instead of lecturers, because students are "clients" of the university and universities should therefore look for new ways to provide modern services to their "clients". It was extremely interesting to find out that the students themselves are interested in improving the educational process itself, as they identify it as a means of obtaining good job opportunities. Students are the optimal group to carry out this survey because they are at the end of the educational process. The result of the survey is a list of services for education as well as support services that can improve management at universities. Although the output analysis is 14 innovative services, in this document we list the top 5 services for each of the areas. The results of the survey show students' interest in changing services, their electronification and moving towards SMART technologies. These changes concern processes and services in the field of education as well as support processes whose task is to change quality and productivity. The results of the analysis did not surprise us, as there is a long-term demand for a change of services at universities. These requirements are presented in Table 1, List of top 5 SMART services for students oriented to education as well as in Table 2, List of top 5 SMART support services at universities. The tables clearly define the direction of IT technologies and services that use them. It is necessary to realize that data collection was carried out at

the turn of 2019/2020, when online education was still practiced minimally. And when we assume that after three semesters of online education, there may have been a change in opinion on services, we do not anticipate radical changes.

Tab. 1: List of top 5 SMART services for students oriented to education.

Id	Name of service	Service description	% of responses
1.	Experts from practice	The aim is to increase the quality of information, with the participation of experts from the external environment. Enriching education with practical experience from the external environment gives stakeholders a better position in a competitive environment.	88
2.	Sharing of knowledge / students for students	This solution suggests that senior students who have achieved the required knowledge can teach the subject to lower grade students. Students would thus deepen their knowledge in the professional and pedagogical field and share their knowledge and experience with colleagues.	50
3.	Anonymous questionnaires for quality improvement and measurement	Feedback helps with planning for the future, but it is also a tool for checking already used processes.	73
4.	Regularly presentation	The essence of regular presentations is to deepen students' knowledge in the field as well as the ability to present, which we consider a necessity in every life situation.	60
5.	Online platform for digital Communication and education	Replacement of face-to-face education by online tool or hybrid model of education	86

Conclusion

Here is a text of the conclusion. References should be presented in the text in its respective place according to the APA Style® of referencing, page numbers are not used in in-text citations.

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Petr Blaschke[1], Jaroslav Demel[1], Iouri Kotorov[2]

[1]Technical University of Liberec, Faculty of Economics, Department of Marketing and Trade
Studentska 1402/2, 460 17 Liberec, Czech Republic
[2]Karelia University of Applied Sciences, Department of International Business
Karjalankatu 3, 802 00 Joensuu, Finland
email: petr.blaschke@tul.cz; jaroslav.demel@tul.cz; iouri.kotorov@karelia.fi

Innovation Performance of Small, Medium-Sized, and Large Enterprises in Czechia and Finland

Abstract

The aim of this paper is to assess the innovation performance of innovative small, medium-sized, and large enterprises operating in the manufacturing industry in two European countries – Czechia and Finland. The performed analysis is based on the use of selected key performance indicators (related to inputs that are expected to contribute to innovations and the outputs of innovation activities themselves) evaluating the company´s innovation performance. The conducted research tried to identify the most significant drivers of innovation performance with regard to the size group of companies. Moreover, the achieved results are further compared within the innovation environment of Czechia and Finland. In the context of international comparison, it can be stated that in the field of innovation outputs, Finnish companies of manufacturing industry reach comparable (in some areas even better) results with Czechia, although Finland is endowed with more limited resources (approximately 3.5 times fewer companies employing almost four times fewer people). It is worth highlighting the innovative performance of Finnish small and medium-sized enterprises, which in some monitored indicators occupy a much more significant share than in the case of Czechia. This fact can indicate a particular signal, which size group of companies should become a target group of public support aiming to boost innovation performance.

Key Words

innovation, innovation activities, innovation performance, manufacturing industry

JEL Classification: O12, O14, O32

Introduction

Innovation is one of the busiest words today. Many companies are placing increasing emphasis on their innovation activities which are then reflected in their innovation performance. This paper aims to assess the innovation performance of three groups of innovative manufacturing companies broken down by their size based on selected key performance indicators (KPIs) and compare this performance in an international context between two selected countries – Czechia and Finland.

Research by Blaschke & Demel (2019) dealing with the degree of companies‘ involvement in innovation activities within the Liberec region did not confirm that the ownership (domestic or foreign) plays a crucial role in terms of innovation performance. Also,

it cannot be clearly stated that important innovation impulses and movements occur mainly in large foreign-owned companies. This ambiguous result initiated new research dealing with innovation performance in companies of various sizes (small, medium-sized, and large). The key concepts in this research will be the innovative activity of the company, innovation performance, and the size of the company (with respect to the number of employees). The comparison will be made between Czechia and Finland.

In recent years, the world, especially Western authors, have argued that the real drivers of major innovation movements are not large but medium-sized or even small companies, even though they have more limited (not only) financial resources. Klewitz and Hansen (2014) summarize the research of others into the assertion that innovative outputs can be identified in small and medium-sized enterprises (SMEs), especially at the level of product, process, and organizational innovations, and that these companies are the main contributors to sustainable development of national economies. In smaller countries, they have even become the economic backbone, as exemplified by the innovation results of SMEs in Finland (European Commission, 2019).

The OECD (2018) considers as innovation activities all development, financial, and business activities carried out by an enterprise that aim to lead to the creation of innovations. According to Walcher and Wöhrl (2018) or Birchall et al. (2011), innovation is one of the most important strategic tools to help a company to gain a significant competitive advantage in a volatile and competitive economic environment.

Sawang (2011) points out companies often assume that investing in innovation will automatically lead to increased productivity, but investment alone does not guarantee its successful implementation. However, the successful implementation of innovations is associated with realistic goal setting, proper planning of individual activities, constant monitoring, and measurement of results (Chesbrough, 2003). The sum of these company activities enables timely response to problems and corrective measures (Kueng, 2000).

In order to correctly manage innovations, it is essential to monitor innovation performance adequately. Birchall et al. (2011) define innovation performance as the development of the overall innovative capabilities of the company. According to Ahmad et al. (2017), innovation performance includes using new ideas or creativity to lead to innovative performance, which leads to the improvement of existing products (services) or to increased efficiency of current procedures and processes.

Almeida and Sequeira (2019) view innovation performance as the successes and results of established innovations. In the same spirit, Dima (2014) also perceives innovation performance as outputs – i.e., outcomes and benefits that the company derives from a successful innovation process. A more comprehensive view of innovation performance is offered, for example, by Thomas and Murphy (2019), who describe it as the company's ability to transform innovative inputs into marketable and successful outputs.

Bloch (2008) considers the share of innovative companies, i.e., companies that have introduced product or process innovations, on the total number of companies in a given economy to be a very widely used simple KPI related to monitoring or measuring innovation performance. However, according to Arundel (2007), this KPI provides an incomplete picture of the innovative performance of a company, a specific sector or the

country as a whole, and can be misleading in international comparisons. That is why more detailed indicators need to be examined at the microeconomic level in terms of the research goal. However, Amaratunga et al. (2001) argues that there is no such indicator that would be able to capture innovation performance comprehensively. Therefore, it is necessary to use more indicators (relevant inputs and outputs).

1. Methods of Research

Within this research, the innovation performance of companies operating in the manufacturing industry will be assessed and compared not only among individual size groups of the enterprises (small, medium, and large ones) but also within the international environment between two European countries – Czechia and Finland.

The manufacturing industry covers a wide range of activities listed in section „C" of the European Industry-standard classification system NACE (Nomenclature of Economic Activities) designed by the EU. It contains the physical or chemical transformation of (raw) materials (i.e., products of agriculture, forestry, fishing, mining, or quarrying and products of other manufacturing activities), substances, or components (NACE, 2020).

The companies of the manufacturing industry in Czechia and Finland were divided into three categories according to the number of employees: small (10–49), medium (50–249), and large (250 and more employees). The categories reflect the definition of small and medium-sized enterprises based on the European Commission (2016).

Internationality will not be considered in this research, i.e., each category includes both domestic and foreign-controlled companies. Based on the presented views, the innovation performance will be explored from two perspectives – inputs (resources) that are expected to contribute to innovations and outputs of innovation activities (Table 1).

The research will use publicly available aggregated data from the internal database of Eurostat (2021) that collects the data on science, technology, and innovation within the Community Innovation Survey. These data are primarily collected by individual national statistical offices and have also been verified with these sources. The innovative performance of companies will be evaluated based on selected KPIs listed in Table 1. The indicators are further divided into input/output and financial/nonfinancial ones and will be presented in detail in the next chapter of the paper.

Table 1: Overview of monitored key performance indicators

No.	Input Output	Financial Nonfinancial	Key performance indicator
KPI 1	Input	Financial	Expenditure on innovation (including R&D)
KPI 2	Input	Financial	Expenditure on R&D performed in-house
KPI 3	Input	Financial	Expenditure on R&D contracted out
KPI 4	Input	Nonfinancial	Enterprises with R&D performed in-house
KPI 5	Output	Financial	Turnover from new or significantly improved products
KPI 6	Output	Nonfinancial	Enterprises that applied for an intellectual property protection

Source: authors' own processing

2. Results of Research

In this part of the paper, the following tables present the results of the empirical research, which are then analysed in more detail and commented on in the next chapter. Table 2 provides a basic situational overview of the manufacturing industry and innovation movements in Czechia (CZE) and Finland (FIN) – number of companies, number of employees, and total revenues. The data are presented at three levels – all enterprises, innovative enterprises, and product innovative enterprises.

According to Eurostat (2021), a company with successfully implemented product or process innovation in the observed period is considered innovative. Product innovative companies, then, are only the ones with product innovation (regardless of any other type of innovation). Moreover, all monitored data are divided based on the company's size (small, medium, large), and it is also possible to read the share of each size group in the total values.

Table 2: Overview of companies operating in the manufacturing industry (2018)

Size	Total number of enterprises				Innovative enterprises				Product innovative enterprises			
	CZE	%	FIN	%	CZE	%	FIN	%	CZE	%	FIN	%
Small	8 252	68	2 353	70	3 611	63	1 399	63	1 984	53	775	56
Medium	3 054	25	816	24	1 909	29	657	29	1 197	32	454	33
Large	888	7	192	6	691	8	179	8	536	14	160	12
Total	**12 194**	**100**	**3 361**	**100**	**6 211**	**100**	**2 235**	**100**	**3 717**	**100**	**1 389**	**100**
Size	**Total number of employees[1]**				**Employees in innovative enterprises[1]**				**Employees in product innovative enterprises[1]**			
	CZE	%	FIN	%	CZE	%	FIN	%	CZE	%	FIN	%
Small	181.9	16	54.4	19	86.0	11	33.8	14	45.7	8	18.4	9
Medium	327.6	29	79.8	28	209.2	26	66.3	27	136.2	22	46.2	23
Large	616.3	55	154.7	54	511.6	63	147.7	60	425.2	70	139.6	68
Total	**1 125.8**	**100**	**288.8**	**100**	**806.7**	**100**	**247.8**	**100**	**607.1**	**100**	**204.2**	**100**
Size	**Total turnover[2]**				**Total turnover of innovative enterprises[2]**				**Total turnover of product innovative enterprises[2]**			
	CZE	%	FIN	%	CZE	%	FIN	%	CZE	%	FIN	%
Small	14.7	8	15.0	11	8.2	6	9.2	8	4.4	4	5.6	6
Medium	36.8	20	28.5	22	25.1	18	24.0	20	15.9	14	14.1	14
Large	128.3	71	87.6	67	108.0	76	85.5	72	93.6	82	78.0	80
Total	**179.7**	**100**	**131.1**	**100**	**141.3**	**100**	**118.7**	**100**	**113.9**	**100**	**97.7**	**100**

Note: [1] values in 1,000 people
[2] values in mil. EUR

Source: authors' own processing, data from Eurostat (2021)

Finland (with half the population of Czechia) has fewer companies in the manufacturing industry (3.6 times). However, both countries have similar parameters for their division into large, medium, and small. There are 4.6 times more large Czech companies, 3.7 times more medium companies, and 3.3 times more small ones than the Finnish ones. Therefore,

it can be stated that the manufacturing industry is more important for Czechia and its economy than for Finland. If we switch to innovative companies, it is 2.7 times more for all these companies (3.8 times more large companies; 2.9 times more medium companies, and only 2.6 more small ones). And finally, for product innovative companies, there are 2.7 times more (all), 3.4 times (large), 2.6 times more (medium and small) in Czechia than in Finland. Overall, it can be said that a significant part of especially large Czech companies, which are often foreign-owned, can be considered innovative or even product innovative.

Equipment with human resources (HR) in the selected field of the industry once again confirms the key role of large and innovative companies in Czechia. It can be said that the differences in the number of employees largely reflect the differences in the composition of the companies‘ size in individual countries. The monitored numbers favour Czechia having 3.9 times more employees in all companies, four times more in large companies, even 4.1 times more in medium, and only 3.4 times for small companies. For innovative companies, it is 3.3 times more employees (all companies), in large companies 3.5 times more, in medium 3.2 times more, and in small Czech innovative companies, there are 2.5 times more employees than in the Finnish ones. Czech product innovative companies have three times more employees in total as well as in large companies. In medium and small companies, it is 2.5 times more. It can be said that with the growing innovation movement of companies, the difference between Czechia and Finland in the number of employees is decreasing.

The turnover of Czech and Finnish companies shows a significantly smaller difference in absolute values. Czechia shows only 1.4 times higher turnover of enterprises in the manufacturing industry than Finland. For large enterprises, it is 1.5 times higher; for medium enterprises, 1.3 times higher, in small enterprises, the total aggregated sales are the same (of course, with a different number of enterprises – see Table 2). For innovative companies, Czechia shows only 1.2 times higher turnover than Finland. For large companies, 1.3 times higher, for medium companies, the turnovers are the same, and in the set of small innovative companies, Finland already has a turnover 1.1 times higher than Czechia. For product innovative companies, the trend is even more pronounced. Czechia shows only 1.2 times higher turnover of all companies; in small companies, Finland already has a turnover 1.3 times higher. With a greater focus of companies on innovation (specifically product innovation), the turnover of Finnish companies, especially small ones, is increasing compared to the Czech ones.

Table 3 summarizes the KPIs identified in the previous chapter. Based on the performed literature research, the monitored KPIs consist of four indicators related to sources of innovation performance (inputs) and two which include outputs of innovation activities (outputs).

Due to the unavailability of data at a lower level, all KPIs are monitored on the set of all companies operating in the manufacturing industry (i.e., both innovative and non-innovative companies are included). However, the authors believe that innovative companies make up the majority share by the logic of the matter. For non-innovative companies (i.e., companies that did not implement any innovation), it can be assumed that they invest in innovations or R&D only in sporadic cases. The same is true in outputs –

non-innovative companies logically cannot have revenues from innovated (i.e., new or significantly improved) products.

Table 3 presents the monitored KPIs. KPI 1 – expenditure on innovation – includes, in addition to R&D expenditure both performed in-house and contracted out, also other spending related to the successful implementation of innovation – e.g., acquisition of buildings, machinery, equipment, software, fees related to intellectual property rights, labour costs of internal and external employees involved in the innovation process, etc. KPI 2 and KPI 3 then focus exclusively on the area of R&D financing which is monitored internally within the company (KPI 2), but also externally in cooperation with other partners such as suppliers, universities, commercial labs, government, public or private research institutes and others (KPI 3).

Within KPI 4, the total number of companies (according to individual groups) that perform their own R&D is monitored, i.e., they have their own R&D department. These manufacturing industry companies can undoubtedly be described as innovative so that they will belong to this group. KPI 5 deals with sales, either from new or improved products. This indicates the turnover of product innovative companies. KPI 6 presents a number of enterprises that applied for any intellectual property (IP) protection, including an application for patents, registration of an industrial design, trade mark, copyright, or trade secrets.

Table 3: Key performance indicators (2018)

Size	KPI 1				KPI 2				KPI 3			
	Input – financial[1]				Input – financial[1]				Input – financial[1]			
	Expenditure on innovation (including R&D)				Expenditure on R&D performed in-house				Expenditure on R&D contracted out			
	CZE	%	FIN	%	CZE	%	FIN	%	CZE	%	FIN	%
Small	342.1	8	332.5	9	68.7	7	183.9	7	15.1	3	48.8	14
Medium	1,008.4	24	696.8	19	185.9	14	398.9	14	76.4	16	147.4	42
Large	2,839.1	68	2,677.0	72	627.9	79	2,169.8	79	391.5	81	158.1	45
Total	**4,189.5**	**100**	**3,706.3**	**100**	**882.4**	**100**	**2,752.6**	**100**	**483.0**	**100**	**354.3**	**100**
Size	**KPI 4**				**KPI 5**				**KPI 6**			
	Input – nonfinancial				Output – financial[1]				Output – nonfinancial			
	Enterprises with R&D performed in-house				Turnover from new or improved products				Enterprises that applied for an IP protection			
	CZE	%	FIN	%	CZE	%	FIN	%	CZE	%	FIN	%
Small	1,628	51	920	56	1,289.1	4	1,659.6	8	1,206	43	479	37
Medium	1,085	34	548	33	4,007.6	12	3,248.5	16	1,092	39	491	37
Large	474	15	175	11	27,037	84	15,193	76	530	19	340	26
Total	**3,187**	**100**	**1,643**	**100**	**33,333**	**100**	**20,102**	**100**	**2,828**	**100**	**1,310**	**100**

Note: [1] values in mil. EUR

Source: authors' own processing, data from Eurostat (2021)

For KPI 1, Czechia reports only 1.1 times higher expenditures of all enterprises on innovation including R&D. Compared to Finland, large and small Czech enterprises show essentially the same level of expenditures, medium Czech enterprises 1.4 times

higher than Finnish ones. If we again consider the different number of companies (see Table 2), the Finnish invested resources are up to three times larger.

From their own resources (KPI 2), all Finnish companies invest three times more in R&D than Czech ones. For large companies, it is almost 3.5 times; for medium companies, it is more than twice as much; for small companies, it is 2.7 times more. The contribution of large Finnish companies to innovation "from their own resources" is very significant here.

From external sources (KPI 3), all monitored Finnish companies invest 1.2 times less than Czech ones, 2.5 times less for large companies, 1.9 more for medium companies, and 3.2 times more for small ones. It is obvious that in Finland, external support is mainly targeted at small enterprises.

KPI 4: Finland has 1.9 times fewer companies with their own R&D than Czechia, 2.7 times fewer large companies, twice fewer medium companies, 1.8 times small companies. Considering the total number of companies in the manufacturing industry in Finland and Czechia, it is evident that large and small Finnish companies have their own R&D units more often than Czech companies.

KPI 5: Czechia has 1.6 times higher turnover from innovated products than Finland. For large companies it is 1.8 times higher; for medium companies, 1.2 times; for small companies, there is 1.3 times higher turnover in favour of Finnish companies. It means that especially small Finnish companies can monetize their innovative products significantly better than Czech small companies.

KPI 6: Czech innovative companies in the manufacturing industry have twice as many enforced intellectual property rights than Finnish ones, 1.5 times more for large companies, about twice more for medium companies, and 2.4 times for small companies.

3. Discussion

Looking at the number of innovative companies operating in the manufacturing industry, the data show that compared to Finland, Czechia has a certain quantitative advantage – there are almost three times more innovative companies – the most striking difference between the two countries is the representation of large companies – Czechia having almost four times more than Finland. The number of employees corresponds to this – innovative companies of the manufacturing industry employ almost three times more people in Czechia. The most significant difference is again in the group of large companies.

However, this trend is no longer proportionally reflected in the total sales of individual groups of companies – Czech and Finnish innovative companies generate practically the same amount of sales (slightly in favour of Czechia). However, Finland holds first place in the groups of small enterprises (EUR 9.2 million vs. EUR 8.2 million).

Another significant difference is in the financial resources that companies invest in innovation activities. In absolute terms, the amounts are quite balanced. However,

considering the number of companies, it is clear that Finnish companies have significantly more resources. Interestingly, large Finnish companies make extensive use of their resources.

Conclusion

The objective of the paper was to assess the innovation performance of three groups of innovative companies (small, medium-sized, large) operating in the manufacturing industry and compare it in an international environment between Czechia and Finland.

Based on the performed analysis, it is impossible to identify the size group of companies that is the essential carrier of innovation performance. However, considering the frequent claims about the limited resources of small and medium-sized enterprises, it is clear that their outputs, observed in this article, show at least comparable innovation performance. This is especially obvious at Finnish small and medium-sized enterprises – with a significantly smaller number of HR, they show considerably higher innovation performance than Czech small enterprises.

Finnish small and medium-sized enterprises can draw external financial resources for their own innovation activities very well. The same model of public support use would probably be applicable in the Czech conditions as well – this may motivate further research of the authors. Still, it would mean a stronger involvement of other fundamental pillars of innovation activities, such as an adapted education system (especially higher education) and support of start-ups.

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Irena Jindřichovská
Metropolitan university Prague, Dubečská 10, Department of international Business, 900/10, 100 00 Czech Republic
email: irena.jindrichovska@mup.cz

Dana Kubíčková
University of Finance and Administration, Estonská 500, 101 00 Prague10
email: dana.kubickova@centrum.cz

Family Firms and Financial Literacy

Abstract
This empirical paper aims to establish the link between the characteristics of family firms, their goals and performance as linked to the influence of financial literacy of their owner-managers. The used methodology is based on four case studies of Czech family firms involved in services, food production, manufacturing and electrical engineering. The exploration is based on semi-structured interviews with open-ended questions. This research tool allows us to precise our findings with ensuing discussions. We have found out that family firms do not insist on maximizing the profit of their activities, but they usually strive to keep the business in reasonably sustainable conditions with the first aim to financially secure the family and another more ambitious aim to hand the venture over to the next generation. Therefore, good name and high-quality products and services become important imperatives for family businesses. Money usually only plays a secondary role in business conduct, even though the owners are aware of their importance for continuous operations. Financial literacy of owner-managers and education of involved staff, in general, is important, but the practical experience and family tradition are considered to be more important. This is usually the case when the firm is small. After the firm extends the operation, the usual managerial systems and more advanced guiding practices including strict KPIs prevail.

Key Words
family firms, financial literacy, business goals, conservatism, tratitions

JEL Classification: M10, M13, M19.

Introduction

Family firms typically form a very important proportion of businesses in every national economy. In this study, we concentrate on the prerequisites of good financial management of this cohort and its linkage to the education and financial literacy of managers, their specific business goals. We also assess the complexity of tools of their financial management and distribution of their financial results. Family firms were in the focus of previous studies from several perspectives. In this research, we employ a holistic concept trying to capture the broad context of each family firm including their history and their major business attributes as well as the way of their financing. The specific feature of our research subject is a frequent blending of family and firm finance, which is sometimes difficult to

disaggregate. Results of firms are frequently considered to represent the family brand. Which is considered to be the greatest value of the firm. The question of money generation, even though it is perceived as important, is considered to be only a secondary goal.

The study analyses typical business situations in four family firms involved in services, food production, manufacturing and electrical engineering. We use semi-structured interviews, allowing deeper discussion with family representatives. This approach allows us to appreciate particular approaches of family firms to specific situations of firms during various stages of their business development. We explore common tasks of managerial finance, e.g., cash flow management, budget preparation, follow up of financial results, product pricing and the like. At the same time, we hope to learn a bit about the specificities of family firms behaviour in today's rather hectic conditions around the coronavirus crisis.

1. Previous studies

Financial literacy and its role in the economy have been a topic of research for the last three decades. Attention to the problem of financial education increased at the end of the 1990s with the increase in financial market operations conditioned by the development of information and computer technologies. Researchers aimed to analyse the ability to make financial decisions from many points of view: they assessed, for example, the ability to use various financial products, to make the financial decisions for future needs and its impact on wealth, the relation between wealth and financial education, etc. Some studies focus on the problem of measuring the level of financial literacy and whether there is a relationship between financial education and financial welfare. This is usually closely tied to retirement planning and wealth accumulation (Lusardi and Mitchell, 2011).

Other studies stressed that obligatory financial education in high schools significantly increased adult propensity to make savings (Bernheim et al., 2001). The others also discussed the content of the financial literacy category itself (Lusardi and Mitchell, 2014). Many studies were conducted to measure and compare the ability of financial planning and make personal savings in various countries, social groups or generations to examine the links between financial knowledge and investment behaviour (Delavande et al., 2008, OECD, 2020).

Although the number of studies on financial literacy is increasing, there is no unanimous view of what financial literacy really consists of. Most often, financial literacy is understood as financial knowledge (Huston, 2010), however, many researchers point out that it is a broader category and stress that being able to make the right financial decisions is based on additional components. Lusardi & Tufano (2015) extended the concept of financial literacy by including decision making in everyday elementary situations, e.g., ways of payment, use of credit cards, keeping a family budget, making mobile payments, etc. Some authors tried to classify the elements of financial literacy (Remund, 2010).

A special group of studies aims to assess the financial literacy of young people and students of both secondary schools and universities (Lusardi et al., 2010, Kubíčková et al., 2018, Kubíčková & Nulíček, 2020). Their findings bring some new aspects of financial literacy and factors that influence its level and scope: students from wealthy families prove to have a weaker financial literacy compared to their poorer peers, financial literacy is more related to foreign language skills and general cognitive aptitude or the level of personal social integration, gender differences, etc. (MacGregor Pelikánová & MacGregor, 2020).

The importance of financial literacy has been highlighted even more by the financial crisis in the first decade of the century. It showed that everyone's ability to make qualified financial judgments and decisions in connection with the personal financial conditions is a basis of the financial stability of the whole economy (Smyczek & Matysiewicz, 2015, Lusardi, & Mitchell, 2014). "The endogenizing financial knowledge has important implications for welfare as well as policies intended to enhance levels of financial knowledge in the larger population." (Lusardi, & Mitchell, 2014, p. 5). Many specific international projects were prepared with these experiences in mind, aiming to increase the level of financial education on both European and worldwide level.

In 2020 the OECD conducted a second international survey of financial literacy competencies using the globally recognised OECD/INFE toolkit (OECD, 2020). This research compared financial literacy as an element of financial resilience in 26 countries. Financial literacy is defined as an ability to create a financial cushion, cope with a financial difficulties and disstress, develop behavioural traits promoting long-term planning and saving, keep control over money, take care with expenditure and avoid financial fraud. The results revealed the financial literacy is low across the sampled economies and confirmed that there is plenty of room for improvement across all the elements of financial literacy: knowledge, behaviour, attitudes, financial products use, etc. In this research, financial literacy is assessed in a broader sense and becomes an incentive to the next research concerning the category of financial literacy.

The importance of financial literacy in the conditions of SMEs is addressed by relatively fewer studies, usually in connection with the specifics of these firms' management (Dickins at al., 2016, Bialek-Jaworska, Nehrebecka, 2016, Hussain et al., 2018). The specifics of financial management in family firms became a topic of research papers in the last three years (Omar et al, 2017, Molina-García et al, 2020). Researchers are focusing on the various aspects of the application of financial knowledge in these firms: on the effect of financial literacy on the firms' performance, on the growth of family businesses, on the way they manage their finance and how they address the concept of sustainability (MacGregor Pelikánová et al, 2021). The results highlight the importance of owners' adequate financial education as a condition for improving the firms' performance and facing the future challenges.

2. Methods of Research

The basic research approach is composed of open-ended questions targeted to stimulate discussion with representatives of family firms. As to the structure of enquiry: The first part provides a general description of the family businesses. Ensuing by questions on the financial management of the company and the issues of financial literacy of owner-managers are explored including assessment of financial literacy of other company members. The questionnaire was developed and adjusted from the previous research used in the conference paper by Jindrichovska and Kubickova 2021 "Financial Management of Family Firms" presented at conference AMIS 2021 (forthcoming).

Part 1 – General Characteristics - company business, its management and structure

a) How were the initial steps of your business as a startup organized and who ran the finances at the beginning?
b) Did you start the company relying solely on your own resources (e.g., from your savings) or have you employed any other source (e.g., a loan)?
c) How did the company develop over time in terms of the complex business structure?
d) How would you define the strengths and weaknesses of the company?
e) Which feature would you consider to be the most important attribute of your business?

Part 2 – Financial management of the company

a) What is the current capital structure of your company? (Debt-Equity mix).
b) Did your company get into any financial difficulties? How did you deal with them?
c) Do you perceive taking a bank loan a risky solution?
d) Do you set up any financial goals for your company and do you create any budgets for the company? If so, please explain.
e) Have you implemented any large investment project? And if so, how did you finance that project?
f) Do you intentionally create any reserves (or so-called cash cushion) for possible financial problems / negative developments of the company?

Part 3 – Financial training and experience of managers

a) What is the field of education (major) of your company founder / CFO)?
b) Have you or your company founder or CFO attended any specialized courses on company finance? (i.e., workshops or seminars focused on financial management in a family business or on financial management in general? If so, which ones?
c) If you as an owner have managed the company finances, at which point/time did you hire a CFO or employ another family member for this position?
d) Are you carrying out any analyses of your company's financial situation?
e) What financial indicators do you use for your financial management?
f) How do you manage the generated profit (retained profit) of the company?

Part 4 – Financial literacy of the owner or CFO and issues of personal finances

a) Could you explain the basic concepts of financial decision-making?
b) Are you generating any savings as a person? If so, do you use any services such as a savings account, building savings, etc., or do you invest your saved money in capital assets?
c) Do you use any ready-made web-based applications to track your finances? Please, specify.

3. Results of the Research

For the purposes of the research, four family businesses were selected, purposefully from different fields of business, with different structures and histories, in order to obtain data on diverse conditions of family businesses.

Case study No 1 – Firm A operating in the field of services:

The first company is engaged in the service sector performing bookkeeping and accounting works since 1991. The current legal form of the venture is a limited liability company owned by the son of the original founder. Until then this legal change the founder operated as a natural person cultivating a steady portfolio of customers, which he gradually handed over to his son. In 2018, the granddaughter of the founder also started working in the same company. This was the impulse for gange of the legal form. Now, the son and granddaughter are the current co-owners.

The orientation of the son is a university degree in agricultural production. His daughter, the second co-owner, is also a university graduate specializing in marketing communication. However, the daughter does not consider her education and qualifications in a particulat field to be decisive for good business:

> *"Education is, of course, important and it can make starting a business much easier. But it is not an ultimate prerequisite for running a successful venture. In this respect, practice is much more relevant. The ability to try new activities and the courage to take risks is critical. The help of your parents is also important. "* [Respondent A]

The nature of the service is to provide consulting to a permanent portfolio of customers. The bookkeeping and management of financial processes is mainly represented by cash flow management and monitoring of selected indicators: ROE, liquidity, CF, EBIT. However, monitoring is not performed systematically. No financial plan or budget is created. Expenditures – both corporate and personal finance - are monitored simultaneously on a cash flow basis. Mobile applications are used as a simple control tool. Financial literacy in the direction of the ability to rationally regulate financial processes is the result of practice in the company. This has now been expanded by the studies of the current co-owner-daughter of the founder.

Case study No 2 – Firm B operating in the field of food production.

The second family company is engaged in the production of cider drinks. The firm was founded in 2016. The founder and his wife left the city for the countryside in 2005. Previously he worked in the city as a crisis manager and his wife was active in marketing. In a new place he wanted to test his business skills in the field of crafts (carpenter, interior designer) and his wife in the hospitality industry.

Both have a high school diploma. Husband in economics, and the wife from comprehensive school. During their operations in a restaurant, they became interested in the cider drink, that they purchased from a local supplier. This was an inspiration, and they decided to produce their own brand. The husband studied courses on arboriculture at university even before founding the company.

In 2016 after two years of trial production, the couple established the company named “Dad’s Orchard”. The company is owned by the founder, his wife works as a natural person and a cooperating family member. The whole production process is performed by the couple. For seasonal jobs, they hire external workers, and their young children also help. The husband manages and supervises the technology, the wife is in charge of the administration, business and finance. The aim of this family business is to extend production up to the size, that is manageable in their conditions and fits their own capabilities.

The financial side of the company is taken care of by founder’s wife, but they consult on important decisions together. Although they have work experience and a basic knowledge of finance, they usually make decisions based on "common sense". They founded the company and finance it mainly with their own capital, but they used a bank loan to expand their production. They do not consider taking bank credit a risky decision if there is a well-thought-out project behind it. For another project they draw subsidies from the Rural Development Fund.

Neither ambitious financial goals nor profit orientation was an important goal for the founders. The company did not encounter any financial problems yet. They solved the challenging year of the pandemic by setting up and expanding internet sales. A good reputation and brand also helped - people came to shop automatically. The husband perceives climate change and the droughts as serious threats, which have plagued farmers in recent years.

Although the company had almost yero sales in 2020, the founders did not get into financial troubles, thanks to the reserve created from the profit in previous years. The founders invest all the profit in the company, either as a reserve or to expand production.

They try to create financial plans based on customer demand. They evaluate the company's financial situation according to turnover, profit and the number and size of customers’ orders. They perform the analysis of their results continuously, not on any specific date, which gives them a constant overview. However, they do not mention the use of any specific financial indicators. They do not calculate the return on investment in more detail.

"The goal is to lead a normal life on the farm, and not to get rich. The goal of our family firm investment is to get the highest possible product quality, rather than becoming a millionaire." [Respondent B]

Both partners theoretically explain the key concepts of financial decision-making. But they do not use it systematically in company management. Morefover, the corporate and family finances are not clearly separated. Apart from the current account the firm does not use any other bank product. The owners make their decisions intuitively according to the balance on the account. They do not use any savings account nor building savings, which represent a very low level of risk. Instead, they invest in riskier but more profitable assets.

Case study No 3 – Firm C operating in the field of manufacturing industry

The third company works in manufacturing and electrical engineering. It was established during the privatization process in 1994, originally as a trading company in the field of the door assembly and shading a natural person technology: purchasing supplies from Germany and selling them in the Czech Republic, including assembly and service.

The original founder was a craftsman's wife - the grandmother of the current co-owners. She provided business contacts and her husband performed assembly and technology. The company gradually grew, later expanding its activities to include its own production. It currently employs more than 50 persons, but the number varies according to orders.

The firm capital expanded and it has been taken over at the end of the 1990s by the son of the founders - a civil engineer who is the current co-owner. He is a graduate of the Czech Technical University, majoring in civil engineering, and after his studies, he first worked for several years as an employee and manager in a construction company. He used his experience, among other things, for personal investment in real estate, which later became a source of capital for the takeover and expansion of the company.

He now owns the company with his brother. According to current management:

"At present, the company is the largest in its field in the Czech Republic, however, other companies from Moravia and also from Poland are gaining a significant stake on the market, so the company has to face growing competition." [Respondent C]

The company also employs other family members: the wife and children of both brothers. His son, who is studying economics at university, is preparing to take over the company. Both current owners are aware of the need for investments for which they generate sufficient capital, but it is becoming more difficult to decide on the next direction, not least as a result of the Covid 19 pandemic.

Finance is managed by the owner's wife. She took over this area at a time when the number of employees in the company was increasing and its management became more extensive and demanding. The wife has an education in economics

and also experience in managing a company from its beginnings. Other areas of the company's activities - orders, purchases, relationships with suppliers and customers, technology - are provided by both brothers together, without defining specialization in a particular area.

The company was originally established exclusively from own equity – personal savings of grandparents. The expansion of activities at the end of the century was based on capital, brought by the son – as a result of his activities in the real estate investments. At present, the company is financed exclusively by its own equity. The loan is considered quite risky and still was not used. This indicates a certain degree of financial literacy and prudence and also good effectiveness of the activities till now.

The company does not create any general budgets, however a detailed budget for every order is created with special attention to the level of cost in all items and to the margin and price. The company intentionally creates a reserve for crisis situations in the amount of 12 monthly costs. For the other free cash money, the terminate bank accounts are used. A part of the equity is invested in real estate.

The owners of the company analyse the financial results at the end of the year, but only with regards to the whole results (sales) and tax liability. The evaluation of individual aspects of the financial situation such as profitability, productivity, inventory turnover, etc. is not performed systematically. The generated profit is usually left in the company for investments or savings. Personal savings are not created.

Both co-owners know the methods of financial decision-making (time value of money) and the evaluation of the financial situation, but they do not use it in practice of company management. The company considers decent and honest conduct to be the main strengths of their management, and they now consider growing competition to be a weakness and not a clear ability to deal with it.

Case study No 4 – Firm D operating in the field of electrical engineeging

The company operates on domestic market since 2002, when, as a family business, it continued the local tradition of the electrical engineering industry. When founded, it focused on the growing demand for contactless technologies. In almost twenty years of its existence, the business has gained the position of a leading manufacturer of components for radio frequency identification technologies (RFID) in the Czech Republic and in Europe. Thanks to its strategic location, it exports its products to the entire European Union and supplies products to the USA and Canada. All products are produced in the country exclusively, thanks to which it can guarantee precise control of all production processes, and high quality of products.

The company was founded by two partners, former employees of a local company with a similar program. They found support in an Italian collaborator who became one of the co-founders of the original company. He left the company after a few

years and the company has been operated and managed by two original founders ever since. Their children are currently preparing to take over the company.

Both founders have a university degree in electrical engineering. And both are involved in managing the process in the company - both are responsible for a specific area and products. When founding, they used only their own capital - personal savings, which were extended by a third partner - a foreign worker, who left the company after starting up. The company still uses only equity and short-term interest-free resources (liabilities). It does not use a bank loan, but the management does not see any risks in it and are prepared to use it if necessary.

They do not prepare any financial plan, nor do they set any specific goals, the overall and long-term goal is to maintain a stable financial position. According to current management:

> *"Significant position on domestic and European market is the main advantage. The next strengh is the wide portfolio of products and high flexibility of small series production. The main weakness is the shortage of highly qualified workforce."* [Respondent D]

CFO is a family member who has an economic education in finance. In addition, he uses his experience gained ove many years. The company also employs other family members, the daughter is studying at a university of economics.

The achieved profit is left in the company a large investment project a few years ago was financed from own resources and short-term liabilities. Provisions are created made for possible future risks. The company compiles financial statements - accounting is kept by the company's employees. The evaluation of the achieved results is carried out not systematically, but selectively: the profit and the structure of costs are monitored. Other indicators are not used to assess profitability or other aspects of the financial situation. More attention is paid to the business area - the volume, structure and regularity of orders and the development of demand are monitored.

Neither the time factor nor other methods of financial decision-making are used when deciding on investments in other areas. The company has not yet had to deal with any crisis situation, it was not significantly affected by pandemic measures last year. As far as personal finances are concerned, an investment portfolio is purposefully created, which is to secure not only the company but also individuals for the period when they will not work in the company.

The following table provides a summary of the identified features of individual companies:

Table 1 **Key characteristics of family firms**

	Firm A	*Firm B*	***Firm C***	***Firm D***
Part 1	**General characteristics**			
Field of education of the owner(s)	*a) agriculture* *b) marketing communication*	*a) economic hi-school + specialty enterprising;* *b) comprehensive education*	*University degree in construction, courses in firm´s management and crisis management,*	*a) electrical engineering* *b) financial*
Division and performance of managerial functions	*By agreement, as needed.*	*By agreement and specialty*	*When the company expanded to more than 30 employees - the financial management was taken over by the wife*	*Owners – business and sales management + hired workers for specific areas.*
Source of capital endownment at the inception	*Own Capital Exclusively*	*Own Capital Exclusively*	*Own Capital Exclusively*	*Own Capital exclusively*
Additional sources of capital	*Own Capital*	*Own Capital, bank loan, subsidies*	*Own Capital (savings), subsidies*	*Own capital*
Company structure	*None: two cooperating owners*	*None: two cooperating owners*	*None: two cooperating owners (brothers) and family members*	*Two cooperating owners and managers responsible for specific product - areas.*
Main strengths vs main weakness	*Loyal customer portfolio / plain financial management*	*Exceptional product, good background, and cooperation within the company / narrow market orientation (Hospitality gastronomy market)*	*mutual trust, maximum productivity, large equity, the largest company in its field in CZ / growing competition in the Czech Republic and abroad, lack of investment management*	*wide portfolio, small series production / need for highly qualified workforce*
Most important feature	*Customers, personal contacts,*	*Well-build brand*	*Fairness, decency, reliability*	*Significant representation on the domestic and foreign markets*

Part 2	**Financial management**			
Current capital structure	*Only equity*	*Equity, loans*	*Only equity (part invested in real estate, among others)*	*Equity, short - term interest - free liabilities*
Risk of bank loan	*They do not perceive any risk, but it depends on the amount*	*They do not perceive any risk.*	*They perceive bank loan as a high risk.*	*They do not perceive any risk.*
Financial goals and discounting	*No specific goals are set up, but the company should be passed to the next generation in good order*	*No specific goals are set up, the goals are set up outside the financial goals.*	*No specific, financial budget is prepared for every order separately (costs and margin)*	*No specific objectives, especially maintaining a stable financial situation*
CFO – hired or family member	*Family member*	*Family member*	*Family member*	*Family member*
Use of discounting method for decision making	*No*	*No*	*No*	*No*
Possible large investment project and its financing	*They do not consider any major investment. In such case they would rely in own resources*	*They invest own capital plus they do not hesitate to use a bank loan*	*They used only own capital (accumulated earnings).*	*Large investment project financed in part by own resources and short-term liabilities*
Creation of financial reserves	*Yes*	*Yes*	*Yes*	*Yes*
Courses of financial management, financial education	*Family experiences*	*Previous business experience*	*Course in firm´s and crisis management*	*Previous business experience*
Position of CFO	*Owner*	*Owner and his wife*	*Owner´s wife*	*Owner*
Use of profit	*Creation of reserves, but not investment*	*Creation of reserves, for investments and further development*	*Creation of reserves (term deposits, bank accounts)*	*Creation of reserves, investments*

Part 3	**Financial training and experience**			
Education of CFO	*Agricultural/ Marketing*	*High school comprehensive + experience with previous business activity*	*Technical + managerial course/ expertise (wife)*	*University degree - finance*
Financial distress	*Not experienced*	*Not, even in the covid year (reserves)*	*Yes (solved by reducing costs: wages, number of employees)*	*Not experienced*
Usage of financial indicators	*Yes: ROE, ROI, liquidity (P&L), EBIT*	*No systematic use. Focus only on revenues, earnings, and volume and frequency of customer orders.*	*No systematic use. Focus on revenues and tax liability, overall situation at the year´s end.*	*Non-systematic use, focus on profitability, profit, cost, tracking the volume and regularity of orders*
Financial information and financial direction	*Records of income and expenses, surplus to savings*	*Only cash flow, financial statements and tax returns prepared externally.*	*Only cash flow via bank accounts, looking for investment possibilities*	*All relevant financial statements*
comparison of results with the other occasion	*No*	*No*	*No*	*No*
Web-based application	*Yes*	*No*	*No*	*Yes (software Helios)*
Credit card/bank account	*Apple-pay, Walet*	*Bank account, internet-banking*	*Term bank accounts, real estates*	*Bank accounts, internet-banking*
Part 4	**Financial literacy**			
Ability to explain basic concepts of financial decision	*Ability to explain it, but not used in practice*	*Ability to explain the concepts, but not used in practice*	*Ability to explain basic concepts, but not used in practice.*	*Ability to explain them and partly use in practice.*
Personal savings	*Yes, after payment of all liabilities*	*No.*	*No personal savings. Firm´s savings treated are treated conservatively.*	*Yes, an investment portfolio is being created*
Personal financial goals	*No*	*No*	*No*	*No*

Source: Authors investigation

4. Discussion and Conclusion

The goal of this research was to find out what is the level and importance of financial literacy for the successful management of family firms. Multiple case study method assisted by semistructured questionnaire was employed as the main research tool. We have explored the education of management of family firms and also the way how financial management is organized (Bernheim et al., 2001; Hussain et al., 2018; Omar, et al., 2017).

Similarly, as in previous studies irrespective of the field of operation, finance was not playing any dominant role in corporate decision-making especially when the family business was young. Corporations concentrated on the quality of product or service provided and protecting or upgrading the good name of the firm. Furthermore, the management was very conservative and the companies employed almost exclusively their capital or short term finances represented by suppliers' liabilities. As to the personal structure, the management consisted almost solely of family members dominated by the founder-manager or the next of kin in the family structure (Remund, 2010; and Molina-García et al. 2020).

The main advantages of family firms are considered: *"practice and ability to try new activities"* [Respondent A]. As to the goals, the second company insisted that *"The goal is to lead a normal life, rather than becoming a millionaire."* [Respondent B]. The third family firm was already reasonably large and dominant in the region. Thus the *"growing competition"* even international represented a weak point for the development of the company according to [Respondent C]. Finally, the fourth company considered as *"The main weakness the shortage of highly qualified workforce"* [Respondent D].

In this study, we have analyzed selected elements of financial management in family companies of different sizes have been explored and compared: Company A and B were micro-companies, whilst companies C and D medium-sized companies. We assumed that the greater complexity of business processes in medium-sized companies would require more detailed attention to financial management and more complex procedures of financial situation. However, this empirical study disclosed it this is not the case in our limited sample. Even in medium-sized family companies, financial management is based on the same principles and to the same depth as in micro-companies. Financial goals and financial results in general, are not the primary areas on which the family business and its management insists.

As we have witnessed, the main attention is devoted to social and technical aspects of the activity: perfection of technological processes, good relations with customers and suppliers, excellent quality and good reputation of products. Financial goals are only secondary. The issues of prospective financial goal, assessment of the financial situation, financial planning are considered to be marginal. Some caution is devoted to capital structure to the imperative to achieve a profit (Lusardi and Tufano, 2015). However, this is principally based only on common reasoning. It is not based on the findings and principles of financial theory. Nonetheless, our findings still need to be verified by analyzing the behaviour of a larger sample of other micro-and medium-sized companies (Remund, 2010; Omar et al., 2017). Another level is a comparison with the conditions of family micro-and medium-sized companies in different countries, especially in countries with traditional market economies.

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Veronika Juríčková and Elena Gregová

University of Zilina, The Faculty of Operation and Economics of Transport and Communications, The Department of Economics
Univerzitna 1/8215, 010 26 Zilina, Slovak Republic
email: veronika.galgankova@fpedas.uniza.sk

The Importance of Investment for Startups and Their Future Earnings

Abstract

Investments are a very important part of the business process of any company, and therefore it is important to know their meaning, nature, and effects. Without investment, no company can expect long-term development. It is important for a company to go through individual life stages, so that constant investment in business development activities will ensure that it remains on the market for a relatively long time, which can be described as "efficient". Investments, therefore, play an important role in companies. In the case of startups as start-ups, investments are a necessary part of their establishment in the market. Especially at the beginning of their life cycle, investments are the basis for the very establishment of a startup. The aim of the article is to theoretically describe the importance, functions of investments and determine their importance for companies, specifically for startups. The article also characterizes the individual investment phases of startups - the required amount of investment, the main investors, earnings of startups. The article uses the methods of analysis and comparison necessary to compare the individual investment rounds. The result of the article is the creation of the importance of investments for the startup, the determination of individual investment rounds during the existence of the startup, and the determination of their amount.

Key Words

investment, startup, earnings

JEL Classification: E22, G32, L20

Introduction

Investing is the conscious activity of an investor who invests his temporarily free resources in financial assets, which are evaluated over a predetermined time horizon. The investor should be aware that at the end of the time horizon the expected result of the investment may be unfavorable and must accept a certain degree of risk by entering the market.

One of the basic principles of investing is prudence. Anyone who wants to enter the markets should know themselves and be able to answer the following questions: How much does it want to invest? How much can he take? What is the investment horizon? For what purpose does he want to value his money? Before starting the investment process, it is necessary to realize whether the company has sufficient financial resources from which to finance the investment, whether it has enough capital to make the investment.

A crucial task for any company is to decide whether or not to make an investment because the possible consequences affect the prosperity of the company and the decision can not be changed or can change at the cost of large financial losses, while the consequences of investment decision are long-term. The investments are mainly in the form of a project and are implemented with the intention of positively influencing the company's performance, thus representing a future source of profit, but also the current financial burden.

The word investing comes from the Latin verb "investire" or "investitura" with the meaning fabric or. coverage. The simplest definition of investment activity is the use of temporarily free funds in order to increase its value in accepting the risk of loss or profit. The economic entity that performs this activity is the investor.

Benjamin Graham (2003) distinguishes between investment and speculation. He defines the investment as follows: “The investment operation is carried out on the basis of analysis, promises security and an adequate return. Operations that do not meet these conditions are speculative. "

Investing is not a one-time act. It is linked to a cycle of activities that follow each other cyclically and are aimed at continuously monitoring the market and deciding on the next step in a given situation. So we can talk about the stages or stages of investing. When defining the term investment, we distinguish the phases:
• setting investment goals,
• creation of investment policy,
• selection of investment strategy,
• portfolio creation and monitoring
• measuring and evaluating performance (Fabozzi, 2009).

Investing is a process of deciding which instrument the investor should use in the market and when it is necessary to terminate the investment. It is very important for the investor to realize that:
• there is a directly proportional relationship between the expected return and the risk,
• risk-free investment brings a low but stable and secure return,
• should decide according to the relationship to risk and expected return (Chovancová a kol., 2012).

Investments are a part of the gross domestic product of the state, which is not consumed in the period of its creation but is invested in the economy in various ways and thus bring the owners savings, respectively. reasonable profit for investors (Drábek, 2001).

Investment in its broadest sense in economic theory is often characterized as an economic activity in which an entity (state, enterprise, individual) gives up its current consumption in order to increase the production of goods in the future (Valach, 2006).

The successful development of the economy depends on the way in which the volume of investments is used and the dynamics of the investment process. Investments affect the dynamics of economic development, economic growth, and overall performance (Vidová, 2002).

According to J. Alexy and R. Sivák (2005), investing is the use of financial resources to obtain individual components of assets. The investment process involves the transformation of external and internal sources of financing into economic resources.

1. Methods of Research

The aim of the article is to describe the very concept of investment and determine the importance of investment for startups. The article defines the term investment, using the views of several authors. At the same time, the article contains the functions that the investment fulfills, the effects of the investment. The next section evaluates the importance of investment for start-ups. The method of analysis and comparison is used in the article. The information for article was obtained from the main Web of Science collection, articles from conferences and books of domestic and foreign literature. The contribution of the article is in the summary of theoretical knowledge about investments and their connection to startups. At the same time, investments in individual investment rounds are reviewed.

Investments mean for companies as well as for startups the possibility of obtaining funds to finance business activities. Financial decision-making is very important for every company, especially for newly established companies (Valaskova, Bartosova, Kubala, 2019). Investments generally perform several functions. The capacity function is manifested in the fact that new material goods form a new capacity. However, this is not always associated with the expansion of existing capacities. Part of the newly created capacities replaces the existing capacities, which had to be decommissioned due to their wear and tear. The capacity function of investments is connected with the extensive development of the economy.

The second function is the cost function, which is also called the substitution function, which complements the capacitive function. In addition to capacity expansion, a gradual increase in efficiency is required, which will translate into savings and cost reductions. Several production factors are used in production, among which there is certain interchangeability. Rising prices for raw materials, fuels, and energy increase the importance of such substitution investments for the efficient development of our economy (Mittal, 2020).

The last function of investments is the pension function, which manifests itself in the phase of realization of investments. The source of investment is depreciation and savings. Investments are a specific form of income for investors, which is applied as a set of requirements for investment work and supplies (Strinková et al., 1995)

In addition to the functions of the investment, the effects that the investment brings are also important. We distinguish four types of investment effects:

From a macro point of view, the income effect of investments is manifested by the fact that as investment grows, AD, GDP, and employment growth. In the microsphere, pensions take several forms, in the form of wages for employees, annuities for owners of agricultural land, dividends for shareholders.

The capacity-building effect of investments means that with the growth of investments, new production capacity is created, which increases the accumulation of capital, the level of potential output. It is necessary to use knowledge from science and research, to acquire machines and equipment with higher productivity, performance, which are less energy-intensive.

The effect of increasing the efficiency of the economy is then based on the previous two types of investment effects, ie the income effect and the capacity-building effect.

The substitution effect of investments arises from the use of several production factors in production, which creates interchangeability, substitution. It is possible to substitute work items, resources, but also labor. The impetus for substitution is the existence of scientific and technical progress (Krištofík, 2010).

Bielik (2002) distinguishes these three basic groups of investments, namely financial, capital, and intangible.

Financial investments - by the financial investment we mean the purchase of various bonds, securities, shares, we can also include the lending of money to invest and other companies where we expect dividends, interest, or profit.

Capital investments - these are investments referred to as tangible or physical. By this investment, we mean the costs of construction, reconstruction of property, while we always understand the physical capital creation - the acquisition of machinery, buildings, tools.

Intangible investments - by intangible investments we mean know-how, expenditures on research, education, social development, and the like.

2. Results of the Research

During its lifetime, a startup needs an investment that it receives not once, but over several investment rounds.

Pre- financing is type of financing will help to define what an idea embodied in the form of a "Minimum viable product" should look like, ie a product with the smallest possible functionality, on the basis of which it will be possible to test market interest. Startups are generally associated with new innovations and ideas (Ionescu, 2020). This phase of obtaining investments is considered to be the riskiest, the startup has just been created and is trying to gain a foothold in the market. Founders usually finance their activities from their own resources (Kliestik, Valaskova, Lazaoiu, Kovacova, Vrbka, 2020). Often, investments are also obtained from acquaintances, family, or friends. Unknown investors are in this case referred to as fools. Business angels represent a significant group of investors in startups and can protect startups against bankrupcy (Kliestik, Misankova, Valaskova, Svabova, 2018). However, in the first stage of foreclosure, they are often unwilling to take such a high risk. At this stage, startups will rather find support from accelerators, incubators, institutions that are dedicated to supporting startups. The

amount of investment in the pre-seed round of financing is only a few tens of thousands of USD, in exceptional cases, the amount of investment may exceed 1,000,000 USD. The average amount of investment is tens of thousands of USD. The typical valuation of startups is up to 1 mil. USD. Typical investors are friends, family, and acquaintances, business angels oriented to the early stages of investment, startup accelerators.

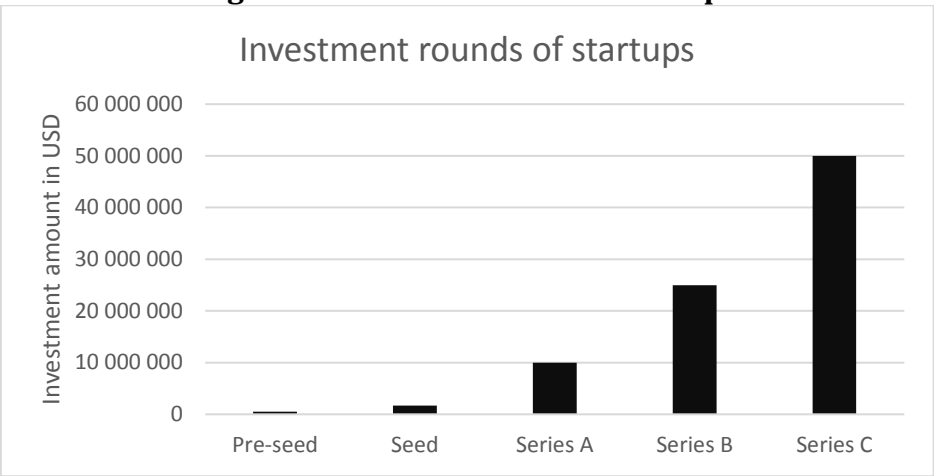
At stage of seed investment, product development is completed. The startup has already partially established itself on the market and can present to the investor the market in which it operates. There is also a regular supply of monthly sales, ie the company obtains finance and earnings through its own business aktivity (Khuong, Liem, Minh, 2020). The most important investors in this phase are business angels, but venture capital, which acquires startups from large corporations, also plays an important role here. In this phase, investors provide startups with very important advice, know-how, support, and contacts. The amount of investment from business angels is around $ 150,000, while the amount of venture capital investment is around 1,500,000 USD. The average amount of investment realized by VC funds is 1.7 mil. USD. The average amount of investment made by business angels is 150,000 USD. The typical valuation of startups is 1–3 mil. USD. Typical investors are friends, family, and acquaintances, business angels oriented to the early stages of startups, startup accelerators.

Series "A" as an investment round provides startups with capital when they are in the "Product-Market fit" phase. The startup already knows exactly how it will continue to develop in the market and achieve sales. Most of the investments made go-to marketing and sales promotion. Startup no longer sells its products directly but also uses other distribution channels, the Internet, intermediaries, and the like. Business angels are no longer the main source of investment for startups, but companies are increasingly using various venture capital funds and the like. At this stage, there is still a risk of bankruptcy of the company and its banker for investors (Kovacova, Kliestik, Kubala, Valaskova, Radisic, Borocki, 2018). The dynamic development is causing an increase in investments of up to USD 10,000,000. The average investment amount is 10 mil. USD. The typical valuation of startups is 10 - 15 mil. USD. Typical investors are venture capital funds, "super" angels.

The investments obtained in series „B" round are used for the further development of the startup, especially for building international trade, promotion, and support. The company is already verified and it is, therefore, possible to obtain an investment of USD 30,000,000. The average investment amount is 25 mil. USD. The typical valuation of startups is 30 - 60 mil. USD. Typical investors are venture capital funds oriented to the later phase of the investment cycle.

Phase „C" is characterized by scalability. The startup is trying to achieve a dominant position in the market. At this stage, the risk of investment is already very low with low level of default and therefore the classic venture capital funds want to invest, but also for private equity funds, banks, and the like (Valaskova, Kliestik, Kovacova, 2018). The average investment amount is 50 mil. USD. The typical valuation of startups is 100 - 120 mil. USD. Typical investors are venture capital funds focused on the later phase of the investment cycle, private equity funds, banks ,and the like (Law, 2017).

Fig. 1. Investment rounds of startups



Source: processed by the authors

3. Discussion

Investing in startups brings a number of benefits, such as a quick return on investment, and in the case of a successful product, a high rate of investment appreciation. The investor is actively involved in the management of the company. On the other hand, such investments are also associated with many disadvantages and risks, such as the inability of the investor to adequately assess the degree of risk involved in the investment. Many times, such investing is based on emotions - FFF investing. When deciding on investing funds in a startup or a large company, the investor decides on the basis of several criteria. It takes into account the size of the market and the growth potential of each company, the characteristics of the company and its employee base. The imaginativeness and creativity of the product offered is also important.

Some of these criteria are difficult to quantify but have a decisive impact on success in attracting investment. In addition to the investment itself, every investor can bring know-how as much as possible most of them are already successful entrepreneurs or company founders. These have for their own investment positive motivation to advise well, which can represent an important benefit or competitive advantage for a startup. Investments have a positive impact on startup earnings. They bring financial resources to the company, which the startup can use to finance products, services provided or to strengthen its position in the market. Therefore, it is essential that each startup manages its earnings and achieved funds (Kliestik, Valaskova, Nica, Kovacova, Lazaroiu, 2020).

Conclusion

Investment decisions are one of the most important strategic decisions in a company. Investments affect the dynamics of economic development, economic growth, and overall performance. Investment decisions are one of the most important decisions in a company because they cannot do without them and ultimately affect the overall development of the company itself. Improper investments can even cause bankruptcy. In Slovakia, it is

possible to invest in the money market, bonds, shares of a prosperous company or company, and real estate. Startups are new companies that bring innovative ideas and products. It is essential to ensure a sufficient supply of funds for their development and establishment in the market. The article therefore focuses on evaluating the importance of funds for startups, evaluates individual investment rounds of companies. The article also stipulates the required amount of investment in the various phases of the life cycle of the company and major investors, which bring finance to the company.

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Miroslava Knapková[1], Miriam Martinkovičová[1], Alena Kaščáková[2]

Matej Bel University in Banská Bystrica, Faculty of Economics, Department of Economics[1], Department of Quantitative Methods and Information Systems[2]
Tajovského 10, 975 90 Banská Bystrica, Slovakia
email: miroslava.knapkova@umb.sk; miriam.martinkovicova@umb.sk; alena.kascakova@umb.sk

Daily Activities and Subjective Well-Being of Self-Employed Persons in Slovakia

Abstract
The paper examines the subjective well-being (SWB) of self-employed persons in terms of its affective (emotional) component, with regard to the gender and type of household of self-employed persons. The aim of the paper was to find out in which activities during the standard working day the self-employed persons in Slovakia feel the happiest, it means that their affective SWB is the largest. Modified Time Use Survey (TUS) methodology (time diaries including data on happiness) was used to identify SWB. Based on the TUS methodology, 13 groups of activities (as parts of the paid work, unpaid work, and free time) and 161 self-employed persons were included in the analysis. The results suggest that self-employed women feel greater emotional discomfort while performing business activities than self-employed men do. The affective SWB of self-employed persons living in single-person households is "emotionally weaker" compared to the other two types of households, not only at performing business activities, but during the whole working day. The natural allocation of time between the paid work (business activities), unpaid work and free time in case of self-employed persons living alone causes a relatively balanced experience of positive emotions in both the paid work and the unpaid work.

Key Words
self-employed persons, subjective well-being, time allocation, business activity

JEL Classification: L26, J22, I31

Introduction

Increasing interest in the issue of quality of life, happiness or satisfaction has undergone an interesting and contradictory development, especially in terms of finding appropriate indicators and ways to measure them. The complexity of the issue is evidenced by the shift of theoretical reflections from the neoclassical welfare economy (Edgeworth, Marshall, Pigou), through a new welfare economy (Pareto, Hicks, Hotelling, Kaldor), towards the economy of happiness (Easterlin, Frey, Stutzer, Kahneman, Diener, Veenhoven). At the same time, there is as assumption that economic activity, the production of goods and services, is certainly not an end, but has value only if it contributes to human happiness (Frey and Stutzer, 2002). This applies also to self-employed persons, individuals who have voluntarily decided to devote their skills, time, and energy to achieving selected goals, which they can manage themselves. As self-employment is an important part of the

Slovak economy, we decided to pay attention to this issue in connection with the research of subjective well-being (SWB).

Satisfaction of self-employed persons is addressed in several foreign studies. Some focus on the purely cognitive component of SWB of self-employed, such as income, wealth, or economic prosperity (Carter, 2011). Cognitive well-being is also associated with the conditions of doing business, the organizational structure of the company, flexibility, or independence. Parasuraman (1996) examined the impact of working and family conditions on the career success and mental well-being (cognitive SWB) of 111 self-employed persons. The results of his study show that conditions in the work environment affect the time spent at work, while conditions in the family environment explain fluctuations in time spent in the home or with the family. Among SWB-related factors, he examined autonomy/independence, inflexibility of working hours, work overload, engagement at work, parental responsibilities, engagement in the family, time spent at paid work (business), conflict between work and private life, career satisfaction, family satisfaction, life stress, and other variables (especially size of business, length of business). He found that gender, work, and family characteristics (number of children, partner/spouse) significantly affect time spent at work and time spent in the family. Ryff (2019) extended the cognitive SWB of self-employed persons by other factors that are by nature linked to self-employment (entrepreneurship and independence, diversity of entrepreneurial activity, business life cycle, entrepreneurial health).

The affective and cognitive components of SWB are interdependent. In a sample of 122 self-employed persons, Hahn (2012) pointed out the connection between the hedonic (affective) and cognitive components of SWB. Dijkhuizen and co-authors (2016) on a sample of 135 elf-employed persons from the Netherlands elaborated a classification of four determinants of SWB, namely commitment to work, job satisfaction, exhaustion and workaholism, which also cover both dimensions of SWB. According to them, these are significantly influenced by such factors as the achieved turnover, profit, and number of employees (the higher the profit and the number of employees, the happier the self-employed persons are).

Several studies point to the interrelationship between business and national happiness. Based on an analysis of available resources on entrepreneurship and SWB, Naudé and co-authors (2014) found that the use of opportunities in the form of entrepreneurship contributes to societal happiness in the initial stages of entrepreneurship (in the later stages of entrepreneurship, however, this effect decreases significantly). Audretsch and Belitski (2015) examined the impact of SWB on business in 75 European cities using data from the Quality-of-life survey. Teixeira and Vasque (2020) focused on the impact of entrepreneurship on life satisfaction and happiness, pointing to their close connection with "national culture".

Gender is an important determinant of affective SWB of self-employed persons. Powell and Eddleston (2013) examined the impact of a positive emotional family background on business success in a sample of 253 entrepreneurs. They pointed out that self-employed women can better combine entrepreneurship with their families and can benefit more from an emotionally positive family background than men entrepreneurs do. Mahadea and Ramroop (2015) found those self-employed who are more educated, married and have children, are happier than other self-employed persons. They also pointed out that

self-employed persons show a significantly higher average level of happiness than employees.

There are no relevant studies in Slovakia focusing on the SWB (especially affective part of SWB) of self-employed persons. We try to fulfil, at least partially, this gap. The aim of the paper is to find out in which activities during the standard working day the self-employed persons in Slovakia feel the happiest (it means their affective SWB is the largest).

1. Methods of Research

To obtain information on the use of time and the affective component of SWB of self-employed persons, we conducted an original research based on a modified TUS methodology. As part of a questionnaire survey, we addressed 1,767 individuals (household members) and 833 households in Slovakia (individuals were members of these households). We conducted the survey in the period of April - May 2017, with respondents reporting data for 2016 (the research was conducted as part of the VEGA project No.1/0621/17). We processed the results of the survey in the second half of 2017; the first processed data were available at the beginning of 2018. To ensure the representativeness of the sample we used weights considering the population structure. The set of households and individuals is representative according to the number of household members, the proportion of households in the regions, and according to the gender and age category of the respondent.

For the purposes of this article, we further analysed the database of individuals, specifically information about self-employed persons. Out of the total number of 1,767 respondents, there are 161 self-employed persons (9.1%), almost 55.5% employees (in the private sector and in the public sector), 2.6% on maternity or parental leave, 1.2% unemployed, 14.8% students, 14.6% pensioners, 1.3% partially or permanently disabled persons, and 0.5% other economically inactive persons. Due to the setting of weights for the total sample, it is not possible to automatically assume the representativeness of the subset of self-employed persons according to the above characteristics. However, the survey is so original and unique (not only in terms of time, but also in terms of space) that we nevertheless dare to publish its results with attention to the above fact.

To find out the emotions during the performance of various activities during the day, we used one of the methods of measuring the affective component of SWB, namely the method of a time diary supplemented with the question focused on the extreme emotions. Using the question "during which activity did you feel happiest?", we were able to connect extreme (positive) emotion with a specific activity. The time diaries included 13 groups of activities belonging to the paid work, unpaid work, and leisure time, based on the HETUS 2008 classification (European Communities, 2009). In terms of the HETUS classification, we distinguish following activities: personal care (divided into sleeping and personal care), paid work (employment, entrepreneurial/business activity), study, household care (divided into cleaning, childcare, and assistance to adult household members), volunteer work and social interaction, social life and entertainment, sports and other outdoor activities, leisure activities, mass media, travel and other unspecified use of time.

Self-employed persons represent a specific group of respondents, mainly because the length of their paid work (entrepreneurship/business activity) is not limited by law. Self-employed persons are not under the legal protection of the Labour Code, and they can perform paid work (business activities) for any length of time on working days and even on weekends. This can have a significant effect on the amount of time spent in unpaid work and leisure activities, but also on the feeling of happiness they feel during various activities.

Table 1 shows the structure of the research sample (self-employed persons), by gender, and household categories (self-employed persons living in a single-member household, in a multi-member household without children under 14 years and in a multi-member household with a child under 14 years).

Tab. 1: Structure of self-employed persons by gender and household category

Gender	**Number**	**Percentage**
Males	110	68,7
Females	50	31,3
Total	161	100,0
	Number	**Percentage**
Sengle-person households	18	11,5
Multi-person households without children up to 14 years	101	62,7
Multi-person households with children up to 14 years	41	25,8
Total	161	100,0

Source: authors' calculations, based on survey

To display information about extreme positive emotions (happiness) for 24 hours a day, we divided the day into 30-minute intervals. Even though these are relatively long intervals (a division of 10 - 15 minutes is used in case of official TUS (HETUS, 2018)), we consider this division to be sufficient. The figures (figure no. 1, 2, 3) show time intervals on the x-axis (from 0:00 to 24:00, divided by 30 minutes). The y-axis shows the shares of those self-employed persons in the total number of self-employed who feel extremely positive emotion (happiness) at a given time. The graphs show how extremely positive emotions develop in different categories of self-employed persons during the day (24 hours).

On the example of this research sample, we try to point out the various possibilities of using time use research, which allows to identify both cognitive and affective component of SWB. Based on this, we formulated the following research assumptions:

A1 We assume that the self-employed women feel happier in performing activities of unpaid work during the working day than the self-employed men.

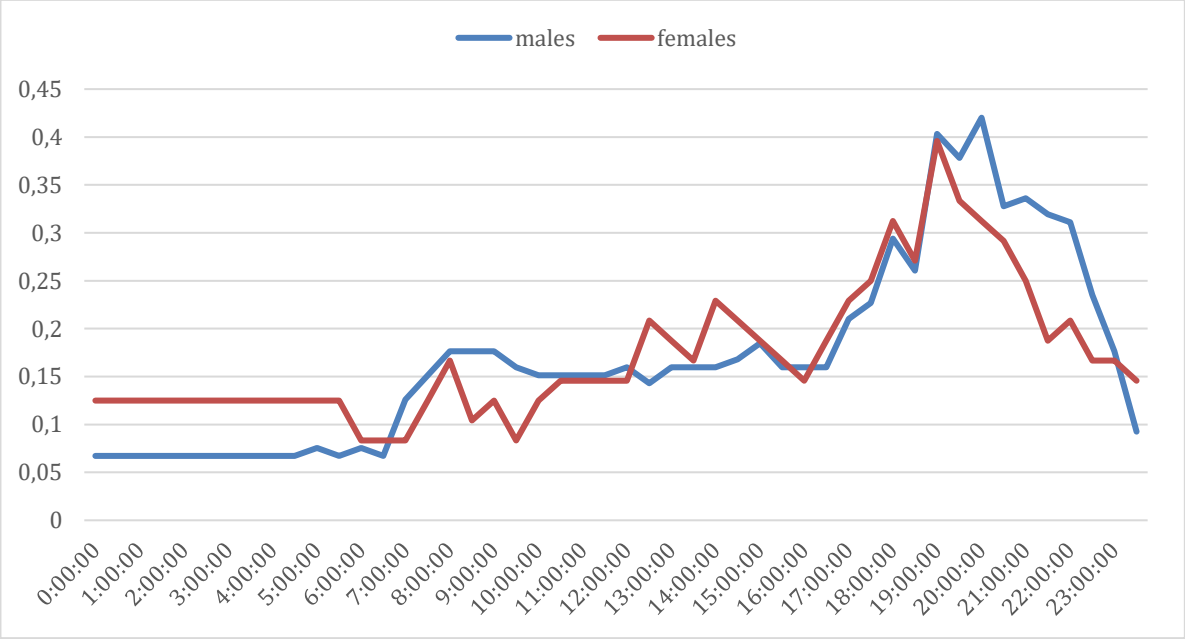
A2 We assume that self-employed persons living alone (single-person households) experience positive feelings of happiness during the working day more evenly than self-employed persons living in other types of households (due to the absence of other duties, such as partner, family, children).

2. Results of the Research and Discussion

Research assumption A1 is based on the findings of previous research on unpaid work abroad and in Slovakia (Powell and Eddleston, 2013; Uramová and Orviská, 2016). These point to the fact that women, despite their duties in paid work (in our case during the performance of entrepreneurial/business activity), manage to perform a larger extent of unpaid work than self-employed men do. The so-called double burden of women is thus a part of their lives even. We therefore assumed that the same situation is evident also in case of self-employed women. However, the results of our survey show (see Fig. 1) that the feelings of happiness of the self-employed women decrease significantly, especially in the evening, compared to self-employed men (the share of self-employed women who feel extreme emotions of happiness at this time is lower than the share of self-employed men). During the evenings, there are mainly activities that fall into the category of home and family care and leisure activities. Therefore, the research assumption A1 was not confirmed.

This finding contradicts the results, which apply to women and men employed in the private sector. In this group of respondents (employees in the private sector), female employees show a significantly higher share of extremely positive emotions than employees do (Martinkovičová et al., 2020). It can be concluded (however, only implicitly) that entrepreneurship and the obligations associated with business activities, irregular working hours, diverse and non-routine work activities during the day, and overall energy demanding business activities cause greater emotional exhaustion and a faster decline in positive emotions of self-employed women than of employed women.

Fig. 1: Extreme emotion of happiness of self-employed persons, divided by gender



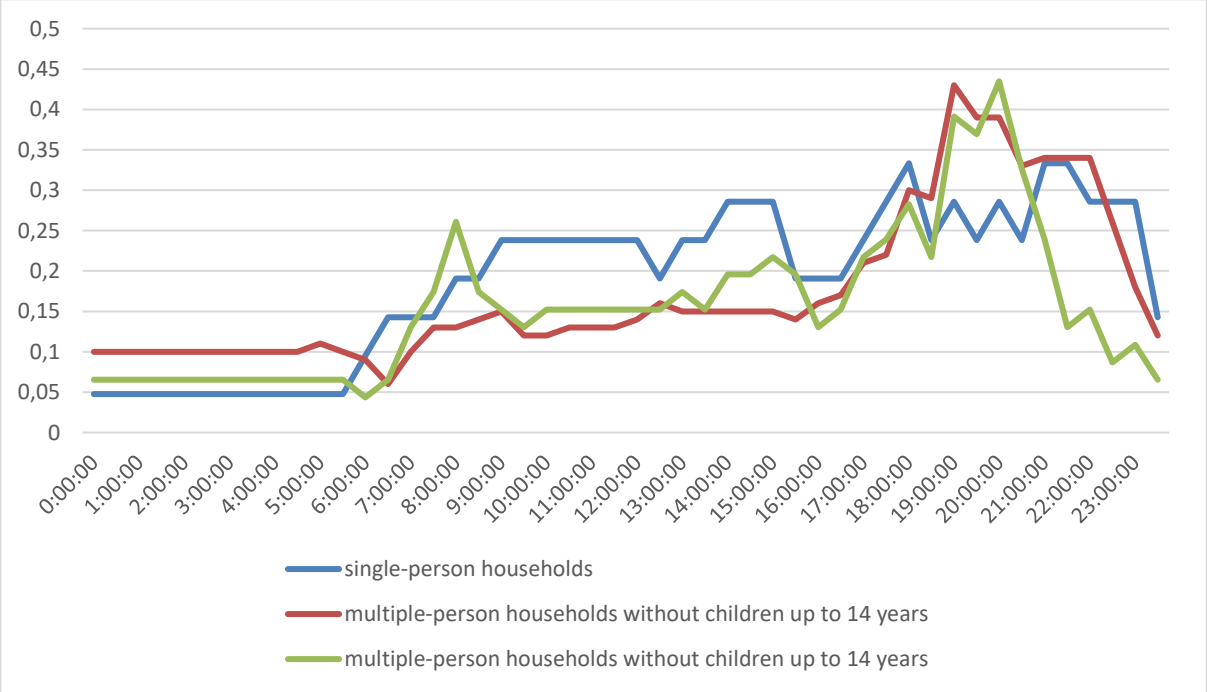
Source: authors' own calculations.

The presence of a partner, spouse, and children, regardless of the economic status of the individual, fundamentally affects his or her overall quality of life. In the case of running business activities, the even distribution of attention, energy and time between work, friends, family, and children is extremely problematic and sensitive. Therefore, when

formulating the assumption A3, we considered the fact that self-employed persons living in one-member households will be more balanced in experiencing extremely positive emotions (these will fluctuate less due to the absence of stimuli (such as partner, spouse, children) that could stimulate emotions more often and more intensively). This is also in line with the conclusions of Mahade and Ramroop (2015), who found that married entrepreneurs who have children are happier than those entrepreneurs who do not live in family households. The assumption A3 was confirmed (see Fig. 2).

Our research, in this regard, does not bring completely new findings. It confirms the knowledge we have gained in previous research focused on the allocation and use of time of Slovak households, decision-making processes in households or the volume and structure of unpaid work performed. These findings relate to the fact that not only economic determinants (such as income, status, age, education) but also non-economic determinants (such as relationships, partnerships, family, or parenthood) are variables that significantly affect the overall way of life of individuals and satisfaction. with it (the cognitive dimension of SWB), but also the emotional, experiential experience (affective component of SWB) of the individual. The empirical data presented in the paper even suggest that in the case of the self-employed persons living in single-person households, this group is "emotionally shallower" in terms of experiencing extremely positive emotions of happiness compared to self-employed living in other two types of households.

Fig. 2: Extreme emotion of happiness of self-employed persons, divided by type of household



Source: authors' own calculations.

Conclusion

When examining the affective component of SWB of self-employed persons in Slovakia, we focused on two basic determinants that, in our opinion, significantly affect this component of SWB of self-employed ones: gender, and type of household in which they live.

In the case of gender, the research shows interesting findings regarding the emotional stamina and intensity of the emotions experienced by self-employed women. We found out that, during the whole working day, emotional feelings in case of women are significantly more fluctuating than in the case of men. These emotional fluctuations can be explained by a more spontaneous involvement of self-employed women in managing work responsibilities and solving work problems, considerable personal responsibility, greater empathy, more intensive social interaction with co-workers, business partners or other entities. This is reflected in their exhaustion and relatively sharp drop in positive emotions in the evening compared to men. Entrepreneurship, therefore, from the point of view of gender, causes self-employed women greater emotional discomfort than men and reduces their affective component of SWB.

Doing business means undertaking voluntarily certain level of risk and it requires requires a lot of energy, strength, will and endurance. Doing business is physically, mentally, and emotionally extremely demanding. Behind the high work commitment, there are both positive and negative emotions, that naturally accompany business activities. Achieved success, good market position, successful coping with competition or innovation, all this help to fulfil feelings of happiness and satisfaction. Alternative lifestyles (voluntary or forced) bring diverse ways of fulfilling life and work satisfaction. Our research has shown that the natural allocation of time between paid work, unpaid work, and leisure time in single-person households (where self-employed person live alone), in which stimulating emotional factors in the form of children, partners, spouses or parents are absent, causes a relatively balanced experience of positive emotions in both paid work (business) and unpaid work. Theoretically and practically long-term reflected conflict between work and private life in the case of self-employed persons seemed to blur. There is an intertwining of the world of business and private life, a reckless transfer of work to home and often the fulfilment of business duties even at a time when other types of households are already solving their ordinary family, parental or partner joys and problems. Paradoxically, in the case of the questionnaire self-employed persons, this fact does not affect the feeling of extreme emotions of happiness and supports their affective SWB.

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VEGA project No.1/0621/17 “Decision-making Process of Slovak Households about Allocation of Time for Paid and Unpaid Work and Household Strategies’ Impact on Selected Areas of the Economic Practice

Marián Lamr, Petra Rydvalová, JanPilař

Technical university of Liberec, Faculty of Economics, Department of informatics
Studentská 1402/2, 461 17, Liberec, Czech Republic
email: marian.lamr@tul.cz petra.rydvalova@tul.cz jan.pilar@tul.cz

Platform for Vitality Analysis of Family Companies

Abstract
The aim of this article is to present a platform used for the analysis vitality of family businesses , which also provide family businesses space for networking contacts . The system concept allows administrators to create test modules , manage family business profiles, and export test results . Part of it is also user portal , which would , together with mobile applications should facilitate family businesses establish contacts on the basis of location and completed profiles.

Test modules are used to test family businesses . Using these modules can evaluate indicators of family businesses , such as the example of their vitality . The user part and the administration part are created as a web application for NodeJS using the Express framework. The web application is divided into an administration part for the administration of test modules and a user part , in which family companies can fill in test modules . A relational database is used to store data . The platform also includes a mobile application for the Android system , which communicates with the server via the RESTful API. This application lets tested by family businesses more easily in the field to establish among themselves contacts .

Key Words
family enterprise, vitality, Javascript, Android, NodeJS

JEL Classification: C88, C87

Introduction

The Faculty of Economics at TUL has developed a Knowledge-based System for Assessing Vitality of Family Businesses in the Czech Republic . (Antlová, Rydvalová, 2017). Faculty of Economics of the Technical University of Liberec wanted to expand on the original solution mobile application that would test after the family firm could download. In this application, it would be possible to get acquainted with other tested companies and it would also help them to establish contact. However, the mobile application needs data for its function, which is not in the original solution of the system. The new solution is more flexible than the original and allows the use of the administration part for the management of test modules. The new solution allows flexible creation of test modules for testing not only the vitality of the family business, but also other indicators of the family business. The new system solution therefore includes an administration part for creating new test modules and data management for family companies. It also contains a user section for family businesses, in which the family business can be tested using the created test modules. The system also includes the already mentioned mobile application for tested family businesses. It uses information about companies managed in the system and uses a map to clearly visualize this data.

In order to test companies as affordable and convenient as possible, it is advisable to implement testing using a web application. Since our solution requires basic data about companies to be displayed on a map in a mobile application, it is appropriate to obtain data in part by machine from publicly available sources. This facilitates the process of registering a new company for users and at the same time verifies the existence of this company. All web application data is stored in a relational database. Because the mobile application uses the same data from the database, it is necessary to create secure access for it. Otherwise, there are a number of dangers when communicating directly between a client application and a database. Much of this problem can be solved by using a web API to communicate between the mobile application and the server, which makes the data from the database available to the mobile application.

The new solution of the system for testing the vitality of family companies now enables the management of test modules and information about family companies directly from the application. It also allows you to store the necessary information about family businesses that are used in the mobile application. Protected access to this information is established from the mobile application. The test module may change over time. This may be a minor improvement to the wording of some of the issues where no further action is required. However, it can also be a complete removal of a question or an extension with new questions, and it is necessary to create a new module. To ensure that the company still has the result of previous tests available, it is necessary to keep the original module. In order for all these functions with modules to be performed by authorized persons, it is advisable to create an administrative part of the website for them. Here it is possible to archive the original module and release a new version. Each version of the module can be filled by the company at most once.

After logging into the system, the modules for companies are freely available on the website and it is not automatically possible to determine whether the module has been filled in by a family business. Verification is performed by an authorized person (administrator). The administration part must therefore also contain the administration of the companies that filled in the modules. Here it is possible to delete filled modules of companies for which this system is not intended. If the company is not a family business, the authorized person will delete all data about the company and its completed modules and may block its access to the system in the future. The platform for the analysis of family companies has a so-called Blacklist.

Family businesses that use this system to test their vitality can also use the mobile application. It is intended primarily for mutual acquaintance of family businesses in the vicinity. The map is great for showing other nearby businesses. The map clearly shows the individual companies and the user can then view detailed information entered by the company itself and machine-read data from publicly available registers. The user learns the economic activities of the company and potentially the website address, which can serve as a first step to mutual cooperation. Because the module can be completed by companies on paper, it is necessary to allow authorized persons to fill in the module in the application on behalf of the company. In order for this backfill to be delegated to other people, it is necessary that the application allows you to create an administration account with limited permissions for filling in data only.

1. Methods and tools for web application development

Web applications have many advantages and disadvantages compared to native applications. Native applications that are created for each operating system separately must be installed. It takes up disk space after installing the application. In contrast, a web application is only temporarily uploaded to the browser over the Internet and is not on the disk at all. Thanks to the use of suitable technologies for the development of web applications, such applications can be advantageously used on various devices and software platforms. Another advantage of web applications is the fact that they do not have to be installed on the device. (Atha, 2020) The disadvantage of mobile applications over native applications is that they cannot be used without an Internet connection and cannot use special operating system functions.

Web applications are divided into two groups: single-page applications (SPA) and multi-page applications (MPA). SPA is an application that loads from the server only once and does not need to reload the page for its operation. In this case, the application only exchanges data with the server. Using SPA, a web application can mimic the behavior of a native application. SPA applications do not load entire pages but only data, so users do not have to wait while using the application. SPA applications can store data in the local storage of the device and thus can work later without an Internet connection. (Skólski, 2016) In multi-page applications, it is necessary to render a new page from the server with each change. However, this means constantly loading almost the same content. Therefore, nowadays asynchronous JavaScript is commonly used in MPA to update a part of a web page without the need to completely reload it.

HTML, CSS, PHP and JavaScript are used to create websites. The server part can be implemented using many languages, such as JavaScript, Java, PHP, Python, Ruby and others. The client part of the web application is limited to the technologies used in the browser.

The NodeJS environment was chosen as the most suitable environment for the development of an application for assessing the vitality of family companies. We will now discuss the advantages and disadvantages of the NodeJS environment. NodeJS is an asynchronous event-driven environment for running JavaScript applications on a server without using a web browser. (Nandaa, 2018) NodeJS allows you to program both the server part and the client part in the form of web pages using the same JavaScript programming language. NodeJS is designed for creating scalable web applications. The NodeJS application thus runs as a single process, without the need to create a new thread for each request. When an asynchronous operation starts, it does not block the thread and continues processing until the asynchronous operation ends. This allows it to handle a large number of concurrent connections without having to manage multiple threads. NodeJS uses a node package manager (npm). Npm is a packaging system that houses more than a million open source JavaScript libraries for NodeJS. The cornerstone for creating web applications is the http module. It is used to create a web server. Each time a request is made to the server, request and response objects are made available for processing. The request object contains request information, headers, and dates. The response object is used to define the headers and data to be sent back.

1.1 Frameworks for more efficient web application development

Frameworks are used to facilitate the creation of web applications. There are frameworks for both the client part and the server part.

Server frameworks

Server frameworks help simplify URL path definitions and handling, database interaction, user authorization, and output formatting. According to the development website of Mozzila (Mozzila, 2020), the most used frameworks include:

a) Django is a framework for Python. It basically provides almost everything a developer might need. Thanks to that, everything works together as it should.
b) Express is a fast, flexible and minimalist framework for NodeJS. Uses JavaScript.
c) Laravel is a PHP framework with elegant and expressive syntax. It contains simple and fast routing or intuitive database ORM.
d) Ruby on Rails is a web framework created for the Ruby language. Like Django, it contains a summary of standard mechanisms.
e) Spring Boot is a framework for the Java language that is designed to use third-party libraries. However, it also allows use with minimal configuration.

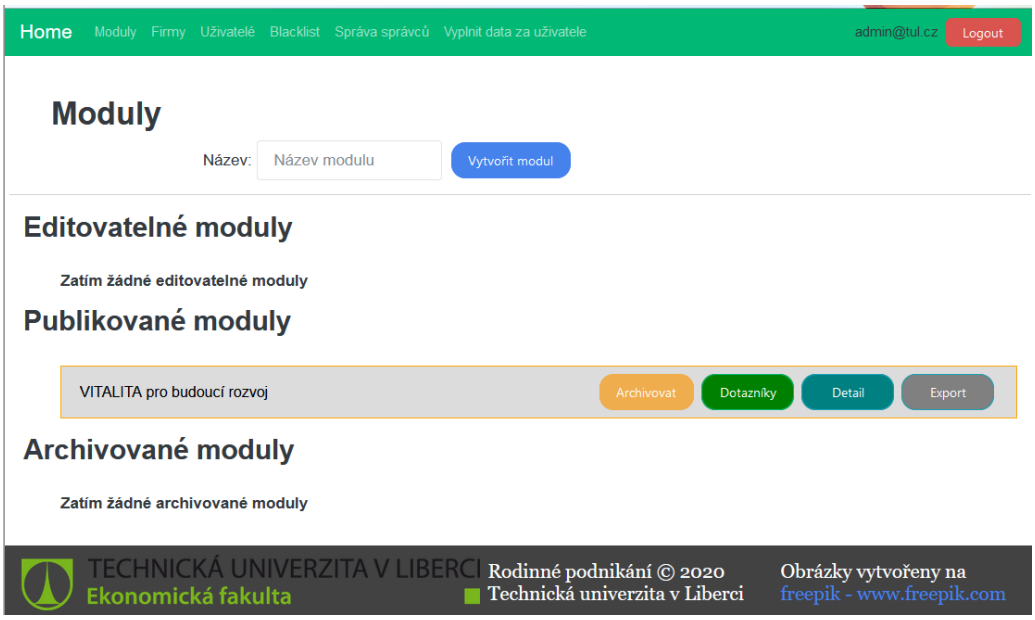
Express was chosen as the most suitable framework for the development of a platform for the evaluation of family businesses, so we will briefly describe it. Express is a minimalist, flexible and most popular web framework for NodeJS. (Mozzila, 2020) Allows you to create functions that process requests with various HTTP methods and URL paths, or routes. Allows you to use the view template engine that is used to render HTML files with specific data. Express uses middleware. Middleware is a function that is included in the chain of functions that process the request. Each middleware can check, modify, or even terminate the request. If the request does not end in the middleware, it is necessary for the middleware to send it to another function in the chain by calling the next () function. If a middleware processing error occurs, it can be delegated to other middleware by adding the error information as a parameter to the next () function. Due to the fact that Express uses middleware, many libraries are created for Express, which solve subtasks in the form of middleware functions. The Express is so-called unopinionated. This means that it does not determine how it should be structured. One of the popular ways is the Model-View-Controller (MVC) architecture. The emphasis here is on separating the application logic from the display. This division helps to maintain application code more easily. (Leff & Rayfield, 2001)

The MVC architecture consists of three parts. The model is the part in which the data structure and logic of the application are defined. View is the part that takes care of the user interface, how the application data is displayed. The controller is the part that contains the control logic that determines how the View and Model parts are interconnected. (Leff & Rayfield, 2001).

2. Solution design and discussion

The vitality assessment platform is divided into an administration and a user part. The user and administration part for administration, as well as the part for family businesses, will be solved in the form of a website. Thus, both parts can be implemented together in one web application. NodeJS is used to run the web server, which allows you to write the server part in JavaScript. This allows you to use the same language on the server as will be used in the client part of the application running in a web browser. Access to the administration part is secured by login data (username and password). There are two levels of administrator privileges in the system, limited and unlimited. Unrestricted users can manage the entire system, including editing detailed business information. Administrators with limited privileges can only fill in modules on behalf of companies. A preview of the GUI application (module editing) of the administration part is shown in Figure 1. The user part of the system is intended for family companies. Since the user logs in to both the website and the mobile application, his login is solved with the help of Google identity. Thanks to this, the user does not have to invent a new password, which he would also have to rewrite on the mobile device. At the same time, we assume that the user probably has a google identity paired on the mobile device and does not have to enter the password. When logging in to the user section, the user enters the "IČO" of his company. Since the „IČO“ number is a unique number assigned to a company, it is used to uniquely identify the company in this system. The „IČO“ number is also used to retrieve basic information from public registers. The user part also includes a mobile application. The mobile application is created for the android system and written in Java.

FIg.1: Web application GUI preview (part of module editing)



Source: own processing

In order for the system to work properly, it will be necessary to use a database to store data permanently. PostgreSQL was used as the database engine. Email, password and

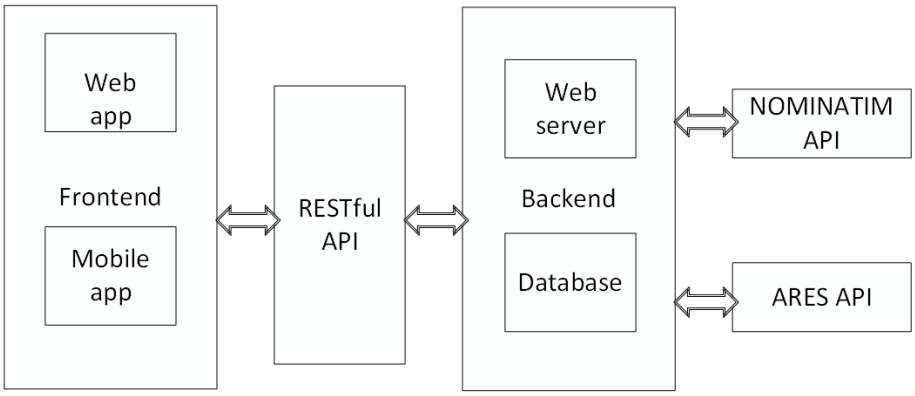
authority are stored in the database about the authorized persons who administer this system. The email of the user who logs in to the system on behalf of the company is stored. A lot of information about companies is stored in the database. Firstly, it is basic information kept in the ARES system, such as: ICO number, name, legal form, address, date of establishment, number of employees, classification of economic activities NACE or capital.

The ARES API is used to download data from the ARES system. According to the "IČO" number of the company, it is possible to verify whether the company exists. The above-mentioned data are also available. Through the ARES API, it is possible to find out not only information from the register of economic entities, but also from the Commercial Register. In it we can get more information about the company, such as its capital. Within family businesses, the entered registered office address from ARES is also the only place where the business operates. However, it can be assumed that the company will have more establishments and there is no establishment at this address. If there is no establishment at the address stored in the ARES system, it is possible to set in the system that another establishment is displayed on the map.

However, the database can also store additional information that the user can add about his company. For example, the website address, facebook, contact phone or email, or the history of the company, its mission and services offered. In addition to this data, information on individual company establishments (address, coordinates and opening hours) is also stored. In order to be able to display company branches on the map, it is necessary to know their GPS coordinates. Coordinates are obtained from the address using geocoding. Nominatim was chosen as the geocoding API. The Nominatim API uses data from OpenStreetMap.

The database stores data about test modules created by authorized persons. The test modules have a name, a longer description and a status that indicates whether users can fill in this module. The test module is further divided into several questionnaires. Each questionnaire has its own name and description. Questionnaires are further divided into specific questions. The text of the question is its text wording and weight, which determines how significantly its answer will affect the evaluation for the entire questionnaire. After completing the module, the individual numerical answers to the questions, the percentage evaluation for each questionnaire and also the percentage evaluation for the entire module are stored. For the automatic evaluation of individual questionnaires and subsequently also of the module, it is necessary to save the evaluation for each of them. Each rating has a percentage limit. According to this limit, it is determined to which skpuiny rating the company belongs to. Furthermore, a short description determining the degree of evaluation is kept, followed by a long description, in which it is described in detail how successful the user (company) is. The database also stores records of which companies and users have permanently blocked access to the system. The block diagram of Frontend and Backend communication with external API (obtaining information from public sources and geocoding) is shown in Figure 2.

FIg.2: Block diagram of platform communication with external API



Source: own processing

The platform also includes a mobile application, which is used for data visualization and easier contact between family businesses. Google Maps is used for visualization. The application uses the use of Maps SDK for Android. The application allows filtering by NACE code. It is also possible to select a city, set the distance from the user's position and select only the establishments that are currently open. The user can be guided to the company using google maps. It is also possible to view detailed information of each company and establishment.

Google SignIn and OkHttp, http client for Android, are used to connect to the API server. User login works similarly to a website. The user is logged in to their account with a Google identity. In exchange for logging in, Google will generate a new logged-in user token for the application. This token is then packaged in a request created with OkHttp to the server, where the user is authenticated. The token is first validated to verify the user's identity. After validating the token, the user's email can be found, which is further searched in the system database. If the user with this e-mail is already registered in the system, it means that the user has access to the mobile application and access is created for him by generating JWT tokens. For further requests to the server, the access token will be used until it expires. Then a refresh token is used, with which the mobile application is requested to generate a new access token. Data is sent from the server in JSON format.

The book by Rydvalová et al. (2015) contains various approaches to defining family business, including foreign authors. Rydvalová et al (2015) further state that there is no uniform definition of family business within the European Union or individual states.

According to Straková & Váhal (2020), the area of small and medium-sized enterprises can be described as untapped development potential both in terms of economics and in terms of human resource development. Štichhauerová & Pelloneová (2017) argues that family businesses are an important form of business organization that operates in both developed and emerging economies, come in a variety of sizes, and operates a wide range of activities across industries. According to Stough et al. (2015) show that family businesses make a significant contribution to labor employment and gross domestic product in countries such as Germany, the United States or Sweden.

In her publication Straková & Váhal (2020), she states that small and medium-sized enterprises play a key role in the European economy, are a source of job vacancies, inspire a business vision, and are very favorable stimulators of employment and competition throughout Europe.

It is obvious that any meaningful support for small and medium-sized enterprises is of great importance not only in the Czech Republic. The platform proposed by us is useful not only for the association of small and medium-sized enterprises, which would enable easier registration, administration and evaluation of family businesses. The great importance of this platform lies in the possibility of easier networking and mutual support between family businesses. The main application in this regard is played by the mobile application, which is part of the platform.

Conclusion

At present, there is no similar platform in the Czech Republic that would allow family companies not only to test vitality and establish contacts as our presented solution. The presented solution is universal and does not have to be used only for testing the vitality of family companies, but it can also be used for another type of evaluation of a family business or conducting a questionnaire survey. Connecting to publicly available APIs and registering a family business to the platform through a google account simplifies identification and automates the filling in of basic data for users. The mobile application, which is part of the platform and is available only to verified family companies, makes it easier for family companies to establish contacts.

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Jan Mačí, Gabriela Trnková

University of Hradec Králové, Faculty of Informatics and Management,
Department of Economics
Rokitanského 62, 500 03 Hradec Králové, the Czech Republic
email: jan.maci@uhk.cz, gabriela.trnkova@uhk.cz

Recent Development in E-Commerce. The Case of the Czech Republic

Abstract

Due to the influence of the coronavirus pandemic, e-commerce has proven to be not only modern but a necessary form of trading for many businesses. As communication technologies permeate society, the shopping habits of not only consumers but also businesses and even the government are changing. From the first data, it is possible to deduce that the limitations caused by coronavirus only accelerated the step-by-step evolution in e-commerce. The aim of this article was to compile a characteristic, how e-commerce has been developing in the Czech Republic before the onset of the effects of the coronavirus pandemic. The subject of interest was not only the sales figures for retail and e-commerce as a whole but the context of the performance of companies in this sector has also been added. From our analysis, it is clear that in retail there is a relatively steady increase in sales through e-commerce at the expense of offline purchases notwithstanding the economic recessions, respectively regardless of retail sales. In fact, due to its nature, the coronavirus crisis is accelerating this transformation. In addition, the analysis of the performance of major companies involved in e-commerce in accordance with the data for the entire retail and e-commerce showed that sales for the last three pre-crisis years have been growing at a declining rate. This had an adverse effect on most of the monitored performance indicators. The Czech leader in the field of e-commerce, Alza.cz, surpasses the entire analyzed sample in the vast majority of monitored indicators.

Key Words

Digitization, e-commerce, retail, sales, sectoral change

JEL Classification: L81, O14, O33

Introduction

Digitization of activities from shopping to communication with the public administration is a very current economic and social issue. Due to the influence of the coronavirus pandemic, e-commerce has proven to be not only modern but a necessary form of trading for many businesses. According to OECD (2011) e-commerce transactions include the sale and/or purchase of goods and/or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of order. E-commerce takes place through a range of different commercial relationships, involving any possible pairing of consumers (C), businesses (B) or governments (G). E-commerce transactions increasingly involve consumers directly, most notably business-to-consumer (B2C) transactions, which are the subject of this article. Additionally, emerging business models involve consumer-to-business (C2B) and peer-to-peer relationships, which take place between two or more individuals (OECD, 2019).

According to the Czech Statistical Office (2020), the share of persons older than 16 years using the Internet in the Czech Republic increased from 32% in 2005 to 87% in 2019, bringing the Czech Republic to the EU average. With the increased use of the Internet, the popularity of online shopping is growing and shopping habits are changing. In addition, the possibility of realizing shopping habits has been severely distorted by the coronavirus pandemic in the last two years. The APEK – Association of E-commerce (APEK, 2021 January 6) mentions that e-shop turnovers in the year 2020 reached 196 billion crowns, which means a year-on-year growth of 26%. The share of Czech e-commerce in retail in the Czech Republic exceeded 16%. For comparison, the 2020/2019 increase in turnover in Germany was 14.3% (E-commerce Magazin, 2021), the Czech e-commerce market is according to 2019 J.P. Morgan Global Payment Trends (J.P.Morgan, 2019) the fastest growing market in Europe.

Measuring the extent of B2C e-commerce is very complex. The problem arises because economic data typically does not record how firms do business (see OECD, 2019). This makes it difficult to perform a detailed analysis of the performance of companies that at least partially operate e-commerce. For example, Singh and Byrne (2005) in their research identify the impact of e-business drivers on operational excellence of firms that influence financial improvements.

There are not many authors dealing with the analysis of Czech e-commerce; see for example Pilík (2012) and Pilík et al. (2017). However, these papers focus mainly on factors influencing customer´s online behavior in the e-commerce environment. Articles dealing with a deeper analysis of electronic commerce as a phenomenon and the company's performance in electronic commerce in the Czech environment are missing.

That is why the goal of this article is to compile a characteristic, how e-commerce has been developing in the recent mid-term period in the Czech Republic. The characteristics point not only to the aggregate numbers for e-commerce as a whole but also for selected e-commerce context within the retail, as well as on the performance of companies doing business in this environment. In view of the above, 2 research questions were asked.

RQ1: How can the trend in e-commerce be characterized and what is the main trend in the relationship between e-commerce versus retail?
RQ2: Is the overall development of e-commerce reflected, and possibly how, in the performance of the businesses involved in e-commerce?

1. Methods of Research

In order to reach the above-mentioned goal of this paper and to answer the research questions referred to above, we process two issues.

1. Development of e-commerce compared to the whole retail.
2. Performance analysis of a sample of businesses involved in e-commerce (especially indicators based on sales, profit and employees).

First, regarding the first point, the processing methodology is as follows. We consider secondary annual data for the period from 2005 to 2020 in the Czech Republic. The time series chosen in this way is interesting mainly because the beginning represents the first full year when the Czech Republic was a member of the EU, at the same time 2005 opens a medium-term horizon before the financial crisis – the Great Recession. The end of the period, i.e. 2020, already makes it possible to capture the first effects of the coronavirus crisis. In addition to the development of e-commerce and retail as such, it is therefore possible to look for possible joint or different manifestations of two crises, each of which is of a different origin. Data sources are professional websites (e.g. Asociace pro elektronickou komerci = Association for Electronic Commerce or peak.cz), as well as public and private databases such as CZSO (Czech Statistical Office) or Albertina (Bisnode / Dun & Bradstreet). For the data analysis, we used basic decriptive statistics as well as different statistical methods and approaches such as trend equation to capture and describe trends. The trend equation does not seek to identify variables that affect the development of sales in retail or e-commerce. In this research, we considered only a simple linear equation purely describing the development of the trend according to individual years.

Second, the performance analysis is based on data from the Albertina database in the period 2016–2019 (unfortunately, consistent data before 2016 and after 2019 was not available; anyway, this period is also consistent with our goal of focusing on the medium-term horizon before the onset of the coronavirus crisis). Albertina database contains the information from financial statements and thus is suitable for assessing the performance and economic situation. However, on its basis, it is not possible to divide or distinguish revenues and other financial characteristics from e-commerce and retail in stores. First, the analysis focuses on "big players" – 55 companies with the largest B2C e-shops (based on their turnover (Shopsys, 2018) and the number of visitors (Reshoper.cz, 2019)), however often also with the retail in stores. The results of this group are compared with the leader on the e-commerce market the company Alza.cz. These seven indicators were used to measure profitability and productivity of Czech e-commerce: sales growth rate, the share of value added in sales, the share of personnel costs in sales, return on sales (ROS), return on assets (ROA), value added per employee, and earnings after taxes (EAT) per employee.

2. Results of the Research

This part of the paper is divided into two subchapters according to the numbered list given in the previous chapter, respectively according to the research questions from the introduction. The data are analysed and commented on more in detail.

Retail versus e-commerce

Regarding the first point, the data for the analysis of the development in retail as a whole in comparison to e-commerce are presented in Tab. 1 below. The table presented here contains only a section of data representing the medium-term horizon before the onset of the coronavirus crisis. The rest of the data, i.e. the years 2005–2020, is available from the authors of the paper or under the sources listed.

Tab. 1: Turnover development in retail (CZK billion)

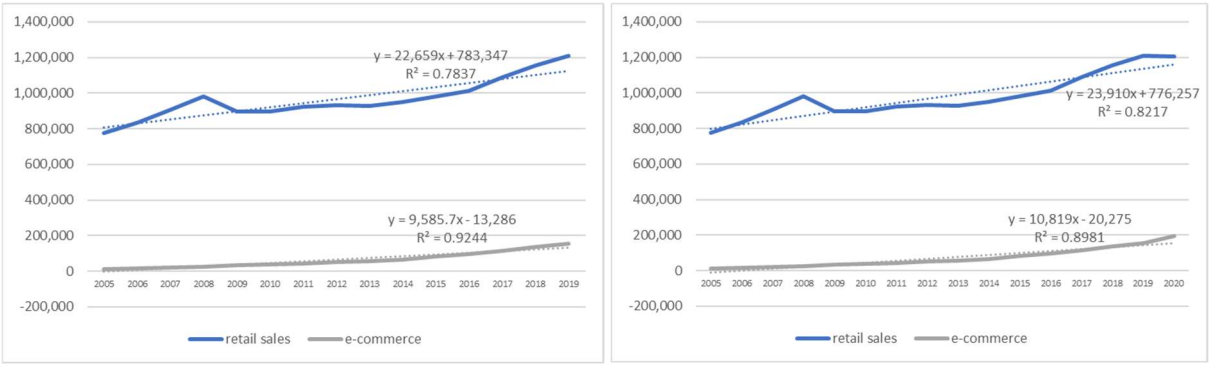
Indicator	2015	2016	2017	2018	2019	2020
Retail (y/y)	980 (+3.34)	1,014 (+3.45)	1,088 (+7.29%)	1,154 (+6.13%)	1,210 (+4.80%)*	1,203 (−0.60%)*
e-Commerce (y/y)	81 (+20.90)	98 (+20.99)	115 (+17.35%)	135 (+17.39%)	155 (+14.81%)	196 (+26.45%)
e-Commerce on retail	8.27%	9.67%	10.57%	11.69%	12.81%	16.30

Source: Own based on CZSO (2021), CZSO (2021, February 5), APEK (2021) and peak.cz. (2018, June 27)
*Note: * The percentage change is given by CZSO; the absolute number was calculated from the percentage change due to the official absolute indicator not yet published.*

Tab. 1 clearly shows that while retail is growing at around 3 to 7% with the exception of 2020, e-commerce is growing at around 14 to 21%. That's about 3 times faster. At the same time, while the share of e-commerce in retail before 2020 grew by approximately 1.1 percentage points every year, in 2020 the change is almost 3.5 percentage points.

The following picture Fig. 1 shows linear trend equation applied to the whole period considered and its difference if the first covid crisis year (i.e. the year 2020) is, respectively is not considered. See left, respectively right side of the figure.

Fig. 1: Sales in retail and in e-commerce in 2005–2019, respectively 2020 (CZK million)

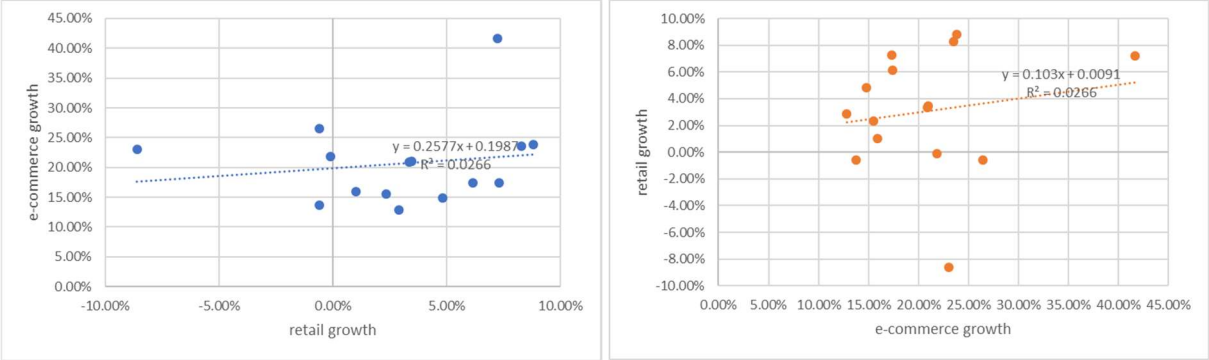


Source: Own

In Fig. 1 it is possible to notice several phenomena. First, while retail as a whole apparently copies the economic cycle (see manifestations of the Great Recession in 2009 and Covid Crisis in 2020), e-commerce is growing steadily. Second, the above-mentioned is transcribed into linear trend equations. While the trend equation for the whole retail seems to be more accurate in terms of model after the addition of 2020 (see coefficient of determination R^2 0.7837 on the left versus R^2 0.8217 on the right), the trend equation for e-commerce, on the other hand, has lost its accuracy in describing the trend (see R^2 0.9244 on the left versus R^2 0.8981 on the right). In other words, developments in e-commerce do not yet respond to economic downturns, or even react counter-cyclically.

Further, Fig. 2 is focused on percentage changes in retail as well as e-commerce.

Fig. 2: Retail growth versus e-commerce growth in 2006–2020



Source: Own

From Fig. 2 it is clear that there is no functional relationship between the growth / decline of retail sales and the growth / decline of e-commerce sales. The line(s) given as an example is(are) obviously absolutely inappropriate. Thus, the development of sales develops independently. Or in addition to probable common explanatory variables (e.g. development of GDP or wages, etc.), which would result in a similar nature of growth/decline, there will seemingly be another variable that causes a split in developments. One can add that the business model of how a business is executed develops independently of the total volume of the business. And although the nature of the two crises was different in the period under consideration, this applies to both.

Performance of a sample of businesses involved in e-commerce

The analysis of e-commerce is often limited to sales growth and the share of e-commerce in total retail. However, this is not enough to assess the performance of e-commerce companies, so it is important to pay attention to profitability or productivity as well. The results of selected indicators are shown in Tab. 5.

As was mentioned in Methodology, the group "big players" involves 55 companies with the largest B2C e-shops, this means it includes both companies based on an e-shop and companies operating an e-shop as well as a network of stores. From this group of companies, the monitored indicators are presented separately for the company Alza.cz, which is a leader in Czech e-commerce.

The sales growth of the group of "big players" is almost half that of Alza.cz. (see Tab. 2). However, it is clear that the growth rate of sales is declining, which corresponds to the overall weakening of the economy in 2019 and possibly to the degree of market saturation.

The share of value added in sales for the group of "big players" in the observed period decreased from 18.21% in 2016 to 16.8% in 2019. The significantly lower share of value added in Alza.cz's sales reflects the fact that Alza.cz is built primarily as an e-commerce business with lower margins compared to the "big players" group, which also includes companies with a network of retail stores, which increases the margins of products sold. The existence of a retail network of stores also results in a higher share of personnel costs in total sales in the case of a group of "big players".

Tab. 2: Performance analysis

Indicator		2016	2017	2018	2019
Sales growth rate (in %)	"Big players"	x	9.87	9.34	7.85
	Alza.cz	x	20.64	18.88	17.08
Share of value added in sales (in %)	"Big players"	18.21	17.46	17.12	16.80
	Alza.cz	7.01	8.05	8.51	7.82
Share of personnel costs in sales (in %)	"Big players"	13.58	12.39	14.22	12.63
	Alza.cz	2.51	2.88	3.18	3.27
ROS (in %)	"Big players"	3.77	4.73	3.80	3.60
	Alza.cz	4.61	4.84	4.92	4.58
ROA (in %)	"Big players"	7.56	9.50	8.15	9.28
	Alza.cz	18.21	18.85	17.97	17.31
EAT per employee (in thous. CZK)	"Big players"	116.61	155.06	122.12	110.80
	Alza.cz	642.03	634.07	626.95	604.91
Value added per employee (in thous. CZK)	"Big players"	675.24	730.81	742.76	766.03
	Alza.cz	1,214.50	1,322.73	1,372.68	1,307.90

Source: Own calculations

Although Alza.cz achieves a significantly lower share of value added in sales, it can more efficiently generate profit from sales and thus achieve higher profitability of sales, which again reflects the fact that Alza.cz is built purely as an e-commerce business and does not achieve such fixed costs as in the case of big players.

In 2019, the group of companies with the largest e-shops achieved ROA based on EBIT of 9.28%. This value is comparable to the ROA average for CZ-NACE 47 (Retail trade, except of motor vehicles and motorcycles) according to the Ministry of Industry and Trade (2019). Alza.cz achieves almost double the return on assets, and significantly higher added value and profit per employee.

In terms of labor productivity, there is a noticeable increase in added value per employee for the group of big players, which may also indicate a shift from generating sales in stores to higher use of e-commerce.

Overall, it can be summarized that companies with the largest e-shops, including Alza.cz, achieve satisfactory profitability and labor productivity. However, in some indicators (sales growth, share of value added in sales, ROS, profit per employee) in 2019 a slight decrease can be seen. The impact of the pandemic in 2020 will be the subject of further research once the necessary data will be published.

3. Discussion and Conclusion

The results presented in this paper, which answer the research questions, indicate that the development of e-commerce is an ongoing process even without the impact of the coronavirus pandemic. In addition, the impact of the pandemic due to its nature only strengthened the trend and the Czech Republic is not very different in this respect from

world development (see e.g. Ekontech.cz (2021, March 19) that reports annual growth of e-commerce in the world +27% vs. growth for the Czech Republic +26% and the total share of e-commerce in retail in the world 17% vs. 16% in the Czech Republic in 2020). The ratio between sales realized as e-commerce to retail sales as a whole is growing and only confirms the structural change in sales in this sector. Such development brings new opportunities as well as threats. Opportunities include, for example, that once a company decides to expand its business model to e-commerce, depending on the nature of the goods or services offered, the company is only a „small" step away from possible internationalization (for example, it is necessary to switch the built infrastructure into foreign language mutations and set up processes from marketing through sales or financing to logistics for intra-community or international trade). As Denicolai, Zucchella, and Magnani (2021) state, digitization as such needs readiness and a clear corporate strategy in the field of resource optimization and specializations. On the contrary, a certain threat to e-commerce is the fading of the impact of the pandemic and the resulting change or normalization of consumer shopping behavior.

The analysis of the performance of companies in accordance with the data for the entire retail and e-commerce showed that sales for the last three pre-crisis years have been growing at a declining rate. This had an adverse effect on most of the monitored performance indicators. At the same time, the analyzed sample of major e-commerce companies grew faster than retail, but at the same time slower than the whole e-commerce. The Czech leader in the field of e-commerce, Alza.cz, surpasses the entire analyzed sample in the vast majority of monitored indicators.

The year 2021 in the field of e-commerce will probably be held in a similar spirit as the year 2020 due to the spring restrictions. If the impact of the coronavirus crisis subsides during the year, it will be a challenge for e-commerce to keep customers acquired during the coronavirus crisis. The effects of 2020 and 2021 will be the subject of our further interest in this area.

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Miroslav Pavlák[1,3], Přemysl Písař[1,4], Jiří Vacek[2,5]

[1]University of Finance and Administration, Department of Economics and Management
Estonská 500, 101 00 Praha 10, Czech Republic
[2]University of West Bohemia, Faculty of Economics, Dept. Business Administration and Management, Univerzitní 8, 301 00 Plzeň, Czech Republic
email: [3]miroslav.pavlak@mail.vsfs.cz, [4]premyslpisar@mail.vsfs.cz, [5]vacekj@kpm.zcu.cz

Czech SMEs Innovativeness and International Business Cooperation Specifics

Abstract

Intense competition in the marketplace is forcing businesses to examine different ways that could enhance or retain their competitive advantage. Forward looking organizations generate sustained competitive advantage through innovation. In today´s competitive and turbulent environment, the challenge for all businesses is not only to innovate in existing markets to remain competitive, but also to enter new markets. However, this is not the only strategy used by SMEs. What is the strategic approach for Czech companies and their competitiveness? The research aims to determine vital factors and specifics of the Czech SMEs in the field of innovations and international cooperation. The theoretical introduction is followed by formulation of two hypotheses, which are than investigated by processing data gained by questionnaire survey performed in the period 1st - 3rd quarter 2020. The data were analysed using the Cronbach alpha reliability test, the Pearson correlation coefficients were used for determination of variables linear dependency, and the analysis was concluded by regression model for dependent variable Innovation management. The results are pointing to the importance of the controlling and risk management systems as the most important factors, and to surprisingly low, but negative influence of the variable international cooperation on innovation potential development. Findings supported by the regression model could be managerially used for Czech SMEs' innovation potential development and are opening the new research questions for Czech SMEs development, which can support the problematic deeper understanding and to forming strategies needed for SME competitiveness development.

Key Words
innovation, competitiveness, controlling, risk management, international business

JEL Classification: M10, M16, M21, M30

Introduction

Small and medium sized enterprises (SME) in the current turbulent world face many challenges, such as the globalization of markets and technologies. Moreover, currently they cope with incoming wave of the fourth industrial revolution complicated even more with COVID-19 pandemics.

To survive, thrive and remain competitive SMEs must develop new business models, differentiating their offers from those of their direct competitors. Safar et al. (2018) stated that the process of globalization and the 4th Industrial Revolution force researchers to look for new flexible business-organizational structures. They argue that each company has a certain form of competitive advantage. One of the opportunities is internationalization. The challenge for all businesses is not only to innovate in existing markets, but also to innovate and compete in new markets to stay in front of competitors. Goller and Bessant (2017) state that although there are many explanations for the nature of innovation, it is clear that the innovation process is based on new approaches and ideas. Goffin and Mitchell (2017) perceive innovation as part of business activities that cut across disciplines and create exciting new ideas. They claim that innovation plays a crucial role in creating competitive advantage.

The innovation process is generating additional opportunities for the SMEs as well as bringing risks and threats. SMEs need a performance-oriented management system to increase the positive effect of innovations and reduce the impact of possible risks. According to (Laval, 2018; Kupec et al., 2020) the controlling management could be a key factor supporting SMEs innovation potential. They emphasize orientation of controlling to the future and setting goals achievement. This approach is supported and developed interdisciplinary in synergy with risk management by (Kamps, 2013; Mikušová, 2019).

If we ask how the entry to foreign market is related to innovation, it becomes clear that this entry itself is a substantial innovation. To succeed, the company must be proficient in all four types of innovation as defined in Oslo manual (OECD, 2018): product, process, marketing, and organization.

In SMEs often prevail incremental innovations that are not so demanding on resources and are less risky. They often do not have specialized R&D departments and use the open innovation model to acquire external expertise that could bring valuable inputs to the innovative quality of decisions. Increasing the stability and competitiveness of SMEs is one of the main goals of national governments and the EU (Písař and Bílková, 2019).

Cavusgil (2021) proposed innovation-based model of the internationalization process including the following stages:

1. domestic marketing,
2. pre-export engagement,
3. experimental / involvement stage,

4. active involvement stage,
5. committed involvement stage.

The company internationalization in the EU can be facilitated by cross-border cooperation under the umbrella of national Operation programs or the EU Interreg program. The projects funded within these programs allow to establish contacts and create partnerships with potential partners in neighbouring regions, often in interaction with local and regional governments, chambers of commerce and other stakeholders (EU, 2020a). The list of available programs for EU countries can be found at (EU, 2020b). At the time being, the list for the new EU finance period 2021 – 2027 is under preparation.

1. Methods of Research

1.1 Aim and hypotheses

The research aim of this contribution is to determine specific factors influencing Czech SMEs innovation potential. To achieve this aim and the purpose of the research, the following hypotheses were formulated:

H1. The controlling management approach is a vital factor for successful innovation management and Czech SME competitiveness.
H2. The international cooperation is an important factor for Czech SMEs innovation potential development.

1.2. Data sources and methodology

The research was based on the Czech SMEs data collected in the period 1st - 3rd quarter 2020. The sample selection process for our research started by randomizing the primary research sample using the internal SME D-base of the University of Finance and Administration which contained until 1.1.2020 n = 4226 SMEs records. The final research sample contains n=432 active respondents. The questionary used the Paper Assisted Personal Interviewing (PAPI) method with 5 points Lickert scale.

1.3. Reliability and correlation analysis

The data reliability was validated using Cronbach's Alpha calculation. The Cronbach's Alpha value of 0.7 and above indicates a high level of consistency and reliability of the test sample on which the conclusions of the study were based.

1.4. Data analysis

The relationships between variables are investigated using Pearson correlation coefficients. according to (Akoglu, 2018). As a research importance criterion was required that the Pearson's correlation coefficient value should be higher than 0.6.

The following step was the construction of the model for the dependent variable Innovation management by using the linear regression model. The detailed computing procedure is described in Darlington and Hayes (2017) and IBM SPSS ver. 25 user manual (IBM, 2021).

2.Results of the Research

2.1. Results of correlation analysis

A test was of the reliability of the variables examined was performed by calculating the Cronbach's Alpha. The achieved value of 0.893 for n = 9 variables indicates a high level of reliability and consistency of the analysed data.

Tab. 1: Correlation analysis of variables

		V1	V2	V3	V4	V5	V6	V7	V8	V9
ROE V1	Pearson Corr.	1	0.152**	0.454**	0.345**	0.469**	0.103*	0.427**	0.445**	0.534**
	Sig. (2-tailed)		0.002	0.000	0.000	0.000	0.033	0.000	0.000	0.000
	N	432	432	432	432	432	432	432	432	432
Employees V2	Pearson Corr.	0.152**	1	0.484**	0.489**	0.497**	0.034	0.507**	0.424**	0.379**
	Sig. (2-tailed)	0.002		0.000	0.000	0.000	0.483	0.000	0.000	0.000
	N	432	432	432	432	432	432	432	432	432
Risk Management V3	Pearson Corr.	0.454**	0.484**	1	0.665**	0.789**	0.127**	0.718**	0.735**	0.717**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.008	0.000	0.000	0.000
	N	432	432	432	432	432	432	432	432	432
International cooperation V4	Pearson Corr.	0.345**	0.489**	0.665**	1	0.763**	0.096*	0.600**	0.585**	0.558**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.047	0.000	0.000	0.000
	N	432	432	432	432	432	432	432	432	432
Controlling management V5	Pearson Corr.	0.469**	0.497**	0.789**	0.763**	1	0.133**	0.758**	0.696**	0.723**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.006	0.000	0.000	0.000
	N	432	432	432	432	432	432	432	432	432
Export V6	Pearson Corr.	0.103*	0.034	0.127**	0.096*	0.133**	1	0.170**	0.066	0.091
	Sig. (2-tailed)	0.033	0.483	0.008	0.047	0.006		0.000	0.168	0.059
	N	432	432	432	432	432	432	432	432	432
Innovation management V7	Pearson Corr.	0.427**	0.507**	**0.718****	**0.600****	**0.758****	0.170**	1	0.583**	**0.630****
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000
	N	432	432	432	432	432	432	432	432	432
Social networks V8	Pearson Corr.	0.445**	0.424**	0.735**	0.585**	0.696**	0.066	0.583**	1	0.620**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.168	0.000		0.000
	N	432	432	432	432	432	432	432	432	432
Industry 4.0 technologies V9	Pearson Corr.	0.534**	0.379**	0.717**	0.558**	0.723**	0.091	0.630**	0.620**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.059	0.000	0.000	
	N	432	432	432	432	432	432	432	432	432

**. Correlation is significant at the 0.01 level (2-tailed), *. Correlation is significant at the 0.05 level (2-tailed), V3 = variable 3

Source: research data, authors processed by IBM SPSS ver. 25

Table 1 indicates important relationships between some variables. Highlighted are relationships between variable Innovation management and Risk management, International cooperation, Controlling management, and Industry 4.0 technologies. All correlation values passed the significance test on the 1% level and are positive. This indicates the importance

of their further analysis for achieving the goal of the research. Based on the correlation analysis, no harmful level of correlation (multicollinearity) was detected, what would be the case if the absolute value of Pearson's correlation coefficient was higher than 0.8. The correlation analysis results can be considered reliable.

The following step was the model construction for the dependent variable Innovation management. The procedure of linear regression – method Enter was used. The variable ROE was excluded from the model because it did not pass the significance test on a maximum 5% level. Results of the model construction see table 2.

Tab. 2: Construction of depended variable Innovation management model[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.057	0.109		0.525	0.600
	Industry_4.0_technologies	0.088	0.043	0.093	20.040	0.042
	Employees	0.123	0.029	0.148	40.251	0.000
	Risk management	0.198	0.043	0.258	40.634	0.000
	International cooperation	-0.021	0.042	-0.023	-0.500	0.062
	Social networks	-0.021	0.043	-0.022	-0.492	0.031
	Controlling management	0.457	0.063	0.437	70.214	0.000
	Export	0.108	0.046	0.069	20.334	0.020

[a] Dependent Variable: Innovation management

Source: research data, authors processed by IBM SPSS ver. 25

According to this regression analysis, the model for the dependent variable Innovation management was developed and all variables passed the significance test on a maximum 5% value.

$$\textit{Innovation management} = 0.057 \times \textit{Constant} + 0.088 \times \textit{Industry 4.0 technologies} + 0.123 \times \textit{Employees} + 0.198 \times \textit{Risk management} - 0.021 \times \textit{International cooperation} - 0.021 \times \textit{Social networks} + 0.457 \times \textit{Controlling management} + 0.108 \times \textit{Export} \quad (1)$$

The model was tested for passing the significance test on a 1% level. Results see in table 3.

Tab. 3: Depended variable Innovation management 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	0.797[a]	0.636	0.630	0.666	0.636	105.665	7	424	0.000

[a.] Predictors: (Constant), Export, Employees, Industry 4.0 technologies, International cooperation, Social networks, Risk management, Controlling management

Source: research data, authors processed by IBM SPSS ver. 25

Model 1 for the dependent variable Innovation management passed the significance test and is explaining 79.7 % of researched cases. The model ANOVA for the dependent variable Innovative management also passed for significance test with a value of 1%."

Hypothesis H1 presumes that the controlling management approach (variable 5) is a vital factor for successfully innovation management (variable 7) and Czech SMEs competitiveness. The value of correlation coefficient between those two variables equal to 0.758 demonstrates a strong dependency between those two variables. The model (1) is also pointing to the high value of variable Risk management coefficient 0.198 (second highest after Controlling management with the value 0.457). Hypothesis **H1 can be accepted**.

Hypothesis H2 presumes that the international cooperation (variable 4) is an important factor for Czech SME innovation potential development (variable 7). According to model (1) the influence of international cooperation on dependent variable Innovation management is weak and negative with the coefficient value of -0.021. This is an unexpected result – especially its negative value. This finding may point to the Czech SMEs specific given by the economic structure highly dependent on the automotive industry. According to the research AMSP (2019) on the sample n=400 SMEs 45% of total Czech export was delivered to Germany. This finding is opening the research topic of the Czech economy's dependence. According to findings from model (1), the **H2 is refused**. According to analysis results, model (1) and hypotheses evaluation, the research aim could be marked as achieved.

3. Discussion

In spite of the refused hypothesis 2, the opportunities for global expansion are tremendous, and the potential for exponential growth is alluring. However, attaining success demands a well-conceived global expansion plan that is grounded in accomplishing specific corporate goals through the careful formulation of business development innovation strategies. Paying special attention to innovative issues often makes the difference between success and failure. Regardless the size or ownership structure, companies that take a proactive, innovative approach to evaluating and understanding both risks and opportunities will stay one step ahead of the competition and reap the benefits of a successful globalization initiative.

According to Grishunin (2017), the innovative business strategy is necessary not only for the competitiveness of an enterprise at a given period, but also for determining an opportunity of the future improvement of the company's position at the market and widening the scope of its activities. Today, business management strategies must not only consider developments in the domestic market, but also global competition, which affects the production programs, internal organizational structure, business organization, etc.

Saridakis et al. (2019) investigate the role of goods, service, and process innovation on SMEs' internationalization (i.e., exporting); the association between innovation's degree of novelty (radical vs. incremental innovation) and SMEs' internationalization; and examine the combined effect of different types of innovation and the degrees of novelty of innovation on firms' internationalization. Their research suggests that the link between innovation and internationalization differs according to the type of innovation introduced and the degree of novelty of the innovation.

The study of Vuorio et al. (2020) examines the profitability impact of service innovation in SME internationalization, taking into account the impacts of entrepreneurial orientation and human capital and conclude that prioritizing internationalizing in favour of innovating may incur costs and result in lower profitability. According reached findings arising questions about efficiency of current CZ SMEs internationalization and performance strategy. The research concussions and findings are pointing on the national business strategy and becoming with the question, if Czech SMEs may to be important business leaders or if they the role of subordinated businesses.

Conclusion

To achieve successful prosperity, a company must find sources of competitive advantage. Creating and building up competitive advantages is carried out by overcoming the competitive advantages of opponents. The reality, however, is that most companies, particularly small and medium-sized enterprises (SMEs), find it difficult how innovation can be effectively managed, and that innovation is not an issue only of high-tech industries.

Q1. As the hypothesis H2, which presumes that the international cooperation is an important factor for Czech SME innovation potential development, is refused, the research questions for the following research orientation could be following: What are the crucial factors for supporting Czech SMEs ' innovative competitiveness activities in the field of internationalization?
Q2. Does the Czech economy need structural changes supporting the Czech SMEs international innovation potential and competitiveness development?

The main research limitations is a time factor and following quantity of SMEs researched. The research must be completed in the time, when the results are still reliable to given problematic and may leads to contribution for SMEs and national economy.

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Zuzana Rosnerová

University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics
Univerzitna 8215/1, 010 26 Zilina, Slovak Republic
email: zuzana.rosnerova@fpedas.uniza.sk

Implementation of Innovations and Their Impact on the Business Environment of the Slovak Republic

Abstract

Innovation is the driving force of any economy. Under the term innovation we can understand a certain renewal, a change that can be associated in the company with any of its activities. The presented article deals with the issue of implementation of innovations and their impact on the business environment in the conditions of the Slovak Republic. The aim of the article is to analyze the tendency to innovate in the case of Slovak companies and to find out which barriers and benefits companies record to the greatest extent in the area of implementing changes. The article works with two hypotheses. The first hypothesis is that companies focus most on innovation related to environmental protection. The second hypothesis relates to the benefits and barriers resulting from the implementation of innovations in Slovak companies. The survey was conducted at the beginning of 2021 on 385 companies operating in the market environment of the Slovak Republic. The second hypothesis was determined as an assumption that the most significant benefit of the implementation of innovations is the crowding out of competition, and in the case of barriers, I identified the financial side and return on investment in innovation as the most significant barrier. Based on the examination, the first hypothesis was not confirmed and the second hypothesis was only partially confirmed. I subsequently assessed the results concerning the innovation issues of Slovak companies with the Global Innovation Index of the Slovak Republic achieved in 2020.

Key Words

business innovations, implementation of innovations, barriers and benefits of innovations, Slovak Republic

JEL Classification: O3, O31

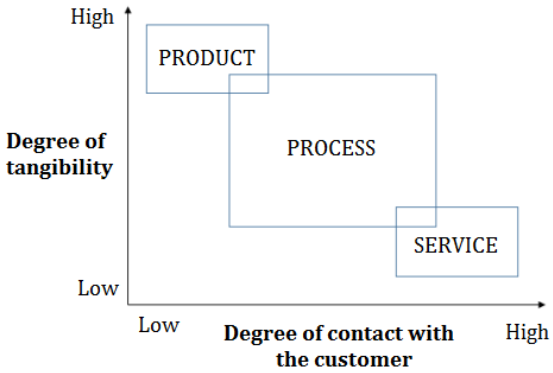
Introduction

The concept of innovation in the business environment is associated with a certain renewal and can be associated with any business activity. It can relate to the sale of production, changes in the organizational structure of the company up to streamlining the production process (Zizlavsky, 2017). Innovation in the business environment can be understood as a way of business behavior, which is connected with the application of new ideas and their interrelationship with changes, which on the other hand can pose a certain risk for the company and do not always bring the expected success (Poradova and Svabova, 2020). Innovation for small and medium-sized enterprises is a very important factor in the development and support of macroeconomic stability of the national economy (Belas et al., 2020). When dealing with business change, it is important to identify several different factors that are very crucial for the innovation itself: what

changes in the company, when it is necessary to distinguish whether it is a change in the product or production process; to what extent does the given object change, namely, whether the given change is revolutionary and at the same time perceived as a completely new change, resp. differs significantly from the original version of the object; and last but not least, it is necessary to identify the sources for the chosen change - whether the originator of the change is technology, or an employee of the company who brings specific ideas for streamlining and improving a particular process (Goffin and Mitchell, 2017). The term innovation is often associated exclusively with products and services. However, this is not the case in today's business environment, and individual processes that are responsible for creating products and services are often affected by innovation. The process innovations that make up products and services are becoming very important (O'Sullivan and Dooley, 2009). In today's advanced world, artificial intelligence is beginning to be used in the enterprise environment to help analyze the manufacturing process (Davidson, 2020). By Clark et al. (2020) the purpose of artificial intelligence not only in the field of optimization of production processes, but also in decision-making processes, which are a very important aspect in the field of solving business innovations. Within innovation projects, companies should emphasize their optimization while maintaining the required innovation effects (Kral et al., 2019). Business innovation directly affects a company's performance and plays the role of a mediator between organizational change and the company's financial performance, which can be measured through the achieved corporate income (Durana et al., 2020). According to Mittal (2020), two fundamental differences can be seen in the assessment of innovation. If technical and economic requirements dominate in the case of business interests, radical concepts of innovation will be addressed. If the company innovation is based on social contexts, the company will proceed in the case of innovations on the basis of incremental effects. According to Siekelova et al. (2020) the most significant motivation for solving business innovations is competitive pressure. This view is shared by Williams et al. (2020), which perceives business innovation as an effort to optimize business processes in order to increase the competitiveness of the company. Dvorsky et al. (2020) in the field of business competitiveness considers strategic management as a basic tool for increasing competitiveness, and according to him, this factor is closely connected with the management of innovative business processes.

In general, in the case of business innovation, it is possible to describe the relationship between the degree of tangibility (which is typical of products) and the degree of contact with the customer, which in turn is characteristic of services. Said relationship is shown in Fig. 1.

Fig. 1: Relationship between tangibility and contact with the customeregional



Source: O´Sullivan and Dooley, 2009

Business innovation is preceded by inventions. By invention we mean an idea or another qualitative change in the structure of knowledge and leadership. Inventions represent a certain level of process creation of new ideas (Bartes, 2005). It is true that not every invention is transformed into innovation, which results due to financial demands, various barriers, or lack of human capital in the company. Bessant and Tidd (2007) refer to invention as an initial combination of ideas related to a specific concept, which can be expressed as a result of a particular market research, can result from the reaction of competitors or from the knowledge of the company's own research and development department. Certain rules should be respected when implementing business innovations. These rules include the following: 1. The change should be based on a thorough organizational analysis. 2. If we are going to make a change, we should find as many supporters as possible to support it. 3. All parties involved in the change should be involved in the process. 4. In the event of changes, it is necessary to constantly consult, communicate and listen to all comments from others. 5. If a change is highly desirable due to the circumstances that have arisen, it must be explained why the change will take place so that we can eliminate any concerns. 6. All the positive benefits that will result from the change must be highlighted. 7. Adverse effects must always be addressed and mitigated. 8. Flexibility, flexibility and a willingness to adapt are essential for the success of change. 9. Where appropriate, third party access to changes should also be considered to ensure the best possible results. 10. Change belongs to the scope of work of managers. 11. In a business environment, change is seen as a complex element. 12. Any type of change in an organization is always directly related to people. 13. With every change, success can be achieved if communication between people takes place at a high level. 14. People's natural attitudes to change are fears of change. 15. A prerequisite for the success of change is a perfect knowledge of the nature and subsequent process of change and a perfectly thought-out concept for change and the chosen strategy. 16. Change is a long-term process for a company in terms of time. 17. The success of change also depends on an understanding of the current corporate culture (Hospodarova, 2008; Bessant and Tidd, 2007).

1. Methods of Research

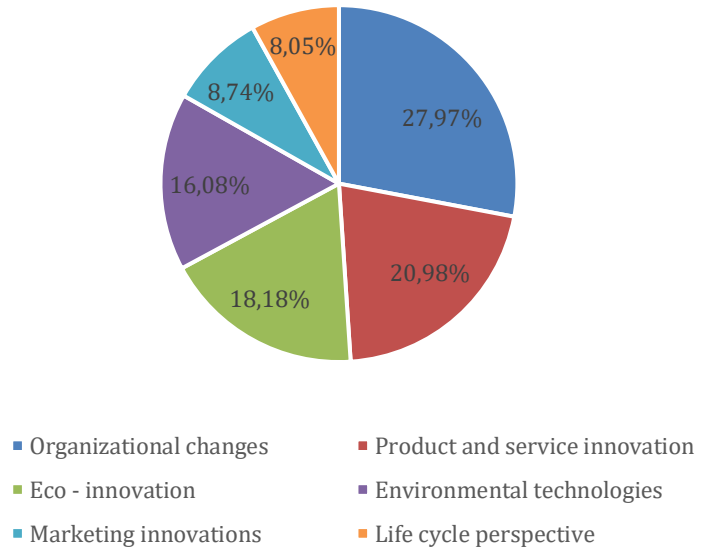
The aim of the paper is to analyze the tendency to innovate in the environment of Slovak companies and to find out which barriers are the most common obstacle to the implementation of change from the point of view of companies and also to identify which benefits companies record the benefits of change. In this article, I work with the hypothesis that companies are mostly focused on innovations related to environmental protection, ie eco-innovation in view of the current global problems related to environmental protection. Regarding the second part of the research, and thus identifying the most common barriers and benefits arising from the implementation of innovations in Slovak companies, I assume that the biggest barrier to their implementation will be funding associated with their implementation and return on investment and the greatest benefit for companies will be innovative practices.

The research was carried out through a questionnaire survey, which was attended by 385 companies operating in the Slovak Republic.

Enterprises can be divided into three groups, one represented by enterprises that have introduced innovations, the other group by enterprises that have not yet introduced innovations but plan to introduce them in the near future, and the third group by

enterprises that do not consider implementing innovation. Based on this diversification, I then found out which types of innovations companies introduced, as well as the reasons why companies do not consider implementing innovations, and I also identified barriers and benefits resulting from the implementation of corporate changes.
Based on the research, I found that the most common area for the implementation of business innovation is the area of organizational change. The second most common area for change is product or service innovation. The third area is eco-innovation. The fourth area of innovation is environmental technologies. The fifth section of applied changes is the area of marketing innovations and the last area for the implementation of business changes are innovations focused on the perspective of the company's life cycle. The findings based on a percentage are shown in Fig. 2 below, which reflects findings from 286 companies.

Fig. 2: The most common areas of implementation of business innovations in the environment of Slovak companies



Another area that was part of the research was the reasons for not introducing innovations into business. The most common reasons for not introducing innovations in Slovak companies were the reasons given in Tab. 1.

Tab. 1: Reasons for not introducing innovations in the environment of Slovak companies

Reasons to non-implementation of business innovation	The company is successful enough on the market
	No sense of innovation
	Lack of funds
	Lack of information on innovation
	Other barriers (eg legislation, laws and bureaucracy, helplessness, blind potential for innovation for the company)

Source: the author's own findings

Part of the research was also to find out which benefits Slovak companies record the most as a benefit from the fact that they have implemented innovations. The findings are gathered in Tab. 2.

Tab. 2: Benefits resulting from the implementation of innovations perceived by Slovak companies

Benefits of implementing business innovations	Environmental Protection
	Access to new markets
	Added value of the final product
	Company image
	Leading the way over the competition
	Increasing productivity and technical capacity
	Attracting investors
	Other (energy saving, feeling satisfied)

Source: the author's own findings

I also found out which barriers companies consider most significant in the issue of implementing business innovations. The following table lists these barriers.

Tab. 3: Barriers resulting from the implementation of innovations perceived by Slovak companies

Barriers to the implementation of business innovation	Long and uncertain return on investment
	Lack of own financial resources
	Insufficient market demand
	Ambiguity of legislation
	Legislation
	Corruption
	Lack of quality workforce
	Isufficient cooperation with scientific researrch institutions
	Other (higher entry price of investments, insufficient support from the state)

Source: the author's own findings

2. Results and Discussion

Based on my own research, I found out that Slovak companies implement organizational changes to the greatest extent. Following these changes, innovation is the most common area for product or service innovation, and eco-innovation is the third most common area for innovation. They are followed by innovations related to environmental technologies, marketing innovations and finally innovations focused on the perspective of the business life cycle. The first hypothesis, which I worked with, was that companies operating in the market environment of the Slovak Republic will be oriented to the greatest extent by innovations on environmental protection, and thus will implement eco-innovations to the greatest extent. This hypothesis was not confirmed, as research has shown that Slovak companies most often deal with organizational changes. Based on the research, I diversified the companies into three groups:

• companies that have introduced innovations in the internal environment,

• companies that will innovate in the near future,

• companies that have not introduced innovations and do not plan to implement them.

385 companies were involved in the research, of which 286 companies implemented already introduced innovations (represented by 44.4%, ie 171 companies), resp. they will implement them in the near future (29.9%, ie 115 companies). The rest of the companies that participated in the research (25.7%, ie 99 companies in absolute terms) did not solve innovations and do not even consider solving them.

Based on this division, I was able to find out which reasons companies consider a problem in the implementation of innovation and also which benefits and barriers they perceive from the implementation of innovation. Businesses perceive the fact that they are sufficiently successful in the market as the most common reason for not introducing innovation, also that they do not see the meaning of innovation and consider the lack of financial resources as the third most serious reason. Another reason was that they did not have enough information on innovation as well as on legislative issues. When finding that companies are considered successful enough, it is necessary to be very careful at all times, as the current situation is characterized by significant changes, companies are constantly trying to move forward in order to strengthen competition, and it is certainly necessary to conduct thorough market research and monitor the company's own market position, taking into account the impact of competition.

The second assumption, which I worked with, concerned the area of barriers and benefits from the implementation of innovations, where in the case of benefits, I assumed that the greatest benefit for companies will be overtaking, respectively. crowding out competition. With regard to barriers, I assumed that companies would consider the financial aspect to be the biggest barrier. The research showed that companies consider the protection of the environment to be the greatest benefit, access to new markets is the second most significant benefit, and my assumption concerning competitive struggle came in fifth place. The issue of barriers to the implementation of innovation was dominated by a long return on investment and a lack of own funds. I can state from the findings that the second hypothesis was only partially confirmed, as the fact that companies see the problem in the financial aspect of innovation, which concerns mainly long and uncertain return on investment and also the lack of own funds, which could be spent on ensuring the innovation under consideration.

The identified reasons and barriers that hinder companies in their ability to innovate thus correspond to the fact that the Slovak Republic does not have a favorable outlook in the field of innovation. According to Euractiv, Slovakia fell by two places in the Global Innovation Index in 2020 compared to 2019. In 2020, the Slovak Republic ranked 39th among the 131 countries evaluated. The location of the Slovak Republic is the worst in comparison with the V4 countries (ie Poland, Hungary, the Czech Republic). The Slovak Republic lagged the most in the Market Sophistication category, when it was ranked 82nd. For comparison with the V4 countries - the Czech Republic was ranked 24th, Hungary was ranked 35th and Poland was ranked 38th (WIPO, 2020). The research results reflect the reasons and barriers in connection with the implementation of corporate innovations, which are perceived by companies and we can consider these factors as those that are

responsible for the results of innovation performance of the Slovak Republic from a global perspective.

Conclusion

The issue of the paper is focused on the implementation of innovations and their impact on the business environment in the conditions of the Slovak Republic. Based on the research, I found out that the most frequently implemented changes, which are focused on companies operating on the Slovak market, are organizational changes. Based on this finding, the first established hypothesis was not confirmed, which was determined as a presumption that Slovak companies will focus on eco-innovation to the greatest extent. Of the 385 respondents involved in the survey, the vast majority stated that they had already implemented innovations, resp. intends to implement them in the near future. We can consider this finding to be positive, as most companies are trying to move forward and adapt to changes in the market environment. In connection with the non-introduction of innovations into business practice, I focused on clarifying the reasons that lead to this fact. Businesses saw it as the biggest reason that they were successful in the market and did not need to address innovation. I also addressed the issue of the benefits and barriers that companies feel from innovation itself. The most common barriers for companies are the long return on investment and lack of own resources. On the contrary, companies consider environmental protection to be the greatest benefit of innovation. However, in my hypothesis, I identified the elimination of competition as the biggest benefit of innovation, and I identified the financial aspect as the biggest barriers. Based on these findings, the second established hypothesis was only partially confirmed. During the research, I also addressed the issue of placing the Slovak Republic in the Global Innovation Index, and I found that the Slovak Republic achieves the weakest score among the V4 countries. The reasons and barriers for not introducing innovations from the point of view of Slovak companies can thus be a reflection of the results of the innovation performance of the Slovak Republic from a global point of view.

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Lukáš Skřivan, Jiří Vacek

University of West Bohemia, Faculty of Economics, Department of Business Administration and Management
Univerzitní 22, 306 14 Pilsen, Czech Republic
email: skrivanl@kpm.zcu.cz, vacekj@kpm.zcu.cz

Innovation Opportunities and Challenges in SMEs in Selected European Countries

Abstract

The global economy is due to the pandemic COVID-19 at the stage where it is necessary to determine the future direction. Vaccination is already underway around the world and international trade is slowly returning to normal. For organizations, this situation is very difficult to survive, recover, and generate resources for investments in innovations for the necessary growth. Organizations must cope with the current situation and revise its business strategy to increase competitiveness. The biggest challenges for companies are sufficient resources (financial and non-financial) and retaining talent. The aim of this paper is to find out what opportunities and challenges SMEs face in selected European countries. The research is based on a literature review of publications that include methods and recommendations for innovation and growth, given the current situation with regard to recovery and utilization of innovative methods and practices. The methods and approaches of the publications authors are different and therefore it was necessary to set search criteria to identify articles and reports for closer analysis. Trends in innovation and sustainability for the following years have changed, and it is therefore necessary to define new targets within the industry, for example, 4.0 and circular economy. In the discussion and conclusion sections we draw attention to non-academic research and possible areas of interest useful not only for recovery from the COVID, but also for their growth and increasing competitiveness.

Key Words

SME, innovation, industry 4.0, development, COVID recovery

JEL Classification: D24, M21, O31, O52

Introduction

In recent months, the businesses and the whole society have undergone a difficult period. The fight against COVID-19 pandemic has not yet been won, but vaccines already exist to protect us against the disease (Sneader and Singhal, 2021). With the great support from governments their development and testing were extremely fast and it is difficult to imagine the situation if they would be developed several years later, as was originally supposed. So we can now see the light at the end of the tunnel and can often hear and read about returning to normal. However, what does this "normal" means?

In this contribution we would like to study innovation challenges in SMEs in selected EU countries on the basis of the literature review. We focused on SMEs as they have been hit most seriously by lockdowns, especially those in the service sector, and those companies

with less than 250 employees are the driving force of the European economy, as this is where 99 % of employees work (Eurostat, 2018).

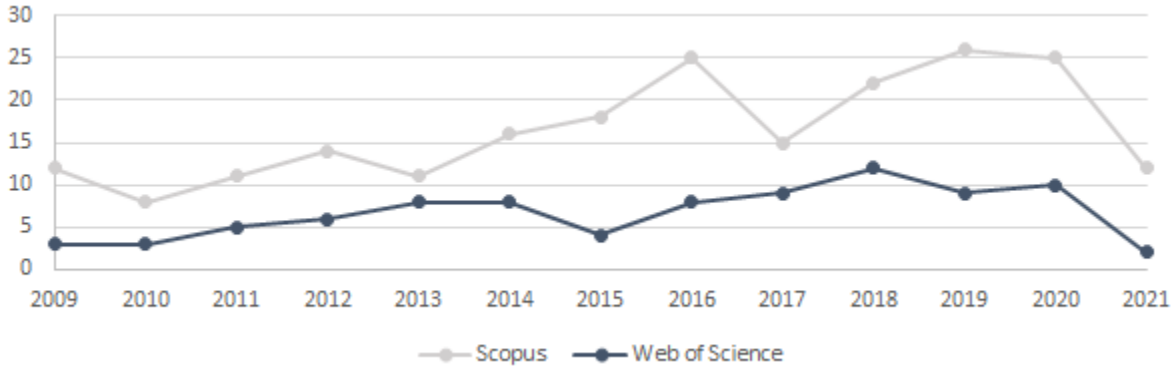
1. Methods of the Research

The literature review identified the resources where one or more keywords is focused on innovation or development in SMEs indexed in citation databases WoS and Scopus. Selected expert articles, focused on the challenges and opportunities for SMEs that can have a strong impact on the business of the future, were analyzed in detail.

2. Results of the Research

Using search phrase "Innovation SME in Europe", since 2009 a total of 215 documents, mostly funded by the European Commission (10 of them from the Czech Republic) with 202 authors have been identified in Scopus (2021) and 87 with 246 authors in the Web of Science (2021). The most productive year of the authors in Scopus is 2019 and in Web of Science 2018 (see Fig. 1).

Fig. 1: Annual Publication of Intersecting Keywords Innovation in SME in Europe



Source: Scopus (2021), Web of Science (2021)

The authors performed a systematic literature research of articles using the following criteria:

a) at least 1 author from a European country;
b) publication in 2020 or 2021;
c) publication type is article or report;
d) it must contain at least 2 of the following keywords: SME, innovation, industry 4.0, development;
e) the key findings address the current opportunities and challenges facing businesses.

The articles selected using those criteria are listed in Tab. 1.

Tab. 1: Results of Systematic Literature Review

Author/ authors	Topic	Keywords	Key findings	Type of paper	Country
Gething et al. (2021)	Road to recovery: The state of corporate restructuring in Europe	Recovery of European economy; innovation; development	Businesses need to prepare for a change in business incentives. As part of the restructuring, they should take into account current trends.	Article	EU
Sneader and Singhal (2021)	The next normal arrives: Trends that will define 2021—and beyond	Recovery of global economy; innovation; COVID-19; development;	2021 will be the year of transition of leisure, innovation, shopping behavior, supply chains etc.	Report	Canada, China, Korea, EU, USA,
Dimson et al. (2020)	COVID-19 and European small and medium-size enterprises: How they are weathering the storm	Economy, prosperity, growth risk, government support, COVID-19	SMES in EU concern about their survival due to COVID-19	Article	EU, the UK
OECD (2020)	Innovation for Development Impact: Lessons from the OECD Development Assistance Committee	Innovation, partnership, COVID-19, SME	Using mobile money and microfinance to drive financial inclusion and small business development.	Article	Australia, France, Sweden and the UK
Masood and Sonntag (2020)	Industry 4.0:Adoption Challenges And Benefits For SMEs	Industry 4.0, SME, Internet of Things	Most companies want to implement the principles of Industry 4.0, but financial and knowledge constraints are considered key challenges.	Article	the UK
García-Quevedo et. al(2020)	Barriers to the circular economy in Euro pean small and medium-sized firms	SME, sustainable development, competitiveness, green innovation	The implementation of the circular economy (CE) is relatively rare in SMEs due to the high potential benefits.	Article	EU

Source: authors' research (2021)

Businesses were hit economically in 2020 and 2021, slowing down development. Although COVID-19 is still ongoing, companies should prepare for the post-pandemic situation and find out how to recover and restart their development. Globally, corporate debt reached USD 5.4 trillion in 2020 (an annual increase of 20% year on year), while in EU countries the debt rose from € 289 billion (2019) to € 400 billion in the first half of 2020 (an increase of 38 %) (Horobin and Weber, 2020; Plat, 2021).

To stay in the market, companies seek help from the governments. By comparison, the fiscal response to the COVID-19 pandemic was three times greater than that of the 2008-2009 financial crisis. Western European countries have distributed nearly $ 4 trillion. Currently, companies are dealing with the situation of how to survive and recover after the end of the pandemic, when the financial support ends. Gething et. al. (2021) address the organizations' key steps needed to save their business:

a) To avoid denial - The organization must cope with the current situation and engage in negotiations with stakeholders. It is necessary to find the right solutions to avoid insolvency. One of the first partial steps is to create a sustainable business plan based on realistic measures and a suitable capital structure.
b) To conserve and create cash - With the global recurrence of lockdowns, it caused businesses to close and uncertainty increased. For these reasons, the recovery of the companies´ economic growth is expected to take a longer time.
c) To embrace transformational change - Organizations should embrace more holistic and radical transformational changes than ever before. The key to success will be to increase liquidity, which leads to self-financing. In this case, the partial steps are reimagining the purpose and value agenda; innovating the products and services and radically changing how to operate to reduce structural complexity and increase speed.
d) Retain talent - Businesses must keep the best people, what is very challenging - the demand is much greater than the offer. Without highly competent staff, it is difficult to restart performance and growth. For this reason, personnel procedures are being transformed to support organizational resilience.

Sneader and Singhal (2021) analyze how COVID-19 affects the global economy. In comparison with all economic sectors, services were clearly hit hardest. When retained demand will be released, it can be supposed so-called "retaliatory shopping" because consumers will be eager to spend and compensate for a long period of inaccessible goods and service and spend at least part of the money savings accumulated due to restrictions. The authors also examine the issue of travel and its return to the pre-pandemic period, with possible exception of the decrease in business trips . This prediction is based on the analogy with China, where business activities recovered after COVID suppression, e.g. domestic assembly is returning to normal, hotel occupancy returned to 90% in the third quarter of 2020 compared to August 2019. During the pandemic, digitisation has grown significantly, supporting the theory that the crisis is fueling a wave of innovation. On the rise are online customer services, teleworking, supply chain restructuring. Significant progress was achieved in the applications of artificial intelligence (AI) and machine learning. In the long-term can be expected the sustainable growth in productivity, ecology and medical innovation.

Dimson et. al (2020) researched 2,200 small and medium-sized enterprises in five European countries - France, Germany, Italy, Spain and the United Kingdom. It has been found that as a result of pandemics, around 70 percent of companies suffered decline in sales; a fifth fear repayment of loans and the need to lay off employees. At the same time, more than half of companies fear that they will have to close down within 12 months. However, there are differences among countries. A total of 39% of companies in Germany stated that the state of the economy is strong / very strong, while only 10% of Italian companies think so. If the situation worsened, 77% of Italian companies would have to

close their businesses. Governments in European countries have introduced measures to increase liquidity for small and medium-sized enterprises and avert bankruptcy.

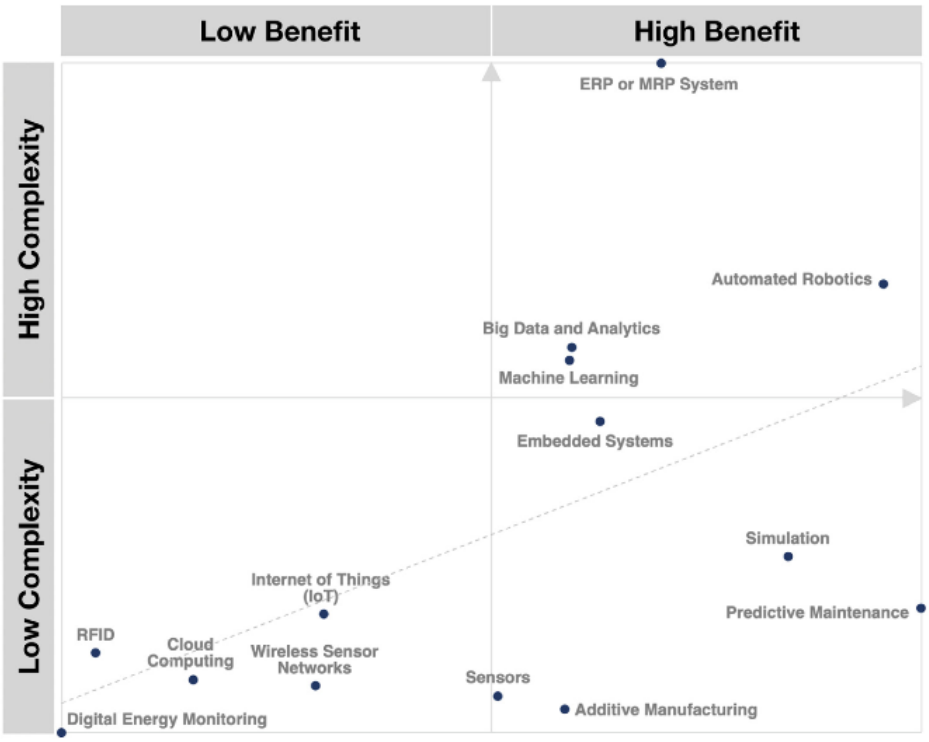
Over the past decade, innovation has become a tool for achieving development goals that have an impact on society in new and creative ways. During 2019, research was designed and conducted by the OECD Development Assistance Committee (DAC) to learn about work on innovation in selected countries. Many innovations exceeded expectations and became a source of real transformation opportunities which are (Ramalingam and Prabhu, 2020):

a) improve the accessibility of vaccines and medicines in the poorest countries and reduce costs,
b) financial support for small and medium-sized enterprises using mobile money and microfinance,
c) using cash transfers to enhance food security,
d) provide insurance and measures that will be resistant to disasters and climate change.

During seven months in 2020, the volume of globally mobilized innovation resources was $ 9 billion, compared to the total funding of Ebola research in 2014-2019 that was $1.9 billion (OECD, 2020).

Masood and Sonntag (2020) researched the implementation of Industry 4.0 technologies, methods and tools in SMEs and its benefits and challenges. In the United Kingdom (N = 271), it was found that the implementation of ERP or MRP systems brought the greatest benefit, while Digital Energy Monitoring the lowest one. Below the line (corresponding to correlation factor R2 = 0.32 - no statistical significance found) are technologies that may have greater advantages than measured (see Fig. 2).

Fig. 2: Average Ratings for Technology Benefits and Challenges in the UK



Source: Masood & Sonntag (2020)

The circular economy (CE) is one of the innovative and sustainable opportunities. García-Quevedo, Jové-Llopis and Martínez-Ros (2020) address this issue in European SMEs and point out that despite the benefits of CE, its implementation is rare. The biggest challenges in this regard are:

a) resources (financial and human),
b) skills (expertise),
c) regulatory framework (good practices and compliance costs).

The research took place in 28 countries of the European Union, where a rigorous econometric method was used to achieve empirical results. In order for CE to be well implemented, a set of administrative and legal procedures must be established in the company in accordance with environmental legislation. Businesses try to minimize material during production, but they also minimize the environmental impact in the area of low consumption and renewable energy. The research and knowledge circulation of new business models is a big challenge to find qualified human resources. It has been found that SMEs that are already innovating in the field of CE better identify regulatory barriers than those that do not.

3. Discussion

Let´s discuss what challenges and opportunities face the Czech Republic taking into account two simultaneous trends - post-pandemic recovery and Industry 4.0 concept,

leading from production of goods and service through restructuring job market, healthcare and social services, educational systems to the umbrella of all those activities - Society 4.0. Naturally it is possible to take inspiration from the articles identified e.g. in this contribution in the citation databases, however their number is relatively low in comparison with reports and studies published not by academic sector, but by large global consultancies as McKinsey, BCG, Delloite, PwC, which have the advantage in developed networks of contact with businesses and are more focused to suggest specific approached, methods and tools in the language understandable to their clients and using the direct feedback. It can therefore be recommended to put more emphasis on those „gray" resources and to the topics of their interest. It can be expected that for the companies it will become important to focus on resilience, risk management, competencies and talents including development of soft skills, design thinking, innovation and knowledge management. And we shouldn´t forget about the interdisciplinary and systems approaches, new technologies of Industry 4.0 and newly emerging trends such as circular economy, gig economy, increased potential of cultural and leisure time industries, and the others.

Conclusion

The preparation of this contribution broadened our insight into the role of innovations in SMEs and specifically in the context of the recovery from the COVID pandemic However this introductory treatise opens many opportunities for future research in this field . Introductory analysis of the sector of knowledge intensive services was published in University of West Bohemia and VŠTE České Budějovice study (Vacek et al., 2019) and other related outcomes of the joint project available from project website https://azis.zcu.cz/. As the feedback on our work the companies often mention the barrier between academia and businesses - our outputs are often considered too academic for practitioners, both in content and the language.

Acknowledgment

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Section II

Management and Marketing

Petr Bartoš

Prague University of Economics and Business, Faculty of Business Administration,
Department of Marketing
Náměstí Winstona Churchilla 1938/4, 130 67 Praha 3 – Žižkov, Czech Republic
email: petr.bartos@vse.cz

Memory in the Context of User Behavior on the Website

Abstract

The article discusses selected research articles related to memory and effects connected with the short-term memory in the context of user behavior on the website. The article occupies effects, such as serial position effect and product and pricing primacy. All these effects are pivotal for planning, designing and building successful website which will be pleasure to use. First part of the article is devoted to memory, history of the humans' memory, how people store the information in short-term memory, how the short-term memory differs from long-term memory and which research articles changed rapidly perception of the short-term memory and which articles had big impact in the field of psychology. The second part of the article presents short-term memory and its specifics. The third part deals with serial position effect, when people have a tendency to recall the first and last items in series better than the middle items, and its impact on designing the website. The fourth part deals with product and pricing primacy effect and its influence on the humans' perception of the product. Whole literature research and all the behavioral effects are put in the context of user behaivor on the website so that UX designers and information architects could plan, design and build prospering websites.

Key Words

memory, user experience, serial position effect, website usability

JEL Classification: M31

Introduction

The paper is based on the literature research and discusses selected behavior on the website derived from psychology which are pivotal for planning, designing and building successful website. The whole article is divided into four parts. First part of the article is devoted to memory, history of the humans' memory, how people store the information in short-term memory, how the short-term memory differs from long-term memory and which research articles changed rapidly perception of the short-term memory and which articles had big impact in the field of psychology. The second part of the article presents short-term memory and its specifics. The third part of the article presents serial position effect, when people have a tendency to recall the first and alst items in series better than the middle items, and its impact on designing the website. The fourth part deals with product and pricing primacy effect which influence the perception of the product by user. The main research question of this paper is "How selected findings from field of psychology can be used in the current trends of User Behavior on the website? The purpose of this paper is to understand the context of the field of psychology and how to implement findings from the field of memory, short-term memory, serial position effect and product and pricing primacy into the field of User Experience of the website.

Following literature review and summary of findings below can help to design more user friendly and better optimised websites and applications from usability point of view.

1. Methods of Research

The paper is based on the literature review of the journal articles primarily selected from the field of psychology. The significant sources and journals from which the articles were selected are namely Psychology of Learning and Motivation - Advances in Research and Theory, Cognitive Psychology, Psychology : the science of behaviour, Journal of Verbal Learning and Verbal Behavior, Journal of Clinical and Experimental Neuropsychology, The principles of psychology, Journal of Experimental Psychology. The selection criteria for following literature research was to base the whole article on the most cited and highly regarded articles and build on these selected articles extensions written by modern authors and experts from field of user experience and website usability. The author of this article proceeded the literature research from the basics of memory from best known and plentifully cited articles written by the authors who might be called pioneers in the research of the memory and experimental study of memory and short-term memory such as German psychologist Hermann Ebbinghaus, American psychologist William James, American professor of psychology and cognitive science Richard Chatham Atkinson, Herbert Alexandre Simon who received the Nobel Prize in Economics in 1978 and the Turing Award in 1975 and last not least American psychologist who was one of the founders of cognitive psychology George Armitage Miller who is besides the other things the author of one of the most highly cited papers in psychology "The Magical Number Seven, Plus or Minus Two". The findings of these famous authors are followed by the articles which are extending their basic theories and then they are put into the context of user experience of the website and best practices of the website usability in the modern age where can be named e.g. the author such as Jakob Nielsen who is labelled as “the guru of Web page usability” by The New York Times.

2. Memory in the context of User Behavior on the website

The first scientific researches of memory are dated since 1885 when Hermann Ebbinghaus conducted experiments on himself and examined his own acquisition and forgetting of new information (Ebbinghaus, 1885). In 1890 James proposed differentiation between primary memory where we can keep very limited amount of information for very short time period and secondary memory defined as a relatively permanent storage system which enables to recall information over minutes, hours, days, years (James, 1890). Experts agree that there is the third part of memory which is called sensory memory. During every moment of an organism’s life is being taken information from sensory receptors (Carlson, 2010). These sensory receptors can be divided on external and internal receptors. External receptors respond to stimuli from outside the body as smell, taste, vision, sound, temperature, pressure or distortion. Internal receptors respond to changes inside the body – e.g. blood and its chemical concentration or pain-recognition (Campbell, 1996).

Websites are often overloaded by many design variables, component, shapes and colors. User must remember and recall many things, shapes, info, lot of content or information. It can be considered as an obstacle and the reason why users do not feel good on the websites and leave. The less users have to think about the following steps, design or interface, the easier and more they can focus on desired goals of their visits. UX researchers and designers should be aware of limited capacity of human memory and system how human memory works.

Each website user has a different capacity of memory and each user can work with the capacity in different way. Users who are coming repeatedly on the website may behave in other way than new visitor. Easygoing users may behave in other way than nervous users or users in stress. Young users who use modern technologies every day may behave than older generations less experienced in modern technology.

It is not possible to quantify cognitive overload, that is why UX researchers and designers must avoid making design mistakes and keep in mind memory limitation. Between the most prevalent mistakes can be considered unnecessary website actions, overstimulation, decision paralysis, too much content, ambiguous interface, hard-to-find pages and features or internal inconsistency (Halarewich, 2016).

As it is obvious from the text above, user behavior on the website is closely connected with keeping the limited amount of information in the memory for a short period of time. That is why the following chapters are focused on short-term memory and related topics such as serial position effect, anchoring effect, list-length effect or website response time.

3. Short-Term Memory

Short-term memory is memory being used while we are thinking. It can be thought of it as the part of the long-term memory that is being used in particular moment (Reisberg, 1997). Short-term memory has a big limitation. The duration of short-term memory is between 10 and 30 seconds (Atkinson & Shiffrin, 1971). Short-term memory has capacity and time limits and can hold about 7 letters or numbers, fewer words and even fewer sentences at time (Miller, 1956). Organized information is held by working memory much better than disorganized information (Slavin, 1997). The organization of objects or items into the meaningful groups, also called chunking, helps to make them more manageable. E.g. phone number split into groups of 3 or 4 digits tends to be easier to remember than a single long number. The phenomenon of chunking has been verified at all levels of cognitive processing (Miller, 1956).

One of the most highly cited paper in psychology which can be also closely connected with user behavior on the website is study written 1956 by cognitive psychologist George A. Miller. The main finding in his article is that an average human can hold in short-term memory approximately 7 chunks (plus minus 2 according to given circumstances) (Miller, 1956). Miller did not specify the amount of information which can be held in each chunk. So, if we put the information into the chunks, we can store more information in our short-term memory. However, there are also studies where researchers argue even for fewer chunks than Miller's magical number seven – e.g. Ericsson in his study Acquisition of memory skill (Ericcson et al., 1980).

Findings by Jacobs in 1887 can be also closely related to designing the website. He found out that people recall more digits than letters. The average span for digits was 9.3 items and 7.3 for letters. Recall span increases with the age. In his experiments 8 year old participants could recall an average of 6.6 digits and 19 year old participants could recall an average of 8.6 digits (Jacobs, 1887).

Peterson & Peterson in their research from 1959 claimed that the longer the time delay the more forgetting occurred in the short-term memory. In their experiment the participants could recall after 3 seconds 90 % of the trigrams, but after 18 seconds only 5 % (Peterson & Peterson, 1959).

Experiments by Herbert Simon have demonstrated that people have a shorter span for larger chunks, such as 8-word phrases, than smaller chunks such as one-syllable words. His experiments determined that the ideal size for chunking of letters and numbers is three. Short-term memory can hold even longer series of the letters or numbers if they are meaningful groups (Simon, 1974).

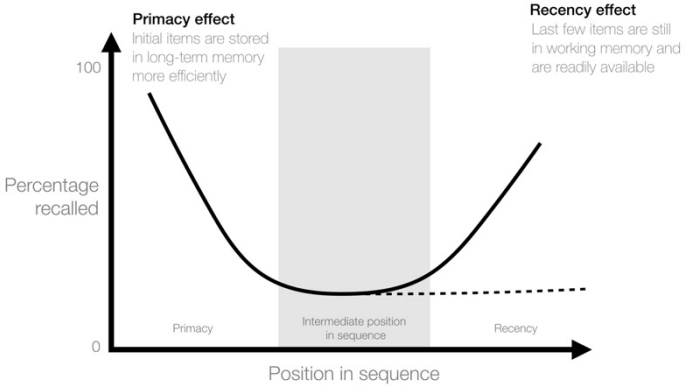
Researchers Baddeley and hitch have developed in their highly cited paper an alternative model of short-term memory which is called working memory which splits memory into more components rather than considering it to be a single and unified construct (Baddeley & Hitch, 1974).

Dempster's paper showed that although humans' brains use grouping in chunks as a method to improve recall, the number depends on the category. From early in childhood to adulthood, almost everyone has a longer digit span than letter span and word span (Dempster, 1981).
Findings on the limitations of working memory discovered by John Sweller are expanding more information processing theories of George Miller. Information coming from his studies are giving deeper understanding of how we should look on the user and the memory when building some complex system such a website (Sweller, 1994).

4. Serial Position Effect

The phenomenon when people have a tendency to recall the first and last items in series better than the middle items is called Serial Position Effect (Colman, 2009). Hermann Ebbinghaus gave a tongue to this finding in 1913 when he discovered that a recall accuracy varies as a function of an item's position (Ebbinghaus, 1913). The function has three characteristic features: good performance for early items (called as Primacy Effect), poor performance for items in the middle of the list, and good performance for late items (called as Recency Effect).

Figure 1: Curve showing Serial Position Effect.



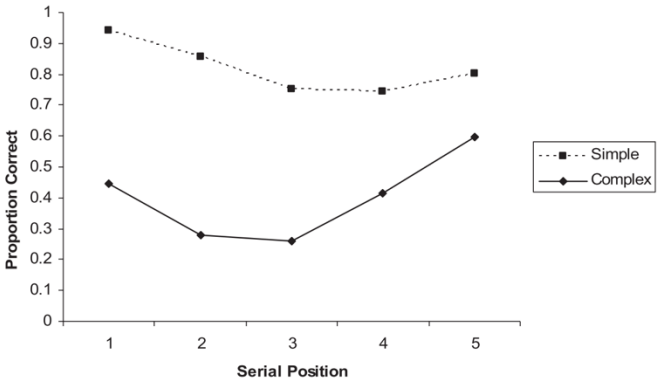
Source: (Glanzer & Cunitz, 1966)

Many experiments about serial position effect of recall were conducted. The crucial findings related to designing the websites and applications are following:

1. The proportion of primacy and recency effects varies according to type of the recall. Researches show that small primacy and large recency effects are found in immediate free recall (when items can be recalled in any order). On the contrary, strong primacy effect and weak recency effect can be found in immediate serial recall (when items must be in exact order from first to last item) (Unsworth & Engle, 2007).

2. Serial position function varies for simple and complex spans. In the experiment from Kane in 2004 items were presented visually and recall was in the forward direction. The function shows that recency effect in comparison with primacy effect is much stronger on complex tasks than on simple tasks. The whole function is shown below in Figure 3.

Figure 2: A function of serial position and memory span task for a list length of five items. Simple span data are an average of word and letter span. Complex span data are an average of operation and reading span



Source: (Kane et al., 2004)

3. Murdock in 1962 discovered that the primacy effect is usually enhanced when items are presented slowly and reduced when presented quickly. The other finding

in Murdock's experiment related to designing is that longer presentation lists reduce the primacy effect (B. B. Murdock, 1962).

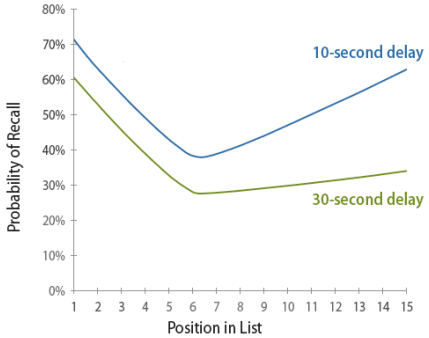
4. Murdock's experiment proved if recall comes immediately after testing, the recency effect is consistent without regard to the number of items on the studied list (B. B. Murdock, 1962) or presentation rate (B. Murdock & Metcalfe, 1978).

5. Glanzer and Cunitz ran the experiment when the same list of words was presented to two groups of participants. One group was asked to recall the words immediately after the presentation. The other group was asked to recall the words after waiting for 30 seconds. Both groups could recall the words in any order. Researchers found out that the words at the end of the list were remembered only if recalled first and tested immediately. Delayed recall for 30 seconds prevented the recency effect (Glanzer & Cunitz, 1966).

6. In Bjork's experiments the recall activity was preceded and followed by a distracting activity and recall was delayed by an additional period of this distracting activity. In his experiments is discovered that the recency effect is reduced when a distracting activity was given and if this distracting activity exceeds from 15 to 30 seconds in duration, distracting activity can cancel out the recency effect completely (Bjork & Whitten, 1974).

7. Many studies have examined the dependence of the serial position effect on the age of the participants. Benjamin found that older adults, on the average, recall fewer chunks and smaller chunks than young adults (Naveh-Benjamin et al., 2007). Other experiments showed that memory for the older adults is poorer (Schneider et al., 2016), less accurate and the older adults exhibit also longer reaction times compared to younger adults (Korsnes & Magnussen, 1996). Griffin's study came with the findings that delayed retention differs according to age group and that both older and younger adults have similar retention for primacy words, but older adults have reduced retention for middle and recency words (Griffin et al., 2017).

Figure 3: Serial Position Curve, when the recall activity was preceded and followed by a distracting activity.

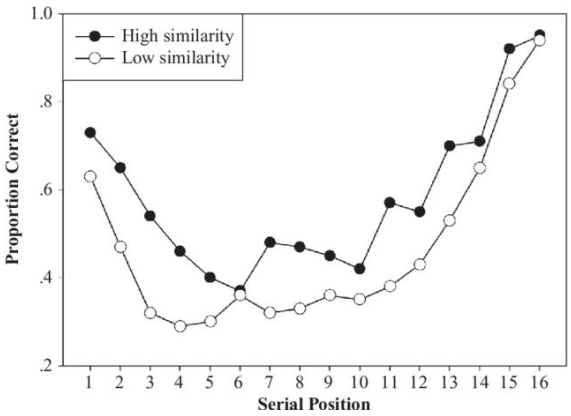


Source: (Holst, 2010)

8. Glanzer & Schwartz's study examined effects of semantic similarity on recall probability in immediate free recall for semantically related and unrelated word pairs. The results show that participants in this experiment were better in

immediate free recall of word pairs with high semantic similarity than word pairs with low semantic similarity (Glanzer & Schwartz, 1971).

Figure 5. Serial position curves showing effects of semantic similarity on re-call probability in immediate free recall for semantically related and unrelated word pairs. From "Mnemonic Structure in Free Recall: Differential Effects on STS and LTS,"



Source: (Glanzer & Schwartz, 1971)

5. Product & Pricing Primacy

There are more ways of presenting product information. There were published studies which looked at two ways of presenting product information – Product Primacy and Price Primacy. Product primacy is the way of presenting the products when the user sees firstly the product and then the price. Pricing primacy is the other way of presenting the products when user sees firstly the price and then see the product item. The studies showed that consumers evaluate the worth of the product more critically when they see a price before the product. On the contrary, when the consumers see the product first, they evaluate the product solely on that criteria. Product & Pricing Primacy says that consumers judge the entire experience according to what they see first (Birkett, 2016).

6. Results of the Research

The consistent color of related website elements or usage of the specific color for the specific purpose e.g. when we change the color of visited link, users do not have to remember where they have already clicked (Nielsen, 2009). It can be useful to use the colors systematically and not randomly e.g. when users visit specific category of the page it is much easier for them to remember when this specific category is associated with some selected color. When we see e.g. menu items of this category, we browse this specific category usage of the same color for the category causes that it is much easier to remember the category and users do not have to think about it.

Presentation of the information in the consistent format might help to remember easier e.g. the most important information on product-detail webpage or while users compare the products. Encoded offer in special link without remembering any code

instead of using coupon codes or help, explanation, user assistance features offered at the right time and on the right place might also save the space in a short-term memory (Nielsen, 2009).

Primacy and recency effects may play the role when UX designers place website elements or items in series. How users try not to exert any extra effort, that is why they tend to go with the most prominent and memorable option with the least friction (Birkett, 2016). The least important items might be placed in the middle of the list because these items tend to be stored and recalled worse than the first and the last items. If the decision on the website should be probably made longer than 30 seconds, the most important items should be placed as the first in series. If the decision on the website is to be perhaps taken immediately after reading the list, place the most important items as the last ones. According to the described rules users might remember after exiting the website e.g. the most important items, benefits or information about the product the most (Holst, 2010).

Murphy's study examined a monotonic effect of link order and clicking on a link. His study shows that higher a link's position in a list of links, the greater the probability that visitors will click on the link. This difference in probability of clicking might have important implications for designing webpage e.g. navigation for visitors (Murphy et al., 2006). This study shows that the primacy effect is not connected only with recalling the items when users exit the page and trying to remember the items, but it is connected also with immediate reaction when people hesitate where to click on the webpage.

Australian researchers examined recommendation systems and their studies showed that the first product in series was preferred over the others by 250 %. In online search engine result page was found a strong primacy effect, as people click much more on first result snippets than the second, third and further. E.g. according to research conducted by the American Society for Information Science and Technology (ASIS&T) in 2011 the top search paid advertisement performed much better from perspective of conversions and click-through rate than further advertisement. In general it seems according to the findings that whatever the user sees first will influence the rest of their experience (Phoenix, 2019) and there is a higher probability that users will click on the first products or links (Murphy et al., 2006).

The other example of primacy and recency effects can be applied while building and conducting the surveys or questionnaires when people have to choose e.g. in dropdown from the list of the answers. There is obvious space for manipulation the outcome of the survey e.g. in the research or academic study when following the rules of the primacy and recency effects. That is why researchers who do not want to manipulate the results should shuffle the list positions for each vote or answer (Holst, 2010).

7. Summary of the Findings

The field of psychology plays the major role in the research of behavior on the website. In this article is discussed short-term memory, serial position effect and product and pricing primacy in context of the behavior on the website. The research question of this article "How selected findings from field of psychology can be used in the current trends of User Behavior on the website" was discussed in the chapter Results of the Research. Literature review of psychological findings put into the context of designing the website shows how short-term memory is limited and how this fact should be considered when the website is designed, how the placement of the website elements plays the role in catching the attention and secondarily in click through rate and last but not least how presented information such as price and product information changes the perception of the product.

8. Discussion

There is a common Web UX designers' misconception that limited short-term memory and magical number 7 should be equal to the maximum number of main website elements on the website or maximum number of items in menu. There is no need to have a number of menu items limited according to magical number 7, because people do not have to memorize the full list of menu items. There is more important an understanding and recognition of the website elements or menu items rather than their recall without seeing them. Shorter menu is certainly easier and faster to scan, but if list of menu items is very short, the choices might be overly abstract and obscure (Nielsen, 2009).

Conclusion

Short-term memory limitation plays a big role when considering page-speed loading or response time of the webpage. If loading or response time is not fast enough users may forget what they are doing while they are waiting for finished rendering of the next page or website element (Nielsen, 2009). Short term memory limitation, serial position effect and product or pricing primacy should be seriously bear in mind so that UX designers and information architects plan, design and build the websites which will meet demanded goals.

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Michal Dostál

Technical University of Liberec, Faculty of Economics, Department of Informatics
Voroněžská 13, 460 02 Liberec, Czechia
email: michal.dostal1@tul.cz

Review of Current Digital Trends in Customer Service

Abstract
Many companies are providing their customer services mainly through human operators and representatives. Now, more than ever, the companies must be on top of the trends in improving customer services in which digitization plays a vital part. This paper looks at current digital trends in customer service and analyzes them from different perspectives. In addition, this paper may pose as an overview of technologies that companies can implement to level up their service.

Key Words
customer service, opinion mining, service personalization, chatbot, mobile technology

JEL Classification: L81, L86

Introduction

Together with after-sales support, customer service is a part of the customer experience (Daqar & Smoudy, 2019). In the digital era, we can see the rise of many technologies that upgrade customer service standards with new technologies and tools. These tools can improve customer service and bring advantages for both the customer and the customer service provider. This paper aims to review current digital trends in customer service and to offer recommendations for service providers regarding the implementation of those trends.

This paper is organized as follows: In the first section, we lay out our research methodology. The second section is dedicated to describing the leading current trends in customer service, supported by findings from literature research. Finally, in the third section, we discuss those trends from different perspectives.

1. Methodology

To point out current digital customer service trends, we have set the following criteria for the literature research: published in 2015 or later, peer-reviewed journal articles or conference papers. Based on our literature research, we identified four major digital trends in the field of customer service (described in Section 2). A shortlist of searched articles divided by the topic is shown in the Table 1. We then analyzed those trends from specific aspects and points of view: customer service provider's point of view, customer's view, a perspective of the complexity of implementations, and a security perspective.

Tab. 1: Shortlist of research articles grouped by the customer service trends

Trend	Research articles
Opinion Mining	Kaur & Gupta (2017), Gupta & Agrawal (2020), Li et al. (2019), Pappas et al. (2015)
Service Personalization	Daqar & Smoudy (2019), Banyte et al. (2016), Riegger et al. (2021)
Virtual Agents & Chatbots	Isidore & Arun (2021), Lacity et al. (2017), Koehler et al. (2018), Ali (2018)
Mobile Technologies	Lee & Lee (2020), Krais & Alghamdi (2021), Ochocka (2019)

2. Current Trends

This chapter describes the four major digital trends in customer service we identified in our literature research: opinion mining, service personalization, chatbots & virtual agents, and mobile technologies.

2.1 Opinion Mining

Opinion mining, also known as sentiment analysis or emotion artificial intelligence (Kaur & Gupta, 2017), is an integral part of business intelligence and plays a critical role in many applications such as service satisfaction analysis or intelligent agents (Wang et al., 2020). The basic idea behind opinion mining is to find specific keywords or comments in text or speech that can be classified as positive, negative, or neutral. (Gupta & Agrawal, 2020)

One of the applications of sentiment analysis in customer service described in the literature are systems for call centers. An example of such a system is presented by (Li et al., 2019). In their approach, they applied some models to their dataset. First, they tested form specific metrics such as if the input was positive, neutral, or negative. Next, they used an acoustic model, which analyzed the audio's loudness, intensity, or pitch. Finally, these variables posed as an input to DNN (deep neural network) classifier. An essential part of this system is the lexical classifier, as it can provide an overview of the usage of specific linguistic terms.

As (Pappas et al., 2015) noted, it is crucial to monitor customer-agent interactions for angry dialogues requiring a follow-up call or action. For that purpose, they presented a classification method to rank fixed-duration windows of speech for whether they contain or express any traits of anger. This enables the management of the call center to manage the customer service quality and, in the end, the satisfaction of the customer. As the saying "customer is always right" is a central part of customer service work, the call center agent should never display signs of anger in the interaction with the customer. However, the described classification method is targeted at both the customer and the call center agent. When anger is detected, it must be further diagnosed what went wrong and where

interaction can be improved. By employing sentiment analysis, the company can be on top of its customer relations and customer service quality, which is a very important aspect.

2.2 Service Personalization

As (Daqar & Smoudy, 2019) mentioned in their research, personalized customer service significantly impacts the customers and their experience. (Tiihonen & Felfernig, 2017) define personalization as content tailoring to known needs and wishes of the user. A specific user model is built to store related information about the user. Based on this model, one can extrapolate products, information, or services that would be convenient for the user. In their paper, they also describe recommendation technologies as an excellent example of a personalization tool.

According to (Banyte et al., 2016), the personalization of customer service is a very effective tool for building a long-term relationship with the customer. The customer's interaction with the company or service provider can be deconstructed into three aspects: personalized contact, the personalized physical environment, and the customer environment (Banyte et al., 2016). Service personalization results in relationship quality such as satisfaction and commitment of the customer, and what is more important, customer loyalty.

When it comes to technology-enabled personalization, we are faced with some success paradoxes defined by (Riegger et al., 2021): (1) exploration-limitation, (2) staff presence-absence, (3) humanization-dehumanization, (4) personalization-privacy, and (5) personal-retailer device. Paradox (1) deals with the fact that when the customer is presented with a preselected set of options or information, it might create a feeling of missed opportunities in other options. Paradox (2) describes a very interesting aspect of customer service personalization – presence or absence of store staff. Some customers prefer to be guided and helped by employees of the store. Others might prefer the staff to be replaced by technology as they want to shop or receive service without any interaction. This is also connected with paradox (3) that deals with the humanization of technology-enabled personalization. Some customers might not like when they are directly addressed by the technology; however, they still prefer for the technology to have human-like attributes. Also, with paradox (4), customers like the personalized content and service; however, they do not want to disclose their identity, especially in front of other customers. The paradox (5) describes customer's opinions about the devices through which they receive the personalized content – whether they own or customer service providers. This topic is also connected with a digitization trend described in Section 2.4 – mobile technologies.

2.3 Virtual Agents & Chatbots

According to (Isidore & Arun, 2021), customer services that are supported by artificial intelligence are more and more appreciated by young customers, that have at least some knowledge about AI and generally are not afraid of sharing personal information. In

current pandemic times, these technologies are at the center of attention as they enable easy and safe environment tools.

(Lacity et al., 2017) describes an implementation of cognitive virtual assistant in a Swedish bank. This technology was used as an instrument for helping users with their support requests such as password change, unlocking a locked account, providing access to specific documents, or delegating the request to a particular operator, who will most likely be able to resolve the request.

The use of virtual agents in customer support (i.e., help desk, service desk, call center, or hotline) is very much discussed in today's literature and is gaining a noticeable favor with companies. The virtual agents use several technologies which enable them to provide better service. (Koehler et al., 2018) introduced an intelligent cognitive agent for Service Desk processes that can extract relevant information straight from the user request while filtering out the irrelevant parts thanks to machine learning technology. (Ali, 2018) used another approach. They implemented methods for semantic analysis of content together with NLP (natural language processing) or in-depth analysis of both structured and unstructured data provided by the process.

The use of this technology enables the shift from the need to have several employees dedicated to customer support, who (in some cases) do nothing more than answer calls from customers. By introducing virtual agents in their stead, customers do not experience waiting while trying to contact customer support. Thanks to this, the number of call operators may be reduced to several specialists who will be contacted in case the virtual assistant is not able to resolve the request of the customer. Though the investment in such technology may appear big at first sight, it will return thanks to possible reduction of call center staff and therefore overall reduction of the costs.

The advantages come from 24/7 service availability while the customer waiting time is reduced. It can also be useful to use the data for effective advertising that is based on the customers' needs and can then create a personalized shopping experience. It is also common today to integrate virtual agent technology into social networks. It could be possible to link a chatbot to an instance of communication via Messenger and resolve customers' requests in an environment that is well known and comfortable for the customer.

2.4 Mobile Technologies

In current pandemic times, mobile technologies play a very important role in the life of most people. Customers order groceries, clothes, or food from their restaurants through mobile devices (Lee & Lee, 2020). Also, banking services are not an exception – customers can create a bank account using just an e-banking app. Mobile technologies and devices are the future, and the same goes for their usage in customer service. According to (Khrais & Alghamdi, 2021), customers associate mobile applications with a number of benefits like convenience, quick access to services and products, and ease of use. Mobile apps contribute to a positive customer experience, especially with online services and online retailers.

One of the most used mobile technology could be considered the QR (Quick Response) code, which usage and popularity grew in the last few years (Ochocka, 2019). It is a so-called two-dimensional code that can hide information like company website, details of a product, or contact information. They are also used for advertising and in recent years are more often used, for example, on posters at scientific conferences, where the reader can download the full paper just by scanning the QR code. The same development is also experienced with RFID (Radio Frequency Identification) technology, where the RFID tags are used for product identification, supply chain management, or access management.

3. Discussion

In this section of our paper, we discuss the four major digital trends in customer service from different perspectives: (1) customer service provider's view, (2) the customer's view, (3) complexity of implementation, and (4) security perspective. In the end, we summarize the main advantages and disadvantages of these technologies.

3.1 Opinion mining

First, let us have a look at opinion mining. From the customer service provider's view, the provider is buying a finished product from a company providing the opinion mining technology that is implemented in some software. In the best-case scenario, this technology would be already implemented in the information system used by the customer company. In many cases, this would act as some sort of paid upgrade of the system. That would, of course, depend on the supplier policies. In the case of the technology not being already present in the system, the contractor would need to find ways to connect this technology to current information system architecture (e.g., use API – application programming interface). That, of course, would pose as an additional cost in the implementation process.

From the customers' point of view, opinion mining technologies should be something they do not need to concern themselves about. The only result should be more valuable and outstanding customer service provided to them. That should be thanks to a better understanding of the customer and their opinions and emotions during and outside the customer service interaction

When we consider the complexity of implementation, it heavily depends on the opinion mining technology provider and their architecture of the system. As discussed above, it is better if the technology is already part of the information system ecosystem. In that case, the implementation would be quite easy and even cost-effective because there would not need to be big changes in the existing information systems. In the other case, when the opinion mining is a standalone solution and needs to be connected to existing technologies in the company, it is essential to put the sizable effort in the planning of the implementation process and to describe the use case thoroughly and may take quite some time.

3.2 Service Personalization

The second digitization trend in customer service, described in Section 2.2, deals with the personalization of service delivered to the customer. From the service providers' point of view, it is a crucial activity. In order to provide personalized services to the customer, the provider must first analyze its customers and create a user model, based on which they take specific steps to personalize their service. They may implement those steps by themselves; however, they may consider outsourcing these activities. This may pose a security risk as they share user data with an external company. There would need to be strict terms and conditions incorporated in the SLA (Service Level Agreement) regarding the access and usage of the user data.

For the customer, the personalization brings better customer service based on their likings and preferences expressed by their previous shopping activities or any other relevant metrics that the personalization is focused on.

The complexity of implementation widely depends on the type of service provided to the customer. For example, online e-shops have easy access to information about customers' interests thanks to the trackers implemented into their e-shop, thanks to which the provider can see which items were put into the shopping basket and which of these actions resulted in the final purchase of the product. One of the popular choices is Google Analytics and its tools for e-commerce.

3.3 Virtual Agents & Chatbots

When it comes to virtual agents and chatbots, the customer service providers have several options of which tools and technologies they can use. The most important part of the implementation process from the customer service provider's view is the first stage – the analysis and building of the use case. The use case needs to have a high level of detail of what will the virtual assistant or chatbot specifically do. An important precondition for the technology is that it needs to be properly trained on the company data. Only this way can it work properly and be of good use to the company in a good customer service sense. The main convenience for the service provider is the ability to handle requests and inquiries in little time without the need for many operators.

From the customers' point of view, it enables contactless communication that is available 24/7. Some customers may prefer this type of communication because it gives them time to structure their inquiry and provides more possibilities regarding their time schedule. They can solve their problem through a chatbot or virtual assistant at any time of the day. It is a lot quicker to inquire a chatbot about a specific problem or information than to be put on hold and wait for a free call center operator or to wait for an email response. The responses may be instant this way, which also influences how the customer is perceiving the customer service provider and may impact the decision on a future purchase

When it comes to the security of the chatbot or virtual assistant technology, it is important to keep in mind that those systems may deal with sensitive customer data, which need to be securely stored and used with caution. The best option is not to give the chatbot or

virtual assistant technology direct access to such data. However, in some cases, like a password reset or other actions where the user needs to be authorized, it is necessary to work with some sensitive user data. For the communication to be secure, the service provider should use encryption and should have strong security measures in place so the communication cannot be intercepted, or the assistant technology be spoofed (in relation to website spoofing, where the content is faked with the malicious intentions).

3.4 Mobile Technologies

The last trend described in this paper, mobile technologies, is one of the most widely implemented these days. It is thanks to the fact that mobile devices are becoming very crucial in day-to-day life, both in working and private life. For the customer service provider is relatively easy to incorporate mobile technologies into their services. One of the simplest ways is to enable payment by card, and therefore by mobile phone or wearable device. Another simple way is to create a mobile application or simply create a mobile version of their website. A great way to use mobile technologies is to introduce QR codes. Service providers may put URLs in there or use some sophisticated methods to upgrade their customer services. For example, we are starting to their usage in hospitality services, where the customers' can check-in by simply scanning the QR code they have received or have in some mobile application of the service provider. In restaurants, it is possible to go through the order process through the customers' phones, even up to the point of the payment. This brings us to the customers' view. For customers, this is a very convenient way to get good customer service and be able to do things comfortably from their mobile device, as it is already their "daily driver," and they are confident in operating the device. Considering pandemic social restrictions, it is an excellent instrument for the minimization of risky social interactions. From the security point of view, it all depends on the used mobile technology. In the case of mobile applications, there may be some security risk in the form of enabled unwanted permissions and malicious functions hidden in the app. The app store review processes should prevent the publication of such apps. When using QR codes, it is possible to encode some URL of a webpage that is considered malware. It is partially on mobile web browsers do detect and block such websites.

Tab. 2: Main advantages and disadvantages of described trends

	Main advantage		Main disadvantage	
	Service provider	**Customer**	**Service provider**	**Customer**
Opinion Mining	Provides analysis of customer satisfaction	Better reactions from the provider	Cost of implementation	Inaccurate labeling
Service Personalization	Easy to implement	Tailored services	Correct research of customer base is needed	Privacy concerns
Virtual Agents & Chatbots	Cost reduction (lower number of staff needed)	24/7 availability of service	Cost of implementation	Non-human interaction
Mobile Technologies	More effective operations	Quick access and convenience	More security responsibilities	Privacy concerns

Source: authors' own work

Tab. 2 describes the main advantages and disadvantages of trends described in this paper. The advantages and disadvantages are divided into groups: service providers'

perspectives and customers' perspectives. Many of the advantages and disadvantages are already described in this paper; however, some of them might need further explanation. We chose the inaccurate labeling of the customer as the main disadvantage of opinion mining. Based on the algorithm, the opinion mining system can falsely label some customers and create misleading information about the customers or miscategorize them, which may then result in not suitable customer service. We also mention privacy concerns. It is because both service personalization and mobile technologies may work with some users' personal data.

Conclusion

In this paper, we described and discussed current digital trends in customer service. From our analysis and discussion, we can summarize a few recommendations that may help customer service providers in their efforts in improving their service.

1. When implementing any of the described techniques and technologies, it is important to take a good amount of time to prepare, plan and analyze the possible use case in the company.
2. One of the easiest digital trends of customer service to implement is the use of mobile technologies. We recommend at least the use of QR codes to upgrade the customer experience.
3. If the company has number of repeating customer service tasks or inquiries, it may be helpful to install chatbot technology, that can solve and answer repeating requests from the customers. However it is really important to do a thorough analysis of the use cases.

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Sandra Filipe*, Claudia Amaral Santos** & Margarida M. Pinheiro***

* GOVCOPP, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: sandrafilipe@ua.pt

** GOVCOPP, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: claudia.amaral@ua.pt

*** CIDTFF, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: margarida.pinheiro@ua.pt

Organic Food Purchase and the Influence of Personality Traits: a study with Portuguese Consumers

Abstract

Consumer concerns with the quality of their diet and with the origins of food products is a current and important topic in marketing research. It is evident that consumers are increasingly purchasing organic products primarily for health and environmental reasons. However, this pattern of behavior is not homogeneous and may depend on demographic and psychographic variables. Presently, knowledge on Portuguese attitudes towards organic food is still scarce. This study aims to contribute to fill a gap in literature concerning the extent to which personality traits may affect Portuguese consumers' predisposition to buy and consume organic food products. Specifically, it has two objectives (i) to describe the buying habits of organic products; (ii) to categorize personality traits that influence this purchasing decision. A quantitative methodology based on an online questionnaire to a sample of 375 respondents was adopted and multivariate analysis methods were used in the evaluation and collection of statistical data to clarify and explain relationships among the different variables. Main results suggest that the major indicators for buying organic food products are: local production, social responsibility, health and quality, diet options and consumer routines. Moreover, online stores are identified as the preferred place to purchase organic food products, and durability and cost play an important role regarding the selection of products to be purchased. Finally, the personality traits that seem to play a significant role in people who buy organic products are Conscientiousness, Extraversion and Agreeableness.

Key Words

Consumer behavior, marketing strategy, market segmentation, organic food, personality traits.

JEL Classification: D18, M31

Introduction

In recent years, consumers around the world are increasingly analysing the origin of prodution of food items and purchasing organic food (*e.g.*, Bazzani, Caputo, Nayga Jr, & Canavari, 2017; Xie, Wang, Yang, Wang & Zhang, 2015) mainly because they are aware of the harm caused by agrochemicals' presence in food, or are concerned with maintaining their long-term health and protecting the environment (*e.g.*, Aprile, Caputo & Nayga Jr., 2012; Magistris & Gracia, 2014). However, this type of attitude and behavior is still not common to all consumers and may depend on the socio-demographic and psychographic characteristics of each individual, among other factors.

Extant literature delved into distinct segments of consumers regarding local and organic food (Aprile, Caputo, Nayga, 2016; Gracia, Barreiro-Hurlé, & Galán, 2014) and its importance for marketing planning. In this context, a personality trait in an individual is a characteristic pattern of thinking and behavior that tends to be consistent over time in different situations (Soto, 2018). Previous studies have shown that the profile of individuals is an important element that influences their assessment of organic food products (Campbell, Mhlanga & Lesschaeve, 2013, Costanigro *et al.*, 2014, Gracia *et al.*, 2014), and their beliefs and attitudes can shape consumer preferences and behaviour in relation to this type of products (Costanigro *et al.*, 2014, Yangui, Costa-Font & Gil, 2016). Moreover, some authors analysed the repercussions of individuals' personality traits on consumer food preferences, for example, related to eating more or less spicy flavors, opting for sweet or bitter tastes (Byrnes and Hayes, 2013, Robino *et al.*, 2016, Saliba, Wragg & Richardson, 2009) or choosing a specific dish (Grebitus, Lusk & Nayga, 2013).

Despite the increased research interest in this topic, the influence personality traits can have on the consumer buying decision towards organic food products has remained generally disregarded and only a few academic studies considered this aspect. Grebitus and Dumortier (2016) showed that differences in personality affected consumer preferences and willingness to pay for organic products, since personality has a differential impact with regard to predicting demand: the more agreeable the consumers, the higher their demand. On the other hand, Bazzani *et al.*, (2017) found that personality traits can be sources of heterogeneity in consumers' preferences for locally produced food items: more caring personalities are more likely to choose locally produced food items, while more extraverted personalities tend to dismiss the locally produced claim. Recently, Gustavsen and Hegnes (2020) probed the relation between individuals' personality and the choice of organic foods using the Big Five personality model (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness to Experience). Results of their study indicate that: Extraversion is negatively related to the attitudes towards organic foods; Agreeableness shows some positive relations with attitudes towards organic foods; individuals with a high level of Conscientiousness have a lower level of willingness to pay for organic foods compared with conventional foods; Openness to Experience is positively related to attitudes towards organic foods.

The relevance of this research area and the fact that information on Portuguese consumers' attitudes towards organic food is still scarce, justified this study and its two different objectives (i) describe the buying habits of organic products; (ii) categorize personality traits that impact this purchasing decision. To the best of our knowledge,

studies focusing primarily on the impact personality traits may have on demand and consumption of this type of products among the Portuguese population have not been conducted yet. Thus, this quantitative research contributes to literature by providing insights on the characterization of the segments that present a higher level of predisposition to purchase organic food products.

1. Methods of Research

The study adopted a quantitative methodology. This approach was considered adequate based on similar studies which carried out the same methodological procedures successfully (*e.g*., Gustavsen & Hegnes, 2020). Data collection took place between 15 December 2020 and 14 January 2021. The data was gathered online via a Google Docs questionnaire and made available to a convenience sample of Portuguese consumers by the snowball technique. The questionnaire was structured into three sections aimed at (i) identifying the buying habits of organic products, (ii) describing socio-demographic data, and (iii) categorizing personality traits.

The first section of the questionnaire consisted of 31 closed questions on the following aspects: places where respondents usually purchase products, the frequency of purchase, the characteristics associated with organic products, the research habits for organic products and the respondents' routines towards a sustainable behavior. A typical 5-point Likert scale, from 'Never' to 'Always', in which respondents specify their level of agreement to a statement, was used. In the second section of the questionnaire, 5 questions were targeted to sociodemographic data regarding gender, age, marital status, education, and professional occupation. Finally, the third section involved the 60 items stated by Soto and John (2017) to hierarchically assess the Big Five personality dimensions and 15 more specific facet traits. For each of these 60 statements, respondents had to choose among a 5-item Likert scale from 'Strongly Disagree' to 'Totally Agree'. Those traits identify the big 5 personality dimensions: Extraversion (outgoing/energetic vs. solitary/reserved); Agreeableness (friendly/compassionate vs. critical/rational); Conscientiousness (efficient/organized vs. extravagant/careless); Neuroticism (sensitive/nervous vs. resilient/confident); and Openness to Experience (inventive/curious vs. consistent/cautious). As some of the assertions used were presented in an inverse way, they also had to be interpreted following the same reasoning. For example, for the dimension Conscientiousness, that includes traits like organized, thorough and planful, the assertion "Sometimes I behave irresponsibly" needs to be interpreted inverselly: the more a person demonstrates conscientiousness, the more he/she disagrees with the sentence.

A total of 375 valid responses were received. The sample involved 67% (250) of female respondents with different characteristics (see

Table 1).

Table 1: Sample characterization

Marital status		**Single**	**Married**	**Divorced/Separated**	**Other**
		63% (237)	31.5% (118)	3.5% (13)	2% (7)

Education level		**<= 9th grade**	**12th grade**	**Undergraduation**	**Master or PhD**
		17% (66)	57% (214)	19% (70)	7% (25)
Professional occupation	**Unemployed**	**Employed**	**Student**	**Working student**	**Other**
	7% (25)	54% (205)	26% (96)	10% (36)	3% (13)
Age	**<18**	**[18, 24[**	**[24, 45[**	**[45, 65[**	**>=65**
	3% (12)	45% (169)	39% (144)	11% (41)	2% (9)

Source: Authors

Multivariate analysis methods were used in the evaluation and collection of statistical data to clarify and explain relationships between different variables that are associated with this data. Cronbach's alpha test was also applied, namely to see if multiple-question Likert scale surveys were reliable. The Kaiser-Meyer-Olkin (KMO) test measured how suitable our data was for a factor analysis. In addition, to check whether there was a redundancy between variables that could be summarized with some factors, this analysis used the Bartlett's test for Sphericity.

Under the umbrella of factorial analysis, the study applied an exploratory factor analysis as a dimensionality-reduction method to decrease the number of variables of the data set, while preserving as much information as possible. To determine the number of factors to extract, the most used two different techniques were combined: the total variance explained and the Scree Plot. For the first, the eigenvalue higher-than-1 rule was applied, retaining only the variables that satisfied this criterion, based on the rationale that each selected principal component is intended to explain at least as much variance as each of the standardized variables. As this technique has the potential to overestimate/underestimated results, it needs to be used with caution (Marôco, 2021). That is why the Scree Plot's graphical test was also performed, to complement the analysis. Conventional statistical significance levels were considered. The statistical analysis was conducted using SPSS V. 27.

2. Results and Discussion

To analyze the internal consistency of the variables, Cronbach's α was used. Since the values found for both the 31 variables corresponding to the buying habits of organic food and the remaining 60 relating to personality traits were 0.867 and 0.913, respectively, it is possible to consider a very good consistency among the variables of each group. Then, a principal component analysis was carried out to reduce the dimensionality of the variables in each group, looking for the smallest number of components that may explain the correlation within each group of the original variables (Pestana & Gageiro, 2014).

As the KMO test is extremely significant (Table 2), the factor analysis was considered useful. Also, and for both variable groups, the p-value < 0.001 led us to believe that the original variables in each group were significantly correlated.

Table 2 - KMO and Bartlett's values

KMO and Bartlett's test for organic food		
Kaiser-Meyer-Olkin Sampling adequacy measure		,843
Sphericity test of Bartlett	Chi-square approximation	4568,492
	df	465
	Sig.	,000

KMO and Bartlett's test for personality traits		
Kaiser-Meyer-Olkin Sampling adequacy measure		,870
Sphericity test of Bartlett	Chi-square approximation	10538,167
	df	1770
	Sig.	,000

Source: Authors

To decide how many factors to retain, we considered both the Total Variance Explained and the Scree Plot methods. Beginning with the first procedure, the analysis indicated the retention of 8 components out of the 31 organic food variables (which accounted for 63.204% of the variance obtained) and 14 out of the 60 variables for the personality traits (which accounted for 63.838% of the variance obtained).

Regarding the organic food variables, the extraction values (that tell us the proportion of variance for each variable that can be explained by the factors) are particularly high for some variables (see Table 3), meaning that the extraction values are valid.

Table 3: Proportion of variance explained (organic food)

	Variable	Extraction value
Place where organic products are purchased	Online stores	0.746
	Facebook	0.727
	Dedicated physical stores	0.613
Reason for the option for organic products	Portuguese origin	0.649
	Recyclable packaging	0.682
	Local products	0.676
Organic products' features	Higher quality	0.770
	Tastier	0.705
	Priced too high	0.700
	Healthier	0.697
	Last less	0.671
	Fair price	0.664
Organic products purchase routine	If I like them I become a regular customer	0.794
	I have favorite brands and establishments	0.760
	I consider quality	0.617
	I search for product information	0.616
Habits of sustainable lifestyle	Avoid polluting the environment	0.681
	Follow a restrictive diet	0.623
	Recycle	0.608

Source: Authors

Also, and among the 8 components for the reduction of the organic food variables, Table 4 suggests the variables that contribute with the strongest loadings in the component. Moreover, the variables that load high provide a good indication on that specific component's measuring. Thus, considering the characteristics the items had in common, 8 components were established, according to **Chyba! Nenalezen zdroj odkazů.**. Results show that a preference for local and socially responsible products, of a healthier nature and presenting a higher quality, as well as consumer routines, diet options and information on products, are the main indicators for buying organic food. Moreover, results indicate that online stores are identified as the preferred place to purchase organic products, and durability and cost play an important role regarding the selection of products to be purchased. These results are in accordance with some previous literature (*e.g.*, Aprile *et al.*, 2012; Aprile *et al.*, 2016; Bazzani, *et al.* 2017; Magistris &

Gracia, 2014), suggesting that respondents are concerned about the environment, but also about their health.

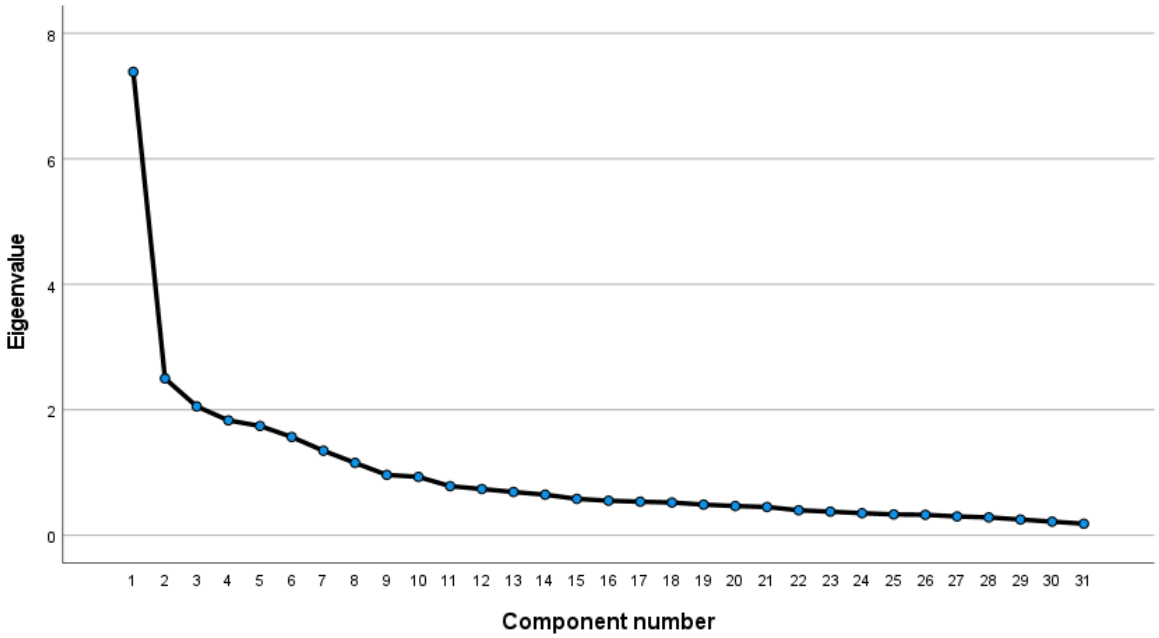
Table 4 - Variables' contribution to the components (organic products)

Components							
Local & Socially Responsible Products		**Healthier Nature & Quality**	**Consumer Routines**	**Diet Options & Product information**	**Online Purchase**	**Durability & Cost**	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Recyclable packaging (0.782)	Avoid environmental pollution (0.706)	Higher quality (0.848)	Become a regular customer (0.838)	Fair price (0.680)	Online stores (0.854)	Last less (0.797)	Fair price (0.731)
Social responsibility (0.779)		Tastier (0.805)	Favorite brands and establishments (0.836)	Vegetarian/Vegan diet (0.672)	Facebook (0.826)		Priced too high (0.629)
Local products (0.777)		Healthier (0.797)		Restrictive diet (0.629)			
Portuguese origin (0.747)				Product information (0.600)			

Source: Authors

On the other hand, using the Scree Plot for the 31 organic products variables (Graphic 1), our suggestion would be to retain only the first three factors, which is compatible with our previous findings. So, combining both results, Local & Socially Responsible Products, Healthier Nature & Quality, and Consumer Routines seem to be the primary causes that justify consumers' option for organic food.

Graphic 1 - Scree Plot for organic products' variables



As regards to the personality traits' variables, the extraction values are particularly high for some of them (see Table 5), therefore reliable. These proportions seem to show a tendency to display self-discipline, related to the way people control, regulate, and direct

their impulses ("I do not leave things untidy", "I am systematic, I like to keep things in order", "I keep things clean and organized" or "I am persistent, I work until I complete the task"). Curiously, we can infer that people with these personality traits also tend to be extroverted, at least in terms of engagement with the external world, and enjoy interacting with people ("I do not tend to be quiet", "I am talkative", or "I do not prefer others to take control").

Table 5: Proportion of variance explained (personality traits)

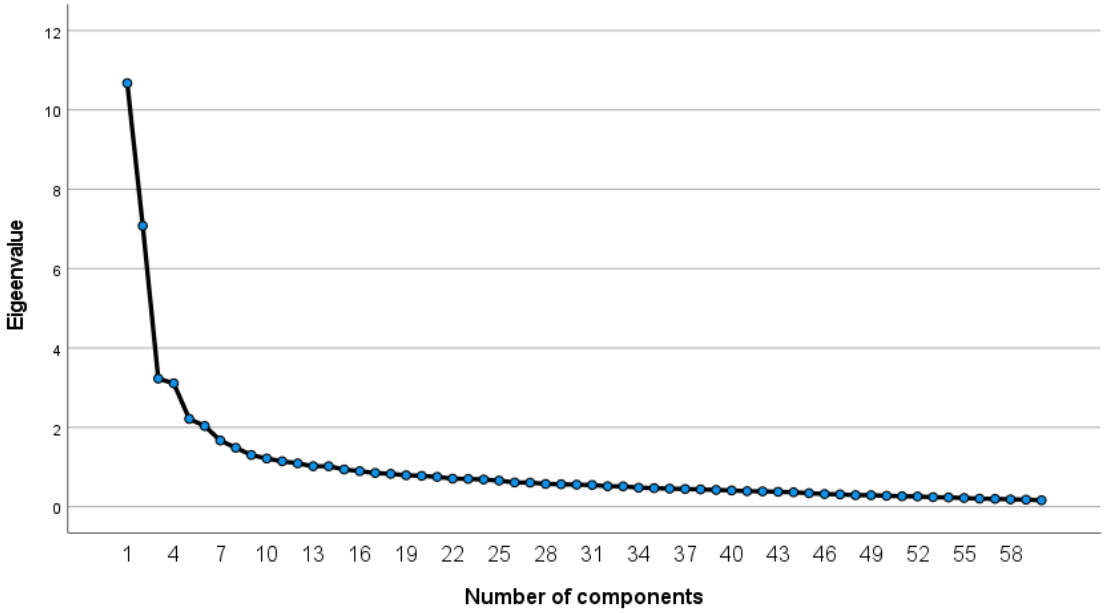
	Variable	**Extraction value**
Extraversion	I tend to be quiet (inverse)	0.750
Conscientiousness	I leave things untidy (inverse)	0.736
Conscientiousness	I am systematic, I like to keep things in order	0.726
Conscientiousness	I keep things clean and organized	0.713
Conscientiousness	I am persistent, I work until I complete the task	0.712
Extraversion	I am talkative	0.707
Agreeableness	I distrust of the intention of others (inverse)	0.706
Extraversion	I prefer others to take control (inverse)	0.702
Agreeableness	Sometimes I am rude to others (inverse)	0.700

Source: Authors

Results suggest that people who care more about biological products are more prone to Conscientiousness and Extraversion, and the Agreeableness trait seems also to contribute to the profile of these consumers, which partially resonates with the findings of extant literature (Grebitus & Dumortier, 2016; Gustavsen & Hegnes, 2020).

Moreover, from the Scree Plot (Graphic 2), results show that the first two components for the personality traits (out of the 14), are responsible, respectively, for 17.794% and 11.802% of the total variance explained (with the other twelve components being responsible for less than 5.5% each).

Graphic 2 - Scree Plot for personal traits' variables



Results also indicate that being reliable (0.701), polite (0.653) and respectful (0.607) are the variables that contribute with most strong loadings in the first component. On the other hand, but in the same line, not leaving things untidy (0.617) and not tending to find faults in others (0.608) are the variables that most contribute to the second component. Hence, the personality traits that seem to be most related with people who buy organic products are those that, somehow, pertain to individuals that tend to be organized, engaged with the external world, and willing to compromise their interests with others, confirming previous studies on how consumer profile impacts the evaluation of and preferences for organic food products (*e.g.* Costanigro *et al.*, 2014, Gracia *et al.*, 2014; Aprile *et al*., 2016).

Conclusion

This study describes the buying habits of Portuguese consumers of organic food products, and cathegorizes personality traits that impact this purchasing decision. The quantitative methodology applied to the collected data was based on an online questionnaire. Multiple multivariated analyses allowed researchers to assess, clarify and confirm relationships among variables.

The observation of the variables' contribution to the components revealed expressively high levels of consistency among them. Also, the main indicators for buying organic food products and the preferences of consumers can be listed in the following components: Local & Socially Responsible Products; Healthier Nature & Quality; Consumer Routines; Diet Options & Product Information; Online Purchase; Durability & Cost. These indicators can further be broken down into additional information regarding buying habits: preferred places to purchase organic products, the final purchasing decision process, characteristics mostly associated to organic products, as well as main purchasing routines and lifestyles. In this context, the sample shows consumers who are informed and have routine purchasing patterns concerning organic food products.

Respondents have a preference for online purchase or dedicated physical stores, with indicators including origin of product, recyclable packaging and local production. Moreover, organic food products are considered as having higher quality, being tastier and healthier, but also normally more expensive and with a shorter lifespan. Thus, it can be concluded that consumers who opt for organic food products are mainly concerned with environmental pollution, recycling and healthier diets.

Regarding the characterization of personality traits and their impact on consumer behavior, results suggest that people who care more about biological products are more prone to Conscientiousness and Extraversion. The Agreeableness dimension seems also to contribute to the profile of these consumers. Overall, the personality traits that tend to play a major role in people who buy organic products are being organized, engagement with the external world, and willingness to compromise. Grebitus and Dumortier (2016) and Gustavsen and Hegnes (2020) had shown precisely that differences in personality affected consumer preferences and attitudes towards organic food products.

This study describes the buying habits of Portuguese rneverneespondents concerning organic food products and highlights that intrinsic characteristics present in personality traits can guide consumers' preferences in a relevant way, resulting in important insights to academics and practitioners interested in this topic, as well as to marketing professionals that intend to promote selling of organic products. However, due to the sampling method, the results cannot be generalized to the Portuguese population. In addition, the difference in results of this study when compared to Gustavsen and Hegnes (2020) can be primarily due to the alternative methodological analysis and to the multiple observation of variables individually. Further and broader studies would be needed to confirm the proneness of certain segments to buy organic food products based on personality traits.

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Diana Havířová

Technical University of Liberec, Faculty of Economics, Department of Informatics
Studentská 1402/2, 461 17, Liberec, Czech Republic
email: diana.havirova@tul.cz

Knowledge Management: Critical Success Factors in an Accounting Organization

Abstract

The process of implementing knowledge management was defined back in the 1990s, but its implementation is still problematic for many organizations. This may be due to the fact that there are a number of different methodologies and models for implementing KM. When selecting these methodologies, a number of specific criteria must be taken into account, such as the size of the company, its focus and the reasons for KM implementation, as well as critical success factors that may determine which areas will be problematic or important in the implementation process. This thesis analyses the critical factors for successful implementation of knowledge management in an organization operating in tax and accounting fields. It is a case study that provides a basis for future systematic research into the process of implementing KM in a selected organization. Emphasis is placed on previous research in this area, from which this thesis adopts important findings in identifying critical success factors. A SWOT analysis dedicated to the implementation of KM in the selected organization is also used in the identification. Leavitt's Diamond and matrices determining the dependence of processes on individual CSFs are used for the appropriate identification of critical areas.

Key Words

Critical success factors, CSF and process matrix, SWOT analysis, knowledge, knowledge management

JEL Classification: C21, R13

Introduction

One important component of a company's success in the market is a competitive advantage over other organizations in the market. The main features of competitiveness are a company's good name, the quality of services provided, client feedback, and economic value, whether in the form of low prices or a correct grasp of available knowledge. Knowledge management is often implemented in organizations to ensure the best possible acquisition, storage, distribution and transfer of knowledge within the company. In many cases, however, the implementation of knowledge management can be a difficult matter, especially for companies with a long tradition, established practices and employees who are reluctant to get used to new practices. This is why choosing an appropriate strategy and methodology for implementing knowledge management is important. One method of selecting a suitable strategy is an analysis of critical success factors and their impact on different processes.

From the perspective of economics, today we often talk about new economy, which, unlike traditional economic directions, focuses more on the operation of information and

communication technologies. It is these technologies that play an important role in knowledge management. Information technologies play a key role here in terms of acquiring, storing and transferring knowledge within an organization. However, in addition to technology, there are also other important elements, such as the cultural and social form of the company and the organization's human resources. This fact is also further discussed in the thesis with regard to CSFs (critical success factors). The aim of this thesis is to analyse the critical success factors in the implementation of knowledge management in a selected organization with regard to previous research in this area and its recommendations. Certain models and methods are selected with regard to the scope of the studied organization, whose identification data are not listed in the thesis due to further planned research and management's wish to remain anonymous..

1. Literature Review

Knowledge can be defined as information enriched by the application, context, interpretation, and reasoning of the person acquiring the knowledge (Davenport and Prusak, 1998). In organizations, these people are its employees, managers and senior managers. Knowledge management processes are necessary for effective acquisition, storage and transfer of new knowledge within individual entities (Gold, 2001). Knowledge management (KM) helps to acquire, use, share, and reuse the knowledge of employees through systematic processes in an organization with the aim of improving organizational performance (Allee, 1997). This knowledge includes proven or newly acquired work procedures and methods, experience from completed processes, documents, systems, standards, etc.

The development of digitisation in all areas of the world today is also reflected in the processes of knowledge management. It is therefore not surprising that information systems play an important role in all phases of KM in a company, whether in the acquisition of new knowledge or its transfer to other employees (Alavi and Leidner, 2001). Advanced technologies such as intranets, cloud storage, communication platforms, etc., are becoming a matter of course for knowledge management inside and outside an organization, and they are called knowledge management systems. However, it is also necessary to take into account important concepts such as organizational learning, behaviour, strategy and sociology (Mamaghani, 2010). All of these aspects affect the integration of KM and its functioning within a company. This fact is also evidenced by evaluations of KM practices in a number of companies, which show that insufficient attention to social and cultural aspects may reduce the effectiveness of purely technological implementations (Ruggles, 1998). APQC was also aware of the importance of the cultural environment, creating a framework on the topic of the knowledge life cycle in an organization with regard to the mentioned aspect of the cultural environment (Jennex, 2007). In this framework, they defined the importance of employee training in the newly introduced area and the employee's contribution to the success of the project. This is also why it is important to include organizational procedures (and especially social and cultural aspects) in the application of IT systems, such as training, IT support, rules of use and feedback inquiries in order to improve efficiency.

T. Gartner (2002) and his colleagues wrote about the importance of economic value in the form of knowledge, stating that the economic value of knowledge lies not in its ownership,

but in its use, because owning knowledge can be useless if it is not used properly. This theory is also associated with the classification of knowledge management as first-generation and second-generation. The concept of second-generation knowledge management was introduced by McElroy, who defines the difference between a strongly technology-oriented first generation and a second generation that is more focused on people, processes, and cultural and social initiatives (McElroy, 2002). According to this author, the first generation is based on the assumption that knowledge already exists in organizations, and it must only be classified, stored and shared, so the goal is better use of knowledge in practice. On the contrary, the second generation also takes into account the process of the creation of knowledge, which is an activity performed in human social systems. According to this theory, knowledge is created by people who participate in knowledge processes.

However, processes such as the creation and use of knowledge are a mere component of the overall concept of knowledge management. KM can be viewed from several perspectives; Beckman believes these are conceptual, process-based, technological, organizational, implementation and managerial perspectives (Beckman, 1999). As this thesis deals with critical success factors of implementing KM in an organization, it is appropriate to discuss the implementation perspective. In addition to critical success factors, assumptions, problems, strategies, etc., this perspective also includes the creation and use of various KM implementation methodologies. T. Gartner describes the experience of implementing KM in a company, including clear communication between senior management and involved employees, an in-depth survey of the initial situation in the company, a definition of ways to acquire and use knowledge, etc. (Gartner, 2002). This experience is further described in the section on data processing and the development of a methodology for implementing KM in the organization with regard to critical success factors.

There are many reasons for measuring the success of KM. One of the reasons is to create a basis for the evaluation of organizational KM, or justification of investments in activities related to KM in the organization, etc. The definition of factors and variables is also important for the successful implementation of KM, as this knowledge can be used to more precisely define the appropriate design and implementation of KM, which is also the goal of this thesis (Turban and Aronson, 2001). According to Veber (2014), critical success factors are characterised by all activities, facts, circumstances, and elements of an internal and external nature that may in some way jeopardize the fulfilment of a strategic goal. These factors arise from an analysis of dominant influences, which can be identified with a SWOT analysis, for example, which is created and used later in the thesis.

Bixler (2002) defined a model consisting of 4 pillars describing critical success factors of KM implementation in an organization, namely leadership, organization, technology, and learning to support holistic KM initiatives in the organization. It therefore assumes that technology alone will not cover all KM requirements. It is important to first define strategies and system requirements, and then apply the necessary technologies to cover these requirements. Davenport (1997) listed critical success factors for KM implementation such as leadership, performance measurement, organizational policies, knowledge acquisition and sharing, information system structure, and last but not least, user support training. Taylor and Wright (2004), on the other hand, identified six critical success factors, including leadership, learning from failure, quality of information,

performance, change management, and creating future ideas for change. All these proposed CSFs are taken into account in the next section, which deals with identifying critical success factors in a particular organization.

2. Data and Methodology

In addition to providing a basic description of the issue, the previous section also outlined the starting points and factors that experts and managers can follow in identifying and determining CSFs in a particular organization. The following section is based on this information; it uses certain models, such as a SWOT analysis, matrices determining the dependence of processes on CSFs, and Leavitt's Diamond to determine the CSFs and the degree of importance of individual processes of KM implementation in the organization. It is important to mention that this is a case study that will provide a basis for future systematic research. The subsequent research questions are:

1. What are the critical success factors in the given organization?
2. What KM implementation processes have the greatest influence on CSFs?

Key information about the company must be identified in order to understand the studied organization and the selected models associated with it. The thesis examines an organization that provides comprehensive accounting and tax services. It has been performing this service on the Czech market for over 25 years, and it is one of the most successful organizations in its field. The company has subsidiaries - offices throughout the Czech Republic, and its management likes to share best practices and newly introduced technologies, which is one of the reasons for the need to implement holistic knowledge management. Before selecting an appropriate methodology for implementing knowledge management, it is necessary to identify critical success factors for the implementation of KM in the selected organization, which can significantly help in choosing and applying the correct procedures.

As mentioned in the literary review, T. Gartner and his colleagues mentioned experience gained in the implementation of KM at Siemens Business Services. Selected experience (see Tab. 1) was used and slightly transformed to create a methodology for implementing KM in the selected organization. This experience is also taken into account in identifying CSFs.

Tab. 1: Findings in the implementation of KM in the organization

Experience according to Gartner	Applied to a specific organization
Need for communication between senior management and involved employees, clear definition of goals	Need for communication between employees responsible for implementing KM and regular employees
Definition of ways in which knowledge can be captured in order to achieve and retain a given benefit	Identification of existing procedures for capturing knowledge and potential improvements in this process
Necessary use of knowledge for the utilisation of economic value	Identification of methods and the extent of use of knowledge that the organization has
Introduction of KM as a whole rather than just parts, see introduction of an IS without adapting other levels of KM	In addition to transforming the IS in the organization, new opportunities also need to be identified

Source: authors' own elaboration according to Gartner (2002)

In order to define the critical success factors of a project, which is the implementation of knowledge management in an organization in this case, it is necessary to analyse the strengths and weaknesses of the project, i.e. potential failures. The creation of a SWOT analysis of the project, which aims to identify strengths and weaknesses within the project, including opportunities and threats surrounding the project, may also be suitable for identifying these aspects. The SWOT analysis was primarily designed for strategic management and decision-making of the organization, making it a suitable tool for identifying critical success factors (Beckman, 1999). These factors are derived from section S - Strengths.

When creating a SWOT analysis, it is important to focus on key factors, hence the searching for "critical factors". Factors that are measurable, factually verifiable and objective are best. The table below (see Tab. 2) shows a SWOT analysis taking into account factors in the implementation of knowledge management in the selected organization.

Tab. 2: SWOT analysis of KM implementation in the given organization

Strengths	Opportunities
- Well-arranged knowledge stored in one place – easily available stored knowledge - Relevant data - data that can be used by all employees - Quick sharing of knowledge through IT technology and workshops - Management support in the introduction of new methods and technologies	- Possibility of connecting information systems (CRM, ERP, etc.) to knowledge management - Possible involvement of advanced technologies (artificial intelligence and automation) to gain more valuable knowledge - Increased competitiveness and maintenance of the organization's economic value - Support of the organization's ecological behaviour through digital technology
Weaknesses	**Threats**
- Necessary training, qualified personnel - Persuasion of the entire organization and all departments to have the same level of involvement - sharing and storing knowledge - Difficult measurability of KM success - Difficult identification of knowledge due to the amount of subsidiaries	- Rejection of new practices by regular employees - Limited resources for introducing a holistic KM concept - Individual departments' fear of sharing knowledge - fear of losing "personal benefits" - Increased workload on regular employees due to the need for thorough storage of knowledge - Improper coordination between IT technologies and human resources

Source: authors' own compilation

For a more comprehensive definition of the correct CSFs, the thesis also uses work from experts in the field of KM, who have defined the characteristics of successful implementation of KM in an organization and set recommendations for a KM system design in the study of three projects (Mamaghani, 2010). These recommendations are:

- The connection of KM systems and information systems of the organization in order to automate the acquisition of knowledge
- The concept of holistic KM throughout the organization
- Management support
- Resource allocation for the preservation of organizational knowledge
- User training in working with KM systems
- Introduction of a security element to the KM system
- Identification of organizational and cultural behaviour that could hinder the use of the KM system

Some of the above points are strongly related to selected aspects of a SWOT analysis. These include the need for thorough training of users working with KM systems, as well as a clear definition of the reasons why it is important that involved participants follow KM procedures and principles in the organization and how they may benefit from it. This also indicates the importance of information systems and thorough selection for potential

connection to existing IT technologies with the aim of automating processes and extracting new data, and thus knowledge. Other important common elements include the support of management of KM implementation and the sufficient allocation of resources for successful implementation, whether these resources are financial resources for the selection and deployment of IT technologies, or human resources sufficiently qualified for KM management. All these elements are further used to create critical success factor models.

Typical critical success factor models include Leavitt's Diamond, McKinsey 7S, MIT 90's, and many others. Leavitt's Diamond specifically identifies structure, managerial tasks, people, and technologies in a company as critical success factors. This model perceives factors as independently functioning variables, but a change in one variable will cause a change in another or even all other variables. When applying the model to knowledge management in an organization, this means that the implementation process will affect both employees or human resources, and the technology used in the company. For employees, this means that new employees will be hired, or their scope of work will change. In terms of technology, existing technology will be discontinued and new technology will be introduced. This will also change the organizational structure and the tasks of managers or departments. In terms of organizational structure, a new department for dealing with KM may be created, or new procedures and standards for knowledge management may be introduced. The cultural and sociological aspects of the organization are also included in this model, as changes in individual factors may result in the displeasure of employees, or encounter obstacles in the functioning of the organization. This may lead to problematic delays in the introduction of KM, or even failure.

A logframe of individual factors and processes was created for the purposes of this thesis. This matrix is usually created to measure the overall success of an organization in fulfilling the strategy, but for the needs of this thesis, it focuses on one strategic goal, which is the implementation of KM in the organization. The individual factors (CSF) in the matrix are aspects of the strategy derived from the SWOT analysis and from the findings of the work of scientists Jennex and Oflman, on which the company can base its development. Introduction processes are usually characterised by the selected methodology; however, due to the temporary absence of a selected methodology, five interconnected stages that are already included in the vast majority of methodologies are sufficient (Truneček, 2004). These processes consist in a preparatory stage, a cognitive stage, pilot projects, dissemination and support, and last but not least, institutionalisation. The processes that influence individual CSFs are determined when the matrix is compiled (Fotr, 2012). These influences are scored, where a significant influence (S) is given 2 points and a contributing influence (C) is given one point. The sum of these points in individual processes expresses the importance of the process for achieving the strategic goal. The higher the number of points, the greater the dependence of the process on the successful implementation of knowledge management. A specific matrix created for these purposes is shown (see Tab. 3)

Tab. 3: Matrix determining the dependence of processes on individual CSFs

Processes /CSFs	**Connection of KM systems and ISs**	**KM integrity**	**User training**	**Well-informed participants**	**Management support**	**Sufficient resource allocation**	Total
Preparatory stage				S	S		4
Cognitive stage		S		C			3
Pilot projects	C		C		C	S	5
Expansion and support	S	S	S		C	C	8
Institutio-nalisation	C		C	S			4

Source: authors' own elaboration according to Fotra (2012)

The matrix clearly shows that the process of expansion and support has the greatest influence on selected critical success factors. It is the most demanding in terms of time and feasibility, as its goal is to expand KM to the entire organization and thus ensure integrity, mass training and education of users, determining daily activities and determining how to measure the benefits of KM. A holistic IS/IT infrastructure is also important; this may not be an easy task in the case of the studied company with many subsidiaries.

Another important stage that affects CSFs are pilot projects, the aim of which is to identify the project team and responsible staff and gain management support. If the project is approved by the organization's management, the resources necessary to finance individual activities must be defined. It is at this stage that a clear definition of the knowledge management methodology begins.

The other stages of the project also contribute greatly to the achievement of strategic goals, but due to their lower degree of dependence, they do not require as much attention as the two processes mentioned above. The aim of the CSF analysis was to clearly define the balance between company resources, qualified participants and the choice of strategy.

3. Discussion

It is difficult to come up with a uniform definition of critical success factors due to the different needs and focus of organizations on the market. Nevertheless, experts still strive to create models for determining CSFs that would suit the widest possible range of companies. In this research, selected models were mentioned and their findings were applied in the creation of CSFs for the implementation of KM in an organization operating in the field of accounting and taxation with a positive attitude towards innovation. Important critical success factors include the interconnection of KM systems with existing ISs, the integrity of KM across the organization, the need for training and education of participants, leadership and management support and sufficient resource allocation. The connection of these factors with individual KM implementation processes was investigated. The process of expansion and support has the greatest influence on selected

critical success factors. This significant influence may be due to the size of the company. The process of expansion and support includes activities such as ensuring the comprehensive implementation of KM at all levels of the organization, connecting existing systems with new systems, and user training, ideally for all employees at all levels (over 200 people). All these activities become more difficult the bigger the company's structure is. This is another reason why this process may affect individual CSFs the most.

Conclusion

The aim of this thesis was to analyse the critical success factors in the implementation of knowledge management in a selected organization. The identification of CSFs is key for choosing a suitable strategy and methodology of KM introduction. Models and methodologies for the implementation of KM in an organization also differ in their focus; some may focus on the acquisition of new knowledge, while others may focus on its use, the importance of IT technologies, and the importance of organizational and cultural aspects. The analysis of CSFs in this thesis showed that it is important to involve all these elements in the right extent, i.e. tailored to the needs of the given organization.

The findings of other authors in the field of KM, a Levitt's Diamond model and a SWOT analysis tailored to the implementation of KM in the selected organization were used in the thesis; this information helped determine the critical success factors of the project. These factors were further used in conjunction with the identification of basic processes of the project in creating a matrix to determine the relevance of the CSFs and to define the processes that the organization should pay attention to during the implementation. Important processes include pilot projects defining human resources, financial resources, the implementation methodology and other processes. The process of expansion and support has the greatest dependence on CSFs. This is the part in which the project may be significantly disrupted or terminated due to unfulfilled or poorly grasped CSFs.

As the thesis provided an outline of important aspects that have a dominant influence on the success of the introduction of KM, these findings may help in choosing a suitable methodology, which the thesis will deal with further. Nevertheless, the methodology that would combine importance of organizational aspects and use of IT technologies for purposes of this company is still not quite developed. This may be a significant area for future research based on paper's findings.

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Petra Kašparová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Voroněžská 13, 460 01 Liberec 1, Czech Republic
email: petra.kasparova1@tul.cz

Jakub Dyntar

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Voroněžská 13, 460 01 Liberec 1, Czech Republic
email: Jakub.dyntar@tul.cz

The Design of Zone-Batch Order Picking System for E-Commerce Business Using Dynamic Simulation

Abstract

Online shopping is growing in strength both in the Czech Republic and throughout Europe, not only due to the coronavirus crisis. A number of new customers have discovered online shopping and some sectors have even seen an increase in tens to hundreds of percent during the Covid-19 pandemic. These consumer behaviour trends are making businesses across various fields transform their business processes and look for new adjustment options at all levels of management. The aim of the submitted study is to present a proposal for optimisation of the order picking system in an internet book vendor warehouse by means of dynamic simulation. It is the activities under the Logistics Department that are most heavily affected by changes in purchasing behaviour. The environment of dynamic simulation offers a very useful tool for finding a suitable solution quickly and effectively in these situations. More specifically, the obtained outputs demonstrate greater effectiveness of the zone-batch picking strategy (as opposed to individual picking of individual orders) for Internet vendors' warehouses with a wide range of products, from which customers only order a few items and in small quantities. By ensuring higher performance, the flexibility of dynamic simulation enables businesses to quickly respond to changes not only coming from the outside.

Key Words

e-commerce, order picking, dynamic simulation, distribution, logistics

JEL Classification: M21, C63

Introduction

The events of recent months associated with the impacts of the Covid-19 pandemic have highlighted changes in consumer purchasing behaviour, which we have been able to monitor for several years across all lines of business. According to the Czech Association for E-Commerce (APEK), Czech e-shops recorded an increase of 26% in their turnover in 2020 compared to the previous year (APEK, 2021). Based on previous studies as well, this trend is not expected to disappear after the pandemic is over (Kim, 2020). Consumers generally appreciate higher comfort and economic savings when buying online (Mahajan

et al., 2000). Therefore, most businesses had to very quickly respond to the growing interest of customers in online shopping, and some of them had to re-establish e-shop sales. These changes were also followed by other necessary adjustments across company processes.

The increasing volume of goods sold to end customers in online shops is also behind the emergence of a new generation of warehouses (Boysen et al., 2019). These warehouses handle a huge number of orders for a wide range of goods, which are typical of a small number of ordered items and a low order quantity (Brynjolfsson et al., 2003). If we also consider customer requirements for short delivery times, efficient management and integration of stock processes is key to achieving a competitive advantage (Yaman et al., 2012). In terms of operating costs, the process of picking customer orders is the most important activity that takes place in distribution warehouses. Picking is very laborious and forms up to 55% of the costs associated with the warehouse operation, with up to 50% of the picking time being consumed by the movement of workers trying to reach goods located at picking positions (Masae et al., 2021). In terms of the impact on the picking system efficiency, the following are key factors in particular (Bottani et al., 2019):

a) the layout of the warehouse;
b) the type of picking system;
c) the order picking strategy;
d) the storage assignment policy; and
e) the routing of workers responsible for order picking between the individual locations.

The warehouse layout is either conventional, i.e., with rectangular arrangement and parallel aisles or non-conventional (Diefenbach and Glock, 2019). The picking system can be either static, where, when picking an order, the worker moves around the warehouse to reach goods, which have a firm position, or dynamic, where the goods are moved to the picking point according to the worker's request and returned to the warehouse after the required quantity has been removed (Öztürkoğlu and Hoser, 2019). As regards static picking systems, which are most common in practice, further distinction is made between picking within the reach of a worker, who is standing on the ground, and picking at height using special handling equipment (Pan et al., 2014). The order picking strategies include individual, zone and batch picking (Ho and Lin, 2017). Individual picking means that the worker is only picking 1 order at a time and picks it in its entirety. Zone picking means that a worker is assigned to a certain fixed part of the warehouse (zone), where he picks parts of orders. During sequence zone picking, he then passes a partially picked order to the next zone, while in the case of synchronised zone picking, parts of orders are picked simultaneously in all zones and then usually consolidated via the sorting system. Batch picking is characterised by combining orders and picking them at once (Vanheusden et al., 2020).

The simplest methods of arranging goods at picking positions include random placement of the item into the assigned empty place or maintenance of assortment groups in certain fixed zones (Silva et al., 2020). In addition, arranging of goods based on classes defined using criteria determined in advance is used in practice (Manzini et al., 2015). Most often, they concern a share in the turnover or the frequency of goods in orders over a certain period of time, when goods are sorted by means of the ABC analysis into 3 classes, and

each class is assigned to a certain part of the warehouse, within which goods are randomly placed to a particular picking position (Ene and Öztürk, 2012). Finally, the route between the individual locations along which the workers responsible for the order picking move are most often in the shape of S (Van Gils et al., 2018).

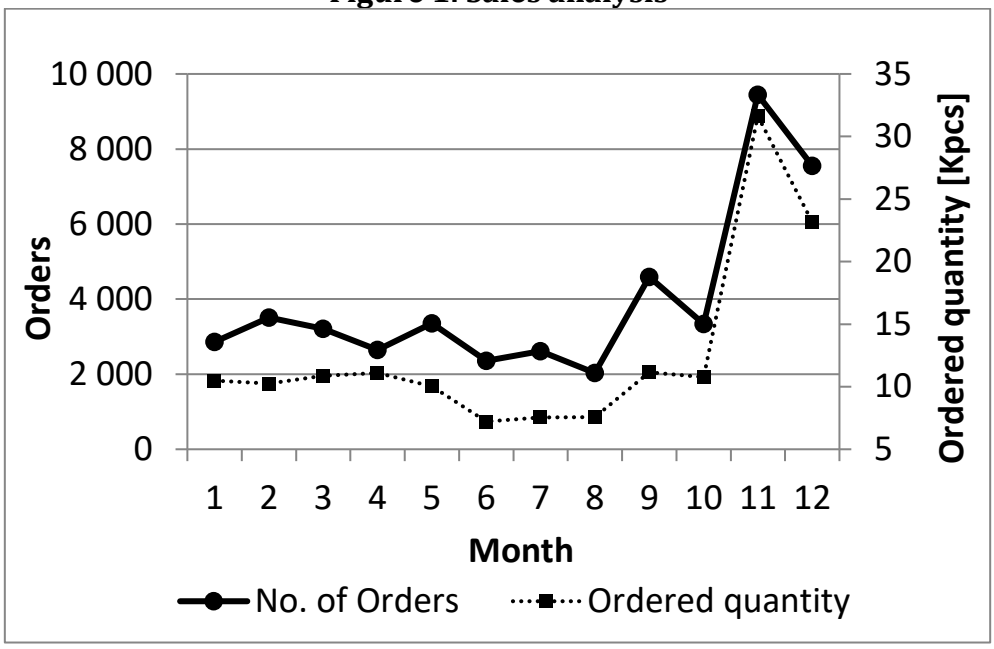
If we combine the options described above for each factor influencing the picking system efficiency, we will receive a large number of different configuration variants, each of which may theoretically be the most suitable for a particular distribution channel with a specific order composition and service level requirements, while at the same time leading to minimum warehouse operating costs. Dynamic simulation is an excellent tool for determining the effectiveness of a specific picking system arrangement. Simulation is a process of creating a logical-mathematical model of a real object, a system defined on it or a decision-making process and implementation of a large number of experiments with it aimed at describing the system, recognising its function and estimating its future behaviour (Lu et al., 2016). Although simulation is widely used as a method addressing various problems in the design of distribution warehouses, there are only a limited number of studies in literature providing a general model design suitable for verifying the effectiveness of the picking system configuration.

The aim of this article is to describe the use of dynamic simulation in the design of an order picking system in an internet book vendor's warehouse. The simulation model of the system was created in a Witness software environment for discrete dynamic simulation with MS Excel support for import of input data and export and modification of outputs and is based on a general material flow simulation model in supplier systems (Dyntar, 2018). This is based on the assumption that any material flow in the supplier system can be broken down into a final number of movements, whereas the execution of the movement may require the use of any source and the fulfilment of any conditions. On the model outputs, we discuss the possibilities of using the general material flow simulation model as a framework for designing efficient distribution warehouses.

1. Methods of research

The analysis of sales data for 2020 shows that the demand of Internet book vendor’s customers shows a significant pre-Christmas season (see Figure 1).

Figure 1: Sales analysis



Source: authors

The median number of items in the order is 2, the median of the total ordered quantity in the order is 2 units (see Table 1).

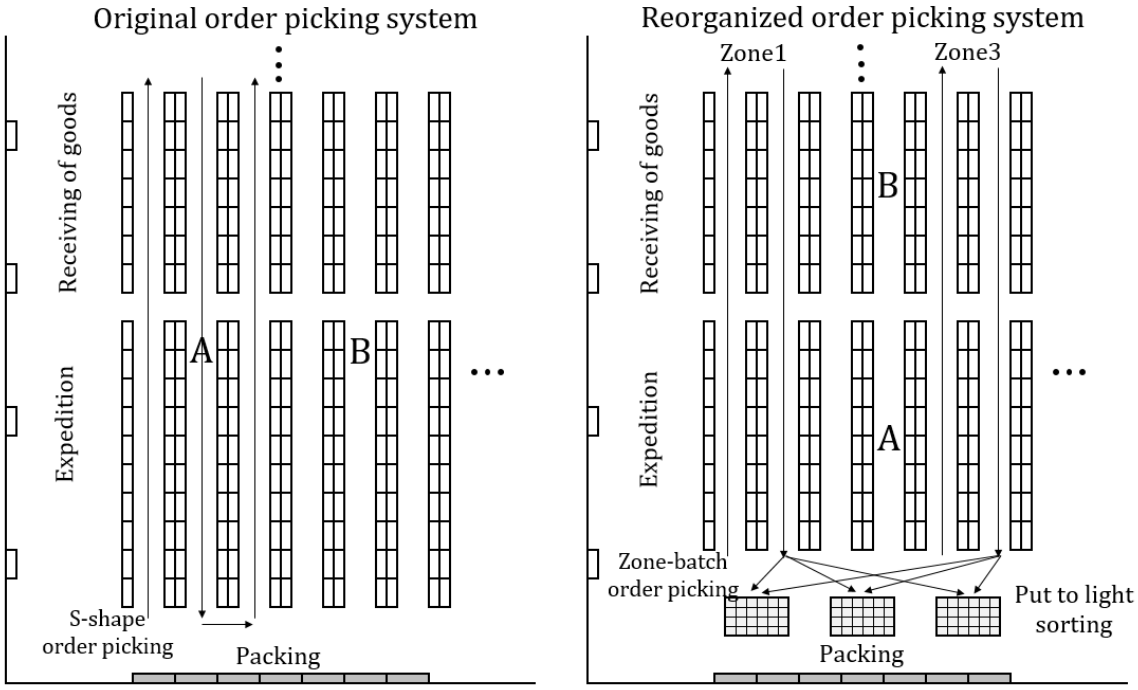
Table 1: Order characteristics

Percentile [%]	10	20	30	40	50	60	70	80	90	95	100
SKUs	1	1	1	1	2	2	3	4	6	9	11
Ordered quantity [pcs]	1	1	1	1	2	2	3	4	6	10	19

Source: authors

The total number of active SKUs in 2020 is 13,498; based on the ABC analysis according to the share in the turnover, 80% of the turnover was found to constitute 2,624 items (i.e. group A), a further 15% of the turnover consisted of 2,903 items (i.e. group B) and the remaining 5% of 7,971 items (group C). The layout of the internet book vendor warehouse is captured by Figure 2. In the original picking system, the customer orders are picked individually, the warehouse worker moves along the S-shaped route and after receipt the goods are randomly placed in zones A, B, C based on their share in the turnover, where zones A, B and C are organised according to the distance from dispatch (i.e. from the left to the right). After the reorganisation, the order picking system is a combination of batch and zone picking. 1 zone always consists of 2 aisles and the warehouseman moves in the zone along the U-shaped route. During the picking of parts of customer orders, the warehouseman continuously sorts the goods into boxes on the picking cart so that every box contains goods for one order. After picking in the zone is over, the warehouseman completes the sorting by placing boxes with goods in a catchment rack equipped with the put to light technology, where it applies again that only boxes with goods intended for one order are situated in 1 catchment rack route. Zones A, B and C for goods to be stored after receipt are organised according to the distance from packaging (i.e. bottom-up).

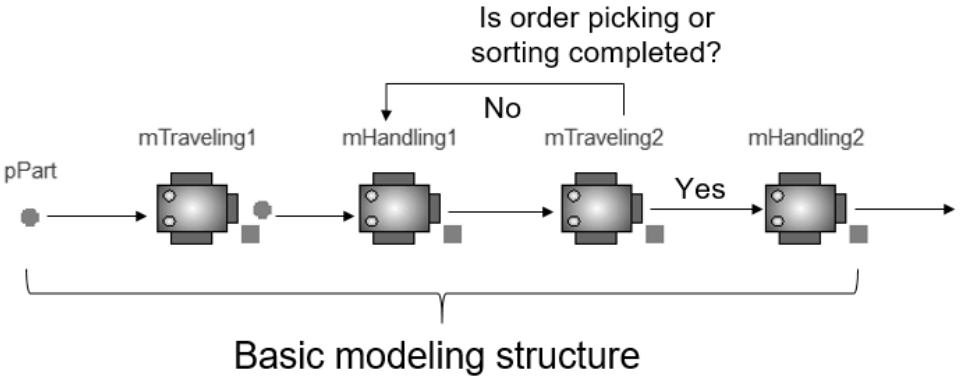
Figure 2: Original and reorganised order picking system



Source: authors

The system model is created in a modified structure of the general simulation model of material flows. Simulated movements include the picking of parts of orders and sorting using a catchment rack. The modification consists in the repeated conditional transfer of the Part type element between the Machine mHandling1 and mTravelling2 elements forming the basic model structure (see Figure 3) and is applied to both simulated movements.

Figure 3: Modified basic modelling structure



Source: authors

The requirements for the execution of the movement of picking of parts of orders are imported into the simulation from MS Excel and coded into the Variable type element. Generation and ordering of picking locations ensuring the picker's movement in the zone along the shortest route and without having to return is done in MS Excel using the RANDBETWEEN() function and the Sort tool. Along with the picking locations, sorting locations are also generated in MS Excel. They are ordered in the Witness environment

using the FOR/NEXT program structure. The requirements for the sorting movement are coded into the Variable element always once the picking movement is over and assigned to the same basic model structure in order to maintain logical continuity of the movements. The shortest distances between the picking locations are obtained in MS Excel by means of dynamic programming. The average speed of the warehouseman is 4 km/h, the average time of goods collection at a picking location is 6s/SKU, the average time of placing a box in the catchment rack during sorting is 5s. The simulated scenarios are described in Table 2.

Table 2: Simulated scenarios

Scenario	No. of crates in a picking trolley	Maximal number of books in a crate [pcs]
1	6	1 to 10 step 1
2	8	1 to 10 step 1

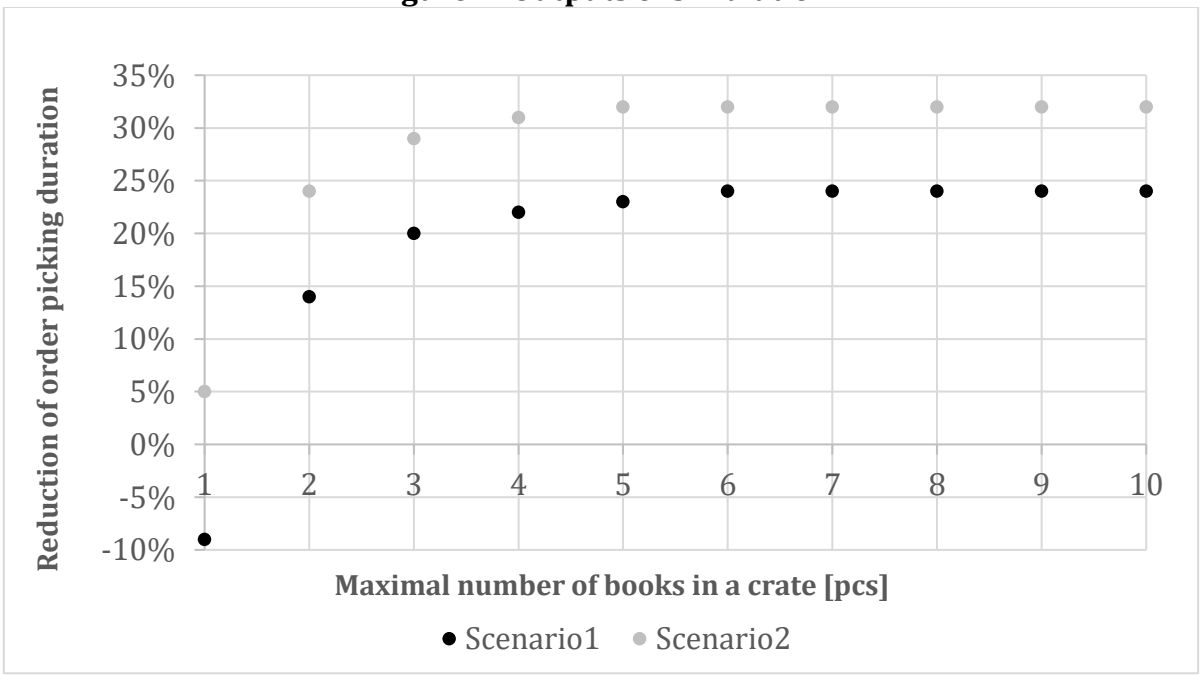
Source: authors

The parameter of the number of boxes per picking cart takes into account the properties of the handling equipment under consideration, the parameter of the maximum number of books in a box takes into account the different weight and format of the assortment sold. The desired simulation output is an answer to the question by how much % the picking of the customer's order is reduced compared to the original condition. The period of November 2020 is simulated for every combination of the parameters. Simulations are performed in the Witness 14 environment with the support of MS Excel 2016 on a computer with Intel Core i7 – 2.8 GHz processor, 16 GB RAM.

2. Results of the research

The simulation outputs are captured in Figure 4.

Figure 4: Outputs of simulation



Source: authors

As regards a scenario with 6 boxes in the picking trolley, the order picking takes longer in comparison to the current condition when the maximum number of books in the box is limited to 1 piece. If the maximum number of books in the box is limited to 2-6 pieces, the duration of the order picking is reduced by 14-24% in comparison to the current condition. The reduction in the duration of picking does not change if the maximum number of books in the box is further increased. As regards a scenario with 8 boxes in the picking trolley, the order picking takes a 5-32% shorter time in comparison to the current condition when the maximum number of books in the box is limited to 1-5 pieces. The reduction in the duration of picking does not change if the maximum number of books in the box is further increased.

3. Discussion

The simulation outputs confirm that in the Internet vendors' picking systems offering a wide portfolio of goods to customers who order often, a few items, and in small quantities, the zone-batch picking strategy is more effective than individual picking of the individual orders. This is in line with, for example, Klodawski et al. (2018). The outputs further confirm that dynamic simulation is a suitable tool for verifying the effectiveness of a specific picking system configuration (see Bottani et al., 2019) and that the modified general simulation model of material flows in the supply systems applied in this study is a suitable framework and alternative, e.g., to mathematical programming models (see for example Žulj et al., 2018 or Kong et al., 2020).

Conclusion

The environment of the dynamic simulation and the chosen modelling technique bring a number of advantages in terms of picking system design. By adding new movements to the simulation, the modelled system can be expanded by the material flows implemented within other warehouse processes to achieve the effects resulting from their integration in the entire logistics system. These include, for example, processes running upon receipt to the warehouse, such as unloading of goods or checking of completeness and quality of delivery, for example, controlled storage of goods after receipt or within implementation of return flows, as well as processes taking place in dispatch, such as a check of order completeness or packaging. Minimising the number of physical elements in the model leads to a significantly higher speed of its operation. For example, simulation of a period of 1 month, which is the subject of this study, took about 5 seconds when using the above-mentioned computer technology configuration. This means that it is possible to test a large number of picking system configuration variants in a relatively short time and decide on the most appropriate method of their configuration and system support before the actual implementation. Thanks to its simplicity, the general model can also be easily transferred to the environment of other simulation products.

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Enikő Korcsmáros and Bence Csinger

J. Selye University, Faculty of Economics and Informatics, Department of Economics
Hradná ul. 21., 94501, Komárom, Slovakia
email: korcsmarose@ujs.sk
J. Selye University, Faculty of Economics and Informatics, Department of Management
Hradná ul. 21., 94501, Komárom, Slovakia
email: csinger.bence@gmail.com

The Online Presence of Small and Medium-sized Enterprises in Social Media in the 21st century

Abstract

Social media can be defined as the most influential and important virtual space today and its importance is constantly growing. As our world continues to evolve digitally, online presence is becoming increasingly important for businesses. We all know that the visbility of a company is key factor in the life of businesses for successful operation. If businesses properly integrate social media into their corporate activities, many opportunities will open up for them. Although the number of online platforms is constantly growing (which can pose challenges for organizations), they have in common that they make businesses visible, allow them to share information about products/services, provide an opportunity for two-way communication and create communities. The primary goal of our research is to get a comprehensive picture of the presence of small and medium-sized enterprises operating in the Nitra region in social media, their way of thinking about the online world, and their future plans related to social media. During the preparation of our study, we examined small and medium-sized enterprises in Slovakia, within that, the Nitra district was the focus of the research. In the course of our study, the data of the total of 311 companies were analyzed. Based on our results, it can be said that there is a relationship between the nature of the companies activities, the employment of person/company dealing with social media, and the time of market presence and the marketing costs of presence on social media.

Key Words

corporate social media, sme sector, 21st century, marketing strategy, Hungary

JEL Classification: M30, M31

Introduction

In general, social media itself is a set of web-based applications as well as interactive platforms that help facilitate the creation, discussion, modification, and exchange of user-generated content. Its group includes blogs, business networks, collaborative projects, corporate social networks, forums, microblogs, photo, video sharing, product / service reviews, social bookmarks, social games, and the virtual world, among others. (Aichner & Jacob, 2015)

But what gives social media its uniqueness? Social media has a number of features that create a richer publication channel compared to traditional media. Social platforms, which have become part of the daily lives of both ordinary people and businesses, allow any user who has Internet access to disclose the processing of information. Second, social media

facilitates public two-way communication, whether it is between individuals or between users and the business. (Cade, 2018)

Continuous communication through various media has become a key factor in the 21st century. (Hao, Farooq & Sun, 2018)

Social media has completely changed the way individuals interact with each other and with businesses. Organizations need to engage consumers in online conversations by incorporating social platforms into their communication strategy. In general, the most common motives for businesses to use social media are to increase credibility, brand awareness, and consumer engagement. (Dijkmans, Kerkhof & Beukeboom, 2015)

The spread of social media has revolutionized society's communication with and about businesses. Online space allows users to create and exchange content. Compared to traditional media, we can talk about five important differentiating characteristics: participation, openness, conversation, communities, and connection. (participation, openness, conversation, communities and connectedness). These five characteristics empower people to directly share their views about the business, its products / services, and also provide an opportunity for users to form a mutually beneficial relationship and communication with the organization. However, the question arises: how can businesses better engage and engage users in social media? This is a key issue as public engagement in social media has been recognized as a key factor in assessing the success of corporate public relations. (Ji et al., 2019)

Compared to traditional media, it can therefore be said that social media contributes to strengthening the ability of businesses to communicate with the public in addition to simply disseminating information. (Cho, Furey & Mohr, 2017)

In terms of business performance, in recent years, the use of social media marketing activities has become an integral part of our society and various web-based technologies, cyberspace, have become common practice in many industries. (Cowling, Liu & Zhang, 2015)

Organizations have the ability to communicate with their customers, suppliers, retailers, and other stakeholders from almost anywhere through social media. In an age of continuous technological development, an enormous amount of technological tools are available to achieve and support these goals. In the case of businesses using these tools effectively, sharing their knowledge, creating content, they contribute greatly to increasing their profits. In addition, these tools help you improve your business processes that will result in increased performance. Social media helps businesses build meaningful business relationships, as a result of which social media marketing tools help organizations develop networks that contribute to reducing the cost of business transactions. (Abbas et al., 2019)

The underlying common feature of social media corporate activities is the improvement and exploitation of user relationships. However, in order to achieve these goals, an effective strategy is needed that includes monitoring the public data flow and active participation through interaction. (Risius & Beck, 2015)

However, when using social media in companies, it is not only and exclusively the setting of goals that is important, but also the success of the measure with the help of appropriate metrics. These metrics include, for example, the number of visits, pageviews, impressions, interactions, and the average time users spend on the page. (Aichner & Jacob, 2015)

Businesses that have taken the opportunity to move online have had access to information that can be used in product design, facilitate brand communication, and market research, recruitment, networking, and reputation management as a result of the ever-increasing trend of social media. in order to increase. (Risius & Beck, 2015)

Overall, social media offers many benefits and opportunities for organizations. With the help of social media, businesses can listen to their consumers on a wider scale, talk to them, get them enthusiastic, or just work with them to develop products and services. Social media provides an opportunity for companies to expand and develop their marketing communication skills. To achieve this, however, they need to monitor constantly evolving and emerging community platforms to influence their target audience. Furthermore, thanks to the dialogues on the platforms, a large amount of information about the company's products / services is spread among the users. It is crucial that companies learn to properly reflect on the dialogues that take place in this online space, for which social media is an excellent opportunity as it provides an opportunity for the company to listen and communicate with its customers widely. Businesses need to see social media as a long-term strategic tool that requires sustained effort. The key lies in three factors: relevance, uniqueness, and creativity. (Csordás, Gáti & Markos-Kujbus, 2013)

The company profile present on social platforms provides an opportunity for the company to obtain a variety of information about people with similar interests to its target audience, resulting in social media serving as a tool for targeted marketing activities. In addition to the ongoing communication mentioned earlier, one of the biggest benefits of the platforms is the ability to provide quick and direct feedback from consumers, as well as CRM (Customer Relationship Management) and social networking to monitor social media activity. This type of marketing activity can be extremely beneficial for businesses, as creating different communities can be defined as a kind of strategy to build brand loyalty. In addition, social media platforms provide an opportunity to reach a new consumer base, build a brand, conduct market research, and also be a financially advantageous opportunity, as a huge marketing team is not required for owners to promote their businesses. (Assaad & Gómez, 2011)

Nowadays, presence on social media is an integral part of our lives, as a result of which businesses cannot ignore their online visibility in the life of effective operation. The topic has become unavoidable. As a result, we aimed to examine the SME sector in the Nitra region of Slovakia, for which an online presence is a key factor, as it is more cost-effective than traditional marketing tools and helps them to reach consumers and establish two-way communication. Based on this, the aim of our research is to get to know the thinking of the SME sector under study. In the practical part of our study, we examine whether the nature of an enterprise’s activities is related to outsourcing tasks related to social media presence, and we also review whether an enterprise’s time to market affects the amount of marketing costs associated with social media, on the basis of which two hypotheses

were formulated by the authors. Our study is based on a survey of 311 small and medium-sized enterprises operating in Slovakia.

1. Methods of Research

The primary goal of our study was to examine the role of social media in the lives of small and medium-sized enterprises. In order to get a comprehensive picture of the corporate importance of social media, we conducted a quantitative questionnaire survey in Slovakia. Our research subjects were small and medium-sized enterprises operating in the Nitra district. Our questionnaire was created using Google Form Builder software, and the query itself was conducted online in an anonymous form. In the first part of our study, we asked about the demographic characteristics of businesses, followed by a number of questions about presence in social media. In the third part of our questionnaire, we focused on issues related to various feedbacks, followed by questions built around future plans for social media. In the last part of the survey, we focused on questions about the success of marketing tools previously used before using social media. At the beginning of our research, we formulated two hypotheses.

Hypothesis 1.: There is a significant relationship between the nature of the company's activities and the employment of an external person (s) /company delaing with a presence on social media.

Hypothesis 2.: There is a significant relationship between the time an enterprise operates in the market and the level of marketing costs of presence on social media.

For both hypotheses, we addressed only those firms that answered yes to the question of whether they were present on social media. Our hypotheses were formulated primarily because we would like answers to the question of whether the nature of an enterprise's activities influences the outsourcing of social media tasks. If this assumption is confirmed, it raises interesting questions for the future as to why a particular type of business uses this type of outsourcing. However, if the presumption is not substantiated, it can be said that whether companies employ an external person / company that deals with their presence on social media is completely independent of the type of company. In the case of the second hypothesis, we would like to examine the mindset of the SME sector. Budget is an extremely important factor for the SME sector. As a result, the question arose in us as to whether the level of marketing costs associated with social media presence is related to how long a business has been present in the market. The result suggests the mindset of the SME sector, ie whether businesses that have been active for a long time are more aware of the opportunities offered by social media and are willing to spend more capital, or vice versa, businesses that have less whether their experience with market presence better recognizes the potential of social media, as a result of which they are able to reduce the competitive advantage of competing firms. Our survey received a total of 311 responses from the SME sector surveyed. After receiving the feedback, we coded the data using Microsoft Excel and then examined the correctness of our hypotheses using the IMB SPSS Statistic 25 program. In our analysis, we used a descriptive statistical method, based on which we obtained answers to the question of whether the relationship between the two variables we assumed can be observed. During the study, a Chi-square test was

performed to find out whether there was significance among the variables.A significance level of 5% was determined during the evaluation.

2. Results of the Research

In the course of our analysis, we examined small and medium-sized enterprises operating in the Nitra region. As a first step, the research subjects are presented. We review key demographic information, answers to questions about social media presence, address online monitoring and feedback management, and examine their willingness to expand their social media presence, how to implement it, and the success of using traditional marketing tools used in the past.

2.1. Review of research subject

Our quantitative questionnaire survey for our study included a total of 27 questions. In terms of number of employees, 66.3% of the enterprises we surveyed were micro-enterprises, 26.2% were small enterprises and 7.5% were medium-sized enterprises. According to their nature of activity, we can talk about the largest number of service companies, followed by commercial enterprises and production enterprises. The largest percentage of businesses surveyed has been in operation for more than 10 years (72.4%). In our next question, we wondered if the organization was present on social media. 67.4% of the respondents marked yes, while 32.6% gave a negative answer. 97.5% of the businesses that answered yes to our question are present on Facebook, followed by Instagram with 47.1%. Although Instagram is also starting to become more popular among businesses, it can be said that Facebook is still preferred in the largest number. In our study, we wanted to get an answer to the question of what the surveyed companies use social media most often. We found that most people use online platforms to provide information. In addition, building brand awareness, expanding the target audience, and increasing revenue have a relatively high number of nominations. For our next question, we were wondering if the company employs a separate person (s) / company who deals with presence on social media. Surprisingly, we found that most businesses do not attach any importance to this at all, as 74% of responses are built around a negative response. Our research revealed that the majority of the surveyed companies, numerically 41.8%, do not monitor the presence of their competitors on social media at all. This is interesting because today, a competitor can also be a pull factor for companies, encouraging them to perform better day by day, in other words, maintaining motivation. In addition, it is important for organizations to consider, you can learn a lot not only from the failures of the competition, but also from their successes. Another interesting piece of information is that, although the presence of a competitor is not monitored by most SMEs, it also ignores critical remarks about competition, from which it could gain information that prevents them from making the same mistake as their competitors. While time is money and of course monitoring activity takes time and human resources, if in the future a business makes a mistake that it could have actually avoided, it will mean a much bigger loss for it in the long run. In our next question, we focused on whether the company monitors and uses the feedback provided by its target audience on social media platforms. Nearly 50% of the research subjects stated that they do not monitor these feedbacks. This is an

interesting result because social media platforms actually offer a highly cost-effective solution for monitoring ever-changing consumer needs. If a company takes advantage of this opportunity, it will be able to quickly adapt to these changes and shape its products / services accordingly. This is key to successful operation and future survival. This is also evident from the fact that companies that monitor and use this information most often use it to introduce new products / services (49%) and to improve existing products (44.3%). In our next two questions, we were curious about what percentage of companies 'marketing activities and marketing spending they spend on social media presence. Based on the answers, it can be said that in the case of both questions the 0-25% answer option was indicated in the vast majority. We were also curious to see how organizations that take the opportunity to be present in the online space feel the change that has taken place in the life of their company since then. Almost 50-50% percent came to the possibility of both positive and non-change. Considering the results obtained, it is an extremely positive fact that only 0.8% of the enterprises marked the negative answer option. In the case of positive changes, according to the respondents, this was most often reflected in an increase in the number of target audiences. In the fourth part of our questionnaire, we focused on future plans for social media activities. The majority of the SME sector surveyed, 57.4% in number, has no plans at all to expand their presence in social media, which suggests that they think in the short term, as the "as good as it is" mindset does not pay off in the long run. Companies that would still take advantage of this opportunity are mostly thinking about appearing on new social media platforms and launching media campaigns, and using sponsored ads as a form of implementation. It is an interesting fact that only 17.2% of the respondents would be willing to use influenza marketing, which is extremely popular today. It can also be concluded from this that many are unaware of the advantages of this embodiment. In the last part of our research, we were curious about how long the research subjects have been present in social media. The results are completely evenly distributed among each other, as 39.6% of the respondents make this period between 1 and 5 years, 31.2% more than 5 years, and 29.2% have selected a response option between 0-1 years.

2.2. Hypothesis analysis

As the next step of our research, let us turn to the interpretation of the two hypotheses we have formulated. During our hypothesis analysis, a significance level of 5% was determined. In each case, the null hypothesis is a statistical assumption that implies that there is no correlation between the variables under study. The alternative hypothesis is the opposite of the null hypothesis, i.e. it means that the two variables are significantly related to each other. The alternative hypothesis is the one we try to present indirectly using the hypothesis test. If the null hypothesis is rejected, we can accept the alternative hypothesis. The null hypothesis can be rejected if we obtain a sufficiently low p value that is lower than the alpha significance level. In the case of our first hypothesis, we assumed a relationship between the nature of the company's activity and the employment of an external person (persons / companies) dealing with social media presence.

Tab. 1: Analysis of the first hypothesis

Chi-square test			
Statistics	**Value**	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-square	15.862[a]	12	0.198
Likelihood ratio	18.194	12	0.110
N of valid cases	311		
Symmetric measures			
		Value	**Approximate Significance**
Nominal by nominal	Phi	0.226	0.198
	Cramer's V	0.130	0.198
	Contingency Coefficient	0.220	0.198
N of valid cases		311	

Source: authors' calculations in SPSS

It can be read from Table 1 related to the first hypothesis that the number of valid answers is 311, ie each of the interviewed small and medium-sized enterprises answered our question. Our results show that there is no significant relationship between the two variables under study, as the value obtained during Pearson's Chi-square (0.198) exceeds the significance level of 5% determined by us. As a result, the null hypothesis, which assumes that no relationship can be detected between the variables, is acceptable. The results support that the nature of an enterprise's activities is not related to the outsourcing of activities in social media. According to this, outsourcing social media tasks has nothing to do with what type of business it is.

In the case of our second hypothesis, we assumed that there is a significant relationship between the scope of activity of the firm in the market and the level of marketing costs associated with its presence on social media. Our results are shown in Table 2.

Tab. 2: Analysis of the second hypothesis

Chi-square test			
Statistics	**Value**	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-square	12.747[a]	9	0.174
Likelihood ratio	11.049	9	0.272
N of valid cases	311		
Symmetric measures			
		Value	**Approximate Significance**
Nominal by nominal	Phi	0.202	0.174
	Cramer's V	0.117	0.174
	Contingency Coefficient	0.198	0.174
N of valid cases		311	

Source: authors' calculations in SPSS

Also in the analysis of our second hypothesis, we obtained the result that there is no significance between the two variables, since the obtained p value is higher than 0.05, i.e. the null hypothesis was accepted in this case as well. The results obtained show that the correlation that the time a company operates in the market is related to the level of marketing costs associated with its presence on social media is not substantiated. According to this, the operating time of a business has no effect on what percentage of its marketing costs it spends on its presence in the digital space.

3. Discussion

In the theoretical part of our study, we provided a comprehensive picture of the possibilities and benefits of using social media at the corporate level, emphasizing why it is worth considering and integrating into corporate operations, as online presence has become an integral part of our daily lives. without. Niedermeier, Wang, and Zhang (2016) argued that technology in the digital world has become indispensable in a wide range of business functions such as sales, marketing, research + development, and customer support. However, the question may arise as to why it is worthwhile and relevant to examine social media specifically in the SME sector. (Bakar, Ahmad & Ahmad, 2019)

In terms of creating stability and social cohesion, small and medium-sized enterprises are essential players in the European Union's economy. In addition, they play a key role in the continuous innovation that is essential in today's knowledge-based society. (Machová & Véghová, 2013)

Social media technology offers many opportunities for business leaders, the first of which is cost-effectiveness, which is a key factor for the SME sector. The adoption and corporate integration of social media technologies among SMEs will help to determine how best to use this type of technology to improve business performance and economic growth, and to facilitate the assessment of the technology's own future. is. (Bakar, Ahmad & Ahmad, 2019)

It is also important to mention that due to the reliability and consistency of social media, it plays a key role in the marketing strategy of businesses. (Pollák & Markovič, 2021)

Conclusion

In the course of our research, we prepared a quantitative questionnaire survey, with the help of which we examined small and medium-sized enterprises operating in the Nitra district. During our study, 2 hypotheses were formulated. In the first hypothesis, we assumed a relationship between the nature of the companies' activities and the employment of an external person / company dealing with social media presence. As a result, we found that there is no significant relationship between the two variables, from which we conclude that the fact that an organization is willing to entrust an external person / company with its presence on social media does not depend at all on the type of company involved, i.e. our results show that, whether it is a producer or a production company, this fact has nothing to do with whether they are more willing to outsource

social media activities, ie it is not an influencing factor. Any type of business can think about outsourcing this type of activity in order to focus on other important things, to save money in the long run, to get the right marketing mix, and to gain a competitive advantage. In the case of our second hypothesis, we hypothesized a relationship between the time of establishment of enterprises and the marketing costs of presence in social media. For our second hypothesis, we hypothesized a relationship between the time of business start-up and the marketing costs of presence on social media. In this case, too, we found that there was no significant correlation between the variables. One might think that businesses that have been in business for a long time have more experience and are much more aware of the potential of social media, even though social media presence is a cost-effective solution, using a higher percentage of their marketing costs to have an online presence. Our results prove that this statement is false, as new entrants are just as, if not better, aware of the power of social media, and as they face less experience and many competitors, they seize every opportunity that is financially feasible for them. and in addition, they are able to reduce their competitive advantage over the competition. Social media provides an excellent opportunity for this. Yarimoglu and Polat (2018), in their study, concluded that although social media offers many opportunities for businesses, the adoption rate in the SME sector has remained quite low to this day. Our further results support that just over 30% of the 311 businesses surveyed are not present at all on any social media platform. In our view, fear can contribute to this, as many people are afraid to move into the online space and believe they do not have the human resource capacity to be present on social media. We encourage them to consider the benefits and challenges of being on social media, seek the help of young, ambitious trainees, and examine the target audience's commitment to social media, learn from their mistakes and successes, and use their critical skills. comments to improve their own performance. In our research, we also examined whether companies monitor and use the feedback they receive from their target audience. Unexpected results were obtained as almost 50% of the respondents answered no. We recommend that companies take these feedbacks into account, as consumers have an extremely large impact on market changes, as demand drives supply and consumer demand is constantly changing, almost day by day. It is crucial for the successful operation of organizations that the company is aware of what its target audience expects. And social media offers an excellent and cost-effective solution to this. Overall, the role of social media is still showing an increasing trend in the life of society. There is currently no better and faster solution for businesses in terms of ongoing contact, communication and feedback. However, it is important to clarify that it is never too late to get started, in this context it is not a question of whether a business will be present on social media, but how it will take advantage of its potential.

Given the ever-growing number of consumers, businesses need to focus on managing social media efficiently and effectively. (Vries, Veer & Vries, 2018)

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Peter Madzík[1], Karol Čarnogurský[2]

Technical university of Liberec, Faculty of Economics, Department of Business Administration and Management[1], Czech Republic
Catholic university in Ružomberok, Faculty of Education, Department of Management[2], Slovakia
email: peter.madzik@tul.cz; karol.carnogursky@ku.sk

Customer Requirements Nonlinearity Analysis – the Casestudy of Webpage Design

Abstract
The present article examines the nonlinearity of requirements from common customer satisfaction data. The Kano model is a frequent basis for analyzing the nonlinear effect of meeting customer satisfaction by requirements fulfillment. However, the process of applying the Kano model brings with it several negatives, such as time-consuming for the customer or twice the scope of the questionnaire compared to conventional questionnaires for measuring satisfaction. The presented research points to the possibilities of the implicit derivation of nonlinearity of requirements from standard satisfaction surveys. Onedimensional requirements were identified by linear regression and nonlinear type of requirements (attractive, must-be and indifferent) were identified by Penalty reward contrast analysis. Nonlinear requirements were added to the regression model using nonlinear functions. The results indicate that the accuracy of the regression model was increased by approximately 25%. From a practical point of view, using this approach would allow targeting of measures to improve the quality of products and services.

Key Words
requirements analysis, customer, Kano model, webpage, regression model.

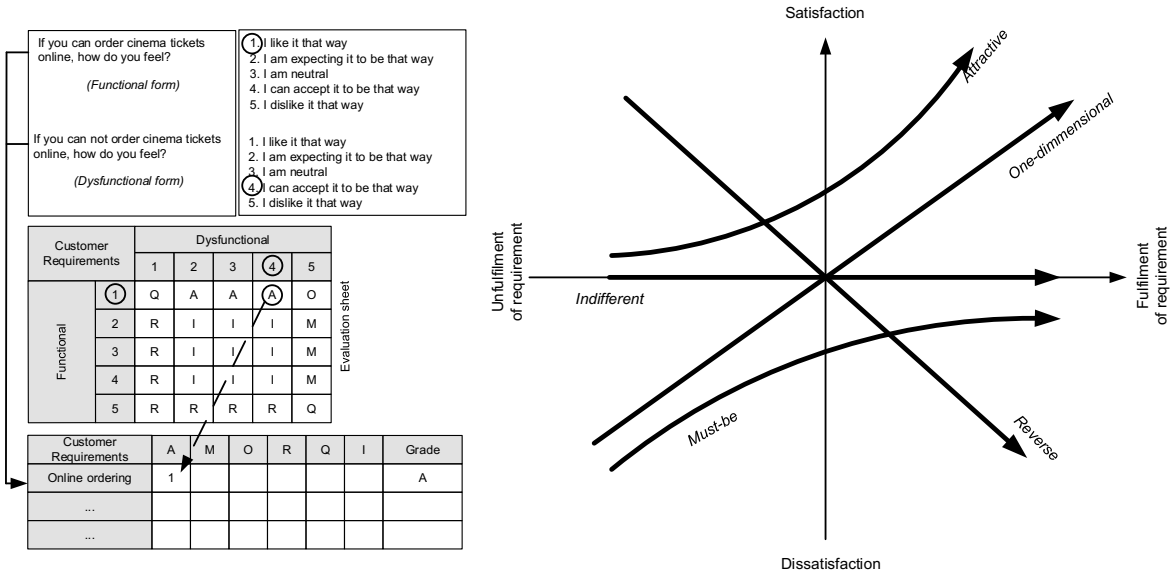
JEL Classification: M11, M15, M31, D8, C15

Introduction

Customer requirements are long-term topics in the field of quality management. They are the basis for quality assessment at virtually all stages of the product or service life cycle. Past direct methods of identifying and analyzing requirements that have been survey-based are now complemented by indirect methods based on secondary data processing (Tontini et al., 2015). Customer satisfaction ratings based on star ratings are relatively widespread. If product attribute assessments appropriately supplement such overall satisfaction assessments, then the data represent a relatively high potential for later product improvement or redesign (Kubina & Lendel, 2012). The design of products and services which meets customer requirements should be based on objective and valid information. For this purpose, over time, the scientific literature has defined an area that deals with procedures and techniques for the systematic analysis of customer requirements - the area of requirements management. The area of requirements management is based on various qualitative and quantitative approaches, the aim is to understand better the needs and expectations of customers (Zimon, Gajewska & Malindžáková, 2018).

A relatively rapidly developing area in the research of customer requirements is the Kano model and its use in various stages of the product life cycle. The Kano model is an application concept that allows capturing the nonlinearity of requirements (Kano, 1984). This model explains that different requirements affect satisfaction in different ways - while some requirements only affect customer satisfaction, others only affect dissatisfaction. The Kano model has the form of a two-dimensional coordinate system. On the vertical axis, there is high satisfaction at the top and high dissatisfaction at the bottom. There is an unfullfiled requirement on the left and a fulfilled requirement on the right on the horizontal axis. It is necessary to say that the authors of the Kano model perceived the continuum of both axes - ie not only satisfaction (vertical axis) is a quantity having a continuous character, but also the fulfillment of the requirement (horizontal axis) has a continuous character. In this coordinated system, the basic version of the model contained three types of requirements, which were plotted in the model using curves. Requirements of a linear nature were drawn in the form of a straight line and were called "one-dimensional". Satisfaction requirements were drawn in the model in the form of a curve resembling an exponential function and were named "attractive". Requirements with a high effect on dissatisfaction were drawn in the model in the form of a curve resembling a logarithmic function and were called "must-be". The Kano model was later extended by two other types of requirements with different effects on the level of satisfaction, and these requirements were named indifferent and reverse. The so-called pair-wised questionnaire containing a positive and negative question for each customer request. The results are then helped. They process the evaluation sheet, and each request is categorized into one of five valid categories. The basic logic of the Kano model is shown in Figure 1.

Figure 1 Procedure for categorising requirements (left) and the traditional Kano model (right)



Source: authors' own processing based on (Witell, 2007)

In the past, many studies have confirmed that higher customer satisfaction can be achieved with the Kano model (Witell & Löfgren, 2007). At present, however, there are relevant comments on the negatives associated with the Kano model. The first is the time-consuming survey, which is based on the Kano model and aims to determine the

nature of the requirements. In a study by Lee and Huang (2009), the authors state that 387 responses needed two months to collect a sample. The quality of the data is also debatable in some cases (Groves, 2006), and the design of the Kano questionnaire itself, which contains all items twice (negative and positive form), can also be a problem.

For these reasons, too, research efforts are currently being directed towards an implicit "estimation" of a category of requirements. This "estimate" is usually based on mathematical analysis, which examines the effect of individual attributes of a product or service on overall satisfaction. At the same time, approaches based on Ensemble neural networks - ENN (Bi et al., 2019) or Penalty reward contrast analysis - PRCA (Tontini et al., 2015) are known. However, the authors of these approaches point out their shortcomings - for example, ENN is the target of criticism that the neural network resembles black-box and PRCA encounters limits with a relatively low degree of explained data variability.

Because of the above information, it can be stated that the research of nonlinearity of requirements represents a relatively high potential. This article aims to point out the possibilities of implicit determination of categories of requirements only with standard data on satisfaction and without using the Kano questionnaire. Research with this focus should partially address the disadvantages of directly identifying categories of requirements and overcoming the current disadvantages of indirect approaches.

1. Methods of Research

Customer satisfaction data were used to examine the nonlinearity of the requirements. This data was the result of a survey aimed at evaluating the quality of e-shop websites. The survey was conducted in the second half of 2020. Fourteen attributes and overall satisfaction were used to evaluate the website. Thus, a total of 15 variables were analyzed. All variables were ordinal, and respondents expressed satisfaction on a scale from 1 (very dissatisfied) to 5 (very satisfied). Following variables are used - Table 1.

Tab. 1: Variables about webpage quality and their codes

Code	Variable	Code	Variable
[At1]	Information sufficiency	[At9]	Appropriate advertising
[At2]	Graphical quality	[At10]	Easy to read text
[At3]	Appropriate layout of information	[At11]	Customer reviews on the webpage
[At4]	Animations on the webpage	[At12]	Correct displaying
[At5]	Links to other webpages	[At13]	Possibility to use the loyalty program
[At6]	Fast webpage loading	[At14]	Webpage interaction with social networks
[At7]	Webpage attractiveness	[OS]	Overal satisfaction
[At8]	Multi-language webpage		

Source: authors' processing

The data were processed by several statistical procedures. After checking the reliability of the scale, the tools of descriptive and test statistics were used. Regression models were used to investigate nonlinear relationships between attribute and overall

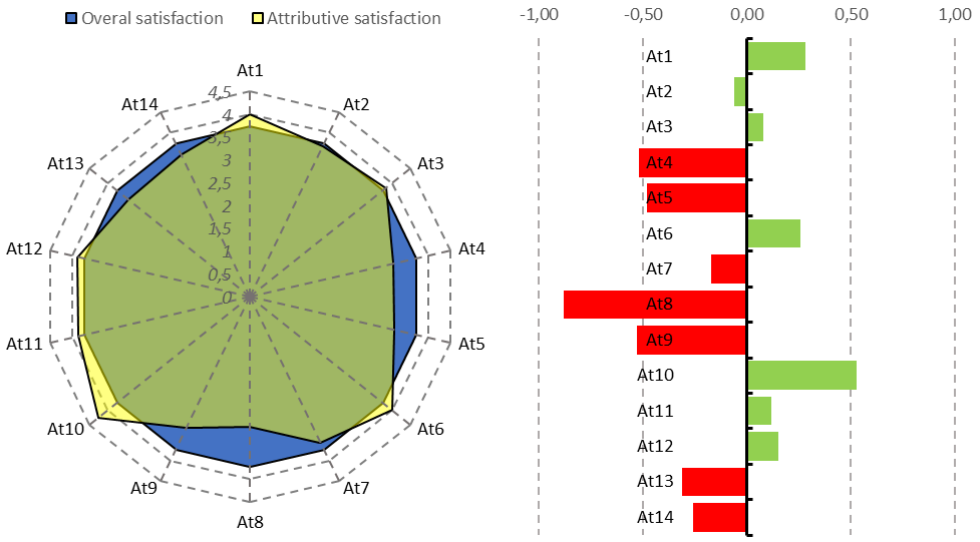
satisfaction. First, a linear regression was used to determine the degree of reliability of linear models. The coefficient of determination R square and resuduals standard deviation was used to assess reliability. The linear regression model was used to identify those attributes of the website that have a linear relationship to satisfaction and are statistically significant to explain overall satisfaction. Those variables that were not statistically significant were tested for nonlinearity. For each variable, we calculated a positive effect on happiness and a negative effect on satisfaction - using Penalty reward contrast analysis, which is usually used to implicitly examine the nonlinearity of product attributes (Tontini et al., 2015).

A categorization matrix was developed from the results of the positive and negative effects. Its character is equivalent to the so-called SI / DI plot (matrix of satisfaction index - dissatisfaction index) (Berger, 1993). According to the categorization matrix, requirements/attributes were subsequently identified that have a nonlinear character - they were either of the attractive, must-be, or indifferent type. Indifferent requirements were excluded from the regression model. Nonlinear attractive requirements were added to the regression model using the exponential function, must-be requirements using the logarithmic function. The resulting regression model was adjusted to a nonlinear character and the expected and actual values of satisfaction - residuals - were compared. Subsequently, residues for linear and nonlinear regression models were analyzed. The results of the analysis were used to assess the accuracy of both models.

2. Results of the Research

The data set that was subjected to the statistical survey contained 327 valid responses. These were processed in the statistical software IBM SPSS Statistics and Minitab. Initial analyzes included testing the reliability of the scale. Thus, a 5-point scale was used, and in the test of 15 variables, Cronbach's alpha reached 0.812 (the minimum recommended value is 0.700). The scale is therefore validated.

Fig. 2: Basic satisfaction analysis (left) and deviations from the average of overal satisfaction (right)



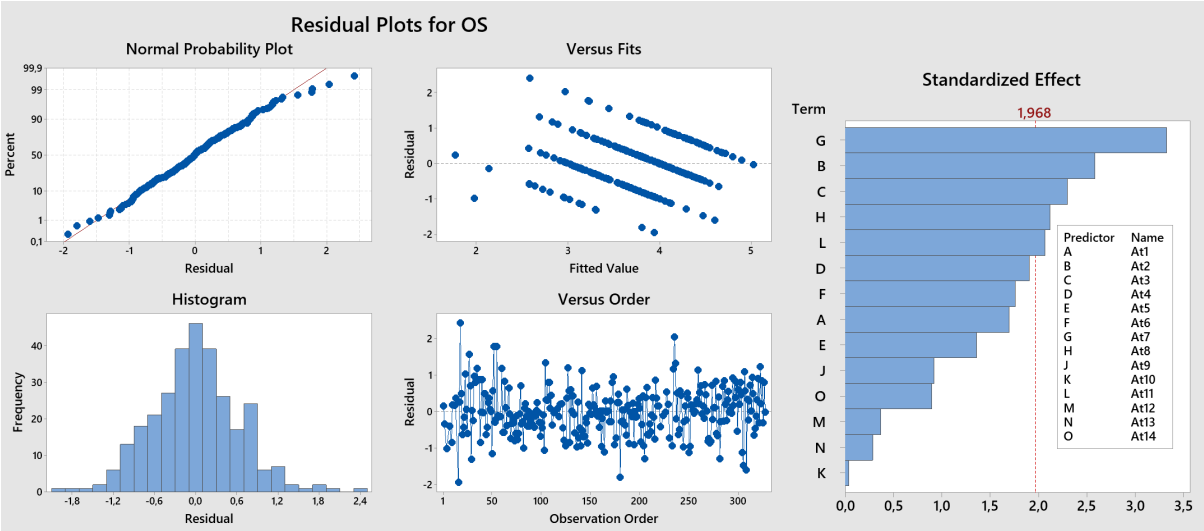
Source: authors' own calculations

Satisfaction data are most often interpreted through descriptive statistics with graphical display support. The most common indicator is the average. The average values of individual attributes (in our case, the variables At1 to At14) are by default compared with the average values of overall satisfaction (in our case OS). Figure 2 shows the results of such a typical satisfaction analysis.

Efforts to increase customer satisfaction in such an analysis will focus primarily on those product attributes (in our case, the website is the product) with a below-average value displayed in red. An extension of this fundamental analysis is usually a linear regression model.

Linear regression is a common way to predict expected satisfaction based on knowledge of input data (He et al., 2007). In cases where the dependent variable is made up of several independent variables, multiple regression is used. Figure 3 shows an example of multiple regression in which overall satisfaction (OS) was a dependent variable of 14 attributive satisfaction (At1 to At14). The resulting value of the coefficient of determination R squared was 39.9%.

Fig. 3: Results of linear regression model

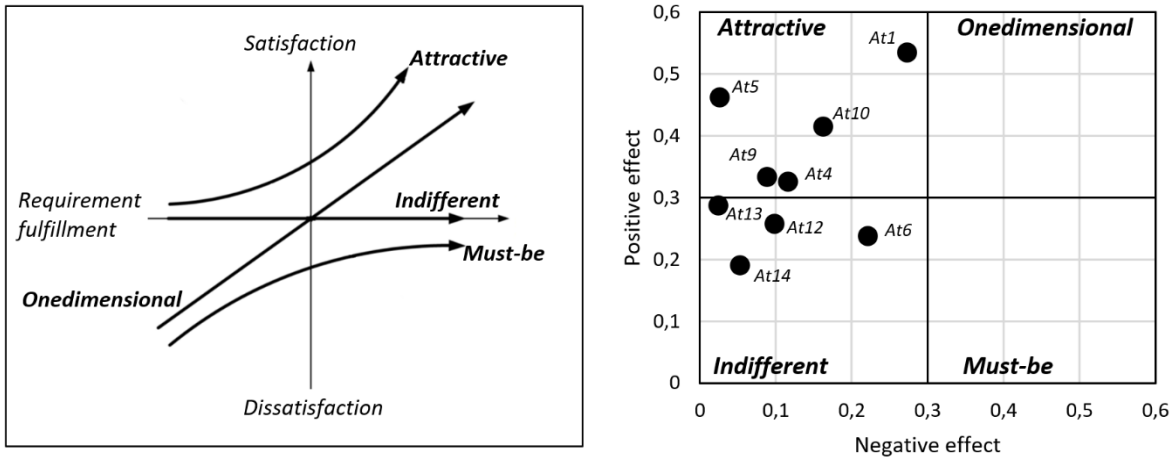


Source: authors' own calculations

The graphs at the top left and bottom left are used for graphical analysis of residual normality and are intended to reveal possible system errors in the data. In our case, such errors were not found, and it can be stated that the residuals had a normal distribution. The graph in the middle of the top shows the deviations of the residuals from the expected values. It is relatively clear in this graph that the data form five point bars (the fifth bar is given by only one point at the bottom left), which is the result of using a 5-point scale. The graph in the middle of the bottom is used to examine the effect of time on the data. As the points in the graph show a random distribution, a negative effect of time on the reliability of the results was ruled out. However, from the point of view of monitoring the nonlinearity of requirements, the most important is the bar chart on the right. According to this graph, it can be seen that in the linear model, there are only five

variables that are statistically significant for predicting overall satisfaction - these are the variables At7, At2, At3, At8, and At11. Thus, the other variables are not linear and affect satisfaction by non-linear relationships. To examine the nonlinearity of individual attributes (ie defacto requirements), we used the Penalty reward contrast analysis approach, the application of which can be found in several satisfaction studies (Davras, 2021; Bi et al., 2020). The analysis made it possible to determine the magnitude of each variable's positive and negative effect on overall satisfaction. After recording these effects, it was possible to use the matrix categorization of requirements and thus distinguish the character of the given attribute - Figure 4.

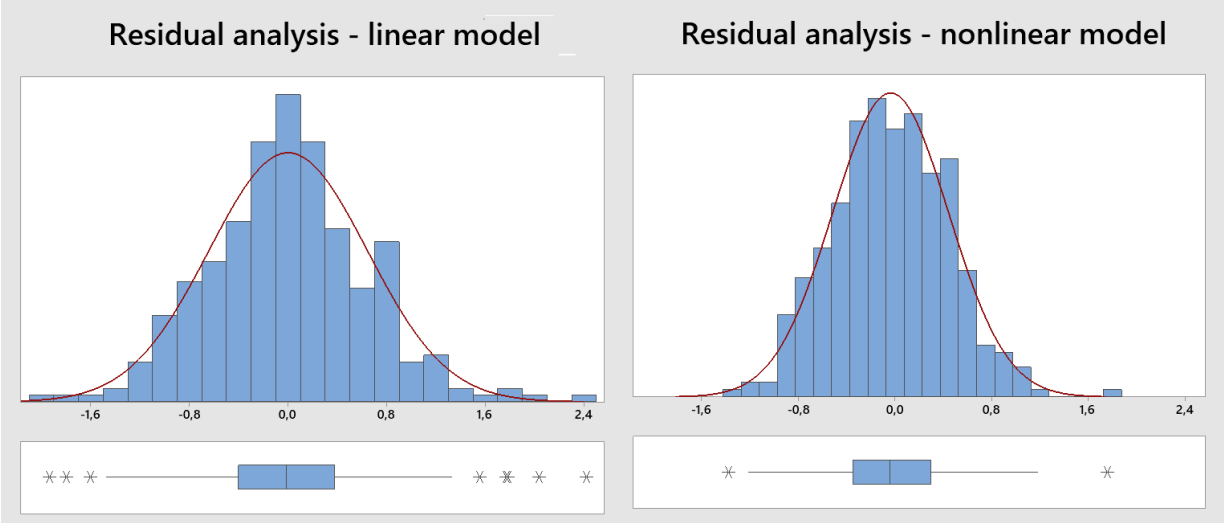
Fig. 4: Matrix categorisation based on Penalty reward contrast analysis



Source: authors' own calculations

From this analysis, we can see that the individual attributes (ie the requirements) were classified as attractive - ie, they have a significant positive effect on satisfaction - and some were classified as indifferent - so their satisfaction impact is negligible. Indifferent attributes are not relevant for overall satisfaction, so they should not be in the regression model. Attractive attributes have a significant effect on satisfaction, so an exponential function should express them. The resulting regression model that we constructed contained linear (variables At7, At2, At3, At8 and At11) and nonlinear (variables At1, At4, At5, At9, and At10) attributes. The reliability of the regression model increased - the standard deviation of the residues decreased by more than 25% in the nonlinear model (from 0.643 to 0.479). For nonlinear models, it is not recommended to calculate the coefficient of determination R squared because the research literature shows that it is an invalid goodness-of-fit statistic for this type of model (Spies, 2010). Therefore, we can compare the results only graphically - Figure 5.

Fig. 5: Comparison of linear and nonlinear regression model



Source: authors' own calculations

3. Discussion

The research results suggest that attributes such as graphical quality (At2), appropriate layout on information (At3), webpage attractiveness (At7), Multi-language webpage (At8), and customer reviews on the webpage (At11) have a linear effect on customer satisfaction. This means that when designing e-shop websites, such attributes should not be missing if we want to avoid low customer satisfaction. On the other hand, our analysis showed that attributes such as information sufficiency (At1), animations on the webpage (At4), links to other webpages (At5), appropriate advertising (At9), and easy to read text (At10) have the character of attractive elements of the website. This means that if the organization pays adequate attention to them, they should significantly increase customer satisfaction with the quality of the website.

In addition to these practical implications, our research can bring several theoretical and research benefits. One of the most important is the development of implicit category determination of the Kano model from satisfaction measurement data (Tontini et al., 2015). The procedure proposed by us can also be integrated into text mining solutions (Bi et al., 2019). At the same time, the validation of the PRCA method to the common structure of satisfaction surveys can be mentioned, while there are currently not many studies that deal with this issue (Davgras, 2010). Other benefits include developing nonlinear regression models (Chan et al., 2011), which show a higher degree of reliability than conventional linear models.

Conclusion

Customer satisfaction is one of the permanent prerequisites for the success of any organization. Improving the quality of products and services should be based on objective information. Satisfaction surveys contain essential information about the interrelationships of product/service attributes concerning overall satisfaction.

Research in this field suggests that the nonlinearity of product/service attributes can significantly contribute to a better understanding of a complex area such as customer satisfaction.

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Margarida M. Pinheiro*, Claudia Amaral Santos** & Sandra Filipe***

*CIDTFF, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: margarida.pinheiro@ua.pt

**GOVCOPP, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: claudia.amaral@ua.pt

***GOVCOPP, ISCA-UA, University of Aveiro,
Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
email: sandrafilipe@ua.pt

The Impact of Personality Traits in Portuguese Buying Habits of Second-Hand Items: an Exploratory Analysis

Abstract

Currently, consumers are increasingly aware of the fast degradation of natural resources. Providing a second life to everyday items appears as a way to support sustainable practices, ameliorate home expenses, and, in certain areas, follow a trendy lifestyle. Used up products can encompass distinct chategories, from clothing to apparel or ICT. Despite extant literature findings on this topic, little is known on the impact personality traits may have in the decision making process of Portuguese consumers regarding the purchase of second-hand items. This exploratory research aims to contribute to fill in this gap with a quantitative comprehensive analysis of a set of psychografic variables resulting from an online questionnaire to a sample of 375 respondents. Different methodological procedures, including multivariate data analysis techniques, were applied to assess relationships between variables. This study has two objectives: (i) describe buying habits of Portuguese consumers with regard to the purchase of second-hand items (ii) cathegorize personality traits that impact this purchasing decision. Among the most relevant results, the analysis showed a significant correlation between variables pointing to a high level of consumer awareness towards sustainable consumption, preference for specific locations to purchase second-hand items, and attention to the utility of the second-hand item. Among the personality traits that may impact consumers, the study highlights Extraversion, Conscientiousness and Agreeableness.

Key Words

Consumer behavior, marketing strategy, market segmentation, personality traits, second-hand items.

JEL Classification: D14, M31

Introduction

The consumption of items is considered sustainable when the consumer assumes social responsibility in the decision-making process, going beyond his or her preferences regarding the attributes of the product (Vermeir & Verbeke, 2008). Used up products are receiving general attention in several fields: from clothing and footwear, to apparel and home textiles, accessories, books or electronics and ICT. As consumers become more attentive to the fast degradation of natural resources, providing a second life to everyday items appears as a way to combat climate changes, support sustainable practices, ameliorate home expenses, and, in many cases, follow a trendy lifestyle. The fashion industry alone employs more than 300 million people worldwide, contributing heavily to carbon emissions. The global consumption of textiles and footwear, for example, is predicted to double in ten years, and the more items we have, the less we use them, causing serious damage to the environment. Tackling this problem has become of the major objectives of the EU, namely with the reinforcement of the circular economy concept (European Commission, 2020).

Today, concerns with the environment comprise a wide range of sectors. Sustainable consumption would include satisfying basic human needs, avoid excessive purchases, without compromising future generations, and with a long-run positive impact on society at large (Prendergast & Tsang, 2019; Quoquab & Mohammad, 2020; Kates, Parris & Leiserowitz, 2005; Webb, Mohr & Harris, 2008). Literature explores different approaches to sustainable consumption, namely with social cognitive theories based on 3 dimensions: economic, social and environmental, affecting, simultaneously, the individual and the society (Phipps *et al*., 2013). Webb *et al*. (2008) have already established more than a decade ago a Socially Responsible Purchase and Disposal (SRPD) scale encompassing purchasing based on corporate responsibility performance, recycling, and avoidance and use reduction of products that would impact negatively on the environment. Eco-conscious consumers are therefore increasingly opting for sustainable brands or second-hand items.

Second-hand markets can help reduce demand for new goods. History dates us back to times where the buying of second-hand items was a necessity, and this kind of trade flourished until the industrial revolution in the 18th century. More recently, as Ferraro, Sands and Brace-Govan (2016) indicate, second-hand consumption has undergone a redefinition, with high-end stores, online retailers and other stakeholders recognizing its value. This new 'fashionability' acts as a motivator for second-hand shoppers, while industry taps into this driver to boost sales. Thus, the so called green or ecological consumers have emerged as an important segment. Green values, however, are complex, involving both situational and psychological factors (Fortuna & Diyamandoglu, 2017; Wu & Zhu; 2021; Gunden, Atis & Salali., 2019; Dangelico *et al*., 2021).

Literature has been focusing mainly on clothing to conduct research on second-hand buying habits, exploring psychological motivations related to self-image, moral identity, cultural, economic and functional perceived values and concerns, among others, with young consumers appearing as major drivers in fading the stigma associated to second-hand clothing, especially in western societies (Xu *et al.*, 2014). However, a myriad of other motivators such as environmental concerns or respect for others appear in

second-hand buying intentions, where personality traits act as drivers whenever consumers consider acquiring second-hand items (Solino & Farizo, 2014).

Despite extant literature interesting findings on this broad topic, little is known on the impact personality traits may have on the decision making process of Portuguese consumers towards the purchase of second-hand items. The quantitative comprehensive analysis applied in this study can contribute to fill in this gap, with the following two objectives: (i) describe buying habits of Portuguese consumers relating to the purchase of second-hand items (ii) cathegorize personality traits that impact this purchasing decision.

1. Methods of Research

A quantitative methodology was adopted in this study to describe the buying habits and cathegorizatin of personality traits via a questionnaire on Google Docs, between 15 December 2020 and 14 January 2021.

The questionnaire was constituted by three blocks of questions. The first block comprised a total of 22 questions on buying habits of second-hand items regarding their frequency, place of purchase, and reasons for buying those kinds of articles. Respondents could choose answers among a 5-item Likert scale rated from 'Never' to 'Always'. An additional question on the likelihood of buying second-hand items was also presented. The second part of the questionnaire integrated 5 questions on sociodemographic data: genre, age, marital status, education level and professional occupation. The third part of the questionnaire was dedicated to personality traits in an attempt to explore the perceptions of individuals when facing distinct situations. Soto (2018) defined a personality trait as a characteristic pattern of thinking and behavior of an individual that tends to be consistent along the time and in different situations. To assess those traits, respondents were invited to provide feedback on 60 statements, as recommended by Soto and John (2017), encompassing the big five personality dimensions: Extraversion (outgoing/energetic vs. solitary/reserved); Agreeableness (friendly/compassionate vs. critical/rational); Conscientiousness (efficient/organized vs. extravagant/careless); Neuroticism (sensitive/nervous vs. resilient/confident); and Openness to experience (inventive/curious vs. consistent/cautious). For each of the assertions, a 5-item Lickert scale requested participants to choose from 'Strongly Disagree' to 'Totally Agree'. The interpretation of the responses had to take into account inverted reasoning. For example, the more conscientiousness a person is, the higher the probabiliby of disagreeing with the statement "Sometimes I behave irresponsibly".

The study was carried with a total of 375 valid responses. Of these, 250 (67%) were from female participants. The sample was also heterogenous to provide consistency to data collection (see **Chyba! Nenalezen zdroj odkazů.**).

Table 1: Sample description

Marital status		**Single**	**Married**	**Divorced/Separated**	**Other**
		63% (237)	31.5% (118)	3.5% (13)	2% (7)
Education level		**<= 9th grade**	**12th grade**	**Undergraduation**	**Master or PhD**
		17% (66)	57% (214)	19% (70)	7% (25)
Professional	**Unemployed**	**Employed**	**Student**	**Student - worker**	**Other**

occupation	7% (25)	54% (205)	26% (96)	10% (36)	3% (13)
Age	**<18**	**[18, 24[**	**[24, 45[**	**[45, 65[**	**>=65**
	3% (12)	45% (169)	39% (144)	11% (41)	2% (9)

Source: Authors

Different methodological procedures were undertaken involving the analysis of the relationships between variables, together with multivariate data analysis techniques. The Cronbach's α rank was used to analyze the internal consistency of the variables. Rhe Kaiser-Meyer-Olkin (KMO) criterion was used to identify whether a factor analysis model is adequately fit to the data, thus testing the overall consistency of the data. The Bartlett's test of sphericity was used to test the hypothesis that the correlation matrix is an identity matrix, which indicates that variables are unrelated and therefore unsuitable for structure detection.

To reduce data dimensionality (by reducing the dimensionality, we interpret a few variables rather than many), the factorial analysis was employed. To decide how many factors to retain, we considered both the Total Variance Explained and the Scree Plot methods. For the Total Variance Explained, the thumb rule is to consider the eigenvalues higher than 1, since each selected principal component is intended to explain at least as much variance as each of the original variables (which, in the case of standardized variables, is 1). However, as mentioned in Marôco (2021), this empirical rule may retain more (or less) factors than those that are really necessary. However, the more components we retain, the less useful each one becomes. Therefore, it is important to confirm the same results with the visual interpretation of the Scree Plot.

All statistical procedures used SPSS V. 27; standard statistical significance levels were considered.

2. Results and Discussion

The internal consistency of the variables was assured by the Cronbach's α rank. In fact, both for the 22 variables regarding the buying habits of second-hand items, and the 60 variables for the personality traits, the values revealed a very good consistency (0.915 and 0.913, respectively). To reduce dimensionality, and within the scope of factorial analysis, an exploratory factor analysis was also run as the study intended to analyze each group of variables to explain the correlation between them, and conclude on whether we can reduce them into a few components, explaining the relationship among the former variables (Pestana & Gageiro, 2014).

As the KMO test is extremely significant, the factor analysis would probably be important, thus it was included in the data mining. Also, and for both variable groups, the p-value < 0.001 for the Bartlett's test of sphericity clearly indicated that the original variables in each group were significantly correlated.

Table 2- KMO and Bartlett's values

KMO and Bartlett's test for second-hand items		
Kaiser-Meyer-Olkin Sampling adequacy measure		,901
Sphericity test of Bartlett	Chi-square approximation	3898,316
	df	231

	Sig.	,000
KMO and Bartlett's test for personality traits		
Kaiser-Meyer-Olkin Sampling adequacy measure		,870
Sphericity test of Bartlett	Chi-square approximation	10538,167
	df	1770
	Sig.	,000

Source: Authors

The study considered both the Total Variance Explained and the Scree Plot methods to decide on how many factors should be retained. In the first procedure, there was a retention of 4 components out of the 22 second-hand items variables (accounting for 58.179% of the variance obtained) and 14 out of the 60 variables for the personality traits (accounting for 63.838% of the variance obtained).

As for the second-hand items variables, the extraction values - indicating the proportion of variance for each variable that can be explained by the factors - were especially high for some variables (see Source: Authors

), clearly suggesting that these are good extraction values. The proportions obtained from this analysis highlight awareness to sustainability issues as one of the main reasons for purchasing second-hand items. Results also lead us to conclude that the location where second-hand items are bought and the category of second-hand items are also relevant variables.

Table 3: Proportion of variance explained (second-hand)

	Variable	**Extraction value**
Second-hand purchase frequency	Antiques	0.680
	Home appliances	0.631
	Clothing and footwear	0.618
	Computer equipment	0.606
Purchase of second-hand items	Dedicated online stores	0.659
	Markets	0.610
Frequent reason for purchase	Avoid excessive consumption	0.696
	Save money	0.705
	Environmental sustainability	0.805
	Recycle and reuse	0.792

Source: Authors

Table 4 suggests the variables that contribute with most strong loadings in the component. The variables that load high provide a good indication as to what that component is measuring. The interpretation of those indicators, namely the analysis of what they have in common, resulted in the selection of 4 components, as depicted below. As an expected outcome, the 3R's sustainability suggests people are aiming to get the most practical benefits from products and to generate the minimum amount of waste, as showed in the literature.

Table 4: Variables contribution to the components (second-hand)

Components			
1	**2**	**3**	**4**
3R's sustainability	**Daily use (home and kids)**	**Collectable objects at dedicated places**	**Vehicles**
Environmental sustainability (0.845)	Home appliances (0.716)	Antiques (0.790)	Vehicles (0.736)
Recycle and reuse (0.818)	Toys (0.705)	Markets (0.733)	
Avoid excessive consumption			

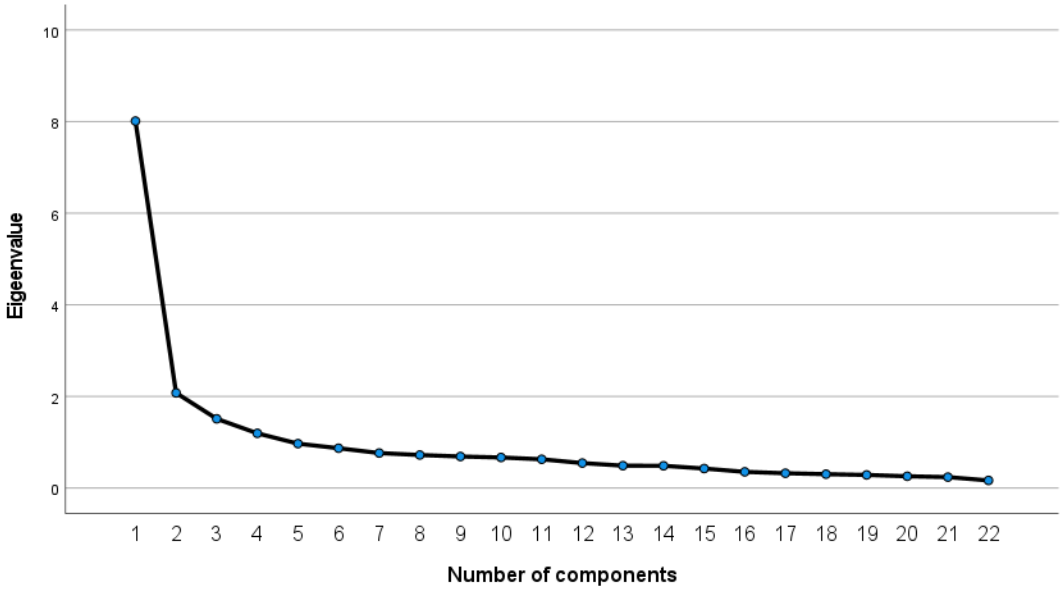
(0.776)			

Source: Authors

In addition, by using the Scree Plot for the 22 second-hand variables (Graphic 1), our proposal would be to retain only the first factor, which is compatible with our previous findings, since component 1, per se, accounts for 36.422% of the variance obtained. By combining both results, the 3R's sustainability seems to be the driver of second-hand consumers.

Overall, the results identified the type of second-hand items that receive the most attention from respondents (antiques, home appliances, clothing, footwear, computer equipment), the preferred locations to acquire them (online stores, dedicated markets), and the main reasons for purchasing that type of products (environmental sustainability/ recycle/ reuse, combat excessive consumption, utility of second-hand item, and also save money).

Graphic 1- Scree Plot for second-hand items variables



In what concerns personality traits, the extraction values for some of the variables were significantly high (see Table 5), indicating a positive outcome. The data seem to show a tendency to self-control and discipline in behavior, exhibiting a personality that knows how to regulate and direct impulses (e.g. "I am systematic, I like to keep things in order", "I do not leave things untidy", "I keep things clean and organized" or "I am persistent, I work until I complete the task"). Extraversion seems therefore to be present in consumers with these personality traits, connecting also to concerns with sustainability and care with the general well-being of others. Positive feedback on statements such as "I am talkative", or "I do not prefer others to take control" highlight those particular traits.

Table 5: Proportion of variance explained (personality traits)

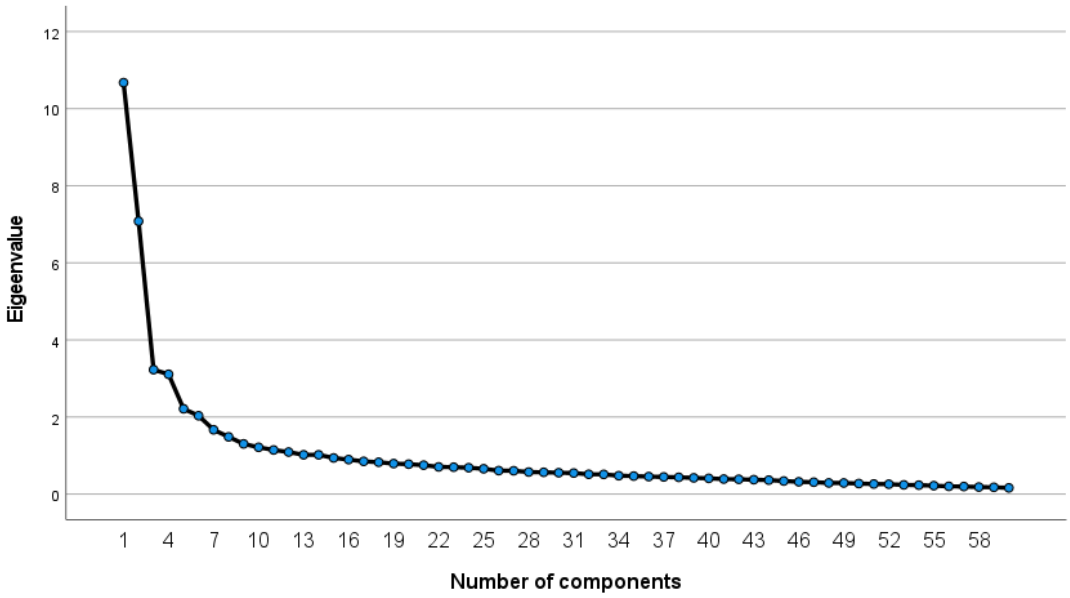
	Variable	Extraction value
Extraversion	I tend to be quiet (inverse)	0.750
Conscientiousness	I leave things untidy (inverse)	0.736

Conscientiousness	I am systematic, I like to keep things in order	0.726
Conscientiousness	I keep things clean and organized	0.713
Conscientiousness	I am persistent, I work until I complete the task	0.712
Extraversion	I am talkative	0.707
Agreeableness	I distrust of the intention of others (inverse)	0.706
Extraversion	I prefer others to take control (inverse)	0.702
Agreeableness	Sometimes I am rude to others (inverse)	0.700

Source: Authors

Results from the Scree Plot (Graphic 2) show that the first two components for the personality traits (out of the 14) are responsible for 17.794% and 11.802% of the total variance explained, respectively (the other 12 components were responsible for less than 5.5%, each).

Graphic 2- Scree Plot for personality traits' variables



Finally, the analysis of results point to reliability (0.701), politeness (0.653) and respect (0.607) as the variables that contribute with highest loadings in the first component. Not leaving things untidy (0.617) and not tending to find faults in others (0.608) are the variables that most contribute to the second component. As a result, the personality traits that seem to be most related with people who buy second-hand items are correlated to concerns with the well-being of others and with the impact the purchase may have on others. This observation is consistent with the concept of corporate social responsibility, showing that environmental and social factors play a key role in consumer behavior (Fortuna & Diyamandoglu, 2017).

Conclusion

This study describes the buying habits of a sample of Portuguese consumers of second-hand items and cathegorizes the personality traits that impact their purchasing decision. Among the most relevant results, the analysis showed a significant correlation between variables pointing to a high level of consumer awareness towards sustainable consumption. The study also revealed some patterns in consumer behavior towards

second-hand items: type of item (*e.g.* home appliances, clothing), preference for specific locations to purchase second-hand items (*e.g.* online stores), and motivations to aquire them (e*.g.* environmental concerns, utility, financial reasons).

This research also provides insights concerning personality traits that may impact consumers' purchasing behavior in relation to second-hand items. From the analysis, the dimensions Extraversion and Conscientiousness, together with Agreeableness, were aligned with higher levels of concern for the environment and general well-being of others, as reported in extant literature (Wu and Zhu; 2021; Gunden *et al*., 2019; Dangelico *et al*., 202). Politeness, respect, reliability, and care for others are thus personality traits that resonate with this profile.

Additionally, this exploratory analysis provides interesting data with implications to academics and marketing professionals, namely to understand and promote an eco-conscious consumer behavior. Results can also suggest that sociodemographic characteristics alone may not drive consumers to a final purchasing decision, while intrinsic characteristics present in personality traits can guide buying preferences in a relevant way. In this regard, and aligned with previous research on sustainability and second-hand products' acquisition (*e.g*., Solino & Farizo, 2014; Prendergast & Tsang, 2019), more studies on how consumer behavior can be modelled are needed, especially due to the relevance of impactful sectors such as waste management policies or circular economy (Fortuna & Diyamandoglu, 2017). Replicating the study with larger samples or tailoring new data collection to specific second-hand products with in-depth approaches would benefit the whole chain of practitioners, industry at large and institutions at municipal, regional and national level.

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Michal Tomíček, Natalie Pelloneová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentská 2, 461 17 Liberec, Czech Republic
email: michal.tomicek@tul.cz, natalie.pelloneova@tul.cz

Measuring the Efficiency of Football Clubs: Empirical Evidence From Professional Czech Football

Abstract

Football is a very popular sport in the Czech Republic. However, like clubs elsewhere in Europe, Czech clubs are currently facing some hurdles. The expenditure levels of some of these clubs are considered excessive. What is more, results on the field are not always forthcoming. The aim of this paper is to propose a method for evaluating the performance of football clubs based on data envelopment analysis (DEA). Professional Czech football clubs playing in the Czech football competition Fotuna:Liga were selected for empirical analysis. Fortuna:Liga is the major football league in the Czech Republic. The performance evaluation of Fortuna:Liga football clubs is an important reference for team managers. To analyse the relative efficiency of football clubs, two frequently used models were employed, the Banker Charnes Cooper (BCC) and the Charnes Cooper Rhodes (CCR) model. The study was conducted on a sample of 20 clubs through 2 inputs and 1 output collected during the 2015/16–2019/20 seasons. The results show that Czech football clubs achieved a relatively high level of efficiency in the period monitored and that traditional clubs achieved the highest efficiency score. These results could help club managers improve the performance of their teams.

Key Words

efficiency, data envelopment analysis, sport, football, Fortuna:Liga, Czech footbal

JEL Classification: C10, L83, C67, C44

Introduction

Professional sports competitions attract millions of spectators worldwide and, among other advantages, also create a significant amount of jobs and business opportunities. Sports activities then expand further and reach other critical economic sectors, such as hospitality, the media, or tourism. Due to their international importance, sports competitions are also an essential element in promoting international trade. One of the world's most important sports competitions is mainly football competitions, which are extremely important for their economic and social activity. In the Czech Republic, professional football clubs are represented by a professional football league (Fortuna:Liga). The analysis performed in 2015 confirmed that the economy around the first and second football leagues is a full-fledged part of the Czech economy. The total consumption associated with the organization of Fortuna:Liga and Fortuna:Národní Liga represents more than 3.6 billion crowns; the benefits to the state budget amount to more than one billion crowns. Both professional Czech football leagues create around 6,000 full-time jobs (LFA & 2Score, 2021).

Although football clubs operate within the same legal framework as other companies, they are a particular type of business due to being mainly conditioned by sporting activities. The question, therefore, arises as to how to measure the performance of football clubs. Some studies mainly show a positive relationship between sports and financial performance. In this context, there is a need to recommend football managers' practices that could help clubs achieve both sports and business achievements. In this paper, a method of evaluating the performance of football clubs based on data envelopment analysis will be proposed.

1. Data Envelopment Analysis

The central part of this is the research of competitiveness and performance of Czech professional football clubs playing the highest competition Fortuna:Liga, through the method of data envelopment analysis (further DEA). DEA is used as a specialized modelling tool for evaluating the efficiency or productivity of a group of comparable decision making units (further DMUs). In this article, these units are football clubs playing the highest competition of Fortuna:Liga.

The use of the DEA method for evaluating the productivity of football clubs seems to be appropriate mainly because not only one variable is evaluated here, but a set of different variables (Dlouhý et al., 2018). In general, DEA models are based on the inputs and outputs of the evaluated units and then compare the efficiency with which the football club can transform its inputs into outputs, i.e. the extent of the outputs the football club can achieve with the number of available inputs (Jablonský and Dlouhý, 2004).

Another fundamentel term is production possibility frontier. This frontier consists of a set of those units that are considered the most efficient within the production possibility set. If a unit is outside the production possibility frontier, it is considered inefficient (Ji and Lee, 2010).

In general, DEA models can be divided according to the model's orientation into input-oriented, output-oriented, and non-oriented models. Further sorting of DEA models can be done based on the nature of the production process. In this case, a distinction can be made between models based on the assumption of constant returns to scale, e.g., the Char-Cooper-Rhodes (CCR) model, and models based on the assumption of variable returns to scale, e.g., Banker-Charles-Cooper (BCC) model (Cooper et al., 2011).

2. Fortuna:Liga

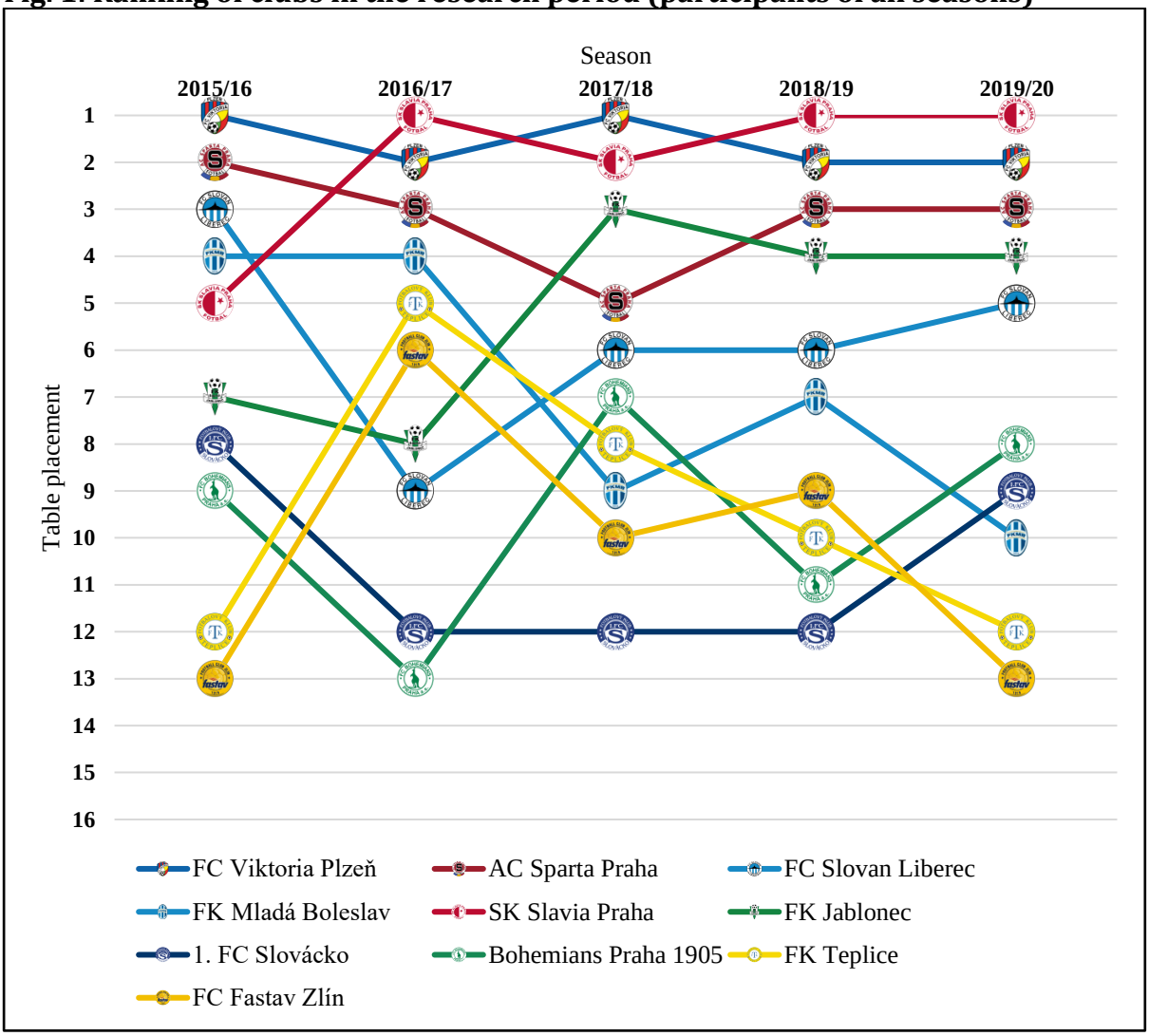
A total of 16 teams from Bohemia, Moravia, and Silesia participate in the Czech highest football competition. Historically, the most successful club has been Prague AC Sparta with 36 titles, followed by SK Slavia Prague with 20 titles. In the last five seasons, the Czech leagues have been dominated by the FC Viktoria Plzeň and SK Slavia Praha teams (Fortuna:Liga, 2020).

Since the 2018/19 season, the Czech highest football competition has been officially named Fortuna:Liga. Only three teams have participated in all 27 years of the independent Czech league (since 1993): AC Sparta Praha, SK Slavia Praha and FC Slovan Liberec. These teams are also in the first three places of the historical table, which is the sum of all league seasons since the beginning of the independent Czech highest competition (Fortuna:Liga, 2021).

An overview of the ranking of clubs that participated in all five seasons researched is shown in Figure 1. One can observe the separation of the three strongest clubs of the Czech highest competition from the rest of the league. These are financially "bounced" clubs that were able to transfer their financial strength to the results framework. Other clubs are in a position to compete for European Cups, but not for the championship. These are mainly the clubs FC Slovan Liberec, FK Jablonec and FK Mladá Boleslav. For the aforementioned FK Jablonec, the performance shift in the order after the basic part from the 2017/18 season can be clearly seen. After the unsuccessful autumn, the club was taken over by coach Petr Rada and after a successful spring part of the season, FK Jablonec placed third in the table (FK Jablonec, 2017). The opposite trend can be observed for another football club from the north of Bohemia, Teplice, and also for FK Mladá Boleslav (Fortuna:Liga, 2021).

Currently the most successful club in the Czech league, SK Slavia Praha, has combined its recent rise in performance with investors from the People's Republic of China. China Energy Company Limited joined the club on September 4, 2015, acquiring almost 60% of the club's shares and becoming its general partner. The company significantly contributed to the repayment of the club's debts (SK Slavia Praha, 2015).

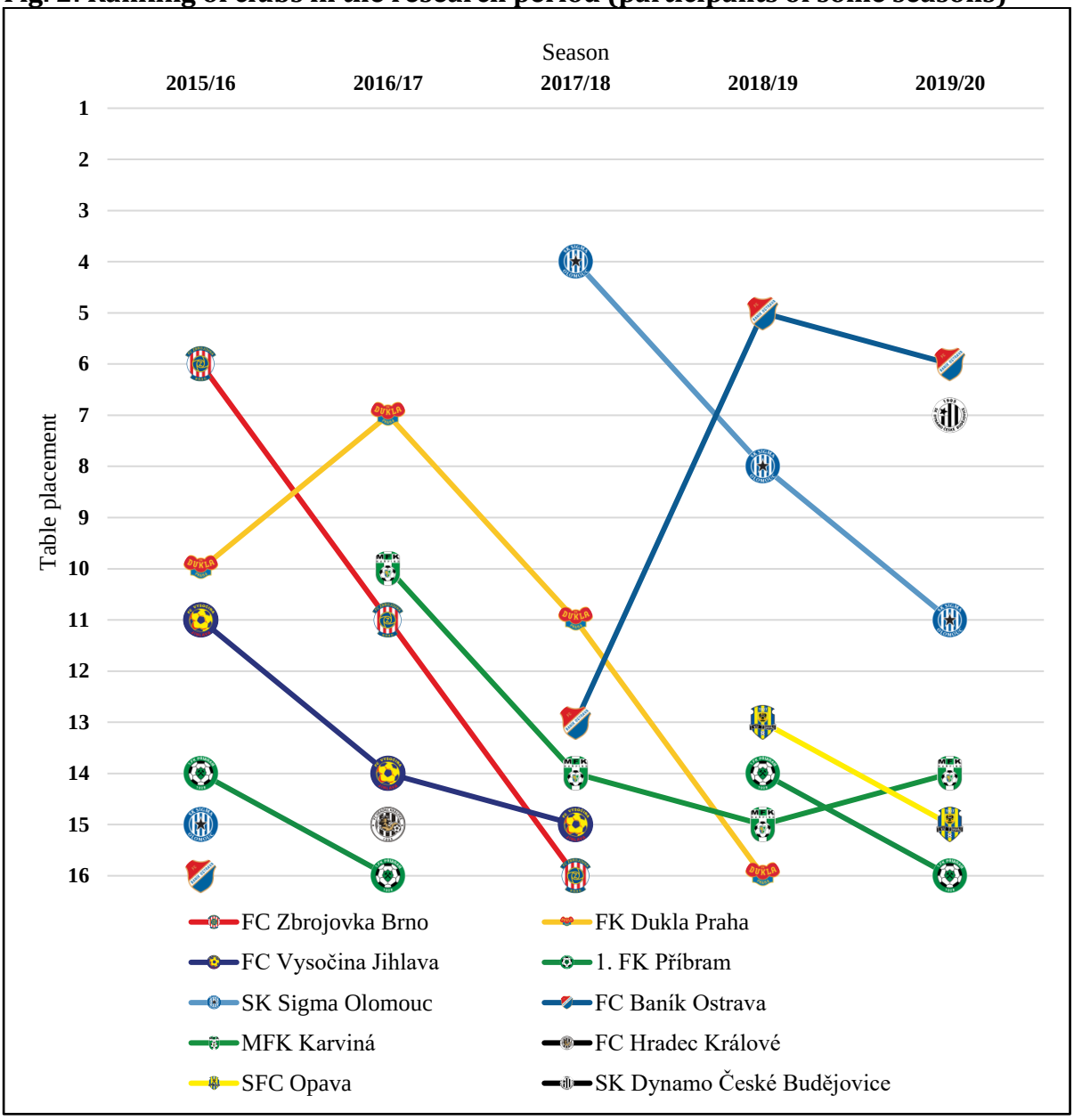
Fig. 1: Ranking of clubs in the research period (participants of all seasons)



Source: authors' own processing

The order of the teams that did not participate in all the examined seasons is shown in Figure 2. These are clubs balancing on the edge of participation in the highest and second-highest league competitions and clubs with a rich history, which especially financially lost contact with the highest competition in some seasons, or they had other serious problems. The club of FC Vysočina Jihlava, MFK Karviná, SFC Opava, 1. FK Příbram, FC Hradec Králové and SK Dynamo České Budějovice can be clearly included in the first category. On the contrary, FC Zbrojovka Brno, SK Sigma Olomouc, and especially FC Baník Ostrava can be considered traditional clubs; the latter was the only one of the aforementioned clubs that managed to win an independent Czech football league (in the 2003/04 season). The highest Czechoslovak football competition was won by Baník Ostrava a total of three times, Hradec Králové and Zbrojovka Brno once.

Fig. 2: Ranking of clubs in the research period (participants of some seasons)



Source: authors' own processing

The largest clubs in the eastern part of the Czech Republic, Sigma and Baník, came down together after the 2015/16 season but immediately took advantage of the first opportunity to return to the elite society of Czech clubs. SK Sigma Olomouc even took fourth place in its "premiere" season after the promotion. In the following seasons, Sigma was unable to repeat this success; against Sigma, Baník placed back in the highest competition only one point from the relegation after the first season. In the following two seasons, the club steadily placed just below the rungs, which guarantee participation in European cups.

It can be noted that the graphically mentioned units "miss" the first three places of the table; they are almost exclusively occupied by the three strongest Czech clubs. Furthermore, with a few exceptions, a declining trend of placement in the table from progression to the highest competition can be observed. A typical example is FC

Zbrojovka Brno (6th, 11th, 16th), FC Vysočina Jihlava (11th, 14th, 15th) or the aforementioned SK Sigma Olomouc (4th, 8th, 11th). After advancing to the highest competition, the only FC Baník Ostrava was able to improve its position in the table in the second season and thus stabilized in the upper half of the table. The fate of FK Dukla Praha, which left the highest competition after the 2018/19 season, did not meet them (Fortuna:Liga, 2021).

3. Methods of Research

The data used for the purposes of the research come from the official databases of the examined sports competition and are supplemented by private databases of companies from the football environment. The researched period includes the seasons from 2015/16 to 2019/20. The research is divided into the following four steps.

1. Collection of necessary data. The research included a group of 20 football clubs playing in the highest Czech football league called Fortuna:Liga. Information about these clubs was subsequently obtained for the entire selected period, i.e. 5 seasons. The core is data from InStat (InStat,2020), which analyzes the performance of athletes and sports teams. They are supplemented by the database of the Transfermarkt.com server (Transfermarkt, 2021) and the databases of the Czech Fortuna:Liga (Fortuna:Liga, 2021).

2. Determination of output and input variables. Due to the number of DMUs (16 clubs in one season), two input and one output variable were included in the DEA model. For the model with 16 football clubs (DMUs) and three variables included in the efficiency model, the model has sufficient discriminant power for the subsequent calculation of efficiency scores. Individual variables were selected using correlation analysis. The first input variable is the number of players (I1). The second input variable is total squad market value (I2). The number of points achieved in the season was chosen as the output variable (O1). Descriptive statistics of the efficiency model variables are given in Table 1.

Tab. 1: Efficiency Model Variables: Descriptive Statistics

Variables	Mean	Standard deviation	Maximum	Minimum
Season 2015/16				
Number of Players	25.88	4.43	39	19
Total Squad Market Value	10,570.31	5,696.35	26,125	5,825
Points	41.31	15.59	71	14
Season 2016/17				
Number of Players	27.31	3.28	35	20
Total Squad Market Value	12,700	8,174.87	32,800	5,950
Points	40.69	12.29	69	22
Season 2017/18				
Number of Players	26.19	3.87	33	21
Total Squad Market Value	14,382.81	11,412	42,050	6,250
Points	40.75	12.96	66	24
Season 2018/19				
Number of Players	27.06	4.15	35	20
Total Squad Market Value	16,476.56	14,091.51	51,600	5,875
Points	42.06	13.96	72	20
Season 2019/20				
Number of Players	28.88	3.84	38	23
Total Squad Market Value	16,449	15,540.64	61,400	5,775
Points	41.25	14.28	72	21

Source: authors' calculations

3. Selection and construction of DEA models. In the presented paper, the CCR and BCC model with input orientation was applied to the obtained data. In the basic input-oriented CCR model with the assumption of constant returns to scale, the objective function (1) is maximized under restrictive conditions (2), see e.g., Jablonský and Dlouhý (2004). Symbol x_j denotes inputs, y_i outputs, u_i is the weight of the output, v_j is the weight of the input and z is the value of the objective function.

$$z = \sum_{i=1}^{r} u_i y_{iq} \tag{1}$$

$$\sum_{i=1}^{r} u_i y_{ik} \leq \sum_{j=1}^{m} v_j x_{jk}, k = 1,2,\dots,n$$

$$\sum_{j=1}^{m} v_j x_{jq} = 1 \tag{2}$$

$$u_i \geq \varepsilon, i = 1,2,\dots,r,$$

$$\varepsilon \; very \; small \; non-Archimedean \; number \; (> 0)$$

$$v_j \geq \varepsilon, j = 1,2,\dots,m.$$

In the case of considering variable returns from scale (BCC model), it is sufficient to extend the previous model by the condition of convexity (Subhash, 2004). The CCR and BCC models differ only by a variable μ. In the CCR model, this variable takes zero values; in the BCC model it can take any values. The BCC model consists of equations (3) and (4).

$$z = \sum_{i=1}^{r} u_i y_{iq} + \mu \tag{3}$$

$$\sum_{i=1}^{r} u_i y_{ik} + \mu \leq \sum_{j=1}^{m} v_j x_{jk}, k = 1,2, \dots, n$$

$$\sum_{j=1}^{m} v_j x_{jq} = 1 \tag{4}$$

$$u_i \geq \varepsilon, i = 1, 2, \dots, r,$$

$$\varepsilon \; very \; small \; non - Archimedean \; number \; (> 0)$$

$$v_j \geq \varepsilon, j = 1, 2, \dots, m,$$

$$\mu \in R$$

4. Technical efficiency score calculation. Technical efficiency (further TE) and scale efficiency (further SE) scores were determined for each football club. All necessary calculations were performed using OSDEA-GUI software. The technical efficiency score determined using the CCR model is called the overall technical efficiency (further OTE). In contrast, the score determined using the BCC model is called pure technical efficiency (further PTE). The overall technical efficiency score can, therefore, be decomposed into the pure technical efficiency score and the scale efficiency score, see relation (5). The scale efficiency measures the degree to which a unit can improve its efficiency by changing its size (Zhu, 2014).

$$SE = \frac{OTE}{PTE} \tag{5}$$

4. Results of the Research

This part of the paper is devoted to empirical research, where the nonparametric DEA methodology was used. In this research, professional football teams of the highest Czech football competition Fortuna:League are evaluated as DMU.

Table 2 shows the average level of efficiency of the clubs. Assuming variable returns to scale (BCC model), it achieves pure technical efficiency at an average level of 86.9% over the five evaluated seasons evaluated. The clubs should reduce the inputs used (i.e., number of players and total squad market value) by 13.1%. However, assuming constant returns to scale (CCR model), the overall technical efficiency is 75.6%, and, therefore, inputs should be reduced by approximately 24%. The scale efficiency (SE) of clubs reaches the level of 86.4%, which indicates that football clubs are operating below their optimal scale of operations. Table 2 also shows that the best season was 2017/16, followed by a deterioration in the 2018/17 season. Gradual stabilization can be observed in recent seasons.

Tab. 2: DEA Scores (Input-Oriented Models)

	CCR model		BCC model		Scale efficiency	
Seasons	**Average OTE**	**SD**	**Average PTE**	**SD**	**Average SE**	**SD**
2015/16	0.709	0.202	0.893	0.096	0.785	0.183
2016/17	0.843	0.120	0.900	0.088	0.934	0.064
2017/18	0.724	0.156	0.847	0.116	0.849	0.098
2018/19	0.764	0.168	0.821	0.124	0.924	0.099
2019/20	0.739	0.175	0.886	0.104	0.829	0.142
Means	**0.756**	**-**	**0.869**	**-**	**0.864**	**-**

Source: authors' calculations

Table 3 contains the resulting efficiency scores for each model and for all clubs examined from all seasons of the Fortuna:Liga. The last row of Table shows the average values of all DEA scores. The CCR-I model resulted in the identification of up to four efficient clubs in a single season. Table 3 also shows that all clubs that were classified as efficient according to the CCR-I model are also classified as efficient according to the BCC-I model. This means that the size of these clubs is optimal and at the same time the clubs are able to efficiently transform the given inputs into outputs. It is apparent that the PTE score in the BCC-I model is higher than the OTE score in the CCR-I model, as the CCR-I model considers the scale efficiency (SE), which reduces the OTE value.

For clubs that are classified as inefficient according to the CCR-I model yet as efficient according to the BCC-I model, it can be concluded that their technical inefficiency is caused by scale inefficiency. Therefore, it can be stated that the size of these clubs is not optimal and an inappropriate sports tactic was chosen.

Tab. 3: DEA Scores

	2015/16			2016/17			2017/18			2018/19			2019/20		
Club	**CCR**	**BCC**	**SE**	**CCR**	**BCC**	**SE**	**CCR**	**BCC**	**SE**	**CCR**	**BCC**	**SE**	**CCR**	**BCC**	**SE**
SLO	0.85	0.99	0.86	0.89	0.92	0.97	0.87	**1**	0.87	0.72	0.8	0.89	0.85	0.88	0.97
PRI	0.52	0.85	0.60	0.71	0.9	0.78	-	-	-	0.74	0.81	0.91	0.50	0.84	0.59
SPA	0.69	0.74	0.93	0.63	0.73	0.86	0.55	0.66	0.84	0.66	0.67	0.98	0.62	0.82	0.76
BOH	0.64	0.8	0.80	0.76	0.88	0.86	0.85	**1**	0.85	0.82	0.84	0.98	0.76	0.79	0.96
OVA	0.23	0.76	0.30	-	-	-	0.71	0.81	0.87	**1**	**1**	**1**	**1**	**1**	**1**
ZLN	0.69	**1**	0.69	0.99	**1**	0.99	0.58	0.84	0.69	0.85	0.86	0.99	0.54	0.84	0.64
HKR	-	-	-	0.96	**1**	0.96	-	-	-	-	-	-	-	-	-
LIB	0.85	0.88	0.96	0.60	0.7	0.85	0.63	0.75	0.83	0.71	0.77	0.92	0.72	0.76	0.95
PLZ	**1**	**1**	**1**	0.78	0.83	0,94	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
JIH	0.65	0.97	0.67	0.89	0.93	0.96	0.70	0.83	0.85	-	-	-	-	-	-
BRN	**1**	**1**	**1**	0.87	0.91	0.95	0.55	0.81	0.68	-	-	-	-	-	-
DUK	0.66	0.86	0.76	0.83	0.84	0.99	0.79	0.91	0.86	0.48	0.79	0.61	-	-	-
JAB	0.70	0.86	0.81	0.85	0.97	0.88	0.81	0.81	**1**	0.83	0.83	**1**	0.86	**1**	0.86
MBL	0.87	0.95	0.91	0.84	0.87	0,96	0.46	0.64	0.72	0.54	0.59	0.91	0.61	0.74	0.82
TEP	0.51	0.75	0.68	**1**	**1**	**1**	0.60	0.78	0.76	0.63	0.76	0.83	0.67	0.92	0.72
KAR	-	-	-	0.89	0.91	0.98	0.80	0.95	0.83	0.56	0.65	0.86	0.44	0.69	0.65
OPA	-	-	-	-	-	-	-	-	-	**1**	**1**	**1**	0.65	**1**	0.65
CEB	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**1**	**1**
OLO	0.53	0.87	0.61	-	-	-	**1**	**1**	**1**	0.68	0.77	0.89	0.73	0.89	0.82
SLA	0.97	**1**	0.97	**1**	**1**	**1**	0.70	0.76	0.92	**1**	**1**	**1**	0.90	**1**	0.90
Mean	*0.71*	*0.89*	*0.78*	*0.84*	*0.90*	*0.93*	*0.73*	*0.85*	*0.85*	*0.76*	*0.82*	*0.92*	*0.74*	*0.89*	*0.83*

Source: authors' calculations

In the 2015/16 season, FC Victoria Plzeň and FC Zbrojovka Brno were efficient from the point of view of OTE. In terms of placement in the league table, Plzeň finished in first place and Brno in sixth place. From the point of view of the PTE score, FC Fastav Zlín and SK Slavia Praha were also described as efficient, the source of their inefficiency being scale inefficiency. In the 2016/17 season, SK Slavia Praha and FK Teplice were efficient from the point of view of OTE. In terms of placement in the league table, Slavia Praha finished in first place and Teplice in fifth place. From the point of view of the PTE score, FC Fastav Zlín and FC Hradec Králové were also classified as efficient. The source of their inefficiency is scale inefficiency. In the 2017/18 season, FC Victoria Plzeň and SK Sigma Olomouc were efficient from the point of view of the OTE score. In terms of placement in the league table, Plzeň finished in first place and Olomouc in fourth place. From the point of view of the PTE score, Bohemians Praha and FC Slovácko were also classified as efficient. The source of their inefficiency is scale inefficiency. In the 2018/19 season, SK Slavia Praha, FC Baník Ostrava, SFC Opava and FC Victoria Plzeň were efficient from the point of view of the OTE score. In terms of position in the league table, Slavia Praha finished in first place, Plzeň in second place, Ostrava in fifth place and Opava in 13th place. For SFC Opava, it is important to emphasize that it was their return to the highest football competition. Due to this fact, 13th place overall can be considered a success. In the 2019/20 season, FC Baník Ostrava, FC Victoria Plzeň and SK Dynamo České Budějovice were efficient from the point of view of OTE. In terms of placement in the league table, Plzeň finished in second place, Ostrava in sixth place, and České Budějovice in seventh place. For SK Dynamo České Budějovice, it is essential to emphasize that their return to the highest football competition, despite the fact that they placed seventh overall, can be considered a success. From the point of view of PTE, SK Slavia Praha and SFC Opava were also described as efficient, the source of their inefficiency being scale inefficiency.

Conclusion and discussion

Given football clubs' current economic and financial situation, there is an increasing need to know how efficiently a club uses its resources. In addition, this analysis is also crucial for evaluating the sports performance of clubs. Among the various tools that are widely used to measure efficiency, the DEA method was chosen in this paper.

In this article, the DEA was applied to the best clubs in the Czech Republic, which participate in the highest football competition Fortuna:Liga. There were 20 different clubs that played Fortuna:Liga in five seasons (2015/16 to 2019/20). This number of seasons made it possible to provide interesting conclusions for each season and for all seasons. The research provided several conclusions.

The first conclusion: from the analyzed period from the point of view of the OTE score, the winner of Fortuna:Liga was always described as efficient with the exception of the 2019/20 season and the club with the lowest OTE score of Fortuna:Liga mostly left the league at the end of the season.

The second conclusion can be drawn from the larger number of seasons included in the research. As can be seen, in the five seasons analyzed, no club was able to maintain efficiency throughout the period under review. It is important to note that the clubs and resources used change from season to season, as do the opponent’s teams. So when an

efficient club uses the same resources in the same way in past seasons, it is not enough to be efficient in the coming seasons.

As a third conclusion, various sources of inefficiency were identified. The first source of inefficiency is observed in pure technical efficiency (PTE) and is related to the waste of inputs. To achieve the same output, a lower value of inputs (i.e. a lower total squad market value or a lower number of players) should suffice. The second source of inefficiency can be observed by calculating scale efficiency and is associated with the selection of inappropriate sports tactics. In this case, of course, the team's head coach is the most involved. The problem is not just how they use their sports resources. These clubs should seek to develop a medium- and long-term strategy to develop new and different tactics with the resources they have or could have in the future. The purchase of players should also take place in the context of the development of these new sports tactics. There are also clubs that suffer from both sources of inefficiency. In this case, clubs should reduce resources and, in terms of size, find out how effective clubs are developing sports tactics.

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Marco Trost[1], Thorsten Claus[1], Frank Herrmann[2]

[1] Technische Universität (TU) Dresden, International Institute (IHI) Zittau
Markt 23, 02763 Zittau, Germany

[2] Ostbayerische Technische Hochschule (OTH) Regensburg
Innovation and Competence Centre for Production Logistics and Factory Planning (IPF)
P. O. Box 12 03 27, 93025 Regensburg, Germany

email: marco.trost@tu-dresden.de, thorsten.claus@tu-dresden.de,
frank.herrmann@oth-regensburg.de

Limitation of Temporary Employment in the Master Production Scheduling

Abstract

To achieve flexibility and in particular volume flexibility is an important task for manufacturing companies, especially regarding increasing fluctuations in product demand. Enterprises cover these fluctuations by the operational production planning. In this context, the harmonization of the available and required capacity is a central task, which is assigned to the levels of aggregate production planning and master production scheduling. For this, general approaches consider only the use of additional capacities and there are only a few approaches that combine aspects of personnel requirements planning with production planning. Therefore, this article presents a linear optimization model for master production scheduling. A frequently used tool in industrial practice to cover the fluctuations in demand is the use of temporary employees. But, the temporary employment often is connected with social inequalities. In order to improve social sustainability, this paper investigate different strategies of temporary employment while satisfying various fluctuations in demand and the impact on costs as well as on other social aspects is analyzed. In this regard, the work intensity, the deviations from the regular working time and the use of overtime are assessed. It was observed that the share of temporary employees could be reduced without a significant increase in costs. However, limiting the share of temporary employees to a level less than the fluctuations in demand affects other social aspects negative.

Key Words

flexibility, production planning, social, sustainability, temporary employment

JEL Classification: A12, C44, D24, I15, J29, M11, M59, O35

Introduction

A high degree of flexibility is required from industrial companies due to increasing environmental impacts and higher variability of products and processes (Jain et al., 2013). In particular, wider product ranges and shorter product life cycles increase the fluctuations in demand for products (Francas et al., 2011). A key tool to smooth these fluctuations is the employment of temporary employees (Qin et al., 2015), but their use can contribute to social inequalities.

In this context, Trost et al. (2021) analyzed the effects of permitting or not permitting temporary employment and overtime. It was observed that a complete exclusion of single flexibility measures is compensated by an excessive use of the remaining measures. Thus, the improvement of one social aspect leads to a significant deterioration of another social aspect. Therefore, it was concluded that the compliance with suitable limits on flexibility measures contributes more to social sustainability than the complete exclusion of these measures.

This paper addresses the determination of such suitable limits of temporary employment and investigates various limitations as well as different fluctuations in demand. Analyzed is the impact of the temporary employment limitation with regard to the resulting costs and to the social working conditions.

1.FTheoretical Background

Industrial companies have to achieve flexible processes, which occur on different levels (Yu et al., 2015). In the literature, for example, Koste and Malhotra (1999) distinguish between the individual resource level, the shop floor level, the plant level and the functional level. A significant aspect of this is the consideration of fluctuations in demand, and the development of tools to harmonize the product supply and demand has become a key factor in achieving a sufficient utilization and a high service level (Francas et al., 2011). One important measure to achieve this, is the employment of temporary employees (Qin et al., 2015).

The ability to adapt the fluctuations in demand efficiently is known as volume flexibility (Jain et al., 2013) and is assigned to the plant level (Koste and Malhotra, 1999). In companies, these are traditionally taken into account by operational production planning, as described, for example, in Herrmann and Manitz (2015). At plant level, aggregate production planning and master production scheduling determine feasible production plans by harmonizing available and required capacities to meet the product demand. In traditional approaches, the use of additional capacities is made possible in addition to pre-production. But, concrete aspects such as legal restrictions or different employment conditions are not considered. Extensions of these traditional approaches by aspects of the personnel requirement planning are so far rare (see e.g. Hemig et al., 2014; Bose et al., 2016; Treber et al., 2016). Therefore, this paper introduces an extended linear optimization model for master production scheduling.

The analysis of flexibility measures is usually based on economic criteria. However, ensuring a necessary volume flexibility requires the variable deployment of employees. Thus, flexibility measures have a direct impact on human working conditions, so that their effect on social sustainability also should be analyzed. In this context, a survey of works councils concluded that there are deficits in working conditions, particularly with regard to the work intensity, the use of overtime and the deviations from the regular working time (Ahlers, 2017). These deficits in working conditions can contribute to psychosomatic illness, resignation, and demotivation (Nerdinger et al., 2014). Additionally, the use of temporary employees can already lead to social inequalities, as temporary employees are disadvantaged in terms of income, participation and career mobility (Giesecke and

Groß, 2004). Furthermore, temporary employees are exposed to higher psychological stress due to their uncertain job perspectives (Virtanen et al., 2005).

Thus, this study investigate different limitations of temporary employment while ensuring a required volume flexibility. Analyzed are the monetary effects of the different limitations of temporary employment as well as their impact on the work intensity, the use of overtime and the deviations from the regular working time.

2.FModel Formulation

The linear optimization model used for this investigation is based on Trost et al. (2021). In addition to general models, it includes a control of the employee utilization and aspects of personnel requirements planning. Also, the use of overtime and temporary employment are permitted. The following notation is used:

Sets

$EG = \{1, \dots, EG\}$	set of employee groups, indexed by *eg*
$J = \{1, \dots, J\}$	set of production segments, indexed by *j*
$K = \{1, \dots, K\}$	set of products, indexed by *k*
$T = \{1, \dots, T\}$	set of time periods, indexed by *t*
$Z = \{0, \dots, Z\}$	set of lead-time periods for capacity load, indexed by *z*

Parameters

$Capa_{eg}$	available capacity per period and employee of employee group *eg*
$d_{k,t}$	demand per product *k* in period *t*
$f_{z,j,k}$	capacity load factors for lead-time period *z*, production segment *j* and product *k*
h_k	inventory holding costs per unit and period for product *k*
I_k^{Init}	initial inventory level for product *k*
I_k^{Max}	maximum inventory level for product *k*
m_{eg}^{Cost}	cost rate for hiring an employee from employee group *eg*
n_{eg}^{Cost}	cost rate for layoff an employee from employee group *eg*
R_j^{Max}	maximum permitted employee utilization per production segment *j*
$Staff_{eg}^{Cost}$	cost rate per employee of employee group *eg*
$Staff_{eg,j}^{Init}$	initial number of employees per employee group *eg* and production segment *j*
$Staff_{eg,j}^{Max}$	maximum number of employees per employee group *eg* in production segment *j*
$Temp^{Max}$	maximum share of temporary employees
V	number of periods for overtime balancing
we_{eg}	lead-time periods for hiring employees of employee group *eg*
wf_{eg}	lead-time periods for employee turnover of employee group *eg*

Decision Variables

$a_{j,t}$	available capacity per production segment *j* in period *t*
$b_{j,t}$	capacity requirement per production segment *j* in period *t*
$I_{k,t}$	inventory level per product *k* in period *t*
$m_{eg,j,t}$	hired employees of employee group *eg* in production segment *j* and period *t*
$n_{eg,j,t}$	number of layoffs of employee group *eg* in production segment *j* and period *t*

$overtime_{j,t}$	used overtime per production segment *j* and period *t*
$Staff_{eg,j,t}$	number of employees of employee group *eg*, production segment *j* and period *t*
$x_{k,t}$	production quantity per product *k* in period *t*

As objective, the total costs (1), consisting of inventory (2), staffing (3), hiring (4) and layoff (5) costs, are minimized.

$$Objective\ Function:\ \ Minimize\ (TotalCosts) \tag{1}$$

$$InventoryCosts = \sum_{t=1}^{T}\sum_{k=1}^{K} h_k \cdot I_{k,t} \tag{2}$$

$$StaffingCosts = \sum_{t=1}^{T}\sum_{j=1}^{J}\sum_{eg=1}^{EG} Staff_{eg}^{Cost} \cdot Staff_{eg,j,t} \tag{3}$$

$$HiringCosts = \sum_{t=1}^{T}\sum_{j=1}^{J}\sum_{eg=1}^{EG} m_{eg}^{Cost} \cdot m_{eg,j,t} \tag{4}$$

$$LayoffCosts = \sum_{t=1}^{T}\sum_{j=1}^{J}\sum_{eg=1}^{EG} n_{eg}^{Cost} \cdot n_{eg,j,t} \tag{5}$$

As general constraints, there are the inventory balance sheet (6), the definition of the initial (7) as well as maximum inventories (8) and the required capacity is determined (9).

$$x_{k,t} + I_{k,t-1} - I_{k,t} = d_{k,t} \qquad \forall\ 1 \le k \le K;\ \forall\ 1 \le t \le T \tag{6}$$

$$I_{k,t=0} = I_k^{Init} \qquad \forall\ 1 \le k \le K \tag{7}$$

$$I_{k,t} \le I_k^{Max} \qquad \forall\ 1 \le k \le K;\ \forall\ 1 \le t \le T \tag{8}$$

$$\sum_{z=0}^{Z}\sum_{k=1}^{K} f_{z,j,k} \cdot x_{k,t+z} = b_{j,t} \qquad \forall\ 1 \le j \le J;\ \forall\ 1 \le t \le (T - Z) \tag{9}$$

The aspects of personnel requirements planning are modelled by the employee balance sheet (10), where hiring ($m_{eg,j,t}$) and layoff ($n_{eg,j,t}$) is permitted. Between the regular and temporary employment are distinguished by different employee groups (EG) and also different lead times for hiring (we_{eg}) and layoff (wf_{eg}) are modelled. Further, the initial (11) and maximum (12) number of employees is defined. The permitted share of temporary employees (13) and the definition of the available capacity (14) are modelled as well.

$$Staff_{eg,j,t} = Staff_{eg,j,t-1} + m_{eg,j,t-we_{eg}} - n_{eg,j,t-wf_{eg}} \qquad \forall\ 1 \le eg \le EG;\ \forall\ 1 \le j \le J;\ \forall\ 1 \le t \le T \tag{10}$$

$$Staff_{eg,j,t=0} = Staff_{eg,j}^{Init} \qquad \forall\ 1 \le eg \le EG;\ \forall\ 1 \le j \le J \tag{11}$$

$$Staff_{eg,j,t} \le Staff_{eg,j}^{Max} \qquad \forall\ 1 \le eg \le EG;\ \forall\ 1 \le j \le J;\ \forall\ 1 \le t \le T \tag{12}$$

$$Staff_{eg=2,j,t} \le Temp^{Max} \cdot \sum_{eg=1}^{EG} Staff_{eg,j,t} \qquad \forall\ 1 \le j \le J;\ \forall\ 1 \le t \le T \tag{13}$$

$$\sum_{eg=1}^{EG} Staff_{eg,j,t} \cdot Capa_{eg} = a_{j,t} \qquad \forall\ 1 \le j \le J;\ \forall\ 1 \le t \le T \tag{14}$$

The permitted use of overtime is controlled with the last set of constraints. For this, the maximum employee utilization (15) and the calculation of overtime (16) are modelled. However, the overtime have to be compensated within a specific time interval (17), so no additional overtime costs occur, which meets legal restrictions. For this modeling, also the initial overtime level have to be defined (18).

$$R_j^{Max} \cdot a_{j,t} \geq b_{j,t} \qquad \forall\, 1 \leq j \leq J;\ \forall\, 1 \leq t \leq (T-Z) \qquad (15)$$

$$b_{j,t} - a_{j,t} = overtime_{j,t} \qquad \forall\, 1 \leq j \leq J;\ \forall\, 1 \leq t \leq (T-Z) \qquad (16)$$

$$\sum_{t'=t-V}^{t} overtime_{j,t'} \leq 0 \qquad \forall\, 1 \leq j \leq J;\ \forall\, 1 \leq t \leq (T-Z) \qquad (17)$$

$$\sum_{t'=0-V}^{t=0} overtime_{j,t'} = 0 \qquad \forall\, 1 \leq j \leq J \qquad (18)$$

Finally, $a_{j,t}$, $b_{j,t}$, $I_{k,t}$, $m_{eg,j,t}$, $n_{eg,j,t}$, $Staff_{eg,j,t}$ and $x_{k,t}$ have to be non-negative and $Staff_{eg,j,t}$ have to be an integer.

3. Case Study

The following case study is based on Trost et al. (2021). First, Tab. 1 presents general parameters.

Tab. 1: General Parameters

Parameter	Value
EG	2
J	2
K	2
W	3
Z	1

The employee related parameters are adapted from a Saxon company in the railway industry with an IG Metal collective agreement for the metal and electrical industry. The related parameters for the regular ($eg = 1$) and temporary ($eg = 2$) employees are presented in Tab. 2. The available capacity per employee and period ($Capa_{eg}$ in seconds) is higher for regular employees than for temporary employees. This consider an experience gap of temporary employees against the regular employees and means that for given capacity load factors a lower productivity is depicted. Further, an external employment agency is assigned to the employment of the temporary employees. Therefore, shorter lead times (we_{eg} and wf_{eg} in month) and lower cost rates ($m^C{}_{eg}{}^{ost}$ and $n^C{}_{eg}{}^{ost}$) for hiring and layoff of temporary employees are necessary. But, due to the agency fees, the monthly cost rate per employee ($Staff_{eg}{}^{Cost}$) is higher for temporary employees than for regular employees.

Tab. 2: Employee related parameters per employee group (eg)

Parameter	$eg = 1$	$eg = 2$
$Capa_{eg}$	524 400	393 300
m_{eg}^{Cost}	15 000	1 500
n_{eg}^{Cost}	60 000	100
we_{eg}	3	1
wf_{eg}	3	0
$Staff_{eg}^{Cost}$	3 671	5 435

Finally, the cost rate for inventory holding (h_k), the maximum inventory level (I_k^{Max} in units) and the capacity load factors ($f_{z,j,k}$ in seconds) are presented in Tab. 3.

Tab. 3: Further parameters

Parameter		$k = 1$	$k = 2$
h_k		115	165
I_k^{Max}		30 000	37 500
$f_{z=1,j,k}$	$j = 1$	3 867	4 092
	$j = 2$	13 976	10 184

Since the employment of temporary employees increases with increasing fluctuations in product demand ($d_{k,t}$), different demand courses are investigated. Based on a mean demand of 40 000 units per period of product one and 50 000 units per period of product two, coefficients of variation from 5%, 10% and 20% are regarded and five random demand series are realized for each normally distributed demand course. For this purpose, a planning horizon of 84 months ($T = 84$) is investigated, where a 6-month warm up as well as run out phase are taken into account, so that the results from 72 months are analyzed ($\hat{T} = 72$). To achieve the required volume flexibility, different strategies are analyzed. For this, a maximum overtime from 20% related to the regular working time ($R_j^{Max} = 1.2$) can always be used and additionally, different strategies of temporary employment are analyzed. These are: the share of temporary employees is (**A**) not limited ($Temp^{Max} = 1.00$), (**B**) limited to 20% ($Temp^{Max} = 0.20$), (**C**) limited to 10% ($Temp^{Max} = 0.10$), (**D**) limited to 5% ($Temp^{Max} = 0.05$) and (**E**) none temporary employees are permitted ($Temp^{Max} = 0.00$).

4.FResults and Discussion

The results were obtained using CPLEX 12.10 on a 3.30 GHz PC with 192 GByte RAM. For the analysis, the results from strategy (A) serve as benchmark. First, the total costs for strategy (A) und the related deviations for the further strategies are presented in Tab. 4. As can also be observed in industrial applications, the total costs increase with increasing fluctuations in demand. These flexibility costs result from an increased pre-production and adjustments of available capacity. Regarding the different limitations of temporary employment, only a moderate increase of the total costs occur, even with high fluctuations in demand and none permitted temporary employees. A maximum cost increase of 1.19% was observed. In addition, several situations could be observed where the total cost increase less than 0.2%. In particular, if the permitted share of temporary employees is at

least as high as the coefficient of variation of product demand, only very small increases in total costs are observed.

Tab. 4: Total costs and relative deviations

Temporary employees	Demand courses		
	5 % coefficient of variation	10 % coefficient of variation	20 % coefficient of variation
(A) No limit	730 831 710 €	746 441 283 €	770 434 224 €
(B) Max. 20 %	+/- 0.00 %	+/- 0.00 %	+ 0.07 %
(C) Max. 10 %	+/- 0.00 %	+ 0.16 %	+ 0.20 %
(D) Max. 5 %	+ 0.01 %	+ 0.56 %	+ 0.47 %
(E) None	+ 0.26 %	+ 1.19 %	+ 0.96 %

Regarding the social effects of the limitations of temporary employment, Tab. 5 presents the results, where the work intensity is represented by the mean employee utilization ($\overline{U}_j$), the deviations from the regular working time are represented by the maximum amplitude of employee utilization ($U_j^{Max-Min}$) and the use of overtime hours is represented by the average overtime related to the regular working time ($\overline{OT}_j$). Note, that the presented results refer to production segment two ($j = 2$) and that production segment one contains analogous effects.

Tab. 5: Mean utilization ($\overline{U}_j$) and amplitude of utilization ($U_j^{Max-Min}$) and mean overtime ($\overline{OT}_j$) for production segment two ($j = 2$)

Temporary employees	Demand courses								
	5 % coefficient of variation			10 % coefficient of variation			20 % coefficient of variation		
	$\overline{U}_{j=2}$	$U_{j=2}^{Max-Min}$	$\overline{OT}_{j=2}$	$\overline{U}_{j=2}$	$U_{j=2}^{Max-Min}$	$\overline{OT}_{j=2}$	$\overline{U}_{j=2}$	$U_{j=2}^{Max-Min}$	$\overline{OT}_{j=2}$
(A) No limit	99.14%	13.59%	2.10%	98.46%	31.03%	4.44%	97.27%	50.86%	7.58%
(B) Max. 20 %	- 0.02%	+ 0.47%	+ 0.03%	- 0.01%	- 0.02%	- 0.54%	- 0.14%	+1.11%	+ 0.34%
(C) Max. 10 %	+0.00%	- 0.12%	+ 0.24%	- 0.06%	+0.09%	+1.87%	- 0.42%	+2.67%	+ 1.26%
(D) Max. 5 %	- 0.01%	+ 1.63%	+ 2.81%	- 0.29%	+3.55%	+3.76%	- 0.79%	+4.12%	+ 8.75%
(E) None	- 0.37%	+17.64%	+20.17%	- 0.67%	+7.87%	+9.97%	- 1.21%	+5.02%	+12.00%

The first observation is that as fluctuations in demand increase, the average work intensity decreases. On the other hand, the deviations from the regular working time increase, and more overtime is used to compensate the fluctuations. With regard to the different strategies of temporary employment, a reduction in permitted temporary employment tends to reduce the work intensity. The reason for this is that instead of temporary employees, additional regular employees are hired who, due to the high hiring and layoff costs, remain in the company longer and thus also in periods of lower demand. But, this also tends to increase the deviations from regular working time and the use of overtime. However, the observed effects are moderate. Only if the permitted share of temporary employees is less than the required fluctuations in demand a higher impact occur.

In summary, limiting temporary employment does not necessarily lead to a significant increase in costs. Rather, it reveals a great potential for reducing temporary employment. Additional regular employees compensate the limitation of temporary employment.

However, a compensation also occurs through the increased use of overtime and a related increase in deviations from the regular working time. In this respect, stronger compensations can be observed in particular if the permitted share of temporary employees is less than the fluctuation in demand. Since the monetary effect also tends to be stronger above this limit, temporary employment can at least be limited to the required volume flexibility.

Conclusion

The aim of this article was to investigate different strategies of temporary employment as a measure to achieve a required volume flexibility. For this purpose, a linear optimization model for master production scheduling was presented. The effect of the different strategies was analyzed in terms of costs, work intensity, deviations from regular working hours and the use of overtime.

The main findings are that the share of temporary employees can be reduced even with strong fluctuations in demand without significant cost disadvantages. Thus, social inequalities can be improved in industrial practice through adapted production planning. However, it should be considered that a certain level of temporary employees is necessary to provide the required volume flexibility. With regard to the subject addressed at this paper, how to determine such a level of temporary employees, it has been shown that the limitation of temporary employees should not be less than the fluctuations in demand. Otherwise, in addition to a significant increase in costs, there will also be considerable social disadvantages in the form of massive overtime and fluctuations in working hours. Accordingly, the use of temporary employees is a necessary and appropriate flexibility measure to respond to fluctuations in demand. However, the use of temporary employees should always be considered and harmonized with the actual volume flexibility required, the costs and other social aspects (e.g. fluctuations in working hours).

This harmonization of flexibility measures, costs and social aspects to ensure necessary volume flexibility will be further investigated in upcoming studies. In the long term, a decision support system for improving social aspects should be created while ensuring economic conditions.

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Denisa Skrbková, Petra Rydvalová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentska 2,461 17 Liberec, Czech Republic
email: denisa.skrbkova@tul.cz; petra.rydvalova@tul.cz

Innovations in Developing Countries with Its Focus on Africa – Case Study by the Maendeleo Non-Profit Organization

Abstract

Innovations are considered the driver of economic growth. Although introduced worldwide, the most developed countries tend to be a step ahead thanks to financing and long-term experience. Thus, it is possible to access the enormous potential of innovations in less developed countries.

Even though developing countries frequently adopt project plans and strategies from successfully implemented innovations in the developed ones, many result in failures. Such plans, reflecting their vast differences, must always be appropriately modified according to current and locally available resources. Along with lengthy bureaucratic processes and existing corruption, the instability of the market environment in developing countries prevents detailed planning of all necessary aspects of innovation projects.

The Maendeleo non-profit organization decided to solve these problems in ways that might inspire others to follow. This case study offers an analytical view of introducing a complex model for supporting project management and introducing innovative techniques by the Czech organization Maendeleo on the example of the introduction of innovations in southeastern Tanzania. The key to their success was not only the provision of financial support to local businesses in the form of micro-loans but also strengthening the community's cohesion, leading to sharing experiences and information that will help other entities improve their activities.

Key Words

non-profit organization, innovation, project management, microfinancing, micro-loans

JEL Classification: L31, O16, R11, Q14

Introduction

As Werner et al. (2013) established, nearly half of all private enterprises are innovative, meaning that they implemented at least one process or product innovation within the past three years. However, how does this innovation tendency of enterprises differ in developed and developing countries? Does this element affect the innovation activities and project management of introducing innovations?

Miller (1987) states that the more unstable and dynamic an environment in which an enterprise operates, the more frequently they tend to innovate, thus growing their innovation potential. Only enterprises that manage to use opportunities in a fast-changing environment have a chance to survive and build competitive positions (Craig and Moores,

2006). Should a company function within a stable and unchanging environment, it would lack the stimulus leading to pioneering activities (Craig and Moores, 2006). Does this mean that enterprises would be more innovative in the unstable environment of developing countries? Unfortunately, dynamics alone are not enough. Many factors affect the introduction of innovations, among them the availability of know-how and human capital, as well as available financial means. The aim of this study, based on literary search, is to identify the key factors influencing the success of the implementation of innovation projects in developing countries, and subsequently to present a demonstration of an effective approach leading to the potential development of opportunities to introduce innovations in small and medium-sized enterprises, impacting the overall economic growth of developing countries. A purposefully selected case study of the non-profit organization Maendeleo based in the Czech Republic is used as a primary tool for the demonstration.

1. Innovation ecosystem

Individual enterprises are continually forced to improve and increase production effectiveness in the interest of the individual states' prospering economy in relation to growing productivity. Among the most suitable methods to achieving these goals is the utilization of possibilities of effective innovation introduction. The result of innovation is not merely the formation of a new process or product but also the creation of information that could be useful to other entities and help them in their activities. Regarding innovation, Audretsch (2003) mentions the formation of positive spatial externalities; meaning advantages formed upon the implementation of an innovation, benefitting geographically close entities. The innovation positively affects most of the surrounding companies active in the same field. The support of introducing new innovative ideas, processes, and products into practice and creating a quality innovative environment is considered one of the key stimuli for forming wealth and economic growth. However, building an innovation-friendly environment in developing countries and successful project management tends to be problematic (Khavul et al., 2009).

1.1 Project management and its obstacles in developing countries

The development of new products cannot be effective without the use of a project management approach. Thus, the critical tool for the successful introduction of innovation in a company is the creation of a quality project plan. However, project planning cannot become an automatic routine. Each project is unique in its complexity, and project management must ultimately adapt to it. The preparation and creation of a project is thus a task for a creative individual. A good leader must be able to coordinate, manage and lead people, as well as flexibly respond to ongoing changes and adapt to changed conditions during the execution of the project (Wysocki, 2013). However, successful project management in developed countries does not ensure the success of the project in a developing country, despite using the same tools. Thus, it is always necessary to critically evaluate the conditions and environment and adjust the project to the specific requirements of the given conditions during planning. In most cases, developing countries lack extensive experience with modern project management (Yanwen, 2012). Despite

this, according to studies by Mukhtarova et al. (2019), similar projects are frequently carried out in both developing and developed countries, although their management differs. The most significant differences are seen on varied levels of planning the subsequent chances of achieving success.

In developing countries, the planning stage is frequently underestimated, and the preparation of communication strategies and project risk evaluations are frequently partly or entirely overlooked in the preparation of the project. For this reason, there are greater discrepancies in its subsequent execution. The planning phase should also result in the creation of a schedule and project timeline, as well as the estimates of human resources and division of individual activities. Another area of planning is budgeting and the allocation of resources to individual activities according to their requirements. In developing countries, the most frequent diversion from innovation projects tends to be a lack of control over projected costs and failure to adhere to schedules. This is significantly connected to cultural habits, where there are frequently different understandings of time management. Culture, customs and habits of individual nations that affect the behaviour of both leaders and project managers, as well as all the participants, play an essential role in project management (Yanwen, 2012). In efforts to execute projects previously implemented in developed countries, it is also possible to identify different approaches in the sociological, political and economic areas and the problems arising from them. Publication by Yanwen (2012) indicates several main problems complicating project management in developing countries.

As a first problem is mentioned, besides insufficient public services, the lack of management infrastructure. In developed economies, even weaker companies, that couldn't afford an innovative project alone, may undertake such projects with supportive administrative tools and a functioning banking system with specifically established milestones of payments. But this situation is frequently very different in the economic environment of developing countries because of the absence of support institutions and simple administrative processes and systems without undue bureaucratic load. Their removal became one of the main objectives of the African Economic Research Consortium (Hare and Davis, 2006). Among other goals of the consortium was the improvement of access to basic and further education. Also Fang et al. (2012), in their publication, pointed out the lack of educating citizens in the area of technologies and thus causing low professionalization of human resources. The average level of education of citizens in developing countries is lower compared to developed countries. Individuals frequently lack both knowledge and experience in professional areas, as well as in planning and resource management. Many projects are managed unprofessionally (Mukhtarova et al., 2019).

As a last, but usually primarily mentioned problem in preparing innovation projects in developing countries is the role of the government. Yanwen (2012) states that most of the long-term more extensive plans are inaccessible to individuals from the perspective of financial requirements. Moreover, the ever-present corruption and bribery in developing countries cause, that small and medium-sized entrepreneurs frequently have no chance to obtain any financial support from officially announced programs (Yanwen, 2012). Also, Jugdev and Müller (2005) agree, adding that the greatest obstacle in the execution of projects and the main aspect affecting the success or failure of a project in developing counties continues to be the lack of financial funds. Securing financial resources for the

execution of innovative projects is one of the most common obstacles at the outset. It is not possible to sufficiently plan and launch the execution of a project without sufficient capital. The question remains of where and how can companies obtain financial funds for their projects.

1.2 Financial options of innovation projects in developing countries

In order for companies to effectively invest in their development, a functioning banking system must be created, one that is conditioned by the existence of a well organized institutional framework. However, a stable environment and political situation are not commonplace. Particularly in developing states, a stable economic climate has been impossible to create to this day (Hare and Davis, 2006). Non-profit organizations, frequently including those from the international environment, attempt to supplement the role of a state and the creation of an alternative institutional environment in developing countries (Hare and Davis, 2006). Microfinancing became a recent trend in support and development of economies in developing countries and as a tool in the fight against poverty. Microfinancing began forming and being used in the 1980s as a new form of donation system supporting the poorest citizens in developing countries. Its original form was based on non-governmental institutions providing microloans to small businesses to help to finance their enterprises and improve their life situation. Microloans are the alternative to bank loans aimed at the poorest residents. These individual loans are provided to people with minimal personal assets. The loans are provided without security, enabling common people to invest capital in a way that their profit is higher than the established interest of the microloan. The key factors of the success of microfinancing are precisely in the careful establishment and adjusting of the interest rates for individuals to cover all maintenance and administrative costs but not using the entire profit obtained (Wahid, 1994).

In theory, this type of financial loan can work independently. However, when the entity attempting innovations (and its investments) lack an oversight body, the allocation of resources is frequently inappropriate, causing a failure of the entire project. For these reasons, various models were created that included microloans within a system of other measures. Among these models are self-help groups that are created either informally, based on traditions and personal experiences, or thanks to the initiative of governments of individual non-governmental organizations and agencies. Self-help groups may also be formed by members of one or more families. In some cases, the self-help groups include all members of the community. However, it is necessary to establish principles for the function of such a group, including the division of functional roles. The advantage of self-help groups is easier access to microloans and shared responsibility (Wilson et al., 2010).

1.3 Factors influencing the success of the implementation of innovation projects – Executive Summary

In developing countries, the planning phase of innovation projects (particularly the time and financial aspects) is significantly underestimated; the risk assessment of an innovation project is completely neglected. Lack of training for citizens in technology and

project management can be noted, which in turn affects the low professionalism of project management. A major factor is difficulty in accessing capital to finance company development. Another key factor is the lack of infrastructure to deliver innovative projects, including access, role and government support.

But there are also successful innovation projects in developing countries. The contribution will further focus on analysing the approach to the implementation of innovative projects carried out under the Maendeleo group in southeastern Tanzania.

2. Methods of Research

In this article, the qualitative research method of the individual case study was used. This method began appearing in research papers as back as the 19th century; however, scientists began entirely using it a hundred years later (Johansson, 2003). Case studies used an intentional selection of one or more studies documenting a specific situation. Thus, the following case study focuses on presenting and implementing a complex model of supporting project management during the introduction of innovative techniques in developing southeastern Tanzania. The Maendeleo non-profit organization from the Czech Republic was selected as an exemplary case. The organization decided to engage in the fight against poverty with the goal to improve the living conditions of at least a small group of people. All information in the following chapter is obtained from interviews with the representatives of the Maendeleo organization, their official website and publically accessible annual reports (Maendeleo, 2019).

2.1 Case study – Maendeleo Project

Maendeleo was founded in 2011 as a non-profit organization with the goal to support residents of poor areas in the least developed parts of the world. It launched its activities in the underdeveloped agriculturally-oriented southeastern part of Tanzania, in the area of Utengu/Usangu. Much like other parts of Tanzania, this rural area is specific in its diversification of inhabitants. Despite this, the individual tribes with diverse cultural customs and religions manage to live in harmony. The main goal of the Maendeleo project is supporting the development of sustainable farming through the innovative form of providing financing for improving the effectiveness and modernizations of the methods for farming rice fields. Another tool aimed at fulfilling the goal is improving the position of farmers when selling their harvest at the market, which results in improving the living conditions of their families. Maendeleo's vision also includes creating an independent active community that will be responsible for its decisions and actions. Maendeleo organizes individual farmers in self-help groups. In 2016, these groups joined to form a local co-op Wakulina Maendeleo Group (hereinafter also WMG). This group currently has 90 members and continues to further develop and expand. From the beginning, WMG was focused on independence and thus partially became an independent organization in close collaboration with its Czech founder organization. In its current form, Maendeleo serves as a donor and advisory board, while the Tanzania-based WMG co-op has the function of the main executor of all activities, including complete project planning, control and execution of projects.

Maendeleo is aware that financial support alone is not sufficient for the development of a community and that without establishing valid rules, it tends to have a negative impact, forming a dependency on external entities. For this reason, the organization chose to implement multiple tools and projects leading to defined goals that are being fulfilled, in modified forms, ever since the organization was established. Over the course of their functioning, the organization provided a total of 276 microloans, which have been paid off except for one instance.

2.1.1 Investment microloans

Unlike traditional bank microloans, an individual cannot request a microloan through WMG, but due to establishing a shared responsibility, microloans are applied for by either the entire community or a self-help group.

Investment microloans are intended to cover additional costs related to the transition from traditional to sustainable agriculture, using the latest and most effective technologies (high-quality seeds, fertilisers, compost preparation, etc.). Each microloan is substantiated by the conclusion of a collective contract that clearly defines the activities for which the funds will be used. Additionally, the contract specifies the rights and obligations of all participating parties. Among them is mandatory participation in non-agricultural activities that take place during dry-weather periods. Members of self-help groups use this time to get to know each other and establish roles in the group to further collaborate in agricultural activities. At the end of the agricultural season, farmers have the option to collect their harvest for the purpose of a bulk sale, because the price of these commodities increases with supplied volume. Also, thanks to the prolonged payment period of the microloans, they can wait with their sale of the crop until the most suitable period, meaning outside the main harvest seasons, when prices are higher.

The original loans provided by Maendeleo did not include an interest rate. This changed with the transitions of the project administration to the hands of the independent WMG co-op that established a 10% interest rate. The ten-per cent interest from the microloan is due, along with the loaned amount, within the deadline of one year.

2.1.2 Sharing and joint approaches

Mutual collaboration between the individual self-help groups developed along with the foundation of the shared co-op. An example could be the shared purchase of a tractor from the microloans of multiple smaller groups. Thanks to this co-op collaboration, these groups (owners of the tractor) decided, after a shared discussion, to offer the tractor for rent to other co-op members at an advantageous price. As a result, the agricultural activities of all self-help groups developed.

2.1.3 Dissemination of information

Education is one of the main pillars for successful project management. Aside from the mandatory participation of self-help group members in non-agricultural activities, each member is also required to participate in professional seminars and training, focusing on the development of sustainable agriculture. Aside from providing expert knowledge, these meetings serve as a platform for sharing experiences and both agricultural activities

and project management. Additionally, in 2020, intensive management courses were organized for the WMG co-op management, as they usually lacked experience with leading entrepreneurial activities.

2.2 Comparison of identified barriers to innovation projects in developing countries with the Maendeleo approach

Innovation projects in developing countries face many challenges. Apart from the difficulty in accessing capital to finance the innovations, the business owners suffer from insufficient training and education not only in technology but also in the managerial field of themselves and their employees. In developing countries, this phenomenon could cause the lack of risks assessment, communication and coordination plan, as well as a financial plan.

Therefore, the Maendeleo Project's effort is to implement a complex system of tools to teach the people in developing countries how to prepare and manage innovative projects with the aim to create a self-sufficient community in the future, able to independently plan individual projects including their financing. Providing the microloans is, therefore, only the first step.

The requirements of forming self-help groups while applying for investment microloans can mitigate the risk of insufficient know-how and education. The formation of groups forces members into mutual sharing of their knowledge and communication. The division of roles within the group gives members a sense of importance and responsibility for the delivered work. It forces them to achieve the estimated plan. Thanks to these measures, almost all of the innovation projects successfully enable people to return their loans, including a 10% interest rate. The profit from the interest is reused for the co-op, covering their operational costs or providing financial support to people from their community who are in need.

Providing microloans to small farmers and establishing mandatory participation in organized training result in a higher effectiveness of their work in the fields, increased volume of harvested crops, as well as increased income of individual households. As a result, parents can provide a more balanced diet for themselves and their children and arrange necessary medical treatments. Additionally, they can send their children to school and provide them with the essential education, which is a significant prerequisite for the further development of the given community and the economy as a whole.

3. Discussion

According to the findings of the African Economic Research Consortium, with two exceptions, no significant economic growth took place in African countries between 1960-2000. The African continent was referred to in the context of the ‘African crisis’ and the formation of a poverty trap. This poverty trap is characteristic with a disadvantageous geopolitical situation, high transaction costs, slow transfer of technologies from abroad, low productivity in agriculture and insufficient health care. All these factors subsequently

affect and decrease the economic activity of citizens, preventing the development of entrepreneurial efforts and innovation, resulting in stagnation of the economy on the same level (Ndulu and O'Connell, 2000). However, the situation began changing rather rapidly in recent years, and some states achieved such a level of the economy that today Africa is referred to as the 'continent in motion' (McKinsey, 2010). Thus, significant differences are formed between the individual states in Africa.

What caused these changes? Some African countries began to make consistent efforts toward improving the living conditions of their citizens and forming a functional institutional framework (Hare and Davis, 2006). Such frameworks will help develop entrepreneurial activities and the formation of a business-friendly environment as a stimulus for economic growth. Entrepreneurial activities result in the opening of new jobs, as well as productivity growth, added value and the development of innovation activities. However, project management for introducing innovations in developing countries has its specifics. A developing country is not simply a poorer version of a developed country. It is based on different ways of thinking, behavioural patterns connected to a deeply rooted traditional culture and religion. This creates significant obstacles in project preparations. As Yanwen (2012) stated, the most significant differences are already apparent in the project's planning as such. Business owners in developing countries usually lack significant experience with modern project management; however, this is not their fault. Developing countries are frequently victims of vast corruption and bribery. Without sufficient capital of their own, small and medium-sized entrepreneurs have no chance to obtain subsidies, grants, or support from the individual funds upon evaluation. Yet, these are the very entrepreneurs who could be considered key entities in the area of innovation, thanks to their responsiveness and flexibility (Wiklund, 1999).

What are the options for obtaining capital for these firms? Due to insufficient coverage of loans, small entrepreneurs have practically no chance of receiving a standard loan. However, since the 1980s, microloans began to appear as a response to fight poverty. Their function and sustainability are discussed on many levels. What types of impact can microloans have on residents? Without ensuring sufficient education in regulating financial flow and project management, the provision of these loans will most likely fail to bring the desired positive effect on the community.

The Maendeleo non-profit organization was aware of this when it decided to enter the Tanzanian market with the goal to establish sustainable farming and help increase effectiveness and modernization of farming methods leading to improving living conditions of poor local farmers through providing microloans. The Maendeleo concept of support aims to create a self-sufficient community able to independently plan individual projects, including their financial backing through the implementation of several support measures. Aside from providing microloans, Maendeleo introduced self-help groups that develop collaboration and cohesion among local communities through mandatory training sessions for local farmers, both in the area of growing agricultural crops and subjects of project management and financial literacy. This corresponds to the African Economic Research Consortium's findings that identify lack of education and access to information as the most significant problem causing underdevelopment of economies in African states (Hare and Davis, 2006).

Conclusion

This study focused on identifying the key factors influencing the success of the implementation of innovation projects in developing countries. The conditions in developed and developing countries are diametral different, and it is not possible to achieve the same results by applying only one tool.

The Maendeleo activities and projects showcase a pilot example of how the state could assist its citizens. Aside from implementing partial economic development tools, it is necessary to create a complex integrated infrastructure of all support mechanisms. This is the only way in which local residents will also be able to adopt the individual processes and habits leading to the improvement of their project activities, as well as the overall improvement of their living conditions. This approach subsequently develops human and knowledge capital, leading to the development of new ideas and innovations that may initiate economic growth throughout the area, region, and state.

However, such steps can't be introduced solely by random non-profit organizations. Without governmental support and the introduction of state-wide strategic management, such small projects have no chance of success on a nationwide or multinational scale.

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Bára Smolová

Technical University of Liberec, Faculty of Economics, Department of Informatics
Voronezska 13, 460 01 Liberec, Czech Republic
email: bara.smolova@tul.cz

Big Data and IT Projects - Comparison of Their Success Rate and Complexity

Abstract

The pressure to process data increases with its quantity. The amount of data increases exponentially every year. According to estimates, in 2020 it should reach the size of almost 59 ZB. This growth trend will undoubtedly continue in the future. The estimated amount of data generated in 2025 is 175 ZB. In addition to the amount of data, its structure has also been changing. Structured data prevailed before, but now most data is in an unstructured form, and its processing is significantly more complex. Companies have been responding to this and investing in the development and implementation of new technologies for processing diverse data, even in real time. It is Data Science that focuses on this issue, particularly on Big Data processing. However, projects focused on the implementation and development of Big Data solutions often end in failure. Are other IT projects so unsuccessful as well? Are Big Data projects more complex than other IT projects? On what aspects does the successful outcome of Big Data projects depend? The aim of this article is to answer these questions. The related research included quantitative and qualitative survey focused on experience with Big Data projects. The article compares the results of surveys focused on Big Data and common IT projects, especially in terms of their success and complexity. The survey helps to clarify some of the differences between Big Data and ordinary IT projects.

Key Words

big data, complexity, information technology, project, success rate

JEL Classification: M15, O22, O32

Introduction

Great attention is paid to the issue of project success. It is known that IT projects have a lower success rate than projects from other areas (Flinders, 2011). This is mainly due to the fact that it is very difficult to estimate the need for financial, time and human resources for the successful project completion. (Solovey, 2019). To make a reasonable estimate, it is necessary to know in detail not only the required solutions and resources (technology, programming language, etc.) but also the company itself - its processes, workplace relationships, skills and knowledge of team members as well as the company's policy (e.g. security), its infrastructure and other aspects - and even that is not always enough (Alami, 2016). IT projects often depend on the capabilities, possibilities and willingness of third parties to the project (technology, certificates, updates, cloud services, etc.). Therefore, for a large number of planned projects, there are often very pleasing estimates and pricing of the solution in the beginning, and such projects are thus more likely to be approved for implementation. During the project, however, the time, funds and other resources required gradually increase. For

this reason, the projects are then considered unsuccessful - they did not meet the predetermined conditions (finances, time, functionality, etc.) (Pratt, 2021).

The indicated success rate of IT projects is 52%, another 40% meet the requirements only partially, and 8% of projects are complete failures - according to research by Scott Ambler of PMI (Project Management Institute) (Ambler, 2021). Other sources give very similar results (Innotas, 2021).

Big Data is a specific area of IT projects, i.e. the implementation and development of advanced solutions for adequately fast processing of large volumes of diverse and differently structured data. The failure rate of these projects seems to be even higher than for other IT projects; according to an official statement by Gartner, 60% of Big Data projects are unsuccessful. An unofficial source from Gartner states that the reality is much worse and the failure rate is up to 85% (Gartner, 2016; Heudeker, 2017).

Big Data projects fall in the field of data science, so they are projects for which it is not appropriate to apply the same development and implementation procedures as for traditional IT projects. One major unknown variable when planning is the quality of input data from all source systems for Big Data solutions.

The first part of the work is devoted to an introduction to the researched issues, the next part describes the procedure of data collection and research methodology. Finally, the results of the research, its limitations and further research are summarized.

1.F Literature review

This section of the article describes the theoretical background of the topic in question.

IT projects

All projects aimed at developing and implementing information technologies, be it software, hardware or information infrastructure, are considered IT projects. IT projects also include projects focused on developing information systems - including all Data Science projects that deal with the analysis, processing and reporting of data, including Big Data.

Big Data projects

Big Data projects include projects aimed at developing and implementing solutions that allow Big Data to be processed.

Big Data can be characterized with 3 basic properties (3Vs) that data can show: Volume (large volumes of data), Velocity (processing speed) and Variety (diversity, varied structures). This definition was first described in 2001 by Gartner's analyst Douglas Laney in his research (Laney, 2001). The definition was further developed by adding other properties, such as Value (valuable data for business) (IBM, 2012). The most commonly used definition of Big Data is the mentioned 3Vs (Chen et al.,2012; Frampton, 2014).

Big Data technologies enable the processing of large volumes of data (up to the order of ZB), in various structures, formats and from various sources, and ensure the processing and analysis of data at the speed at which the data is generated (e.g. security log processing).

Data Economics

Big Data technologies are also the driving force for the data economy, which has an ever-increasing share in the GDP of countries; in 2020 it was 2.8% in the EU with a value of about € 355 trillion. The baseline scenario for estimating the share of the data economy in the EU for 2025 is 4% of GDP (European Commission, 2020).

There is an increasing emphasis on increasing the use of data, data products and services in the Single Market (European Commission, 2020).

Project Success Defined

Perceptions of project success vary from company to company depending on scope, goals, budget, and other factors. Projects are generally considered successful if they meet 'Triple Constraints' (or Iron Triangle) - that is, if they meet the requirements of time, budget and scope (Atkinson, 1999).

However, projects meeting Triple Constraints cannot always be considered successful - sometimes they meet all the criteria, but they do not return the required value to the organization. In these cases, functional, business or system requirements are often poorly defined, or they are incomplete or in insufficient detail.

2.F Data collection and methodology

The purpose of the survey is to compare the perceived success of Big Data and traditional IT projects by respondents, including a comparison in terms of complexity. A partial goal is to evaluate the statistically significant linear dependence of project success on partial aspects, such as team morale, stakeholder satisfaction, perceived quality of work performed, etc.

The research used a combined quantitative and qualitative methodology. The main benefit of this work lies in the results of quantitative research, in which a survey is conducted with a focus on respondents with experience with Big Data projects.

The qualitative survey was performed from 2019 to 2020. It contained a total of 14 questions. Based on the random selection, 120 respondents who had experience with Big Data projects were contacted and 89 of them answered. The random selection was made using a random number generator program (companies working with Big Data were numbered in the author's database). The questionnaire survey was conducted electronically and through in-person and telephone-based querying. Right from the start of the survey, respondents were asked to confirm that they have experience with

Big Data projects; if they did not confirm this, their answers were not taken into account in the research results.

The survey results are compared with the results of Scott Ambler's research, which focused only on IT projects, with the survey having been completed by 149 respondents. Surveys are compared in terms of success and complexity of projects.

As part of the qualitative research, a semi-structured interview was conducted with Senior Analyst Ing. Jana Hamalová, who has many years of experience with Big Data. The interview lasted about 45 minutes and was focused mainly on her experience with Big Data projects and the respondent's views of the issue. The interview was conducted in Czech and the structured portion of the interview included 10 questions.

3.F Results of the Research

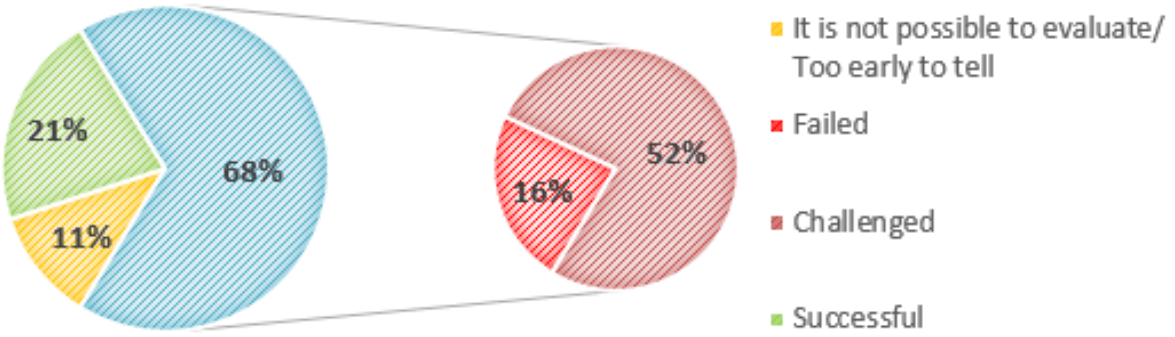
The results of both research approaches are presented in this section.

Quantitative Research

Descriptive statistics were used to summarize the research data. The results are plotted in pie, bar or spider chart.

According to the author's survey, the failure rate of Big Data projects is 67.42% (51.69% meet the requirements only partially and 15.73% fail to meet them) and the success rate is 21.35%, 11.24% of respondents believe that the success cannot be evaluated from their viewpoint or it is still too early to do so. The survey results are presented in Fig. 1.

Fig. 1: Big Data project success



Source: author's own

Furthermore, the survey focused on the respondents' evaluation of Big Data projects in terms of the project team's morale, the resulting satisfaction of stakeholders, quality of the solution developed, expected return on investment and also meeting the set time schedule. Based on these answers, the dependence of the perceived project success on the parameters described above was investigated. The Chi-Square independence

test and also the Pearson correlation coefficient were used, see Tab.1. The resulting values of Pearson's correlation coefficient and Spearman's was the same.

Tab.1: Test of independence between success and other aspects of the project

Research aspects:	P-Value	Pearson's R .
Delivering on time	0,0062	0,2854
Quality of work	0,2529	0,1662
Return on investment	0,0017	0,3009
Stakeholder satisfaction	0,0000	0,4403
Team morale	0,3312	0,1771

Significance level $\alpha = 0.05$

H_0: The success of the project does not depend on the researched aspect.

H_1: non H_0.

Source: author's own calculation based on result from Statgraphics Centurion XVIII

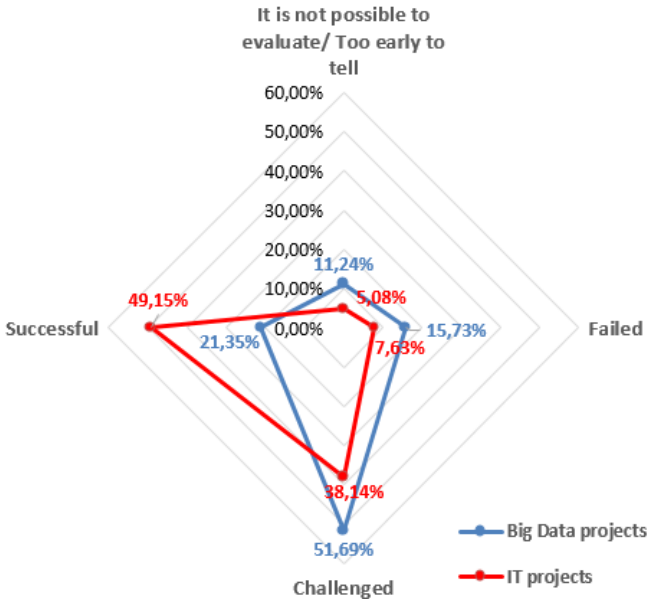
The null hypothesis (H_0) is rejected at the 95% confidence level for aspects - stakeholder satisfaction, return of investment and delivering on time and conversely, the null hypothesis is accepted for aspects team morale and quality of performed work.

A statistically significant dependence of the perceived success of Big Data projects on stakeholder satisfaction, return on investment and delivering on time was demonstrated, specifically based on the Chi-Square tests of independence. The largest positive association was demonstrated in stakeholder satisfaction according to Pearson's R. On the contrary, no dependence has been proven between the evaluation of quality of work and team morale on the resulting success of Big Data projects.

3.1.1 Comparison of survey results

The work also compared the survey results regarding the success of Big Data projects and IT projects, see Fig. 2. The structure of the compared questions and answers in the surveys was the same (including the rating scale).

Fig. 2: Comparison of the percentage of success of Big Data and IT projects

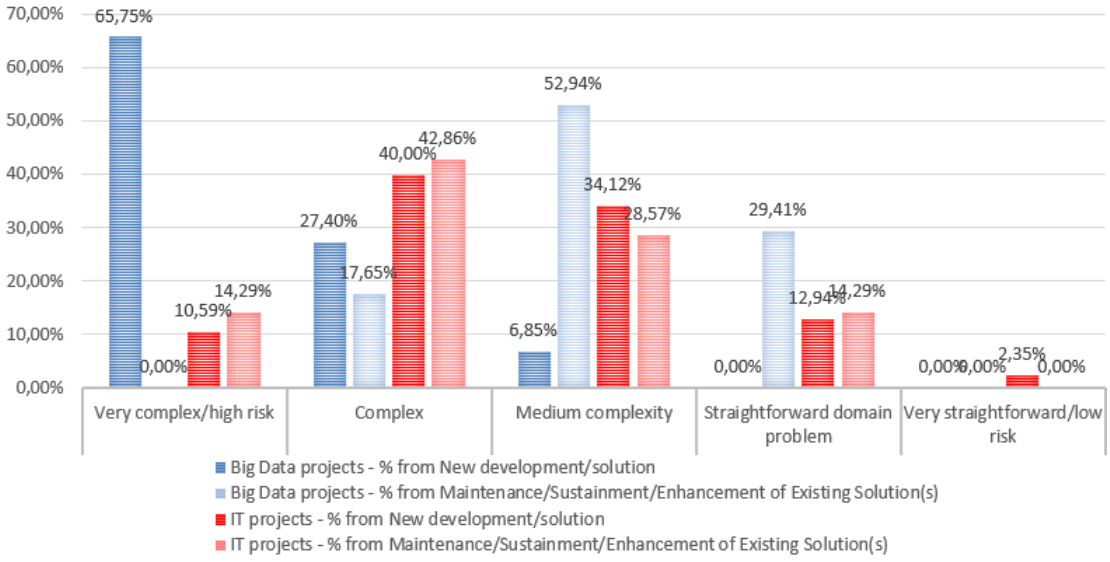


Source: author's own, data from author's research and from (Ambler, 2021)

The chart above shows that IT projects are more successful than Big Data projects. Big Data projects most often end up in the Challenged state - i.e. in the state when the solution was delivered, yet some requirements were not fulfilled to an acceptable extent. They also more often end in the Failed state, when no requirements have been met to an acceptable extent.

The projects were also compared in terms of the perceived solution complexity and the type of project, i.e. whether it was a new solution or a further development of an existing one, see Fig. 3.

Fig. 3: Comparison of perceived complexity of projects by respondents



Source: author's own, data from author's research and from (Ambler, 2021)

According to the comparison, projects aimed at implementing new Big Data solutions are considered by the respondents to be the most complex (65.75% in total). On the contrary, Big Data projects focused on maintenance and further development of these projects are considered less demanding than new solution development, and respondents rate their difficulty as rather average (52.94%). According to the survey, IT projects are considered to be complex or on average complex and there is no significant difference, whether it involves implementing a new solution or developing and maintaining an existing one. It is necessary to mention that a vast majority of respondents from the survey focused on Big Data have experience with common IT projects as well.

Qualitative research

The following questions and answers related to the researched issues have been selected from the semi-structured interview.

Q1: What is your experience with Big Data?

"I have experience with implementing Big Data in the field of insurance (Česká spořitelna) and also in telecommunications (O2). I have nearly 5 years of experience with Big Data"

Q2: How would you say that Big Data projects are specific compared to traditional IT projects?

"Big Data projects are complex, especially in terms of the need to understand data in context, which is not always easy."

"Projects focused on data processing are very dependent on the quality of input data; the quality of data is often a stumbling block of these projects. Data quality is often not taken into account in planning, and this then causes great complications in development and, thus, consumes more time and money."

"In my opinion, the problem is often wrong or unclear requirements for projects - including IT projects. For Big Data projects, ignorance of the quality and availability of source data adds to the complexity. I think it often causes failure."

"Another frequently mentioned problem in this area is finding experts who specialize in Big Data. Not every IT professional is able to work with Big Data due to the aforementioned need for the ability to understand things in deeper contexts and also the need to have excellent analytical thinking. The financial evaluation of Big Data projects is also slightly higher than that of regular IT projects, which is why there is a kind of rivalry between team members, especially when it comes to external staff. Every supplier tries to push its employees into these positions, and it is also this reason why even incompetent people get into the projects."

4. Research Limitation

The main limitation of quantitative research is the limited number of respondents. The qualitative research compared Big Data and IT projects without specifying the project size (e.g. according to costs) and also that the respondents were not geographically limited.

The qualitative research is limited mainly by conducting a semi-structured interview on a given topic with only one respondent, albeit a specialist in the given issue. Rather, the qualitative research only complements the results from the quantitative part.

Conclusion and future work

The quantitative research showed that Big Data projects are considered by the respondents to be more complex than regular IT projects, and it was also confirmed that the success of Big Data projects is lower than with IT projects. The development of a new Big Data solution is considered to be the most complex, more complex than for IT projects.

The main finding from survey is that the success of Big Data projects is statistically most dependent on stakeholder satisfaction, but also on expected return on investment and delivering on time and, conversely, does not depend on the team morale and perceived quality of work.

This research is at an early stage and it is necessary to get more answers from respondents, with a closer specification of the area. Furthermore, it is necessary to analyze the basic differences between Big Data and IT projects in terms of approaches to project management, basic phases, costs, etc. This research was followed by a questionnaire survey, which specializes in this topic in the Czech Republic and which aims to map the situation in Czech companies that use Big Data.

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Sebastian Zips

Hochschule Zittau-Görlitz, Faculty of Business, Department Marketing
Theodor-Körner-Allee 16 02763 Zittau, Germany
email: Sebastian.Zips@hszg.de

Did the CoVid19 Pandemic Boost Binge Watching?

Abstract

The impact of the Corona Pandemic lockdown in 2020 and 2021 has changed the leisure and social behaviour of the population, especially among young people of Generation Z. An involuntary shift of leisure activities into the home led to more films and series being consumed. Netflix and Disney Plus report growing subscription figures. But has this also led to an increase in so-called "binge watching", or "series marathoning"? Furthermore, it will be shown whether socio-demographic factors such as gender, age, relationship status, living situation and size of city people live in have an impact on the intensity of binge watching. Empirical material was collected through an online survey in five different countries (Germany, India, Italy, Kazakhstan and Russia) in May 2021 with a total of over 540 complete interviews. Methods of statistics such as T-tests and correlations test the hypotheses. It can be said in advance that the pandemic will significantly increase the time spent streaming and also the intensity of binge watching.

Psychographic motivations will not be examined in this study; they will be dealt with in a separate follow-up study.

Key Words *Movie Streaming Platforms, Binge Watching, CoVID19 Pandemic, Socio-Demographic Factors*

JEL Classification: O30, Z19, I18, J12,J16, O18.

Introduction

In the winter/spring of 2020, the SARS-COV virus spread rapidly across the world at lightning speed. On 11 March, the WHO classified Covid-19 as a pandemic. The governments of many countries have tried to slow down the spread with drastic measures such as lockdowns, travel bans, contact bans and curfews. Citizens were first confronted with self-isolation and social distancing on a large scale to ensure infection prevention. Research shows that inadequate social contact and isolation can have long-term negative effects on mental health (Ravens-Sieberer et al.: 2021). A lack of perceived affiliation with acquaintances, relatives and friends significantly worsens mental health. (Holt-Lunstad et al.: 2015).

The social isolation of young people in particular has meant that they have been severely restricted both in their social contacts and in their leisure activities. Subscriptions to Netflix and other streaming platforms have increased rapidly and strongly. But has this led to this target group now to wider extent of binge watching? If so, to what extent do socio-demographic variables such as age, gender, relationship status and housing situation play a role here? This is what this paper wants to shed light upon. Psychographic factors are not examined in this paper.

1. Binge Watching - a Concise Literature Review

1.1 Definition and Characteristics of Binge watching

The word binge watching itself is recent. Its derivation from the words like *binge eating* or *binge drinking* expresses consumption without measure or purpose, which is excessive in nature (Sung et al.: 2018;). A precise definition does not yet exist, and a clearly defined threshold at which binge watching occurs does not seem to exist officially. (Sung et al: 2018). However, there seems to be a convention in research that consuming two or more episodes of a series within one session can be considered binge watching (e.g. Castro et al.: 2019; Pittman & Sheehan: 2015). The number of three episodes or more is also considered binge watching for television series (e.g. Erickson et al.: 2019; Riddle et al.: 2018; Tukachinsky & Eyal: 2018).

Three phenomena can be identified as **negative effects**: **Binge watchers do not want to stop watching** and thus reach a flow state, which has also been linked **to addictive behaviour** in previous studies (Chou & Ting: 2003). Socialisation motivations in particular have already been linked to various excessive behaviours (Kuntsche & Kuntsche: 2009). Ultimately, **sleep quality and emotional well-being are impaired**, while **immobile lifestyles and social isolation are reinforced** (Ort et al.: 2020). Incidentally, this sequential consumption is not limited to series, but can also be used on films with multiple episodes such as *Lord of the Rings, Matrix, Marvel's Avengers, Transformers, Star Trek, Star Wars, The Fast and the Furiuos*.

The entry of new streaming platforms such as *Netflix*, *Amazon Prime Video* or *Disney Plus* have contributed enormously to the popularity of the binge watching phenomenon (Ort et al.: 2020) and in turn, binge watching increases engagement with the streaming platform (Exelmans & Van den Bulck: 2017). Traditional linear TV consumption of a predetermined, non-selectable programme on fixed days and times with frequent interludes and commercial breaks is increasingly succumbing to the innovative power of platforms that offer customers three disruptive added values at once compared to linear TV: Access to an **a) individually preferred programme** of films and series from all conceivable genres **b) at any time (24/7)** and - after the abolition of geo-blocking in April 2018 – **c) at any location**.

1.2 Reasons of Binge Watching

Annalect (2014) states that younger persons and females are more prone to Binge watching than older ones and males. Reasons for this still need to be found. In their paper "Why do we indulge? Exploring Motivations for Binge watching" (Sung et al. :2018) show in a three-step approach first the motives for watching TV, then for the usage of streaming platforms and finally for binge watching itself: In the early 1980s, reasons could first be identified for linear TV in general (Rubin:1981): **for pastime, companionship, relaxation, information, escape, entertainment and social interaction**.

For the use of streaming platforms, the following 5 drivers could be identified (Kim & Lee: 2013): **24/7 access, entertainment, information, pastime, fashion/status**. This means that one is considered stylish to use this form of TV, which is associated with a certain social recognition.

Song et al (2004) showed that **virtual community, monetary compensation, diversion, personal status gratifications** lead to binge watching. In addition to entertainment, the achievement of positive feelings (Morahan-Martin & Schumacher: 2003) and the attainment of a state of relaxation, which is brought about by being completely immersed in the action and not wanting to let this "stream of action" break off, are also important. (Mikos: 2016).

1.3 Binge Watching as an Escape from the Pandemic.

A summary of the reasons for binge watching is given by Sung et al (2018): "In sum people may binge watch programs in order to break away from the daily grind, to enhance enjoyment and/or to reinforce social interaction."
According to a survey (Statista: 2021a), 29% of young people report to not feel well, 39% feel lonely and 35% reported psychological distress. These characteristics are identical to the drivers for binge watching mentioned above. A further study by Statista also shows that 48% of young people state streaming on pay platforms as a leisure activity. (Statista: 2021b). In turn, the number of subscribers to streaming platforms increased: The example of Netflix alone shows a worldwide increase of almost 25% (!) within only 15 months in the IV. quarter of 2019 with 167 Millions subscribers to 207 Millions in the I. quarter of 2021(Statista: 2021c).

2. Hypotheses

Considering the literature review above we see that binge watching can be used as an escapism, especially for younger people. Since the pandemic and its measurements restricts people in their actions we have formulated the following hypotheses:
H1a): The number of hours spent streaming has increased during the pandemic.
H1b): The intensity of binge watching has increased in the pandemic.

With reference to the study by Annelect (2014), according to which younger people and women in particular are more likely to binge watch, these two hypotheses can be formulated:
H2a): Younger people show even more intense binge watching behaviour in the pandemic than older people.
H2b): Women have increased the intensity of binge watching more than men during the pandemic.

Since some sources see the restriction of social contacts and a resulting increase in loneliness as a consequence of the pandemic, it can be assumed that binge watching is used as a compensation for this. People who are in a relationship seem to be less "susceptible" to binge watching than singles. Although you can live in a relationship, you do not have to share a flat: There are long-distance relationships where each of the two nevertheless has their own "single aprtment", or - especially in the case of younger people - one or both partners still live in the parental home. Therefore we formulate the two hypotheses:
H3a): People in a relationship tend to binge watch less during the pandemic than singles.
H3b): People who live alone use binge watching more extensively during the pandemic than people who do not live alone.

Finally we can assume that people in smaller cities tend to less binge watching than people in bigger cities, because they have a bigger variety of leisure activities (e.g in the garden) which can be done even during the lockdown. We thus say:
H4: Binge watching correlates positive with the number of inhabitants of a city.

3. Describing the Survey

The survey was conducted via an online survey that the students were asked to distribute on social networks. The course was made up of participants from Germany, India, Italy, Kazakhstan/Russia. This results in an international sample that is not limited to a certain country region, but is intercontinental. The table below gives sociodemographic key data of the sample showing the data of the country specific samples and the overall data set.

	N	Age	Women %	In Relationship %	Living alone %
Germany	134	22,2	60	40	21
India	145	29,4	42	53	5
Italy	118	25,4	66	59	4
Kazakhstan-Russia	145	21,5	73	45	15
Total	**545**	**24,6**	**60**	**48**	**12**

Table 1: Overview of sociodemographic survey key data

545 total participants completed the survey. The share of women is 60%, which is more than half, and the average age is 24.6 years (median=21 years), which is exactly the target group of "binge watchers". Just under half (48%) said they were in a relationship. 89%, however, stated that they do not live alone. This includes flat-sharing as well as living at home with parents, which is not uncommon among younger people, not at least for financial reasons.

The streaming intensity before and during the pandemic was asked in hours. The intensity of binge watching was to be assessed by the respondents themselves on a quasi-metric scale ranging from 0-10.

4. Results

To test H1a the mean values of the variables $\bar{x}_{h_bef}$=7.11 (SD=6.66) and $\bar{x}_{h_dur}$=12.69 (SDh_dur=10.75) were compared using a paired sample T-test. The result is highly significant: (t=-8.15; p<.001). The number of hours spent streaming per week increased by almost 78% during the pandemic. A Cohen's d value of .62 indicates a medium seize effect. **Thus, H2 can be maintained.**

To test H1b, a comparison of means was also carried out here between the two variables. For the intensity of binge watching (0-10), the value is $\bar{x}_{h_bef}$=3.93(SD=3.08), whereas the mean value for this variable is significantly higher during the pandemic: $\bar{x}_{h_dur}$=5.81(SD =3.22). The T-test determines a T-value of -16.335 at a high significant level (p<.001).

Here, a medium effect can also be observed since we yield a Cohen's d=.60. **Thus, H1b can also be retained**.
Pearson correlations were calculated to determine the relationship between the two variables both before and during the pandemic. It shows that the correlation before the pandemic was highly significant but rather medium: r=.391; p<.001, whereas during the pandemic the correlation was strong: r=.698; p<.001.

Two methods were used to test **H2a**. First, a correlation was calculated between age and binge watching intensity before the pandemic and during the pandemic. The highly significant result in both cases (before the pandemic r_{bef}=-.199; p<.001; during the pandemic r_{dur}=-.286; p<.001) shows an increase in the correlation due to the pandemic. Thus, it can be said that the younger the individuals, the more likely they are to engage in binge watching, and even more so in the pandemic. In order to visualise the result, the sample was divided into two groups, with the median of 21 years representing the dividing line. One group (young, N=269) is therefore 16-21 years old. The second group (old, N=213) contains all persons over 21 years of age. A two-sample T-test is then conducted for the intensity of binge watching before and during the pandemic. The results are: $\bar{x}_{youngbef}$=4.11(SD=3.01), $\bar{x}_{oldbef}$=3.57(SD=3.11);p=.05. $\bar{x}_{youngdur}$=6.37(SD=3.02), $\bar{x}_{old\ dur}$=5.29(SD=3.36);p<.001.

The means increased during the pandemic for both groups, but the difference between the two means before and after increased only slightly during the pandemic. Cohens's d shows a weak effect of .34. Thus, this hypothesis **can be kept:** Younger individuals tend to binge watch more during the pandemic.

To test **H2b**, whether women actually binge watch more than men, a two-sample T-test was also conducted, which yields no significant result: Before the pandemic: $\bar{x}_{Fbef}$=3.93 (SD=3.03), $\bar{x}_{Mbef}$=3.74(SD=3.09); p=.497. During the pandemic: $\bar{x}_{Fdur}$=6.13(SD=3.09), $\bar{x}_{Mdur}$=5.65(SD=3.32); p=.123. The hypothesis that women would binge watch more **must be rejected.**

Relationship status **(H3a)** and living alone **(H3b)** could also be influencing variables on binge watching before and during the pandemic. Again, these two hypotheses were tested with two sample T-tests. For the indices, Rel = living in a relationship. Alon(e)=living alone, tog(ether) means living with others in a flat (parents, shared flat).
H3a): $\bar{x}_{Singbef}$=3.90(SD=3.05), $\bar{x}_{Relbef}$=3.73(SD=3.08); p=.563. $\bar{x}_{Singdur}$=6.01(SD=3.16), $\bar{x}_{Reldur}$=5.70 (SD=3.29); p=.319 . Thus, the hypothesis **must be rejected**.
H3b): $\bar{x}_{Alonbef}$=4.39(SD=3.44), $\bar{x}_{Togbef}$=3.78(SD=3.01); p=.157. $\bar{x}_{Alondur}$=5.89(SD=2.23) $\bar{x}_{Togdur}$=5.71(SD=3.10); p=.698. This hypothesis **cannot be kept**.

H4 can be checked with a Pearson Correlation: streaming before and during the Pandemic with number of inhabitants of city: r_{bef}=-.039; p = .420. r_{dur} = .078; p=.094. Accepting a significance level of p<.05 we have to **reject** this hypothesis and state: The size of the city does not influence the intensity of binge watching.

Sum up of the results (hypotheses paraphrased to tag lines):

H1a	Amount of Streaming hours increased during pandemic	Yes
H1b	Intensity of binge watching increased during pandemic	Yes
H2a	Younger people binge watch more during pandemic than older ones	Yes

H2b	Women binge watch more during pandemic than men	No
H3a	Singles binge watch more during pandemic than people in a relationship	No
H3b	people living alone binge watch more during pandemic than people living together	No
H4	The number of inhabitants with a city correlates with the intensity of binge watching	No

Table 2: Sum up of the results of hypotheses testing

5. Discussion

The results of three hypotheses are in line with the expectations, three are not. It can be seen that the pandemic has led to an increase of almost 80% in streaming to begin with. The increase in the correlation between streaming and binge watching shows that the popularity of series marathoning has grown. The pandemic thus acts as a driver on binge watching. This result is not particularly surprising: after all, it was described in the introduction that binge watching is fuelled firstly by escapism and secondly by the platforms and their product policy. It was logical to conclude that binge watching must have increased during the pandemic. The empirical findings can now support this assumption. It could also be shown again that it is precisely the younger target group that gives more space to binge watching.

However, the finding that women engage in more such series marathons could not be supported. Neither before nor during the pandemic. Although there is a slightly higher mean value among female viewers, this is not significant. Further research with a larger sample is needed here, especially then examining psychographic drivers to find out what exactly might make women tend to do such marathons more.

Also, people's relationship status and living arrangements do not factor into the intensity of binge watching, either before or during the pandemic. Whether single or couple, alone in the flat or with roommates, there is no difference in intensity. This is a positive finding after all. Marathoning series does not seem here to be a compensation for the loneliness that a single person or someone living alone might have. A follow-up study can bring clarity here. Binge watching is therefore not a channel to compensate for this loneliness. One reason for this can be seen in the fact that streaming series together within a household is a leisure activity for all participants that can be carried out in the pandemic. In terms of leisure choices, single households do not differ from joint households. The social component of exchanging ideas about series content and developing fan theories should not be underestimated as a mental distraction, especially in the pandemic. On the net, you can find communities that can act socially with each other in this way, so no one has to feel lonely.

It doesn't matter whether you live in the city, in the village or in a megacity, although one could assume that there are more opportunities for leisure outdoor activities in the countryside, even during the pandemic. However, this may be due to the fact that the leisure activities of the young target group are the same, regardless of whether they live in the country or in the city.

Conclusion

In conclusion, the pandemic acted as a driver for binge watching. Younger people are more likely to be affected than older people. No effects, both before and during the pandemic, could be determined by the socio-demographic variables such as gender, relationship status, living situation and place of residence as sources of variance. For streaming platforms this means that younger persons from Generation Z are still their key market but within this group they do not need to target their portfolio for male or female viewers, for singles or people in a relationship.

A follow-up study dealing with psychographic drivers and motives for binge watching in the context of the pandemic and linking to the findings of this study would be desirable in order to create a complete picture consisting of socio-demographic and psychographic motives.

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Section III

National and International Competitiveness

Diana Bílková

University of Economics, Prague, Faculty of Informatics and Statistics, Department of Statistics and Probability
Sq. W. Churchill 1938/4, 13067 Prague 3, Czech Republic
email: diana.bilkova@vse.cz

Analysis of Wage Diversification in OECD Member Countries: A Study Based on Cluster Analysis

Abstract

The main objective of this research is to capture wage inequality in OECD member countries and to find out in which countries wages are the most levelled and in which countries wages are the most diversified. The Gini coefficient and hence the Gini index were used for this purpose. The ratios of quantiles were used as an additional indicator of wage inequality in cluster analysis. Another important aim of this study is to create clusters of OECD member countries so that the countries within the same cluster are as similar as possible in terms of the mentioned indicators of wage inequality. For this purpose, OECD countries were primarily divided into seven blocs according to their geographical location, historical development, culture, social systems, and level of advancement. Cluster analysis and within that, Euclidean distance were used for this purpose. Five clustering methods, namely the farthest neighbour method, the nearest neighbour method, the Ward method, the centroid method, and the group average method, were used to classify countries into seven clusters. The highest values of the Gini index were found in two Latin American OECD member countries, namely in Chile and Mexico, values exceeding 45 percent indicate strong wage diversification. On the contrary, Slovenia, Slovakia, the Czechia show a strong levelling of wages, the values of the Gini index are around 25 percent.

Key Words

wage diversification, Gini coefficient and Lorenz curve, cluster analysis, Euclidean distance, Ward's method

JEL Classification: J31, E24, C38

Introduction

In the developed countries of the world, wage shears are constantly opening up. Wages and salaries of employees with the highest incomes are rising the most. For example, wage differences are evidenced by the difference between the average wage and the median wage, too. Most employees in the developed countries in the world do not reach the average wage. Real wages of experts are currently rising in the developed countries of the world, so it can be expected that this disparity will continue to increase.

Rising wage and income inequality is also a major problem in Organization for Economic Cooperation and Development (OECD) countries, especially in view of the current coronary crisis and the fact that the prospects for a slowdown in this growth is currently very low, especially for more developed countries.

This paper deals with the analysis of the development of wage diversification in OECD member countries in the period just after the global economic crisis, specifically 2013–2018. The main aim of the current research is to quantify the development of wage diversification using the Gini diversification coefficient and then the Gini diversification index (Gini coefficient multiplied by a hundred in percent) with the intention of comparing this development in individual countries or their groups. An equally important objective of this research is to create clusters of OECD member countries so that countries within the same cluster will be as similar as possible in terms of wage diversification expressed by Gini coefficient, the ratio of the fifth wage decile to the first wage decile, the ratio of the ninth wage decile to the fifth wage decile and the ratio of the ninth wage decile to the first wage decile. Cluster analysis was used for this purpose, with a total of five clustering methods used in the cluster analysis. There is the farthest neighbour method, the nearest neighbour method, the Ward method, the centroid method and the group average method. The Euclidean distance was used in the cluster analysis. Prior to the use of cluster analysis, OECD member countries were primarily divided into seven blocs based on their geographical location, historical development, culture, social systems, and level of advancement of the country. There are Western European developed countries, Scandinavian countries, Anglo-Saxon countries, South European countries, Central European post-communist countries, Baltic countries and Non-European countries. The following scientific hypotheses follow from the set research objectives:

H1: In all OECD member countries, the wage diversification expressed by the Gini index does not exceed 50 percent.
H2: Wage diversification in post-communist countries is lower than in other countries due to the past almost egalitarian system.
H3: Central and South American OECD countries show the highest degree of wage diversification within OECD member countries.
H4: Non-European OECD member countries are characterized by a higher degree of wage diversification than European countries.
H5: Clusters of OECD member countries, created so that the countries within the same cluster are as similar as possible in terms of wage diversification, roughly correspond to the blocs of countries determined on the basis of their geographical location, historical development, culture, social systems, and level of advancement of the country.

The issue of wage and income diversification is a frequent subject of research by scientists around the world, see for example in Barrett, Bezuneh and Aboud (2001), Deininger and Olinto (2001), Lay, Narloch and Mahmoud (2009), Lerman, Serova and Zvyagintsev (2008) or Malek and Usami (2009).

1. Methods of Research

The data for this research come from the official Organization for Economic Cooperation and Development Statistical Database OECDSTAT (2020) and International Labour Organization Statistical Database ILOSTAT (2020). Gross annual wage after its conversion to purchasing power parity (PPP) in 2018 constant prices at USD is the main research variable. Then, average gross annual wage after its conversion to PPP in 2018

constant prices at USD is the main research wage indicator – hereinafter in the text referred to as average wage. All 36 OECD member countries are statistical units of research. These states are divided into seven blocs according to their geographical location, historical development, culture, social systems and level of advancement of the country, see Tab. 1.

The data for this research includes employees in both business and non-business spheres. The wage is paid to the employee for the work done in the private (business) sphere, salary in the budget (state, public, non-business) sector. From the point of view of the analysed data from the OECD statistical database, both wages in the business sphere and salaries in the non-business sector are included under the wage term.

Tab. 1: Country blocs of the OECD member states, country names and their international codes

Group of countries	Country	Code	Group of countries	Country	Code
Western European developed countries	Austria	AUT	**Central European post-communist countries**	Czechia	CZE
	Belgium	BEL		Hungary	HUN
	France	FRA		Poland	POL
	Germany	DEU		Slovakia	SVK
	Luxembourg	LUX		Slovenia	SVN
	Netherlands	NLD	**Baltic countries**	Estonia	EST
	Switzerland	CHE		Latvia	LVA
Scandinavian countries	Denmark	DNK		Lithuania	LTU
	Finland	FIN	**Non-European countries**	Australia	AUS
	Iceland	ISL		Canada	CAN
	Norway	NOR		Chile	CHL
	Sweden	SWE		Israel	ISR
Anglo-Saxon countries	Ireland	IRL		Japan	JPN
	United Kingdom	GBR		Mexico	MEX
South European countries	Greece	GRC		New Zealand	NZL
	Italy	ITA		South Korea	KOR
	Portugal	PRT		Turkey	TUR
	Spain	ESP		United States	USA

Source: www.mvcr.cz

The data was processed using the SAS, SPSS and Statgraphics statistical packets and the Microsoft Excel spreadsheet.

The Gini coefficient takes values in the range from zero to one, where it gets value zero at extreme levelling, when each statistical unit obtains the equal part from the total sum of the values of the researched variable, and it gets value one at extreme differentiation, when the total sum of the values of the variable being examined is concentrated into only one statistical unit. The Gini coefficient is considered to be one of the most suitable indicators of measuring wage and income inequalities. The Gini coefficient multiplied by a hundred is called the Gini index. This is the same statistic, expressed only as a percentage.

The essence of cluster analysis is explained in detail, for example, in Everitt, Landau, Leese and Stahl (2011). In this research, OECD countries were classified according to wage diversification (Gini coefficient, fifth to first wage decile ratio, ninth to fifth wage decile ratio, and ninth to first wage decile ratio) in 2018.

The Ward method and the Euclidean distance are the most common techniques that have also been used in cluster analysis. From the point of view of the Ward method, which belongs to the methods of hierarchical clustering, the procedure is not based on the optimization of distances between clusters. The minimization of cluster heterogeneity is solved according to the increment of the intra-cluster sum of squares of deviations of objects from the centre of gravity (centroids) of the clusters. Ward method tends to remove clusters that are too small, so it tends to form clusters of about the same size, which is a welcome feature in terms of clustering in OECD countries. For this reason, the Ward method was used in the cluster analysis. Because the groups of OECD countries in Tab. 1 are not the same size, the Ward clustering method is supplemented by the farthest neighbour method, the nearest neighbour method, the centroid method, and the group average method.

In terms of measures of distances and similarity of objects, we choose according to how we need to strengthen the influence of variables, for which an extremely large difference is observed on the total sum. Because in this case we do not need to strengthen the influence of any variable (points with the same Euclidean distance from the centre lie on the circle), the Euclidean distance was chosen in this case.

There are various methods and recommendations in cluster analysis for determining the optimal number of clusters, but they do not provide any definitive conclusions, as cluster analysis is basically an exploratory approach, so it is not a statistical test. The interpretation of the resulting hierarchical structure depends on the context, and in theory there are often several possible solutions. There are several approaches, especially validation indexes, with which we can determine the optimal number of clusters. The well-known Dunn index is one of the best-known validation indexes. Because OECD countries are divided into seven groups in Tab. 1, the number of clusters was also chosen to be seven without the use of any validation index.

2. Results of the Research

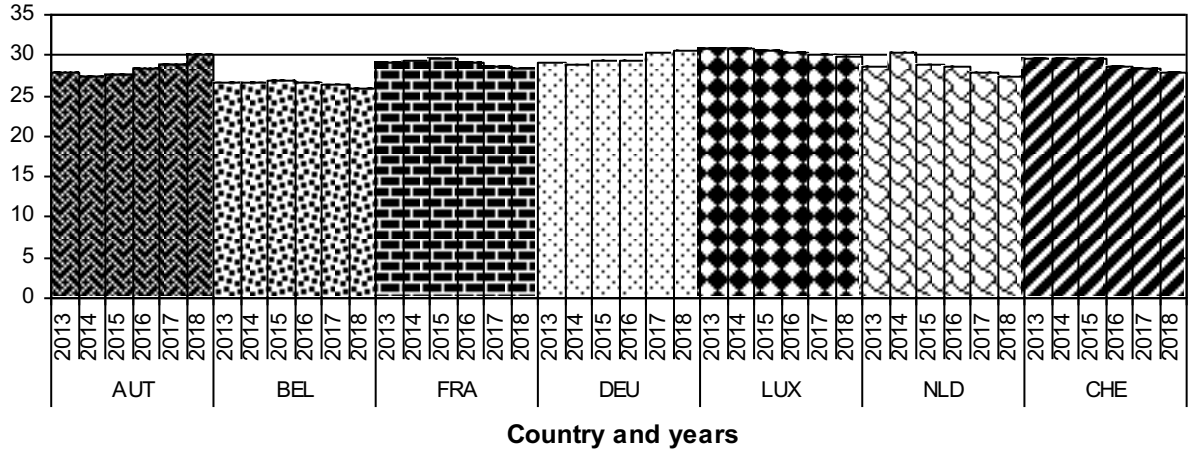
Figs. 1–5 quantify the development of diversification of OECD member countries in the period 2013–2018. Specifically, Fig. 1 refers to Western European developed countries, Fig. 2 represents Scandinavian countries, Fig. 3 represents Anglo-Saxon and South European Countries[1], Fig. 4 refers to Central European post-communist and Baltic post-communist countries, and finally Fig. 5 includes Non-European Countries.

The Gini index takes values in the range from zero to one hundred, where it gets value zero at extreme levelling, when all employees have the same wage, and it gets value one hundred at extreme differentiation, when all wage belongs to one employee. The closer the Gini index is to one hundred, the higher inequality is in wage distribution. The closer the Gini index is to zero, the higher levelling is in wage distribution.

[1] Too small blocs of countries from Tab. 1 were plotted with another small bloc.

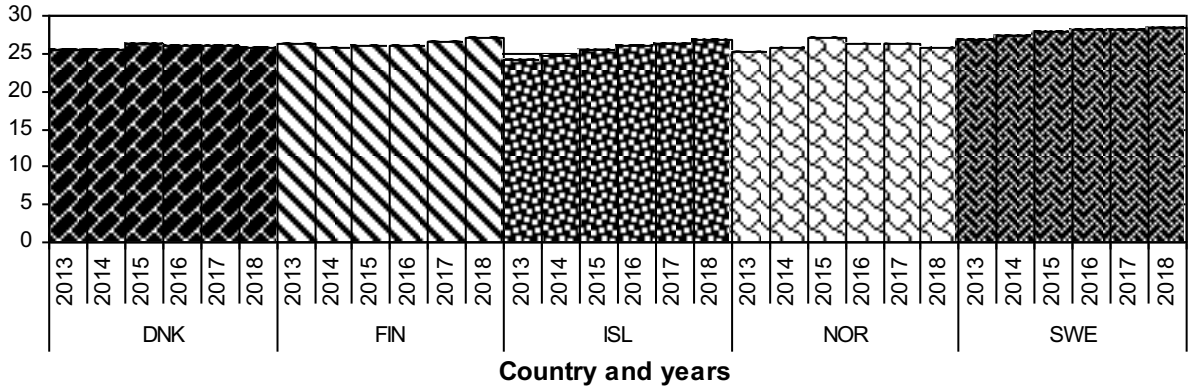
Figs. 1–5 show that the highest values of the Gini index were found in two Latin American OECD member countries, namely in Chile and Mexico, with values in excess of 45 percent indicating strong wage diversification. Chile and Mexico are the only Latin American countries to be members of the OECD. Low taxes are typical for both countries. Employers' wage costs in both countries are the lowest among OECD member countries. When comparing average net wages, the differences between Western European countries and the two Latin American countries are much lower than when comparing gross wages.

Fig. 1: Gini index (in %) of wage of Western European developed countries



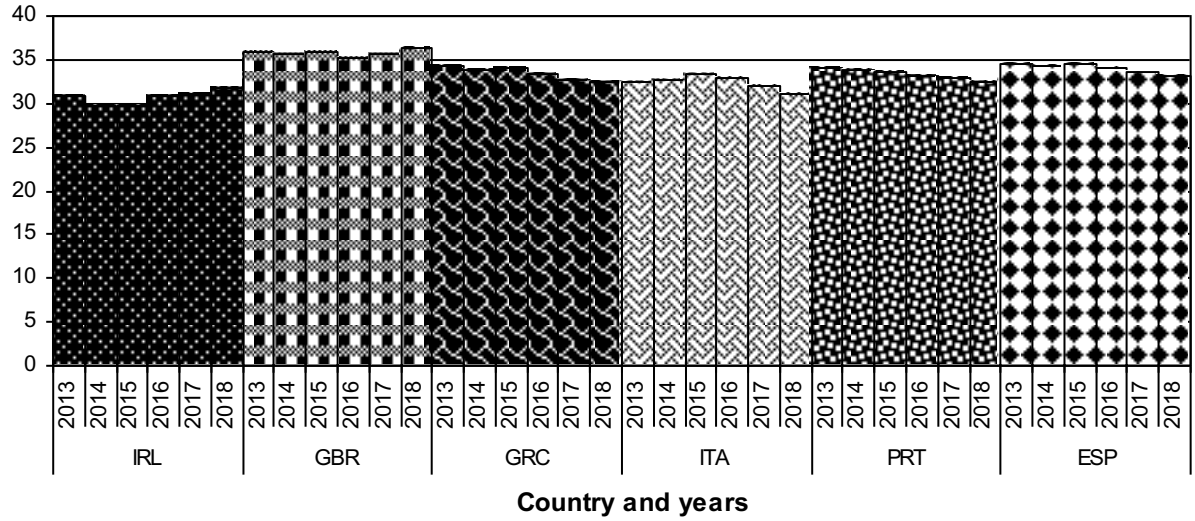
Source: Authors' own research

Fig. 2: : Gini index (in %) of wage of Scandinavian countries



Source: Authors' own research

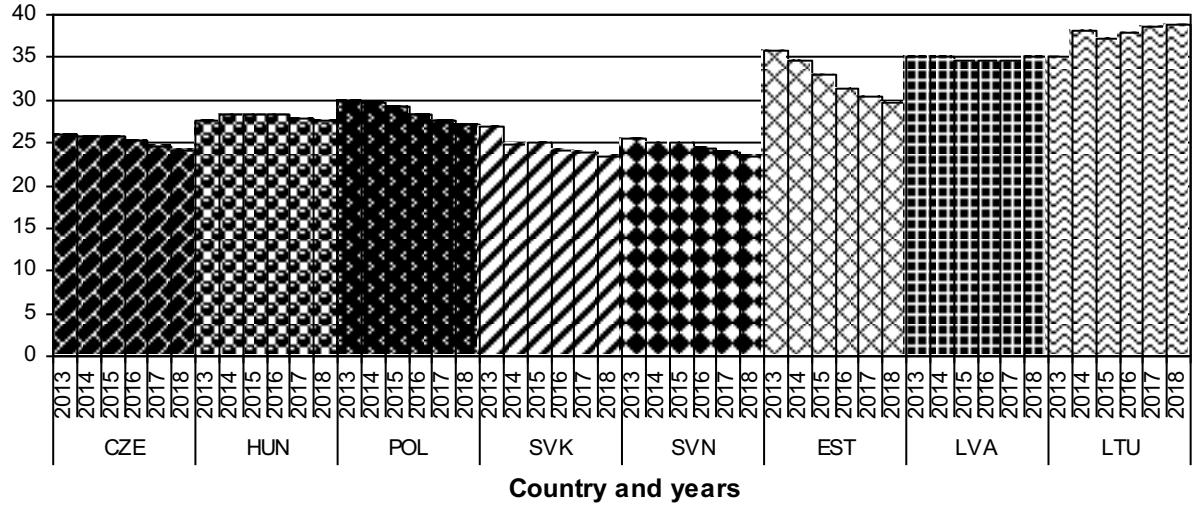
Fig. 3: Gini index (in %) of wage of Anglo-Saxon and South European Countries



Source: Authors' own research

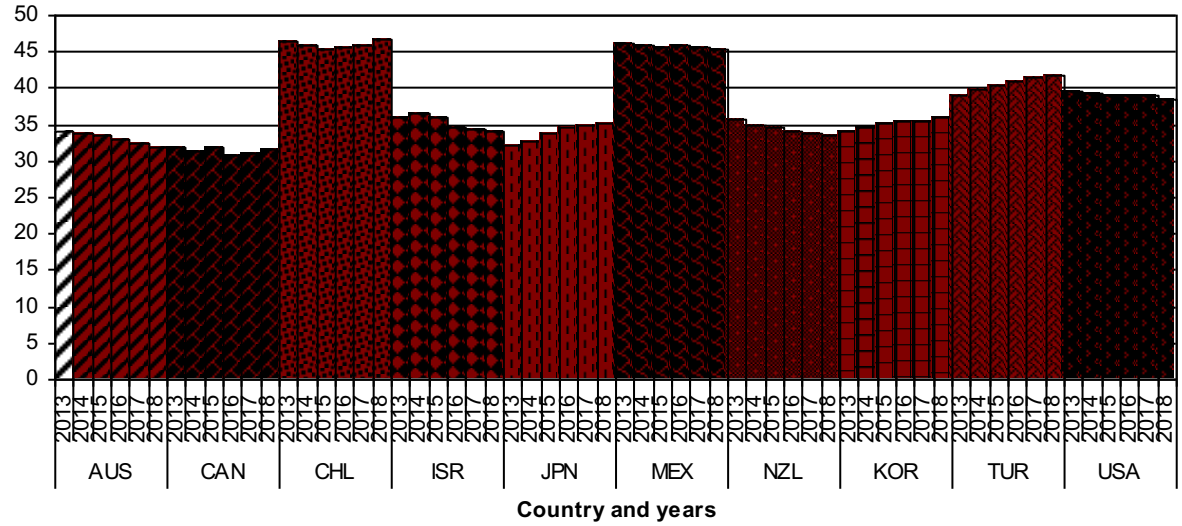
On the contrary, post-communist countries, namely Slovenia, Slovakia and the Czechia, show the lowest wage diversification, which does not exceed 27 percent. As the people of post-communist countries switched from the original egalitarian systems to capitalism from the early 1990s, they encountered a new phenomenon, such as the rise of social inequality. The original Yugoslavia had a looser regime even before the collapse of the communist bloc, which also affected the economy, and since some time it was even possible to do business freely. The Slovenian economy benefits from its advantageous location, which in a small state connects the eastern part of the Alps, which is important for tourists in all seasons, several tens of meters long coast of Adriatic Sea and it is a transit country for travel to the Balkans, especially to neighboring Croatia. The country has a high level of banking, a very good infrastructure, a dense and high-quality motorway and road network and high-quality tourist centers.

Fig. 4: Gini index (in %) of wage of Central European post-communist and Baltic post-communist countries



Source: Authors' own research

Fig. 5: Gini index (in %) of wage of Non-European Countries



Source: Authors' own research

The results of cluster analysis are presented in Tab. 2.

Tab. 2: Results of cluster analysis using five different clustering methods, Euclidean distance and seven clusters

Clustering method				
Furthest neighbour	**Nearest neighbour**	**Ward**	**Centroid**	**Group average**
1st cluster	**1st cluster**	**1st cluster**	**1st cluster**	**1st cluster**
1st AUS	1st AUS	1st AUS	1st AUS	1st AUS
2nd CAN	2nd AUT	2nd CAN	2nd CAN	2nd CAN
3rd ESP	3rd BEL	3rd ESP	3rd ESP	3rd ESP
4th EST	4th CAN	4th EST	4th EST	4th EST
5th GBR	5th CHE	5th GBR	5th GBR	5th GBR
6th GRC	6th CZE	6th GRC	6th GRC	6th GRC
7th ITA	7th DEU	7th ITA	7th ITA	7th ITA
8th LUX	8th DNK	8th LUX	8th LUX	8th LUX
9th NZL	9th ESP	9th NZL	9th NZL	9th NZL
10th PRT	10th EST	10th PRT	10th PRT	10th PRT
2nd cluster	11th FIN	**2nd cluster**	**2nd cluster**	**2nd cluster**
1st AUT	12th FRA	1st AUT	1st AUT	1st AUT
2nd BEL	13th GBR	2nd BEL	2nd BEL	2nd BEL
3rd CHE	14th GRC	3rd CHE	3rd CHE	3rd CHE
4th DEU	15th HUN	4th DEU	4th CZE	4th CZE
5th FRA	16th IRL	5th FRA	5th DEU	5th DEU
6th HUN	17th ISL	6th HUN	6th DNK	6th DNK
7th IRL	18th ITA	7th IRL	7th FIN	7th FIN
8th NLD	19th LUX	8th NLD	8th FRA	8th FRA
9th POL	20th NLD	9th POL	9th HUN	9th HUN
10th SWE	21st NOR	10th SWE	10th IRL	10th IRL
3rd cluster	22nd NZL	**3rd cluster**	11th ISL	11th ISL
1st CHL	23rd POL	1st CHL	12th NLD	12th NLD
4th cluster	24th PRT	**4th cluster**	13th NOR	13th NOR
1st CZE	25th SVK	1st CZE	14th POL	14th POL
2nd DNK	26th SVN	2nd DNK	15th SVK	15th SVK
3rd FIN	27th SWE	3rd FIN	16th SVN	16th SVN
4th ISL	**2nd cluster**	4th ISL	17th SWE	17th SWE

5th NOR	1st CHL	5th NOR	**3rd cluster**	**3rd cluster**
6th SVK	**3rd cluster**	6th SVK	1st CHL	1st CHL
7th SVN	1st ISR	7th SVN	**4th cluster**	**4th cluster**
5th cluster	2nd KOR	**5th cluster**	1st ISR	1st ISR
1st ISR	3rd LTU	1st ISR	2nd KOR	2nd KOR
2nd KOR	4th LVA	2nd KOR	3rd LTU	3rd LTU
3rd LTU	**4th cluster**	3rd LTU	4th LVA	4th LVA
4th LVA	1st JPN	4th LVA	5th USA	5th USA
5th USA	**5th cluster**	5th USA	**5th cluster**	**5th cluster**
6th cluster	1st MEX	**6th cluster**	1st JPN	1st JPN
1st JPN	**6th cluster**	1st JPN	**6th cluster**	**6th cluster**
7th cluster	1st TUR	**7th cluster**	2nd MEX	1st MEX
1st MEX	**7th cluster**	1st MEX	**7th cluster**	**7th cluster**
2nd TUR	1st USA	2nd TUR	3rd TUR	1st TUR

Source: Authors' own research

Conclusion

Now, we evaluate the defined scientific hypotheses based on the obtained research results:

H1: Proven. The two OECD member countries of Latin America show the highest wage diversification within the OECD member countries in the period 2013–2018. There are Chile and Mexico, the wage diversification expressed by the Gini index does not exceed 47 percent in either of these two countries in that period.

H2: Proven in terms of the Central European post-communist country bloc, with the exception of Poland. The Baltic post-communist countries bloc shows relatively high wage diversification, probably due to quite dramatic demographic effects.

H3: Proven, Chile and Mexico are the only two OECD member countries in Latin America to show the highest level of wage diversification within OECD member countries in 2013–2018 due to the fact that the government does not make any major interventions in the economy here. During this period, the Gini index ranged 45.4–46.7 percent in Chile and 45.3–46.2 percent in Mexico.

H4: Proven in part. Wage diversification in non-European OECD member countries is in the range of 30.7–46.7 percent, which is completely outside the wage diversification of the Scandinavian countries, the Central European post-communist and essentially Western European developed countries. However, the wage diversification of non-European OECD member countries partly overlaps with the Anglo-Saxon countries, the Southern European Countries and the Baltic post-communist countries.

H5: Proven in part. The groups of OECD member countries, always in the same cluster using the above five clustering methods, very roughly correspond to the geographical location, historical development, culture, social systems, and level of advancement of these countries.

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Simon Eichentopf
IHI Zittau/Technical University Dresden, Faculty of Business and Economics,
Department for International Management
Markt 23, 02763 Zittau, Germany
email: simon.eichentopf@tu-dresden.de

Market Entry Strategies of German Companies in Japan

Abstract
This research analyses potential changes within market entry strategies of multinational companies (MNC) in Japan due to vanishing keiretsu. This structural market change is being claimed to not only have tremendous impact on the establishment chain of entering MNCs but also on their performance.
As a result of the literature review, it can be shown that foreign companies entered the Japanese market by preferring an internationalization route of incremental increases of commitment, i.e. verifying the establishment chain. Only one empirical study, which tested the establishment chain as well as performance implications was identified. Unfortunately, that specific study is outdated and does not cover the recent changes (Hedlund and Kverneland, 1985), which is why more research is needed.
However, this empirical research aims to show whether MNCs are still following the establishment chain or whether decreasing keiretsu networks led them to leapfrogging behavior or initial foreign direct investments (FDI). Especially performance implications are of key interest for both, researchers and managers. In order to test hypotheses about the establishment chain and timing strategies, a sample of (currently) 335 German companies shall represent the research object.

Key Words
establishment chain, entry mode, japan, keiretsu

JEL Classification: C21, R13

Introduction

The Uppsala model, as an internationalization process theory of MNCs, is of major relevance within the field of international management to describe how international firms go abroad and to explain why they do so. The establishment chain represents an underlying internationalization pattern within the theoretical framework and describes a consecutive series of market entry modes in order to incrementally increase the commitment in an unknown foreign market, e.g. indirect exports, direct exports, licences, sales subsidiaries, and production subsidiaries. By following the establishment chain, firms gain experience and experiental knowledge about the market first-hand, which enables them to take the next step in expanding into the market (Johanson and Wiedersheim-Paul, 1975; Johanson and Vahlne, 1977).

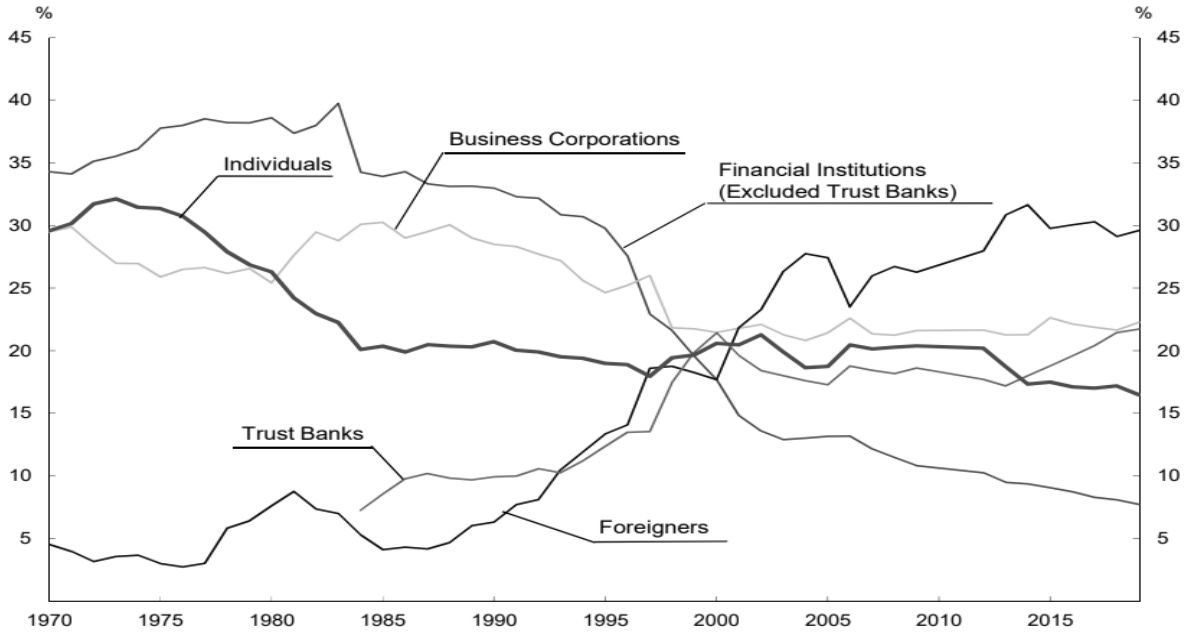
Due to its non-trade barriers (NTB), the Japanese market has traditionally been perceived as one, which is very difficult for MNCs to enter (Buckley, Mirza, and Sparkes, 1987; Haghirian, Sinkovics, and Bamiatzi, 2008; Uzama, 2009). Especially keiretsu networks, access to distribution channels, governmental regulations, and the difficulties in employing highly qualified locals as well as resulting high entry costs have been named

frequently as major hurdles to overcome (Simon, 1986; Simon and Palder, 1987; Yoshitomi, 1996). Keiretsu networks through their cross-shareholder relations (e.g. the ownership structure of Toyota and its suppliers is characterized by vertical ownership interlinkages) have made it almost impossible for foreign companies to enter the local distribution channels and the market *per se* via FDIs. As a result, especially MNCs (from Western countries) that had to bridge substantial psychic distance used to follow the establishment chain and incrementally gained experience within the market, before setting up own subsidiaries or entering a joint venture.

Following the concept of "outsidership" in a market where firms act as a network which provides each member considerable benefits (Johanson and Vahlne, 2009), the literature review emphasized the factor of "trust" within a business relationship, especially with foreign companies, for successful business activities in Japan (Cavusgil, 1998; Baron and Capo, 2016). This factor has been confirmed by an anonymous managing director of a German subsidiary in Osaka in the course of an interview in 2019. In this regard, the theoretical framework of the Uppsala model, namely the establishment chain and the gradual accumulation of knowledge of a MNC by its stepwise increase of commitment, should be enriched by a "trust"-dimension. By staying for a long period of time inside of the market and by committing to the customers and business partners through a joint venture or 100% subsidiary, entry strategies that can be described by the establishment chain are also "trust building" and therefore promising internationalization routes.

It is argued that keiretsu structures recently seemed to show signs of disintegration (Pease, Paliwoda, and Slater, 2006). A reliable indicator for the recent structural changes within the Japanese market can be seen in the development of ownership structures of Japanese companies, as shown in figure 1.

Fig. 1: Ownership structure of stock-listed Japanese companies in 1970-2019



Source: Japan Exchange Group, 2020

Therefore, it is hypothesised that consequences might follow not only for market entry strategies of MNCs but also for their respective firm performance. In this respect, the term "market entry strategy" covers both, country specific timing strategies (pioneers and followers) as well as the succession of market entry modes, as defined by the establishment chain of the Uppsala model. The hypotheses can be clustered into two categories, one which addresses the changes within the patterns of market entry strategies and another one which addresses the respective performance implications of the respective strategies:

Market entry strategies

It is assumed that German companies generally enter the Japanese market incrementally, as stated by the establishment chain, in order to stepwise gain market knowledge in a market which is characterized by high psychic distance, substantial cultural differences and high complexity. The Uppsala model serves as theoretical background.

H1 German companies follow mostly an internationalization pattern that is characterized by incremental increase of commitment.

Pioneers are considered to be the first foreign entrants into a domestic market. Therefore, pioneers do have to gain market knowledge by themselves incrementally.

H2a German companies that enter the Japanese market as pioneers follow the establishment chain.

Followers are considered entrants into a mature foreign market, which already has been targeted by other MNCs. This is why followers can learn from the experiences and potential mistakes of former competitors which is why it can be expected that the establishment chain for this kind of MNCs will not be followed. So called "leapfrogging"-behavior, i.e., skipping of entry modes, or initial FDIs might be characterize their internationalization paths.

H2b German companies that enter the Japanese market as followers do not follow the establishment chain.

German companies that entered the Japanese market later, are considered to have been able to learn from former entrants, which is why they did not need to follow the establishment chain, but to skip entry modes instead.

H3a The later German companies enter the Japanese market, the more they tend to skip market entry modes (i.e. leapfrogging).

German companies that entered the Japanese market later, are considered to have been able to learn from former entrants, which is why they did not need to follow the establishment chain, but to enter the market via FDIs.

H3b The later German companies enter the Japanese market, the more they tend to intial FDI.

Performance implications

Following the establishment chain enables MNCs to gain market knowledge first-hand, to build trust with customers and business partners and to enter local networks (Johanson and Vahlne, 2009), which especially for the Japanese distribution system used to be difficult.

H4 German companies that follow the establishment chain are more successful than companies that follow different internationalization paths.

Pioneers are considered to be the first foreign entrants into a domestic market. Therefore, pioneers do not have to compete with other foreign competitors, which is why they are able to reap monopolistic benefits, which followers are not able to realize. Besides, pioneers might be able to build up additional barriers, which need to be overcome by following MNCs.

H5 Sector-specific pioneers are more successful than followers.

Japanese keiretsu structures are eroding. Since this major entrance barrier had to be faced by German companies in the past, it is assumed that MNCs, which entered the Japanese market later, performed better, as they could spend their resources in other ways than to deal with major Japanese conglomerats. In addition, MNCs which entered later, benefited from experiences of former entrants.

H6 The later German companies enter the Japanese market, the better is their performance.

It is attempted to test the Uppsala model and country specific timing strategies as well as the respective performance implications for German MNCs that entered a psychically distant market. This market underwent structural transformation, so that entry barriers decreased. This work will contribute to the literature in showing empirical evidence for a change in market entry strategies when entry barriers erode – in the case of Japan it is keiretsu networks. Besides, practical implications for German managers at firms that have not yet entered the Japanese market, can be drawn from performance implications of different internationalization paths.

1. Methods of Research

1.1 Sample description

So far, 335 German companies have been identified to generate primary data via an online questionnaire. Company names have been drawn from the German Chamber of Commerce and Industries Japan (AHK Japan), German Asia-Pacific Business Association (OAV), and a textbook by Max Eli (2004). However, potential remains to include additional companies, i.e., chambers of commerce and industry, to achieve a final sample size of 350-600 companies. This sample size might appear small; however, in comparison with the empirical studies of the literature this sample can be described as decent.

1.2 Data collection

It is planned to retrieve primary data. Thus, a questionnaire will be sent to managers of companies that are exercising business activities in Japan. Those managers shall be located at the respective headquarter and be familiar with the internationalization process of the firm. Before the questionnaire will be distributed, suitable managers will be identified.

1.3 Data analysis & operationalization

In order to test the above-mentioned hypotheses, quantitative data analysis will be drawn upon. The data shall be analyzed through OLS regression. Critical variables, such as entry modes of the establishment chain, timing strategy types, and sector differentiation will be dummy-coded. Control variables are represented by total sales, sales in Japan, total number of employees, number of employees in Japan, international experience (in years), and number of entered markets in Asia. As performance implicating variables, the subjective manager satisfaction on a Likert-scale, return on sales, and achieved market share in Japan will be included into the analysis.

2. Results of the Research

Unfortunately, only results for the literature review can be presented to this date, see Table 1. Via EBSCO and Scimago databanks and limiting criteria, such as compulsory keywords in the abstract "japan" and "entry", "English language" and "peer-reviewed articles" led to a total amount of 24 studies on the subject of interest. These studies can be split into the following categories:

a) Theory-based studies on dynamic market entry strategies and entry modes (6),
b) Non-theory-based studies on dynamic market entry strategies and entry modes (3),
c) Non-theory-based studies on static market entry strategies and entry modes (15).

Tab. 1: Resulting pool of literature

Author/s	Year	Category	Source
Hedlund und Kverneland	1985	a)	EBSCO
Simon	1986	c)	EBSCO
Simon und Palder	1987	c)	EBSCO
Buckley, Mirza und Sparkes	1987	c)	EBSCO
Anderson und Coughlan	1987	c)	SCImago
Ryans	1988	c)	EBSCO
Green und Larsen	1991	c)	EBSCO
Tyson	1991	c)	EBSCO

Ursacki und Vertinsky	1992	c)	EBSCO
Sarnat, Thibault, Ursacki und Vertinsky	1992	c)	SCImago
Turpin	1993	c)	EBSCO
Hayter und Edgington	1997	a)	EBSCO
Cavusgil	1998	c)	SCImago
Makino und Neupert	2000	c)	EBSCO
Yamawaki	2004	c)	EBSCO
Baek	2005	b)	EBSCO
Glisby und Holden	2005	c)	SCImago
Meyer-Ohle	2007	b)	EBSCO
Ojala und Tyrväinen	2007	a)	EBSCO
Ojala	2008	a)	EBSCO
Forlani, Parthasarathy und Keaveney	2008	c)	SCImago
Uzama	2009	a)	EBSCO
Ojala	2009	a)	SCImago
Baron und Capo	2016	b)	EBSCO

Source: Own table

Please note that due to the citation restrictions, most authors of Table 1 could not be mentioned in the list of references but they will be made available upon request.

As a result, MNCs seem to have preferred an entry strategy which could be described by the establishment chain, as shown in Table 2. Furthermore, the analysis of Hedlund and Kverneland (1985) is the only one containing performance implications of differing internationalization paths for MNCs in Japan, which makes it most comparable to the author's research.

Tab. 2: Verification of the establishment chain within theory-based literature on dynamic market entry strategies

Study	Theoretical approach	Establishment chain verification	Preferred internationalization path
Hedlund and Kverneland, 1985 (18*)	Uppsala Model	✓	Export via Agents Production subsidiary
Hayter and Edgington, 1997 (1*)	Uppsala Model, TCT, Theory of the oligopolistic advantage	✓	Export via Agents Joint Venture (51%) 100% Subsidiary
Ojala and Tyrväinen, 2007 Ojala, 2008 Ojala, 2009	Uppsala Model, OLI-Framework, RBV, Network Theory	✓	Before year 2000: Exports 100% Subsidiary After year 2000:

(8*)			Representative office
Uzama, 2009 (14*)	Uppsala Model, OLI-Framework, RBV, TCT	✓	Joint Ventures 100% Subsidiary

Source: Own table

**sample sizes*

3. Discussion

Since the empirical work has not been conducted yet, the discussion and the conclusion sections are left aside. However, the author will be very glad to discuss the result of this research during the LEF.

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Marek Furmankiewicz

Wrocław University of Environmental and Life Sciences, Institute of Spatial Management
Grunwaldzka 55, 50-357 Wrocław, Poland
email: marek.furmankiewicz@upwr.edu.pl

Urban Local Action Groups in Poland: Monofunctional Social Activities Within Community Led Local Development

Abstract

The article presents the basic characteristics of Urban Local Action Groups (ULAGs) in Poland. ULAGs are associations of citizens and legal entities representing different interest groups: the social sector (organisations and residents), the economic sector (local entrepreneurs) and the public sector (state and local government institutions), each operating in accordance with the assumptions of the Community-Led Local Development approach financed by the European Union (EU) and covering the entire area of a single city or several urban units. The ULAGs establish a bottom-up development strategy for a given area and obtain the funds required for its implementation by organising local grant competitions, in which the decision-making council (project selection committee) composed of local stakeholder representatives selects projects offered by local entities for funding. Only 7 ULAGs have been established in Poland at the beginning of the 2014-2020 EU Programming Period. The research described herein made use of the method of content analysis for the purpose of studying Local Development Strategies (LDS) prepared by ULAGs for the years 2015-2022. All investigated ULAGs were financed from the European Social Fund. Their activities were typically focused on social issues, including such aimed at social and professional activation and social inclusion of the inhabitants. The examined ULAG activities did not display the typical features of neo-endogenous integrated development, as they were prevented from utilizing EU funds for investment activities or infrastructure development. The article discusses the basic goals and tasks planned in the strategies of these organisations.

Key Words

Community Led Local Development, Urban Local Action Groups, cross-sectoral partnership, community mobilisation, neo-endogenous development, Poland

JEL Classification: L31; O15

Introduction

The development of participatory management of urban areas and community mobilisation related to the concept of grassroots or endogenous development has for many decades been an important policy carried out in most democratic countries of the world (Campbell, 2014; Willis, 2011). This involved the introduction of various forms of participatory spatial planning (Castro et al., 2020; Sanoff, 2000), participatory (civic) budgets (Bednarska-Olejniczak et al., 2020) and other methods of engaging local stakeholders in planning, social and economic activities on the local scale (Macken-Walsh, 2010; OECD, 2001). One of the relatively new forms of cross-sectoral cooperation for local development are Urban Local Action Groups (ULAGs), created around the year

2014 in towns and cities of the European Union (EU) as part of the Community-Led Local Development (CLLD) approach (Panciszko, 2020). This approach is a continuation of the LEADER-type programmes that have been implemented by the European Economic Community (currently the EU) since 1991 in rural areas (Moseley, 2003; Servillo & De Bruijn, 2018; Šaradín, 2019), and subsequently in fishing regions (Bartłomiejski, 2011). Literature on the subject commonly considers the formation of the organisational model of LAG-type partnerships – established throughout the EU on the basis of a very similar, shared set of principles – as one of the processes of 'Europeanisation', i.e. the creation of unifying development policies among EU member states (Furmankiewicz et al., 2021a; Konečný, 2019). There is abundant literature available on the various social and political aspects of LAGs in rural areas (Boukalova et al., 2016; Cejudo & Navarro, 2020; Moseley, 2003), with a significant lack of academic analyses of the type of goals chosen by local stakeholders in LAGs strategies (Furmankiewicz & Campbell, 2019; Kisiel & Gierwiatowska, 2013). Among the fewest of these rank analyses of Urban LAGs (ULAGs), which are not as common in the EU as rural and fishing LAGs (European Leader Association for Rural Development, 2016). So far, they have been analysed, inter alia, in Poland (Kola-Bezka, 2020a, 2020b; Panciszko, 2020; Zajda et al., 2017) and in Romania (Puşcaş & Beleiu, 2020). However, the organisational structures, cooperation processes, goals and effects of ULAGs activities remain poorly recognized in literature on the subject.

The main purpose of this paper is to present the basic characteristics and analysis of the main objectives of ULAGs operating in Poland in the 2014-2020 EU Programming Period. The subject of the analysis includes 7 existing ULAGs. The main research method is content analysis performed on Local Development Strategies (LDS) formulated by the examined ULAGs for the years 2016-2023. The article focuses on goals from the ULAG strategies that are still in the implementation phase, as the projects have not yet been completed and accounted for at the time of the preparation of this article.

1. Area-based partnership and neo-endogenous development

The development policy of urban areas today supports various types of grassroots initiatives – both in terms of their economic activity (entrepreneurial and professional activity), as well as social activity (participation in local social activity). One of the forms of management of local resources is the creation of various types of multi-sectoral local partnerships covering entire cities, districts or focusing on the implementation of specific projects (OECD, 2001). Policies of this type were frequent in democratic Anglo-Saxon countries like Canada (Rounds, 1993) and the UK (Bailey, 2003; Perrons & Skyers, 2003). The launch of URBAN, EQUAL, INTERREG and LEADER Community Initiatives in 1991 saw the large-scale establishment of territorial partnerships as formal organisations in the European Economic Community. This continued after the establishment of the EU in 1993 (Furmankiewicz et al., 2015; Moseley, 2003) and was followed by the carrying out of the URBACT Urban Development Network Programme in cities (Zajda et al., 2017). It is the LEADER Initiative, however, which has become particularly renowned for supporting the creation of area-based partnerships in rural areas, known as Local Action Groups (LAGs). Within these organisations decisions regarding strategic goals and implemented activities are made by members of the association and decision-making council (project-selection council) composed of

representatives of local authorities, entrepreneurs, non-governmental organisations and local inhabitants (Furmankiewicz et al., 2021b; Zajda, 2014). According to estimates by the European LEADER Association for Rural Development, about 3,300 LAGs have been established up to the year 2019, covering over 50% of the rural population in the EU (European LEADER Association for Rural Development, 2019). In Poland, during the EU Programming Period 2014-2020, there were 324 LAGs, of which 7 were urban, 24 specialised in fishing issues, 12 aimed at the development of fisheries and rural areas and 293 aimed at integrated rural development (Zajda et al., 2017). A number of other countries have experienced the establishing of urban LAGs, such as the Netherlands, Greece, Italy, UK, Hungary, Ireland, Lithuania, Portugal, Sweden and Romania (European LEADER Association for Rural Development, 2016; Servillo & De Bruijn, 2018), but in-depth analyses of their activity remain scarce (Kola-Bezka, 2020a, 2020b; Panciszko, 2020; Puşcaş & Beleiu, 2020; Zajda et al., 2017).

The development of LEADER-type programmes and the CLLD approach was strongly related to theoretical concepts of territorial governance (Esparcia et al., 2015) and neo-endogenous development (Ray, 2006). The latter concept was particularly concerned with the issue of balancing endogenous and exogenous factors in local development. Programmes of this type are concerned with supra-local goals only to a small extent, but they give local stakeholders a high degree of independence in defining development goals and activities based on local needs, which result from the characteristics of a given functional region (Bosworth et al., 2016; Furmankiewicz et al., 2020). Partnership cooperation allows to increase the effectiveness of local government development policies in terms of meeting the needs of the residents (Adamski & Gorlach, 2007; Babczuk et al., 2017).

2. Methods of Research

The research covers all existing Urban LAGs in Poland, as retrieved from information obtained from the Ministry of Agriculture and Rural Development and the Ministry of Infrastructure and Development (Ministerstwo Infrastruktury i Rozwoju, 2014). The gathering of general data on the existing ULAGs in Poland in the 2014-2020 EU Programming Period was followed by obtaining Local Development Strategies (LDS) prepared by ULAGs from their official websites. LAG strategies in Poland share a similar structure of chapters due to top-down ministry and regional authorities' recommendations (Ministerstwo Infrastruktury i Rozwoju, 2014; Panciszko, 2020). They usually contain information on the number and structure of partners participating in the cooperation, a description of the participation of local stakeholders in the preparation of the strategy, the characteristics of the area of operation (strategic diagnosis), a SWOT analysis, the designated mission, the main and specific goals; and the main types of tasks to be performed (referred to as 'operations' in the strategies). They also contain descriptions of effect indicators. Due to their similar structure, they are highly suitable for comparative analysis.

The article presented here details the analysis of the provisions concerning main and specific goals and planned activities, with the use of the content analysis method, commonly utilised in social, political and management sciences (Neuendorf, 2017;

Szewrański & Kazak, 2020). A qualitative description of the provisions in the strategies served as the main method for the analysis (Sandelowski, 2000).

3. Results

Urban LAGs in Poland have only been established in the Kuyavian-Pomeranian voivodeship (*województwo kujawsko-pomorskie*, province with self-government). This was a direct result of decisions made by the regional authorities. In six cases, the established ULAGs overlapped with the areas of entire towns, while in one case they covered seven inner-urban districts (in Bydgoszcz). The population in the ULAG area was rounded up from 29 thousand (Brodnica) to 137 thousand inhabitants (Toruń) (Table 1). The ULAG area ranged from 14 (Chełmno) to 116 (Toruń) square km (Figure 1).

Table 1. Basic data on Urban LAGs in Poland

No.	Name of ULAG (in Polish)	City/Town	Area sq. km	Number of inhabitants in LAG area	Funds for LDS implementation (EUR)	Number of partners
1	Stowarzyszenie LGD "Dla Miasta Torunia"	Toruń	116	136 999	1 416 857	94
2	Stowarzyszenie Bydgoska LGD "Dwie Rzeki"	Bydgoszcz	39	135 432	1 388 418	72
3	LGD Miasto Włocławek	Włocławek	84	107 815	1 451 929	128
4	Stowarzyszenie LGD "Grudziądzki Spichlerz"	Grudziądz	58	97 676	1 257 198	76
5	Stowarzyszenie LGD Inowrocław	Inowrocław	30	75 001	1 122 178	40
6	Stowarzyszenie LGD Chełmno	Chełmno	14	20 215	816 880	84
7	Stowarzyszenie LGD Miasta Brodnicy	Brodnica	23	28 579	685 788	42

Source: Author's research based on ULAG LDS. Data sorted by number of inhabitants in ULAG area.

Fig. 1: Location of Urban LAGs in Poland (numbers according to table 1)

Source: Author's compilation

The number of partners (legal entities and natural persons who were members of the ULAG association) ranged from 40 (Inowrocław) to 128 (Włocławek). It should be mentioned that there are two regional capital cities in the Kuyavian-Pomerania province: Bydgoszcz is the seat of the voivode (regional branch of central authorities), and Toruń is the seat of regional self-government authorities (which exercise direct supervision over the LAG) (Przybyła et al., 2019) – both cities were engaged in CLLD. The ULAGs have received grants for the implementation of their activities ranging from EUR 685,788 (Brodnica) to EUR 1,416,857 (Toruń). All ULAG strategies were financed exclusively by the European Social Fund. Support from this fund could be allocated towards the implementation of three types of projects:

1. Activities in the field of active integration of local inhabitants. The submitted projects could be concerned with the creation of self-help clubs providing care and assistance services for the dependent; community day-care centres and youth clubs to help educate and activate young members of local communities; and work clubs to support unemployed people in finding employment. This group of tasks also supported counselling aimed at enabling social mobilisation and a return to the labour market, the organisation of therapeutic classes and trainings allowing one to gain new professional qualifications. It was also possible to utilise the fund to cover the costs of employing assistants of disabled persons and of marginalized families.

2. Activities in the field of organising the local community and social animation. This group of tasks covered the costs of employing people whose aim is to integrate residents and stimulate them towards joint activities for the benefit of local communities. Support was also granted to projects in the field of social and civic education, as well as those aimed at the organisation of events and meetings having to do with integration, culture, sports and environmentalism. This could also involve establishing self-help services, or simply covering the costs of volunteer work.

3. Activities supporting the development of social entrepreneurship. Here, support was allocated to the creation and development of social economy entities, i.e. companies and organisations working towards the professional reintegration of people at risk of social exclusion.

The maximum support limit was set at PLN 150,000 (about EUR 35,000) for projects aimed at providing employment opportunities for its participants; and PLN 50,000 (about EUR 11,900) for projects dedicated to increasing the efficiency of social action. The ULAGs organised grant competitions in which the grants detailed above were awarded to the local entities applying for them. LDS were fully adapted to the imposed recommendations (Table 2), involving issues such as: the promotion of social, professional and entrepreneurial activity of residents, the development of social entrepreneurship, the training of animators and leaders for the purpose of organising local social activity, the social inclusion of excluded groups, activities promoting and making use of cultural heritage. In practice, only the so-called 'soft projects' fell into the scope of the envisaged actions. The ULAGs were financed virtually exclusively from the ESF and thus were prevented from using the grant for common investment activities or local infrastructure development (‘hard projects’).

Table 2. The main and specific goals of Urban LAGs in Poland (abridged version of the original text).

No.	*City*	*Main goals*	*Specific goals*
1	Toruń	Improving the social/professional situation of people at risk of poverty or social exclusion; Increase in integrated activities in the field of local community organisation and social animation	Increasing the effectiveness of the implementation of social and environmental activities; Increased social and professional activity and entrepreneurship among people at risk of poverty or social exclusion; Increasing the effectiveness of the implementation of activities in the field of organising the local community; Strengthening the potential of animators and leaders in the field of social animation
2	Bydgoszcz	Support for residents in the field of social inclusion	Increasing the activity of the community with the use of forms of active integration of an environmental nature, including social and employment activation and activation in accordance with the Municipal Revitalization Programme
3	Włocławek	Creating conditions for social inclusion and support for residents in the field of social and professional activation	Active integration in the field of local community organisation and social animation, social economy and social entrepreneurship
4	Grudziądz	Strengthening the role of social capital in socio-economic development	Increasing the social and professional activity of the inhabitants
5	Inowrocław	Improving the social and professional situation of the inhabitants; Reducing the scale of social exclusion and poverty	Increased social and professional activity and entrepreneurship of the inhabitants; Activation of socially excluded and poor people
6	Chełmno	Increasing the number of activities in the area of active integration of an environmental nature for the benefit of the excluded and people at risk of social exclusion and their environment; Support in organising the local community and fostering social animation as well as improving the quality of social capital	Support for activities aimed at social and professional activation; Increasing the number of activities in the field of animating the life of the local society; Acquisition of skills and activation of residents and promotion of the LAG area; Support for social economy initiatives
7	Brodnica	Creating conditions for social inclusion and social and professional activation	Social and professional activation of people at risk of poverty and social exclusion; Organising and animating the local community; Supporting social potential for the development of social economy

Source: Author's research based on Urban LAG Local Development Strategies

4. Discussion and Conclusions

The results represented here indicate that ULAG activity in Poland was focused almost exclusively on social issues in the field of the social and professional activation of residents. This scope of activities was imposed on them by voivodeship authorities and

the operating principles of the European Social Fund. Therefore, it can be assessed that they have little relation to the concept of neo-endogenous integrated development, which combines various activities, with both economic investment and social issues taken into account (Furmankiewicz & Campbell, 2019). ULAG activities proved to be highly specialised and monofunctional. By comparison, traditional, rural LAGs implemented a much wider range of activities, as they supported small investment projects of local entrepreneurs and farmers, the activities of local non-governmental organisations, but also the development of small infrastructure owned by the commune (Hoffmann & Hoffmann, 2018). The ULAGs were therefore of a significantly different nature when compared to rural LAGs, where the development of local infrastructure and investments of local entrepreneurs (and farmers) was an important element of supporting local development. The ULAGs were prevented from establishing goals with the prospect of fully and freely meeting local needs, as the three main themes of potential operation were designed by the authorities in a top-down manner. By comparison, the municipal LAGs in Romania, organised in cities with more than 20,000 inhabitants, could carry out both soft and hard (infrastructure) projects (Pușcaș & Beleiu, 2020). Characteristically, only one out of 16 Polish regional self-governments decided to support ULAGs. It resulted from the lack of interest of the regional and central policymakers, in creating cross-sector partnerships in large Polish cities and towns. Likewise, Urban LAGs have been relatively rare in other EU countries (European Leader Association for Rural Development, 2016). This means that the CLLD idea was not popular in urban areas, despite the models of various types of urban partnerships having been known for many years in the UK (Hemphill et al., 2006). The potential opportunities for cross-sector cooperation in cities are significant, as, compared to rural areas, they are characterized by a high concentration of entrepreneurship and NGOs. Theoretically, cities provide many stakeholders who could potentially implement small projects under the CLLD. One example includes housing cooperatives, frequently found in Poland (Płuciennik & Hełdak, 2019). There are third sector organisations which could implement many local projects aimed at social inclusion, and for people with disabilities or senior citizens (Kurtyka-Marcak et al., 2019).

One of the more interesting issues for further research would be an attempt to determine why the ideas of neo-endogenous development with the use of intersectoral territorial partnerships enjoy only a limited popularity in urbanized European areas, despite the possibility of obtaining additional funds for local activities from the EU. With Urban LAGs so scarcely represented in literature on the subject, it might also prove interesting to pursue an international comparison of their activity.

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Martina Hedvičáková

University of Hradec Králové, Faculty of Informatic and Management, Department of Economics
Rokitanského 62, 500 03 Hradec Králové 3, Czech Republic
email: Martina.Hedvicakova@uhk.cz

Capital-Labor Substitution in the Context of Industry 4.0 and the Economic Crisis

Abstract

At the end of 2019, and especially in 2020, the global pandemic Covid-19 began, which also marked the onset of a new economic crisis. World economies have borrowed to support the economy and there has been a decline in GDP and rising unemployment. Although the unemployment rate has also risen in the Czech Republic, it is one of the lowest unemployment rates of all European Union countries. The unemployment rate is lower than the natural unemployment rate and labor demand exceeds labor supply. In the labor market, there is a decline in aggregate labor productivity and an increase in unit labor costs. This situation, together with the Industry 4.0 initiative, creates space for a significant advent of automation and rotobotization. Some government measures, along with quarantine and lockdown measures, also contribute to a faster onset of automation. The aim of the paper is to capture the dynamic development of the observed basic values (share of unemployed persons, average real and average gross nominal wages, aggregate labor productivity and unit labor costs) in the labor market due to the onset of the fourth industrial revolution called Industry 4.0 and the Covid-19 pandemic in Czech Republic. Based on the evaluation of the data, the labor market and the effects of the current economic situation on the development of labor substitution by capital will be analyzed. The partial goal is to use the system dynamics model to show the mechanism of labor substitution by capital, which will be created in the Stella Professional environment.

Key Words

unemployment, Industry 4.0, automation, system dynamics model, substitution

JEL Classification: E24, J21, D24

Introduction

The year 2020 was marked by the global pandemic Covid-19. Most countries have sought to revive the economy through positive demand shocks. As a result, there was a high level of national debt. National economies are in recession. There has also been a significant decline in GDP and employment. The growth of these two economic variables is crucial for further recovery. In the Czech Republic, GDP fell to -5.6% in 2020, and unemployment is growing very slowly (3.51% in Czech Republic and EU average unemployment rate rises to 7% in 2020) (CZSO, 2021). In addition, due to the lack of people in the market due to ongoing quarantine measures or restrictions on certain professions, labor demand in the labor market is higher than labor supply. Many parents were also in nursing care due to the closure of schools and kindergartens. Also for this reason, companies are trying to automate and robotize their operations. At the same

time, the fourth industrial revolution is reflected here, which is marked by investments in automation and digitization of production.

In the literature, on average, the estimated large flexibility of substitution between capital and labor is 0.9. Research (Gechert et al., 2021) explains this great flexibility with three problems: distortion of publication, use of variations between countries, and omission of the first-order condition for capital. Their results show that the failure to normalize the production function leads to a significant bias in the estimated elasticity. The weight of evidence gathered in the empirical literature strongly rejects the Cobb-Douglas specification. (Rowthorn, 1999) has a similar conclusion, which shows that the heterogeneity in the previously presented estimates is given primarily by modeling decisions for technological dynamics. They estimate the long-term meta-elasticity of the aggregate economy in the range of 0.45–0.87. Most industry estimates do not differ significantly from the aggregate economy estimate.

The model (Alvarez-Cuadrado et al., 2017) shows that sectoral differences in the degree of substitutability of capital - labor - a new mechanism - are the driving force of structural change. When the flexibility of the combination of capital and labor varies across sectors, the factor balancing effect is effective. It tends to intensify production in a more flexible input sector, which is becoming more abundant. As a result, the growth rate of sectoral capital to labor ratios may vary, and if this effect dominates, the shares of each factor used in a given sector may move in different directions.

Despite disagreements over the level of impact of automation, experts agree that new technologies tend to be applied to every economy and sector, which has an impact on work regardless of its replacement or addition (Lima et al., 2021).

1. Methods of Research

The aim of the paper is to capture the dynamic development of the observed basic values in the labor market due to the onset of the fourth industrial revolution called Industry 4.0 and the Covid-19 pandemic in the Czech Republic. Based on the evaluation of the data, the labor market and the effects of the current economic situation on the development of labor substitution by capital will be analyzed.

The main variables examined will include: share of unemployment person, average real and average gross nominal wages, aggregate labor productivity and unit labor costs from 2007 to 2020. These data were obtained from the Czech Statistical Office and the Ministry of Labor and Social Affairs. Other necessary information and knowledge were used from professional international scientific conferences, workshops and professional scientific journals. Information on the development of investments and economic data for individual sectors was drawn from the Ministry of Industry and Trade of the Czech Republic (Hedvicakova, 2018; Hedvičáková & Kozubíková, 2021). In particular, primary resources will be used.

The first vision of the fourth industrial revolution comes from Germany in 2011 and the overall concept was subsequently presented in 2013 at the trade fair in Hanover. We can

therefore conclude that this concept arose out of the need to revive the economy after the economic crisis that began in 2008 as the financial crisis in the United States. The Industry 4.0 concept has been adopted by most countries around the world. For the Czech Republic, the Industry 4.0 initiative has an important role, as it is a small open economy that is highly dependent on the economic situation in Germany. The economic situation of the Czech Republic is also significantly dependent on the manufacturing industry. For this reason, government support is needed to increase investment and support automation and digitization. Therefore, even the current economic crisis can be seen as an opportunity for wider implementation of Industry 4.0 in practice. The advent of Industry 4.0 brings with it, in addition to indisputable advantages, also concerns about the rising unemployment rate. A number of studies are emerging around the world that estimate the possible impacts of Industry 4.0 on the labor market. However, these studies differ significantly in estimates of the number of new and lost jobs due to the Fourth Industrial Revolution.

Research (Frey & Osborne, 2017) shows the expected effects of future automation on work, further analyzes the number of jobs at risk and the relationship between occupations, the likelihood of automation, wages and education in the US market. According to their estimates, around 47% of total employment in the US falls into the high-risk category. According to their model, the most endangered are workers in transport and logistics, together with the majority of administrative and administrative support workers and workers in manufacturing professions. Surprisingly, service employees are also at risk.

The number of newly created and lost jobs due to automation and robotization varies from study to study. The best-known studies on the issue are listed in Table 1.

Tab. 1: Overview of estimated job creation and disappearance

Author	The ratio of endangered and newly created jobs
Frey, Osborne (2013)	47% of jobs at risk in the US
Office of the Government of the Czech R. (2015)	5:2 (CR)
Davos Forum (2016)	7:2 (developed countries)
Arntz, Gregory, Zierahn (2016)	7:6 (SRN)

Source: own processing based on(Národní vzdělávací fond, o.p.s., 2016)

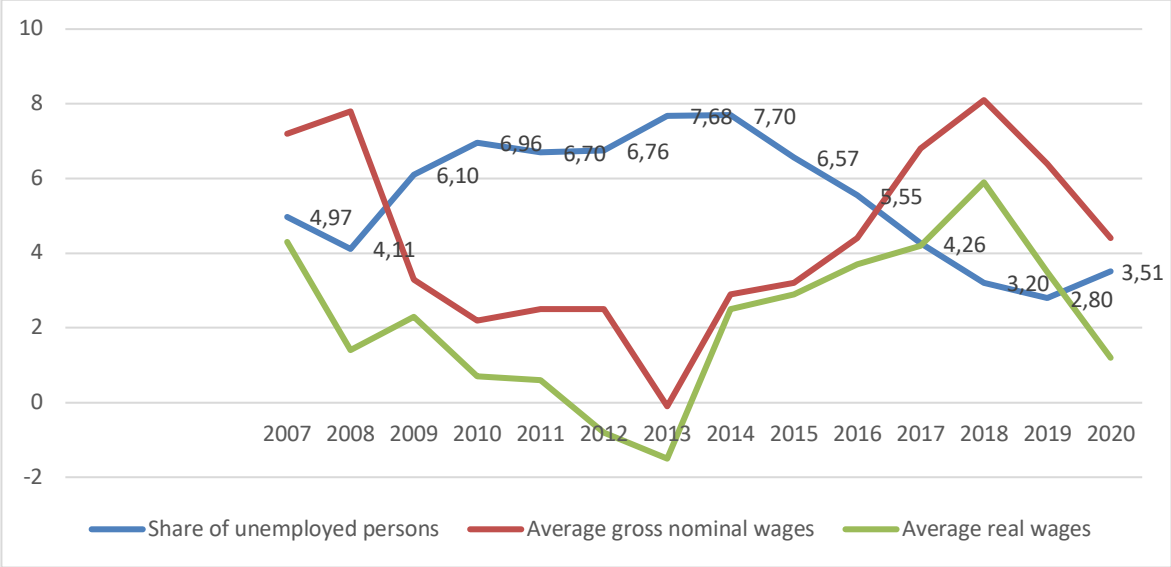
For the above reasons, there will be a dynamic development of the unemployment rate in the labor market, partly due to economic cycles and the implementation of Industry 4.0. In the labor market, there will be substitution of labor by capital. This situation on the labor market will be used to create a model of system dynamics according to the methodology in the software program Stella Professional. The system dynamics model will be created according to the methodology of Sterman (Sterman, 2009). The limitation of this mode is the quantification of the given problem - expression in numbers. The authors see the greatest threat to future employment in artificial intelligence systems that will take on work that requires both a person's cognitive and mental abilities, instead of repetitive work. Another limitation is the higher rate of abstraction, especially by examining the development of GDP in connection with the development of the labor market (productivity per hour, development of the number of employees and hours worked per employee). However, GDP is also affected by fiscal and monetary policy, the banking sector, etc.

2. Results of the Research

The share of the unemployed was declining from 2005 (when it was measured) until 2008, when the global economic crisis began. This year, the share of unemployed persons reached 4.11%. From 2009, the share of unemployed persons grew until 2014, when it reached its maximum of 7.70%. The Czech economy also began to grow and the share of the unemployed fell to 2.80% in 2019. In the following year, the Covid-19 pandemic erupted in full force worldwide. Looking at FIG. 1, the share of unemployed persons increased slightly to 3.51% (CZSO, 2021). Figure 1 shows that although GDP fell to -5.6%, the unemployment rate grew very slowly. And this trend continued in the first two quarters of 2021. The unemployment rate is thus below its natural unemployment rate. This situation was caused on the one hand by support programs of the Ministry of Industry and Trade (eg the Antivirus program) and for another excess of labor demand over labor supply. Such a low demand for labor is disadvantageous for employers who do not have a sufficient number of workers and must motivate current and potential workers financially or with various benefits. This involves rising labor costs, which will be reflected in rising prices in the future and inflation will rise.

Figure 1 also shows that average real wages have been declining since 2018. Until 2018, there was economic growth and the economy was in expansion. Real wage growth was 5.9% per year. During the Covid-19 pandemic, real wage growth declined by only 1.2%. The average inflation rate was 3.2% in 2020 according to (CZSO, 2021). It follows that the growth of average gross nominal wages was 4.4% in 2020.

Fig. 1: Share of unemployment person and average wages of the Czech Republic in 2007-2020 in percentage



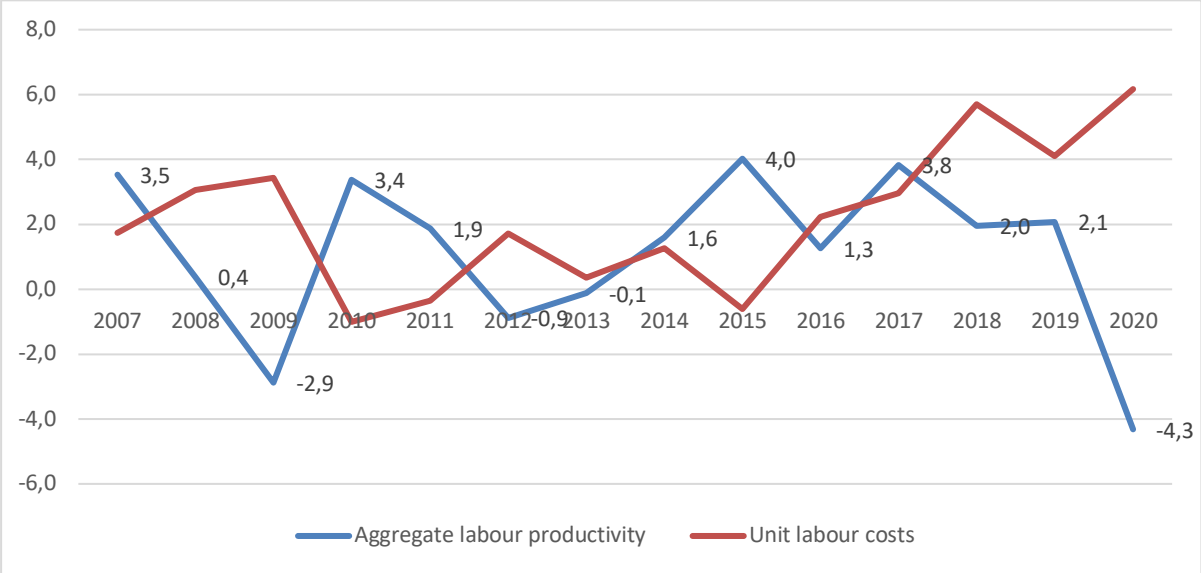
Source: authors' own calculations, data from (CZSO, 2021)

Figure 2 shows the development of aggregate labor productivity and unit labor costs in 2007-2020 in the Czech Republic. It is clear from the figure that the development of these two variables does not correspond to the development of the economic cycle. However, it is very clear that as unit labor costs increase, aggregate labor productivity decreases. The growth of unit labor costs was mainly at 3.4% in 2009, when the economic crisis began. But a year later they fell to -1%. Unit labor costs started to grow

again in 2016 (after a slight fluctuation) until 2018, when they reached the level of 5.7%. In 2021, they reached a maximum of 6.2% during the period under review (CZSO, 2021).

Similarly, aggregate labor productivity fell the most during the first crisis to -2.9% in 2009 and reached its maximum in 2020 -4.3% (CZSO, 2021).

Fig. 2: Aggregate labour productivity and unit labour costs of the Czech Republic in 2007-2020 in percentage



Source: authors' own calculations, data from (CZSO, 2021)

The above two graphs show that during the crisis, the number of unemployed increased and average wages fell. At the same time, aggregate labor productivity and labor costs increased.

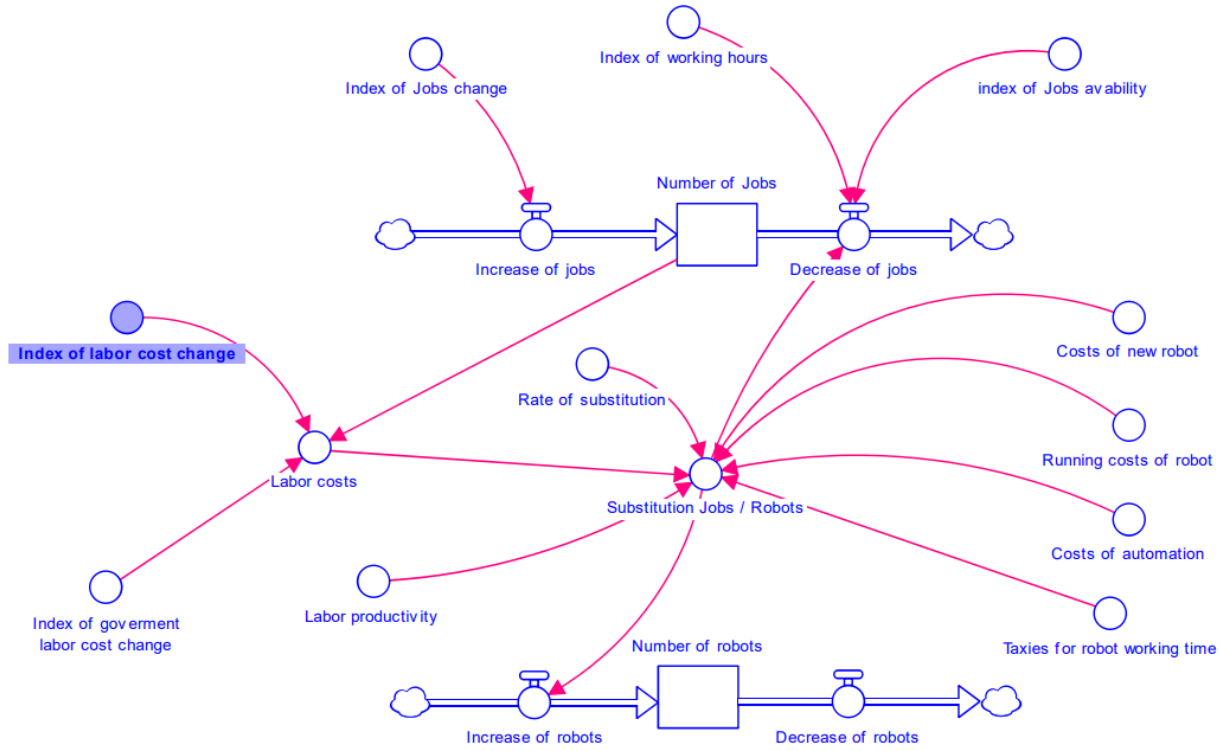
System dynamics model capital-labor substitution

The next figure 3 shows the mechanism of substitution of labor by capital. The basic elements of the scheme are the amount of work (workers available on the labor market) and the number of robots installed in companies.

The amount of work is predominantly influenced by the natural rate of change of the working-age population, the considered reduction of the working time fund and the availability of the working-age population (for example, in times of viral epidemics).

The number of installed robots depends on the substitution of labor / capital, ie. How effective it is for companies to replace workers with automatic production mechanisms. The key elements of this substitution are the investment cost of the robotic workplace, the operating costs of the robotic workplace (including, for example, the considered taxation of robot work) and the number of workers to be replaced by the robotic workplace. According to the final comparison, the company then chooses to what extent and how quickly it will replace right-wingers with robots.

Fig. 3: System dynamics model capital-labor substitution



Source: authors' own processing in Stella Professional

3. Discussion

Although the economy is in recession, the unemployment rate is growing very slowly and is below its natural unemployment rate. Therefore, the demand for labor also exceeds the supply of labor. Businesses need to increase labor costs to keep or get new jobs. The Industry 4.0 initiative also enters here, where labor is expected to be replaced by capital. With this, unemployment is expected to rise. Different studies report different impacts on the labor market (Hedvičáková & Král, 2021). Related to this is the question of whether it is really a revolution or just evolution? The study states (Asadollahi-Yazdi et al., 2020) that this is a development of a sector coming with the improvement of technology. In the era of Industry 4.0, all companies tend to be compatible with the concepts and pillars of Industry 4.0 in order to remain in a competitive industrial world. All companies need to know aspects of Industry 4.0 and adapt their supply chain system and decision-making approaches to its functions.

According to economic forecasts, there should be a recovery and the economy should already reach its bottom. The gradual recovery will bring with it additional demand for workers. This further increases the need for robotics and automation in production.

Another criterion for the substitution of labor by capital is the growth of wages and therefore the wage costs for companies. In the long run, wage levels will increase relative to capital prices, increasing the profitability of robotics and automation,

according to a number of studies (Frey & Osborne, 2017). In addition, recent empirical research reveals a causal relationship between access to cheap labor and mechanization in agricultural production in terms of a sustained economic transition to increased mechanization in characterized areas of low-wage labor migration (Frey & Osborne, 2017; Hornbeck & Naidu, 2014). Capital-labour substitution will also lead to increased labor productivity and thus increasing production efficiency. The degree of substitution of labor by capital and increasing productivity will differ in individual branches of production, and will also be different for individual professions.

It will also depend on the support of individual governments in the field of innovation and development or investment. Equally important will be legislative changes that will support the process of automation and robotics, such as cars without drivers.

Another issue for discussion is the possible reduction of working hours. This aspect will also lead to faster automation and robotization. Studies show (Schiller et al., 2017)that a 25% reduction in weekly working hours with a retained salary has beneficial effects on sleep, drowsiness and perceived stress on weekdays and days off. But it means increased costs for companies.

Conclusion

The Covid-19 pandemic caused the global economic crisis. As a result, GDP fell and unemployment rose. This period hastened the onset of the Fourth Industrial Revolution. Businesses are moving to online solutions, employees are working remotely from home and new technology solutions are being introduced. Some companies have started to prosper, but medium-sized companies in particular are in danger of going bankrupt as demand has fallen due to quarantine measures. Industry 4.0 is associated with concerns about rising unemployment and growing digitization. However, the impacts will be different and will vary from profession to profession. In the long run, the most endangered jobs will be the most common professions that can be easily automated: dealers, drivers, security, etc. However, markets are adapting to the new situation. However, the acceleration of technological change may lead to a long-term mismatch between the exponential increase in the speed of automation, the compensatory effect of retraining and the creation of new jobs (Zemtsov, 2020).

However, companies will make decisions mainly according to current conditions on the labor market. As long as labor demand exceeds labor supply, the average wage will continue to grow and there will be various quarantine measures in the market, companies will invest in automation and thus increase labor productivity and overall production efficiency.

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Peter Jančovič[a], Jakub Szabó[b]

University of Economics in Bratislava, Faculty of International Relations,
Department of International Economic Relations and Economic Diplomacy[a],
Department of International Political Relations[b]
Dolnozemská cesta 1/b, 852 35 Bratislava 5, Slovak Republic
peter.jancovic@euba.sk, jakub.szabo@euba.sk

Commodity Structure of Least Developed Countries' Exports to the European Union

Abstract

In this article, we employ cluster analysis to differentiate between various groups of least developed countries (LDCs) according to the commodity structure of their exports to one of the world's largest economies – the EU. The article is organized as follows. Firstly, we review the literature on international trade between the EU and LDCs, and the role of non-reciprocal EU's preference regime Everything but Arms (EBA) in the trade relations between the EU and LDCs. In the subsequent section, we approximate the methodology and data applied in this paper. Thirdly, we present the main findings from cluster analysis of LDCs' exports to the EU in 2019. Last section summarizes the main takeaways stemming from our findings. Our findings support the prevailing notion that LDCs' exports are insufficiently diversified, relying on exports of primary commodities and products with low value-added, mainly mineral semi-products, textile and clothing. We also managed to identify several regional clusters of LDCs according to the commodity structure of their exports to the EU. The most predominant are LDCs in South-East Asia (cluster 12) exporting high volumes of their textile and apparel production to the EU, and LDCs from East Africa (cluster 2) with large amounts of coffee and tea exports to the EU.

Key Words

European Union, least developed countries, exports, commodity structure, cluster analysis

JEL Classification: F10, F53

Introduction

According to the United Nations (n.d.), Least Developed Countries (LDCs) are comprised of 46 low-income countries "confronting severe structural impediments to sustainable development". Overwhelming majority of LDCs – 33 countries – is situated in Africa, 9 can be found in Asia, 3 in Oceania, and only 1 in Latin America and the Caribbean.[1] LDCs represent the poorest and weakest segment of the world economy, encompassing over 800 million people, 12% of world population, but accounting for less than 2% of world GDP and about 1% of global trade in goods (UN-OHRLLS, n.d.). The export-to-GDP ratio average of LDCs is low, around 25%, below the developing country average of about 35%, indicating a weak involvement of LDCs in international trade. Moreover, LDCs exports are highly concentrated, and proffer low value added. UNCTAD (2018) data suggest that even

[1] The UN Committee for Development Policy, a subsidiary body of the UN Economic and Social Council, reviews the list of LDCs every three years based on three criteria: gross national income per capita, human assets index, and economic and environmental vulnerability index.

though the LDCs export volumes increased between 2000 and 2016 by 276%, overall LDCs participation in Global Value Chains remains limited, having grown by only 2% between 2010 and 2017. Furthermore, the share of foreign value added in their exports is still low at around 9%. This indicates that LDCs are predominantly just a source of inputs for other countries' exports in several sectors.

Prevailing form of LDCs exports are natural resources and primary commodities. Second largest commodity exports from LDCs are apparel and textiles, even though disproportionally from Asian LDCs. There are various reasons for LDCs' insufficient diversity in their exports. LDCs production and export sectors are known for lacking adequate infrastructure and functioning pro-export institutions. Many LDCs also face specific trade-related obstacles such as landlock positions, distance from large and dynamic markets, and small domestic markets limiting potential economies of scale.

The EU provides the most generous non-reciprocal duty-free and quota-free (DFQF) regime for LDCs (UNCTAD, 2016). The European Communities and subsequently the post-Maastricht EU started to grant LDCs various non-reciprocal trade preferences, providing an enabling, DFQF trading environment for LDCs. Majority of the major trade preference regimes stem from the 1968 Generalized System of Preferences (GSP). The EU's GSP is recognised as the most progressive in terms of benefits granted to LDCs. Afterwards, the EU added the GSP+, reciprocally requiring implementation of 27 conventions related to human, labour and environmental rights. Since 2001, the EU established the Everything but Arms (EBA) regime for LDCs, providing non-reciprocal DFQF access to all products except arms and ammunition (European Commission, 2020).

As we have explained above, LDCs exports are insufficiently diversified, relying on primary commodities and production of textile and clothing. At the same time, we know that economic protectionism might be one of the impediments to LDCs lack of export competitiveness and EU's non-reciprocal preference regimes are regarded as the most generous ones. Thereby, the aim of this paper is to examine the commodity structure of LDCs' exports to the EU using a cluster analysis, technique rarely applied in this field. The article is structured as follows. Firstly, we provide a brief literature review on international trade between the EU and LDCs. The subsequent section describes the methodology and data applied in the paper. Next, we present the most pertinent findings of cluster analysis. Conclusion summarizes the main takeaways from our analysis.

1. Literature Review

Literature assessing trade flows between LDCs and the EU under the preferential regimes (GSP/GSP+/EBA) is relatively ample. Herz and Wagner (2011) observe that even though the exports of developing countries are enhanced by non-reciprocal preferential regime (GSP) in the short-run, the medium to long-run effects are clearly negative. The underlying reason might be, the authors argue, an increasing distortion in the economic structure of GSP recipients caused by biased economic incentives. On the other hand, majority of academic work regarding the non-reciprocal preferential regimes for LDCs tilts towards more optimistic conclusions. Thelle et al. (2015) discovered that the average percentage point reduction in the EU import tariffs under the GSP/GSP+ has been 3.5 and under the EBA 5.3. According to the authors, this led to an average export increase of 6.2%

under the EBA, which is significantly higher compared to an average export increase of 1.2% under GSP/GSP+.

Persson and Wilhelmsson (2007) examine the effects of trade preferences offered by the EU on developing countries' exports using a gravity model. Their findings affirm that the EU preferential GSP trade regimes for LDCs have a significant effect on the trade volume. They argue that even though a decline in overall export volume was registered during the observed period, the decline would have been even steeper had there not been the GSP. Doležalová (2020a) looks at the impact of three trade preferential regimes – EBA, African Growth and Opportunity Act (AGOA) of the US and Chinese DFQF program – on the commodity and geographical structure of LDCs. Her findings do not suggest that preferential schemes for LDCs have contributed to a greater diversification of LDCs exports. On the other hand, Doležalová (2020a) notices significant changes in the geographical structure of LDCs' exports within the EU, the United States and China. Ito and Aoyagi (2019) find out that LDCs benefited also from Japan's non-reciprocal preferential regime, suggesting that unilateral preferential access is beneficial in all contexts, not only in the EU.

When it comes to overall LDCs' export capacity, the UN Conference on Trade and Development (UNCTAD) provides multiple reports and research papers assessing LDCs' trade (in)complexity. UNCTAD (2016) examines the impact of G20 trade policies on export performance of LDCs, while UNCTAD (2020b) analyses the impact of the WTO services waiver for LDCs from 24 WTO members including the EU. UNCTAD also provides detailed annual reports on LDCs, which also include the trade capacity of these vulnerable economies (e.g., UNCTAD, 2020b; UNCTAD, 2019; UNCTAD, 2018). All recent UNCTAD reports conclude that commodity structure of LDCs' exports is oriented towards primary commodities, reflecting their dependence on primary exports, and lately also on the textile and clothing sectors. Increasingly, LDCs suffer from concentration in their export composition and export destinations. Reliance on highly concentrated low value-added exports and not sufficiently diversified import markets might be significantly problematic during the global economic slowdowns like the Covid-19 induced recession. UNCTAD (2020b) observed that the global recession brought a sharp slump in the external demand for LDC goods and services and depressed the prices of their main exports.

Cluster analysis is used relatively seldom in analysing the international trade flows, import and export structures. Lukáč, Stašková and Blaščák (2018) create clusters of import and export partners of Slovak Republic in sugar trading. Skvarciany, Jurevičienė and Vidžiūnaitė (2020) employ cluster analysis to assess the impact of Western sanctions on trade with Russia, which were imposed due to the annexation of Crimea. The authors clustered the EU countries according to the average for 1998-2018 exports of products to Russia. Yeo and Deng (2019) investigate the impact of trade policy measures on trade flows between Pakistan and its dominant trading pattern for the period 2006 to 2015. Besides the gravity model, the authors also employ cluster analysis to distinguish between four specific country groups according to their geographical and organizational clusters. Doležová (2020a) clusters LDCs based on the impact of non-reciprocal preferential regimes from the EU (EBA), the US (African Growth and Opportunity Act) and China's DFQF regime. Doležalová (2020b) also uses cluster analysis to examine the commodity and geographical structure of the EU imports of its 50 biggest trade partners. The article assesses the similarity of the commodity structure of the imports destined to the EU as

well as the importance of the EU as a trade partner employing the share of exports to the EU on the total exports of the country.

2. Methods of Research

In this article, our aim is to examine the commodity structure of LDCs exports to the EU. We employ cluster analysis to classify LDCs into relatively homogeneous groups according to the commodity structure of their exports to the EU market. Cluster analysis represents a set of techniques that classifies cases into groups, clusters, which are relatively homogeneous within themselves and relatively heterogeneous between each other (Yim & Rameed, 2015). Thereby, there exist a high similarity between the cases in each cluster and a low similarity between the cases in different clusters.

Cluster analysis algorithms can be divided into hierarchical and non-hierarchical. The hierarchical algorithms can be further subdivided into agglomerative and divisive clustering algorithm (Hansen & Jaumard, 1997). At the beginning of agglomerative hierarchical clustering, each case forms its own individual cluster and similar cases are subsequently merged together until every case is grouped into one single cluster. Agglomerative clustering procedure therefore begins with each observation in a separate group, and then combines the two observations which are closest together to form a new group, until the required number of clusters remains. In reverse, the divisive hierarchical clustering starts with one large cluster and is gradually separated into smaller groups of clusters until each case forms an individual cluster (Yim & Ramdeen, 2015). In our analysis, we employ agglomerative hierarchical method of clustering that allows us to determine an appropriate number of clusters during the clustering process.

The use of hierarchical agglomerative cluster analysis also requires the definition of the clustering linkage method, and the distance measure. Regarding the linkage method of clustering, we use Ward's method where the dissimilarity between two clusters is defined as the loss of information from joining the two clusters. Loss of information is found by measuring the increase in the error sum of squares, or the sum of squared deviations of each pattern from the centroid for the cluster (King, 2015). Ward's method is the most appropriate for quantitative variables in our view. To measure the distance or similarity between the cases, we employ the squared Euclidean distance as a measure of distance or similarity between the cases. This is the most commonly used distance metric when applying Ward's method of clustering. According to Hopke and Casuccio (1991), the squared Euclidean distance (SED) between cases *i* and *j* can be defined by the following equation:

$$SED_{ij} = \sum_{k=1}^{m} (x_{ik} - x_{jk})^2 \quad (1)$$

where m refers to the number of measured variables, x_{ik} is the value of the *kth* variable for the *ith* datum point and x_{jk} is the value of the *kth* variable for the *jth* datum point.

The set of observations is made of 46 LDCs, since this article aims to determine relatively homogeneous groups of LDCs in terms of the commodity structure of their exports to the EU. In accordance with the existing literature (Doležalová, 2020b), the variables under

which the clusters were created are the % shares of individual commodity categories in the total exports of LDCs to the EU in 2019. We opted for the last year prior to the Covid-19 pandemic since the interim effects stemming from the global recession would have distorted the plausibility of the data and our capacity to interpret the results in the long run. The data for cluster analysis are based on the Standard International Trade Classification (SITC) Revision 3, in form of a two-digit SITC codes. The SITC Revision 3 two-digit codes are sorted out to eight sections. Sections 0 to 4 are commodities including primary products and 5 to 8 are manufactured goods (UNCTAD, n.d.). The data were retrieved from the UNCTADstat database.

3. Results and Discussion

The results of our cluster analysis are depicted in Table 1. LDCs were divided into twelve clusters according to the similarities in the commodity structure of their exports into the EU, based on the two-digit SITC codes. Dendrogram, outcome of the cluster analysis, can be found in the appendix (Appendix 1). Afterwards, individual export commodities as % share of total exports from LDCs to the EU were averaged for each cluster. Table 1 summarizes three main commodity groups in terms of their share on overall imports to the EU for each of the twelve clusters. One of the first findings we observe is that the EU does not constitute a major export market for majority of LDCs. More precisely, 14 LDCs exported less than 5% of their total exports to the EU in 2019. Around 30 LDCs recorded their exports into the EU to be below 20% of their overall exports in 2019. The EU is a major export market, 50 plus % of their exports, only in case of these three economies: Bangladesh, Liberia and São Tomé and Príncipe.

Tab. 1: Clusters of LDCs based on the commodity structure of their exports to the EU at the two-digit SITC codes (2019)

Cluster no.	*Countries*	*Main export commodities (cluster's average % share)*		
		1st	*2nd*	*3rd*
1	Angola, Chad, South Sudan	33 – Petroleum, petroleum products (82.41%)	22 – Oil seeds and oleaginous fruits (3.89%)	29 – Crude animal and vegetable materials (2.87%)
2	Burundi, Sao Tome and Principe, Rwanda, Uganda, Ethiopia	07 – Coffee, tea, cocoa, spices (65.88%)	29 – Crude animal and vegetable materials (7.81%)	05 – Vegetables and fruits (3.66%)
3	Eritrea, Yemen, Mauritania, Gambia, Senegal, Solomon Islands	03 – Fish, crustaceans, molluscs (53.44%)	28 – Metalliferous ores and metal scrap (14.17%)	42 – Fixed vegetable oils and fats (7.55%)
4	Democratic Republic of the Congo, Zambia, Mozambique	68 – Non-ferrous metals (66.41%)	12 – Tobacco and tobacco manufactures (6.14%)	27 – Crude fertilizers and crude minerals (5.74%)
5	Guinea, Sierra Leone, Liberia, Niger	28 – Metalliferous ores and metal scrap (47.61%)	52 – Inorganic chemicals (13.89%)	79 – Other transport equipment (13.40%)
6	Somalia, Sudan	29 – Crude animal and vegetable materials (65.75%)	22 – Oil seeds and oleaginous fruits (8.15%)	06 – Sugar, sugar preparations and honey (4.17%)

7	Haiti, Madagascar, Timor-Leste, Djibouti, Comoros, Tuvalu	07 – Coffee, tea, cocoa, spices (17.44%)	55 – Essential oils for perfumes and cleaning (13.33%)	84 – Articles of apparel & clothing accessories (8.86%)
8	Benin, Togo, Afghanistan, Mali, Guinea-Bissau, Burkina Faso, Central African Republic	05 – Vegetables and fruits (15.15%)	26 – Textiles fibres and their wastes (10.37%)	22 – Oil seeds and oleaginous fruits (9.92%)
9	Kiribati, Tanzania, Malawi	12 – Tobacco and tobacco manufactures (44.53%)	03 – Fish, crustaceans, molluscs (15.25%)	66 – Non-metallic mineral manufactures (9.20%)
10	Lesotho	66 – Non-metallic mineral manufactures (83.19%)	27 – Crude fertilizers and crude minerals (14.28%)	84 – Articles of apparel & clothing accessories (1.27%)
11	Bhutan	67 – Iron and steel (86.63%)	74 – Other industrial machinery and parts (2.95%)	87 – Professional and scientific instruments (0.81%)
12	Bangladesh, Myanmar, Cambodia, Lao People's Democratic Republic, Nepal	84 – Articles of apparel & clothing accessories (71.48%)	65 – Textile yarn and related products (7.35%)	85 – Footwear (6.36%)

Source: authors' calculations

The results of cluster analysis confirm that LDCs' exports to the EU consist almost exclusively of primary products (SITC sections 0 to 4) with a low value-added. The exportation of LDCs within clusters 2, 3, 6, 7, 8 and 9 are dominated by agricultural products, such as coffee, tea and cocoa (clusters 2 and 7), fishes (cluster 3), crude animal and vegetable materials (cluster 6), vegetables and fruits (cluster 8) and tobacco (cluster 9). In most cases, the share of one commodity category is above 50% regarding clusters, as well as individual economies. LDCs within cluster 1 have a high share of energy products – petroleum and petroleum products – in their total exports to the EU. Clusters 4 and 5 are characterized by high exports of mining products, such as non-ferrous metals (cluster 4) and metalliferous ores (cluster 5). On the other side, high shares of manufactured exports, such as iron and steel, other mineral semi-products, and clothing and apparel products prevail in clusters 10, 11 and 12. Cluster 11, consisting only of Bhutan, exports an intermediate products of iron industry – pig iron – which belong to the category of low-skill and relatively technology-intensive manufactures. Cluster 10, made up of only Lesotho, has a high share of non-metallic mineral manufacturers in its exports to the EU. Least developed countries within cluster 12 export mainly labour-intensive textile and clothing products to the EU.

To summarize, LDCs' trade flows into the EU are led by exports of natural resources and production with low value-added, predominantly textile and clothing products. There are few deviations though, resulting from a strong export sector of one country within a particular cluster. For instance, third major export commodity within the cluster 5 is an item no. 79, other transport equipment, which covers Liberian exports of special purpose ships and cargo ships. Naturally, Liberia is not a prominent ship-building country, its economy merely benefits from a "flag of convenience", registering largest amounts of ship

owners in the world, second only to Panama (OEC, n.d.). Such deviations have a capacity to distort the informative capability of the results.

Other than that, outcomes of our cluster analysis are very useful in identifying export similarities in regional clusters. Cluster 12 depicts regional collection of LDCs in South Asia and other countries in the immediate proximity, relying on exports of apparels, clothing and other textile-related products requiring cheap and abundant labour. Bangladesh is a quasi-leader in the region in terms of textile exports into the EU. The EU market is crucial for this Southeast Asian country, with the EU market absorbing more than half of its exports. Bangladesh is in fact one of the few LDCs that is completely reliant on the EU import capacity. The textile fibres and their wastes exports in cluster 8 are also relatively regionally distributed, namely in case of Burkina Faso, Mali, Togo and Guinea-Bissau. Textile exports into the EU are also prominent within cluster 7, especially in case of Haiti, Madagascar and Tuvalu.

Other clusters delineate LDCs regionally as well, at least to a certain extent. Cluster 2 captures significant exporters of coffee and tea. With the sole exception of São Tomé and Príncipe, cluster 2 is comprised of countries being situated in East Africa, in proximity of the Horn of Africa. Except for São Tomé and Príncipe, countries in the cluster export between 6,7% (Rwanda), to 21% (Ethiopia) of their total exports to the European Union. 90% of Burundi's exports into the EU consists of coffee and to a certain degree a tea. Approximately half of the exports of Ethiopia, Rwanda and Uganda into the EU is either coffee, or tea. The same does not, however, apply to cluster 7. Even though countries in this cluster are relatively similar in terms of their exports of coffee and tea (Comoros, Timor-Leste, Madagascar or Haiti), they are geographically very dispersed.

Cluster analysis brought also couple of outliers, LDCs exporters sui generis. We notice cluster 6 (Somalia and Sudan), 10 (Lesotho) and 11 (Bhutan) containing only one or two LDCs inside the clusters. Cluster 6 is relatively disproportional, with the EU accounting for over 20% of Somalia's exports, but only 3.8% for Sudan's. Nevertheless, these two countries have a major overlap – crude animal and vegetable materials. In case of Somalia, an item no. 29 constitutes over 85% of the country's exports into the EU. In case of Bhutan, the EU does not represent a significant trading partner (less than 3% of Bhutanese exports). Lesotho, on the other hand, exports quarter of its production into the EU, namely very country-specific non-metallic mineral manufactures (no. 66 SITC Rev 3).

Conclusion

This article deals with the commodity structure of LDC's exports to the EU in 2019 using cluster analysis. After we reviewed the literature on international trade between the EU and LDCs, we proceeded to the methodology and data applied in the article. In this article, we employed cluster analysis of LDCs' exports to the EU in 2019, the year prior to the global pandemic in 2020, not to distort our findings due to cyclical nature of the Covid-19 pandemic. Next, we presented the main findings of our cluster analysis. We observed that LDC's exports to the EU are still insufficiently diversified, relying on exports of primary commodities and products with low value-added, namely mineral manufactures, textile

and apparels. Furthermore, the EU does not constitute a significant trading partner for LDCs, with around 30 LDCs having their share of exports to the EU below 20% of their total exports and 14 LDCs below 5%. Cluster analysis allowed us to identify several regional clusters in terms of the commodity structure of LDCs' exports to the EU in 2019. The most prominent clusters, geographically speaking, are LDCs in Southeast Asia (cluster 12) exporting high volumes of their textile and apparel production to the EU, and LDCs from East Africa (cluster 2) with large amounts of coffee and tea exports to the EU.

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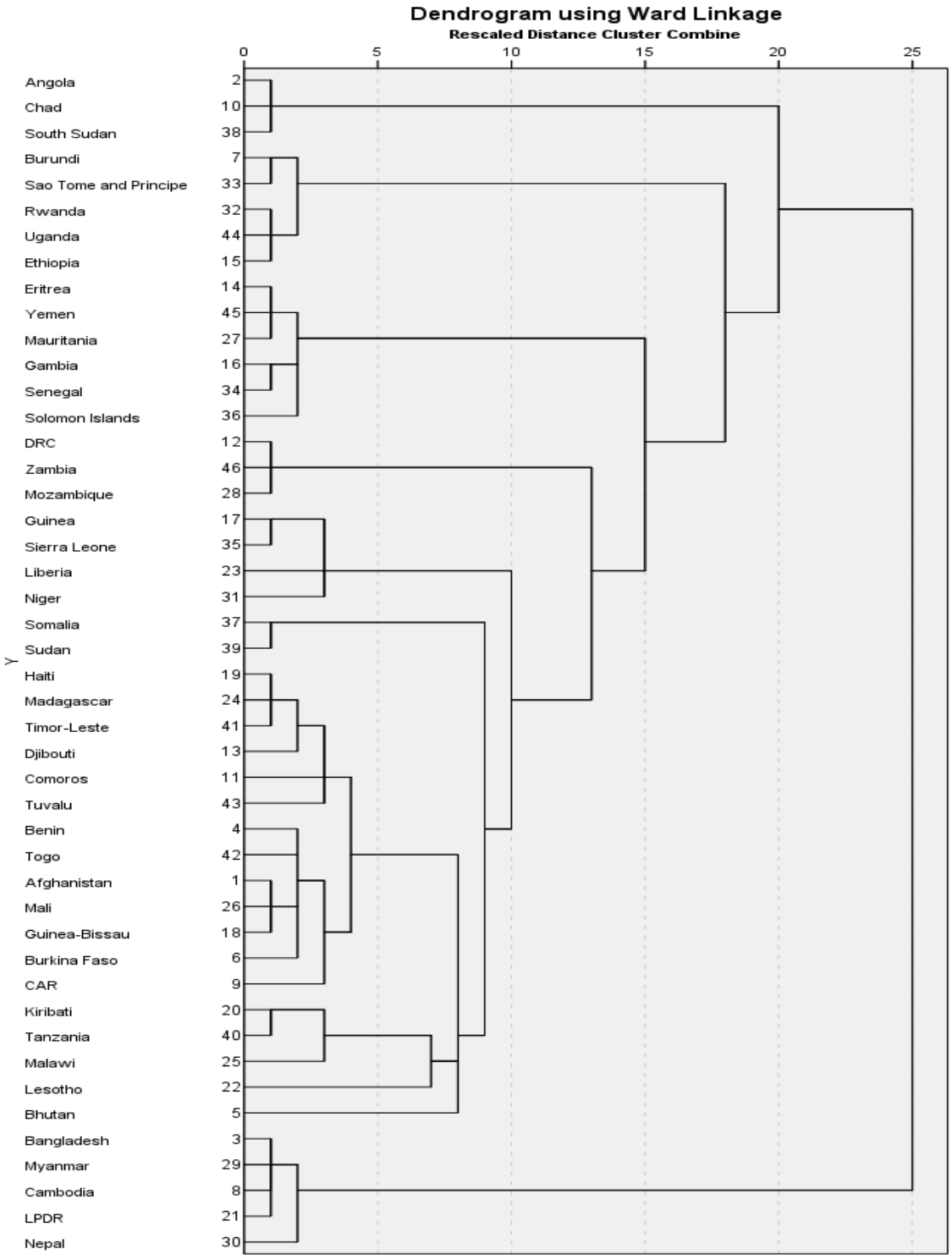
Appendix

Appendix 1: Dendrogram of the commodity structure of LDCs' exports to the EU in 2019



Source: authors' calculations in SPSS

Jiří Kraft

Technical University of Liberec, Faculty of Economics, Department of Economics
Studentská 2, 461 17 Liberec 1, Czech Republic
email: jiri.kraft@tul.cz

Particular Relationships among Market Structures, Creation of Wealth, and Investment in the Regions of the Czech Republic in the Era of Industry 4.0

Abstract

The purpose is to assess certain aspects of the regional economies in relation to the existing market structures represented by the size categories of companies and, in addition to that, to highlight implications for public support of small and medium-sized enterprises. The paper examines a period of five years with the year 2014, when Industry 4.0 was explicitly identified, lying in the middle of this period. Variability of parameters is analysed by means of the coefficient of variation, while correlation analysis is applied to evaluate the relationship between three size categories of companies and regional investment. The analysis was preceded by the Dixon's test of outliers. The aim of this paper is to investigate the market structures representing one of the most significant attributes of competitiveness and how they are reflected in a selected sample of Czech regional economies at the beginning of the fourth industrial revolution. Investment made in each of the regions became the basis for the development of the economy connected to Industry 4.0. The paper answers the question of whether regional investment is related to the involvement of companies belonging to various size categories. It was discovered that regional differences in gross domestic product are bigger than differences in the number of companies belonging to each size category. It was concluded, based on relevant data, that the support of small and medium-sized enterprises is justified and that there are also potential positive effects for the economy in the era of Industry 4.0.

Key Words

Industry 4.0, market structures, regional gross domestic product, regional investment, company size categories

JEL Classification: L11, R12

Introduction

Industry 4.0 is a phenomenon that exists and has developed not only in the economic reality, both macroeconomic and microeconomic, but also in the society as a whole. In July 2014, the German GTAI agency (Germany Trade & Invest) issued a comprehensive document titled Industry 4.0 and subtitled Smart Manufacturing for the Future. The document deals with the start of the fourth industrial revolution which is based on the digitising of manufacturing processes and the interconnection of the virtual digital world with the real world while showing trends towards Cyber-Physical Production Systems and the Internet of Things (MacDougall, 2014). The German Government supports this process and takes part, together with companies of all size categories, in its deployment, and uses the process to enhance the attractiveness and competitiveness of the German economy and politics (Belov, 2016). Together with the ever-deepening digitisation of the

manufacturing process, mainly in small and medium-sized enterprises, Cyber-Physical Production Systems are considered to be a powerful tool for enhancing the competitiveness and efficiency of manufacturers (Huang et al., 2019). The existence of so-called "smart factories" benefiting from dynamically developing technologies is linked to Industry 4.0. Also, combinations of technologies are emphasised; L. E. Grinin et al. (2017) introduced the MANBRIC-technologies acronym (medico-additive-nano-bio-robot-info-cognitive technologies). When referring to the fourth industrial revolution, Li, Hou, Wu (2017) put special emphasis on the connection of digital, physical and biological technologies. All these changes induce alterations not only in the industrial structure of contributions to GDP, but also in the structure of investment in industries and, moreover, they are reflected in the structure of stock markets (Chovancová et al., 2018).

Revolutionary changes have many significant impacts on the whole society: requirements for competencies and skills of workers are undergoing a fundamental transformation, which may generally affect the demand for labour and result in its decrease. Focused on comparing positions of countries on the brink of the fourth industrial revolution, research shows different development trends in performance efficiency and competitiveness in different regions. The Czech Republic, for example, is the only country among the transformed economies of the former Soviet bloc that joined the traditional market economies in terms of the contribution of industries connected with advanced technologies to gross value added and the growth rate of GVA over the years 2000-2015 (Kraftová et al., 2018). Ciffolilli, Muscio (2018) analyse comparative advantages of European countries and regions, and their technological specialisation, while emphasising Europe's need to achieve a balance between the support of excellence in research and innovations, and the position of less developed regions.

Each of the preceding industrial revolutions had principal impacts on the domain of market structures and each of them significantly affected the industrial structure of the economy and the competitive potential of economic entities within the newly established parameters of competition. It can be assumed that it will not be any different in the period of the fourth industrial revolution. Digital technologies and their application in manufacturing or, more generally in all economic activities, generate two contradictory tendencies. The first tendency allows for further massification of production, which may result in the growth of production volumes of one commodity achieved by one company, decrease of the number of manufacturers of certain products as a consequence of gradual saturation of consumption and, thus, in a higher degree of monopolization. On the other hand, the growth of production will go hand in hand with the increasing number of employees who will be replaced by new technologies linked to information control systems, which will make it possible even for small manufacturers to produce advanced quality products of innovative nature. This can lead to an increasing number of non-monopoly businesses.

Put in a very simplified way, an interconnection with the stages of the economic cycle can be observed within macroeconomic relations. The economic cycle influences the development potential of Industry 4.0 and, on the other hand, Industry 4.0 influences the economic cycle.

The microeconomic reality, as it is perceived by manufacturers, is linked with companies existing under various market structures, i.e. monopolistic competition, oligopoly, and

monopoly. It is also characterized by various degrees of competition and, at the same time, by various levels of capital availability as well as various sizes of companies, which is crucial for their integration in the market structures. Development changes in the market structures are caused by natural (economically rational) behaviours of entities on the offer side, and they are also partially driven by the tools of economic policy applied on a long-term basis mainly in the EU member countries. Within the EU, the tools of economic policy are declared either in strategic documents, e.g. Europe 2020 strategy (EC, 2010), Small Business Act (EC, 2011), or the related support programmes, e.g. CIP for the 2007-2013 programming period or COSME for the 2014-2020 programming period. Prause, Guenther (2019) associate governmental interventions related to Industry 4.0 in Germany with preventing market failure and impacts of negative externalities on the one side, and encouraging proliferation of technologies and impacts of positive externalities on the other. The Slovak experience, on the contrary, suggests signs of inefficiency in the use of EU financial support from the European Structural and Investment Funds by small and medium-sized companies, which hampers the desired improvement of their competitiveness (Vojtovič, 2016). In the Czech Republic, the support of small and medium-sized enterprises is governed by a law (ČR, 2002); the concept of support of small and medium-sized businesses is updated by the Ministry of Industry and Trade (MPO ČR, 2013) on a regular basis and considerable funds are allocated to operational programmes – Enterprise and Innovations for Competitiveness in the 2014-2020 programming period – in order to implement the concept.

In reality, companies integrated in various market structures operate within regions and the economic position and performance of these regions reflect the availability of capital to these companies, their innovation capabilities, and overall competitiveness. The geographical, regional dimension is something that is never missing even in the strategic documents and the related programmes for support of the business environment.

This prompts the question of which of the companies – small, medium-sized, or big – invest in the context of Industry 4.0 more and, by doing that, improve the competitiveness of Czech regional economies in the dynamics of changes. Interconnection of companies of various size categories within the market structures may both facilitate and hamper the development of regional economies. Moreover, it seems quite probable that the traditional patterns of market structures, as they were described in the middle of the previous century, will undergo certain modifications under Industry 4.0. The question of public support provided to private enterprises, which this paper also addresses, does not have an unambiguous answer.

No matter how important a position and crucial role in the economic practice they have, market structures do not receive enough attention in economic research in connection with the newly identified conditions of Industry 4.0. Graphically, it is easy to prove that the oligopoly price is below the monopoly price and the hypothetical price of products produced by companies within monopolistic competition in the short term. In the long term, however, the price of products produced by companies within monopolistic competition drops below the oligopoly price. The quantities of products also deserve a comment. The quantity produced by an oligopoly is higher than the quantity produced by a monopoly. This suggests an oligopoly's advantage over a monopoly in producing real output. In this respect, long-term monopolistic competition is seemingly the worst option. But only seemingly as it refers to the production of one small company of tens or even

hundreds in the same industry. An oligopoly, on the other hand, usually consists of a very small number of dominant companies.

1. Methods of Research

The research presented in this paper focuses on the economy of the Czech Republic and its administrative regions. The size structure of companies is considered to be a sufficient reflection of the market structures existing in reality. The size structure is composed of the number of small, medium-sized and big companies. The period examined is five years with the year 2014, when the fourth industrial revolution was explicitly identified by German GTAI, lying in the middle, i.e. 2012-2016 (it should also be noted that, in some cases, the necessary statistical data published by the Czech Statistical Office are for 2016 only).

The analysis seeks to find answers to the question of regional differences in the creation of wealth consisting of the regional gross domestic product and the size structure of companies, and addresses the question of similarities or differences in regional investment compared to the size structure of companies in the regions. The paper aims to find an answer to the questions (i) whether or not the regional differences in the achieved gross domestic product are connected with the number of companies of different sizes in the region, and (ii) if the amounts of regional investment is related to the size composition of companies in the region. A secondary objective is to answer the question (iii) if, in this respect, the existing support of small and medium-sized companies is economically rational even though it is known that graphical evidence of such support exists (Kraft, 2016).

Two hypotheses are examined:

1. The variability in the creation of the regional gross domestic product, as it is measured for each year of the investigated period by the coefficient of variation, exceeds the analogically measured variability of the size structure of companies.

2. In each year of the investigated period, regional investment shows a positive correlation with the number of small, medium-sized and big companies in each region.

To test the first hypothesis, the coefficient of variation was calculated according to (1):

$$V_x = \frac{s_x}{\bar{x}} \times 100 \qquad (1)$$

Appropriate to apply to sets with unknown distribution, the Dixon's Q test of outliers (with the level of significance being α=0,05) was performed first to avoid distortion of results by outliers.

This test was applied also in the case of the correlation analysis of regional investment and its comparison with the size structure of companies where the Spearman's rank correlation coefficient (2) was applied, as this coefficient does not require normal distributions:

$$r_s = 1 - \frac{6\sum D_i^2}{n(n^2-1)} \quad (2)$$

The Hendl's scale (Hendl, 2012) was applied to assess the results as it distinguishes small |0,1-0,3|, medium |0,3-0,7| and strong correlation |0,7-1| .

The data regarding the size categories of companies were taken from the Czech Statistical Office (Dubská, 2011) where the number of employees is considered to be the main parameter. Of course, this parameter can be considered to be crucial mainly from the regional perspective (regional dimension of employment). The analysis does not include "Not Stated" or "No Employees" categories that are also reported by the Czech Statistical Office (CZSO). The small company category includes five subcategories, while the categories of medium-sized and big companies include three subcategories.

The regional GDP is taken from the CZSO's public database (2019). Regional investment is represented by the regionally formatted gross fixed capital reported in the CZSO's public database (2019) which is also the source of data regarding the number of companies broken down by size categories.

2. Results of the Research and Discussion

Performed before the calculation of variability and correlation, the Dixon's test of outliers and its results showed that Prague, the capital city of the Czech Republic, is always an outlier in terms of the regional GDP, regional investment, and the number of companies broken down by size categories. In terms of relative values, i.e. the number of companies represented in each size category, the capital city, which is also a region, is an outlier only in some cases. Nevertheless, because Prague was always an outlier in all the cases considered, the set was net of the figures regarding Prague in order to calculate the correlation ratio between the size categories of companies and the amount of regional investment.

Assesment of the Analysed Variability

The results of the analysis investigating the variability of the size structure of companies and comparing this with the variability of the formation of the regional gross domestic product are shown in Table 1. It proves that, in terms of the parameters describing the formation of the regional gross domestic product, the heterogeneity of the set of 13 Czech regions (without the capital city) nears 50% for the number of small companies and the number of big companies, which is a level that is generally considered to be significant. The variability of the percentage of medium-sized companies in the assessed 13 Czech regions is approximately 10 percentage points lower.

Table 1. Values of variation coefficient in 13 Czech regions

Year	rGDP	S	M	B
2012	48.54	46.79	37.63	47.81
2013	48.49	47.04	37.94	47.80
2014	49.00	47.78	37.95	47.57
2015	49.28	47.72	38.58	47.65
2016	49.83	48.18	38.25	48.08
Average	49.03	47.50	38.07	47.78

Source: Own research

Explanatory notes: rGDP = regional Gross Domestic Product, S = number of small companies, M = number of medium-sized companies, B = number of big companies.

The figures in Table 1 show very small deviations in the creation of wealth among the analysed regions (column 1), which remains nearly the same over the years. The other three columns of Table 1 show variability in the number of small companies related mainly to monopolistic competition and the competitive fringe of an oligopoly with a dominant firm, in the number of medium-sized companies including dominant firms of a major part of oligopolies and weaker entities within unstable cartels, and in the number of big companies related to monopolies, firms in stable cartels and strong entities in unstable cartels. Stable cartels are established by big companies on a similar technological and economic level, while unstable cartels are composed of both big companies and medium-sized companies with a lower level of technological and economic maturity.

The variability in the medium-sized category is the lowest of all categories and, moreover, it is lower than the variability of the regional GDP in the 13 analysed regions in each of the analysed years. The variability among small and big companies is slightly higher than that of medium-sized companies, the differences between the two size categories, however, are negligible. Over the analysed years, the variability in both size categories is lower than the variability of regional GDP. These results correspond to the average value of variation coefficients of all indicators which is given on the bottom line of Table 1, by way of illustration.

It can be concluded that hypothesis 1 was accepted: the variability of regional GDP exceeds in each year the variability in each size class of companies and, thus, Czech regions show more similarities in market structures than in their performance measured by the creation of gross domestic product. It is also worth mentioning that the variability of all parameters assessed here increases over time.

Assesment of the Correlation Analysis

The results of the correlation analysis, or the value of the Spearman's rank correlation coefficient, are presented in Table 2. For n=13 and the level of significance being $\alpha=0.05$, the critical value is 0.555. A statistically significant correlation between the percentage of small and medium-sized companies and the amount of regional investment is observed, but only in the years 2015 and 2016. Nevertheless, the history of correlation coefficients provides an interesting view. Regional investment in Czech regions has been shown to positively correlate (the correlation is medium and, in 2015 and 2016, it achieves a critical value according to the Hendl's scale) with the percentage of small companies. On the contrary, a negative correlation is observed between regional investment and the percentage of medium-sized companies. The correlation is also medium (even though it

is slightly higher compared to the percentage of small companies; the value is statistically significant for the last two years). A weak correlation of regional investment with the percentage of big companies is obvious; in 2012, the first of the investigated years, the correlation achieved a medium level, but it was on the lower limit of the Hendl's interval. Also interesting is the comparison of the values of correlation coefficients over the years. The level of correlation apparently changed after 2014. It reached a critical value to show a statistically significant relation for small companies and it was above the critical value for medium-sized companies. On the other hand, the decrease of a positive correlation for big companies after 2014 is striking.

Table 2. Values of correlation coefficient of regional investment and the size categories of companies in 13 Czech regions

Year	rCGFC vs. %S	rCGFC vs. %M	rCGFC vs. %B
2012	0.379	-0.495	0.346
2013	0.368	-0.401	0.264
2014	0.379	-0.440	0.236
2015	**0.555**	**-0.681**	0.121
2016	**0.555**	**-0.643**	0.192

Source: Own research

Explanatory notes: rCGFC = regional Creation of Gross Fixed Capital, %S = percentage of small companies in the region, M = percentage of medium-sized companies in the region, B = percentage of big companies in the region.

The causes of the observed variations should be examined while studying the relationship between regional investment and the size categories of companies. In this respect, it is possible to concentrate on the differences in the ranking of regions in terms of regional investment and in terms of the percentages representing the size categories of companies.

In terms of the amount of regional investment, a high percentage of small companies persists in the Hradec Králové, Liberec, and Karlovy Vary Regions. The percentage of small companies in relation to the amount of regional investment was low in the Central Bohemian Region in 2013 and in the Pilsen Region in 2016.

The relationship between the medium-sized companies and the amount of regional investment is determined by the low percentage of these companies (in relation to regional investment) in the strongest regions – Central Bohemian, South Moravian and Moravian-Silesian – and by the prevailing high percentage of this size category in the Pardubice and Vysočina Regions. In 2015 and 2016, the Karlovy Vary Region belonged to the latter. Regional investment in these regions are not among the highest ranking. The gross fixed capital created in the Karlovy Vary Region was, without exception, the lowest in the investigated period.

Undoubtedly, the low correlation of regional investment is, to a great extent and during the whole period, caused by the low percentage of big companies in regions that are strong in terms of investment – the South Moravian and Central Bohemian Regions. In addition to that, the Pardubice Region, which has the third highest percentage of big companies, ranks number ten in the amount of investment in the said period. In 2015, the Pilsen Region ended up in a similar position as the Pardubice Region, and in 2016, Liberec and Vysočina joined the previously mentioned two regions.

Hypothesis 2 was not supported; regional investment showed a negative correlation with the percentage of medium-sized companies in each of the investigated years.

What can be deduced from the development described above? A relatively high level of variability in the creation of the regional gross domestic product corresponds to a high variability in the number of small and big companies, while the variability of the number of medium-sized companies remains approximately 10 percent lower in Czech regions. This is quite interesting mainly because these regionally less differentiated numbers of medium-sized companies show a negative correlation with regional investment.

Regions in the Czech Republic are not homogeneous in the creation of their regional gross domestic product, quite the opposite. The reasons for this are not only historical, but different regions benefit from different sources of wealth and, probably, skilled labour in particular. Moreover, the actual heterogeneity of regions has increased over the period in question. It is worth asking why the variability of all examined parameters increases over time and whether this is related to the implementation of Industry 4.0. The different pace of adaptation of companies to the conditions of Industry 4.0 in different regions can be the reason. The pace can also be influenced by a different structure of industries and their different importance for the development of Industry 4.0.

The answer to the question about the relation between the size of companies and the amount of regional investment that was asked to state the objective of the paper is ambiguous. The correlation is positive for small companies, it is negative for medium-sized companies and it is low, but positive for big companies.

Apparently, investment is relatively lower in regions with a high percentage of medium-sized companies, while in regions where the percentage of medium-sized companies is low investment is relatively high. Medium-sized companies usually operate in industries supplying the domestic market and their position in the market is usually that of a dominant company in an oligopoly. They are exposed to a less competitive environment than small companies in the competitive fringe of oligopolies. Small companies have to invest in their attempt to eliminate the competitive edge enjoyed by medium-sized companies. Small companies operating in the reality of monopolistic competition are exposed to the same pressure. Moreover, investment made by small and medium-sized companies is linked to the state support provided to small and medium-sized companies which is assumed to have positive effects. The situation of medium-sized companies is difficult, and even more so within a category where the range for the number of employees is so wide. Most companies fall within the interval 50 to 99 employees. In each of the years, there are nearly twice as many of them compared to companies employing 100 to 199 employees; the interval 200 to 249 is the least frequent among medium-sized companies. Big companies are under the pressure of international competition which is increasing with the growth of Industry 4.0. These companies perform in the international environment and it is international competition that stimulates their investment. The number of big companies, however, is small. Positive and also undeniable is the fact that especially big companies under the pressure of internationalization and reality of Industry 4.0 will not be allowed to behave as typical monopolistic corporations and abuse their position in the market which might have desirable impacts on the development of pricing and the number of products produced by them.

Conclusion

The paper deals with the results of research investigating the relations among market structures, investment, and variability of the gross domestic product in the regions of the Czech Republic in the period of advancement of Industry 4.0.

The first hypothesis was confirmed: the variability of the regional gross domestic product exceeded the variability of the number of companies in their respective size categories in each year of the investigated period. The second hypothesis was not confirmed, because the correlation between regional investment and the percentage of medium-sized companies was negative in each year of the investigated period. Achieving the goals of the research is related with the given hypotheses. The presented findings imply that the regional difference in the creation of the gross domestic product outweigh the variability of the number of companies in each size category, but the amount of regional investment does not always correspond to the percentage of the size categories.

It can be concluded that the importance of small and medium-sized companies and their contribution to the establishment of a competitive business environment is crucial for the development of regional economies and, therefore, support by the state, or an integration grouping, is desirable. Their support in the era of Industry 4.0 is justifiable and there is usually also a potential for positive effects on further economic development.

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Nikolay Kunyaev[1], Livon Martynov[1]

[1]Bauman Moscow State Technical University,
Department of Engineering Business and Management
2nd Baumanskaya 5, 105 005 Moscow, Russian Federation
email: nikolaykunyaev@mail.ru, livonmartinov@mail.ru

A Practical Method of Applying Authors' Conceptual Foundations by Enterprises of Fund-forming Industries in the Conditions of Hypercompetition

Abstract

This article reflects the authors' attempt to develop practical methods based on the authors' conceptual system of principles by the fund-forming industries organizations in a hypercompetitive material and virtual business environment. It is crucial, as integration into the world economy is one of the central aspects of the modern Russian economy today. In many ways, it competes with the leading industrial companies of various countries on a global scale. It is the principal reason for many business associations' development (holding companies, business concerns, corporations, consortia, and other modern forms of business organization) of the construction sphere. Since the industrial industry is developing with the help of the construction sphere, they are interdependent from each other. Authors define them as fund-forming organizations. Thus, in the conditions of the digital economy formation, taking into account the transition of Russia to the sixth technological order, hypercompetition greatly influences the mentioned above organizations. In particular, its driving forces should be considered by their management systems that use the information and communication environment through information and communication technologies for mediated communications in the business environment. Therefore, they were taken into account and formulated in the form of principles at an early stage of the study. These principles are the basis of the concept described in this article. An approach to determine the appropriate provisions for managers of the considered organizations was proposed. These provisions will allow managers to eliminate many obstacles that arise, for example, while the geographical remoteness of the business partners of the organizations in question within the 24/7/365 conditions. These provisions will allow many modern organizations of fund-forming industries to function and develop effectively in a hypercompetitive material and virtual business environment.

Key Words

practical method, authors' conceptual foundations, hypercompetition.

JEL Classification: D01, D81, P13, Y2

Introduction

In the digital economy formation conditions, Russia tends to widely utilize information and communication environment (ICE), employing information and communication technologies (ICT) and boosting the development of hypercompetition. Its interrelated driving forces affect many fund-forming industries' organizations, specializing in the

construction and reconstruction of various industrial facilities, that produce high-tech products (Kunyaev, Martynov, Starozhuk, 2019). The effectiveness of these organizations directly depends on how well their management systems take into account the influence of hypercompetition (D`Aveni, 1994, 1998). Indeed, the aforementioned is unquestionably essential in the conditions of material and virtual business environment (MVBE) under the formation of the world information and communication economic environment (WICEE) (Turban, McLean, Wetherbe, 2001; Martynov, 2007, 2019).

1. Literature Review and Research Methods

The trends and problems identified in the above-mentioned works, as well as in other scientific publications (Lenny Koh and Maguire, 2009; Valacich, Schneider, 2013), cause the need to develop an adequate managerial mechanism (adaptation mechanism for the fund-forming industries enterprises to the changes in the conditions of hypercompetitive MVBE). In many respects, the efforts of this study are aimed at the development of such a mechanism regarding its toolkit components (Kunyaev, Martynov, Starozhuk, 2019).

Under the enterprises of fund-forming industries are understood as various business associations including unions, alliances, holding companies, business concerns, corporations, consortia, and other modern forms of business organization that specialize in engineering services, construction, and reconstruction of various objects of industrial industry (for example, plants, factories, etc.). They produce high-tech products necessary to maintain the economic potential of Russia in the market today. In works (Kunyaev, Martynov, 2019, 2021), these enterprises have a name of business associations of the construction sphere (BACS) that the authors of this paper will use below.

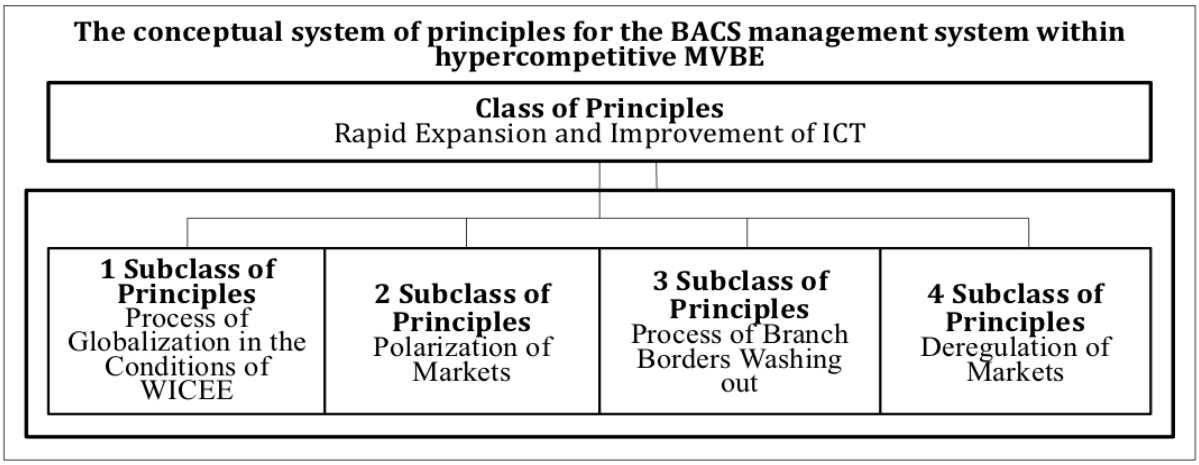
The works (Kunyaev, Martynov, 2019, 2021) indicated the rationale for obtaining the authors' conceptual system of principles. In addition, the paper (Kunyaev, Martynov, 2019,) shows how to derive these conceptual provisions. These provisions (system of principles) were classified for the convenience of its application by managers in practice. The present publication is a continuation and development of the previous studies (Kunyaev, Martynov, 2017, 2018, 2019).

The proposed classification has one class (CP) and four subclasses of principles (1SP-4SP) being a specific methodological toolkit (see Fig. 1), which is convenient for managers to apply in practice rather than all 35 principles at once.

Therefore, the next step is the development of basic methodical provisions for the application of the received earlier authors' concept in the considered business environment by organizations' management systems of many fund-forming industries. In our opinion, it is preferable to use an integrative approach to solve the problem. This approach is regarded in detail in (Martynov, 2007).

The application of the integrative approach will bring us closer to the solution of our major problem - the application of a specific BACS management system of the classified authors' conceptual principles system (see fig. 1).

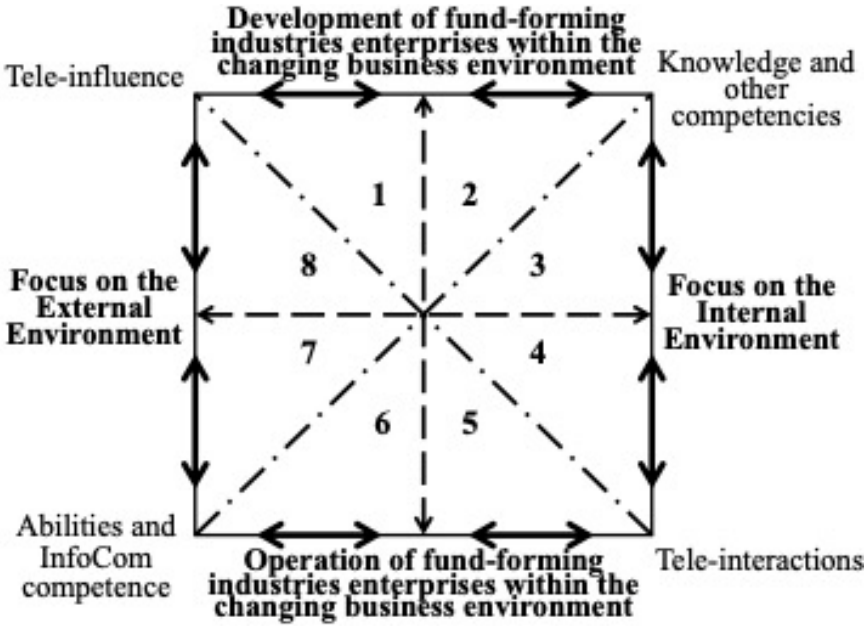
Fig 1. Classification of the Authors' Conceptual System of Principles.



Source: (Kunyaev, Martynov, 2019)

Besides, according to the work (Martynov, 2007), it is also crucial for managers to take into account the peculiarities of InfoCom culture for the implementation of adaptive changes in the conditions of hypercompetitive MVBE (see fig. 2).

Fig 2. Model of the methodical fundamentals determination.



Source: Authors Plotting

InfoCom culture is included in the new set of the toolkit as an innovation and a mandatory element of the newly developing BACS management mechanism facing

changes in the conditions of hypercompetitive MVBE. According to the work (Martynov, 2007), InfoCom culture is especially relevant since it is an organizational culture of creative tele-cooperation and fruitful effectiveness of purposeful tele-interactions in the conditions of ICE with the help of ICT.

All this will improve the ability of employees to learn, stimulate innovation, and overcome the challenges that impede the evolution, increase efficiency, and achieve the overall goal of BACS within the considering business environment. Our principles' application (Kunyaev, Martynov, 2019) by the BACS management system is obvious to influence the formation and choice of options for their development strategy and appropriate tactical actions in the conditions of hypercompetitive MVBE (Kunyaev, Martynov, 2021).

2. Results of the Research

Thus, the review of the works (Martynov, 2007, 2019), as well as our early studies (Kunyaev, Martynov, 2019), showed that one should take into account the following while developing the basics of methodical provisions of the BACS management system in a hypercompetitive MVBE:

- application of the InfoCom management theory principles (Martynov, 2019);
- InfoCom culture (Martynov, 2007);
- proposed authors' conceptual framework (the principles themselves) (Kunyaev, Martynov, 2017).

Therefore, with the help of an integrative approach, the authors of this work consider features of InfoCom culture in the internal and external environment within the processes of functioning and development of BACS in the respected business environment. It is schematically presented above in section 1, fig. 2:

- tele-influence;
- knowledge and other competencies;
- tele-interactions;
- abilities and InfoCom competence.

As a result of the considered model consisting of 8 sectors of interrelations, employing the integrative approach, the authors formulated 16 provisions. These provisions are the methodical fundamentals that should be considered by management systems to implement their adaptive changes in BACS under a hypercompetitive MVBE.

In other words, we have formulated two positions in each part of the presented model in fig. 2, which is based on fig. 1 (see section 1 above):

Sector 1 - "BACS Development in a Hypercompetitive Material and Virtual Business Environment - Knowledge and other Competencies":

1) The BACS management systems should use 1SP on a par with the CP, which will allow the free movement (distribution) of information, knowledge, and technology through space and time. It is necessary to identify the directions of BACS development by its management system based on the gained knowledge about changes in trends in the conditions of hypercompetitive MVBE. Therefore, it is vital to consider in ICE utilizing ICT the following:

- the level of development of the intellectual and creative potential of employees and business partners;

- determination of relevant parameters based on market analysis, as well as planning based on the definition of the final result boundaries in a hypercompetitive MVBE.

That provision will allow the gaining of new competencies and knowledge about interrelations and mutual influence in the ICE with the help of ICT in the conditions of hypercompetitive MVBE.

2) The BACS management systems should use 1SP along with the CP in the conditions of hypercompetitive MVBE. It will allow coordinating the interests of geographically distant participants of BACS business processes. It is requisite to be done, first of all, at the expense of knowledge about changes in the considered conditions and other competencies. Moreover, the intellectual and creative potential of BACS employees and its business partners should be adequately used in the context of hypercompetitive MVBE.

Sector 2 - "Knowledge and other Competencies - Focus on the External Environment":

3) The BACS management systems should use 2SP on a par with CP in the conditions of hypercompetitive MVBE. It will allow:

- to form proper mechanisms of stimulation and motivation of employees and business partners in ICE with the help of ICT;

- to develop the competence and intellectual and creative potential of employees and their knowledge of relationships and mutual influence.

4) The BACS management systems should use 2SP on a par with CP in the conditions of hypercompetitive MVBE. It will allow coordinating in ICE with the help of ICT the current and innovative activity at the implementation of investment and construction projects (construction and reconstruction of objects of the industrial branch) at a due level of qualification of employees and business partners. All that is implemented in ICE with the help of ICT, where it is significant to anticipate the emergence of problem situations based on diagnostics of changes in the conditions of hypercompetitive ICE. Besides, the following assessments should be adequately implemented:

- the level of inconsistencies between the internal and the external environment;

- proportionality of knowledge and other competencies, as well as intellectual and creative potential of employees in the elimination of identified inconsistencies;

- identified knowledge of market trends.

In the case of non-compliance with the BACS management system identified within the ICE through ICT, it is necessary to replace mid-skilled employees with low- or high-skilled employees in a hypercompetitive MVBE.

Sector 3 - "Orientation to the External Environment - Tele-interactions":

5) the BACS management systems should use 4SP on a par with the CP in a hypercompetitive MVBE, which will overcome many barriers in a hypercompetitive MVBE.

6) the BACS management systems should use 4SP on a par with the CP in a hypercompetitive MVBE which will activate existing and create new networks of tele-interactions. In this mode, mutually beneficial tele-partnership and tele-cooperation are carried out, and the common goals of BACS are achieved within a hypercompetitive MVBE.

Sector 4 - "Telecommuting-BACS Functioning in the Material and Virtual Business Environment":

7) the BACS management systems should use 3SP on a par with the CP in a hypercompetitive MVBE, which will increase relevant knowledge and other competencies in the ICE with the help of the latest ICTs. It is necessary for the interaction processes implementation regardless of geographical distribution and time in a hypercompetitive MVBE, that is, in the 24/7/365 mode (Kunyaev, Martynov, 2019, 2021).

8) the BACS management systems should use 3SP on a par with the CP in a hypercompetitive MVBE. It will enable them to purposefully overcome the barriers in the transition from functioning to the development of BACS in ICE through ICT to effectively ensure interoperability within the overall objective.

Sector 5 - "Functioning of BACS in Conditions of Hypercompetitive MVBE-Ability and InfoCom-Competence":

9) the BACS management systems should use 1SP on a par with the CP in a hypercompetitive MVBE. It will allow the development of:

- alternative solutions to prevent contradictions in the identified problem situations employing diagnostics of changes in the conditions of hypercompetitive MVBE;

- the intellectual and creative potential of employees, their knowledge, and other competencies about the interrelations and mutual influence within ICE with the help of ICT in a hypercompetitive MVBE.

All this will allow getting new knowledge and competences about interrelations and mutual influence within ICE employing ICT in the conditions of hypercompetitive MVBE.

10) BACS management systems should use 1SP on a par with CP in the conditions of hypercompetitive MVBE. It will allow them to perform InfoCom competences within ICE employing ICT, considering (Martynov, 2007):

- cognitive abilities of employees;
- causal schemes of the corporate knowledge fund formation;
- mental management models as a result of interpreting relevant information into knowledge.

Sector 6 - "Abilities and InfoCom-Competences - Orientation to the Internal Environment":

11) the BACS management systems should use 3SP on a par with the CP in a hypercompetitive MVBE, enabling them to make informed changes within ICE through ICT. It will enable BACS and its business partners to achieve their objectives through analysis:

- ability to identify and resolve problem situations;
- dynamics of changes in the conditions of hypercompetitive MVBE;
- increase and use of the intellectual and creative potential of employees, their knowledge, and other competencies concerning interrelations and mutual influence within ICE employing ICT, including in the mode of tele-interaction.

12) BACS management systems should use 3SP on a par with CP in the conditions of hypercompetitive MVBE. IT will allow them to perform InfoCom competences within ICE employing ICT in a time of:

- modifying the intellectual and creative potential of employees, their knowledge, and other competencies for the implementation of telecommunications;
- expanding the range of products and services provided, adjusting the strategic objectives of BACS.

These changes are implemented by the BACS management system based on hypercompetitive MVBE for:

- achieving the common goal of the entire chain of business partners;

- elimination of obstacles in the development of telecommunication networks;

- creation of effective regulation mechanisms of economic interests and increase of business partners network efficiency.

Sector 7 - " Focus on the Internal Environment - Tele-influence":

13) the BACS management systems should use 2SP on a par with CP in the conditions of hypercompetitive MVBE. It will allow them to consider pre-emptive tele-influence in a hypercompetitive MVBE within the ICE with the help of ICT in advance.

14) the BACS management systems should use 2PP on a par with CP in the conditions of hypercompetitive MVBE, which will allow them the following in ICE with the help of ICT:

- identify and detail areas of change;

- adjust strategic and tactical tasks by performing tele-influence.

Sector 8 - "Tele-influence - Development of BACS in the Conditions of Hypercompetitive MVBE":

15) the BACS management systems should use 4SP on a par with CP in the conditions of hypercompetitive MVBE. It will allow to purposefully overcome barriers under the transition from functioning to development of BACS within ICE employing ICT. It is necessary to ensure the tele-influence effective delivery as part of the overall goal of BACS and the entire network of business partners.

16) the BACS management systems should use 4SP on a par with CP in the conditions of hypercompetitive MVBE, which will allow achieving the strategic goals.

The aforementioned theoretical and methodological basis should be applied in practice with an appropriate assessment of relevant environmental factors affecting the activity of BACS (features of hypercompetition). In our opinion, it should be done most appropriately using the following step-by-step procedure.

Step 1 determines the factors of modern MVBE and identifies the relevant ones using the expert evaluation method. Then, the highly essential aspects of the macro environment, which dynamic changes can affect the primary activity of MVBE, are considered. The expert council based on criteria defines the importance of each factor for company activity, making a corresponding conclusion.

In Step 2, an expert assessment of the impact of relevant factors on BACS activities is carried out and the numerical value of each relevant factor is calculated using the principles of probability theory.

At the next Step 3, the influence of modern MVBE on BACS is determined in a complex way, and the integral index of its state evaluation is calculated by the equation (Orlov, 2011):

$$KjKi \sum K = Vi, \qquad (1)$$

where ***Ki*** is the coefficient of the importance of the ***i***th factor; ***KjVi*** - the coefficient of the significance of the ***j*** criterion by the ***i***th factor; ***n*** - number of evaluation factors; ***Vi*** - integral index of the external environment state evaluation.

Expert assessments set the minimum and maximum assessment of the relevant factors' impact nature regarding modern MVBE on BACS. The scale of the considered conditions assessments is brought forward in Table 1 (compiled by the authors).

In Step 4, the obtained information is formalized based on interval scale construction of individual assessments. They are arranged in the form of interval variation series. As a consequence, it is not difficult to obtain a numerical value of the criterion, which expresses the business environment's state nature under consideration and choose the path of development.

Table 1. The scale of the modern MVBE assessments.

Grade levels	Characteristics of hypercompetitive MVBE influence stages
0,1 – 0,2	Super unstable state
0,2 – 0,3	Unstable state
0,3 – 0,4	Favourable state
0,4 and above	Stable state

Source: Authors Plotting

The proposed step-by-step procedure for diagnosing and assessing the impact of the current MVBE conditions on the BACS will allow the management of the companies under consideration to identify:

- problems it may encounter while carrying out its primary activity;
- possible changes in the external environment that may affect its core business;
- changes in the external environment in relation to it, as well as the reasons and conditions for limiting (or expanding) its core business;
- to get an idea concerning the nature and significance of its influence, choose ways for its development.

Conclusion

This article considers the approach to the toolkit components development of the BACS' InfoCom mechanism in the conditions of modern MVBE. It is vital to apply them to the management that implements and upgrades infrastructure-developed projects (engineering facilities) of the industrial complex of the Russian Federation. The aforementioned recommendations properly provide a methodological basis for the

conceptual provisions' relevant group utilization, affecting the adoption of strategic decisions. Issues related to the prioritization and selection of strategic alternatives for the development of BACS in the considered conditions of the business environment are the subject of our further research and publications.

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Petr Doucek, Lea Nedomová, Ladislav Luc

Prague University of Economics and Business, Faculty of Informatics and Statistics
W. Churchill sq 4., 130 00 Prague, Czech Republic
email: doucek@vse.cz, nedomova@vse.cz, ladislav.luc@vse.cz

Are Wages in ICT Growing Faster than GDP in the Czech Republic?

Abstract

The regular trend of both nominal and real wages in the economy of the Czech Republic raises the question of whether their growth is also supported by the overall growth of the economy. This article presents an analysis of the trend of wages and salaries of ICT Professionals in the Czech Republic. The category of ICT Professionals is defined as ICT Specialists and ICT Technicians, so they are not employees only in the ICT sector, but ICT professionals who are part of every sector of the economy. Our article analyzes Trexima's wage data for the past twelve years, i.e. the years 2008-2019. These data are collected regularly at annual intervals as part of a uniform survey of wages in all EU countries.The wages are adjusted for the inflation, recalculated to the 2008 basis and converted based on the relevant average annual CZK/EUR exchange rate. When analyzing the time series using MS Excel, we came to the conclusion that the wages of ICT Specialists grew faster and the wages of ICT Technicians grew slower than the Czech Republic's GDP. The growth rate of real wages of ICT Specialists is also higher than that of ICT Technicians. As the share of ICT Technicians in the total number of ICT Professionals is only about thirty percents, the growth of wages of ICT Professionals is higher than the growth of GDP in the observed period.

Key Words

ICT profesisonals, ICT specialists, ICT Technicians, trend in wages, GDP trend,

JEL Classification: D31, J44, L63, L86, O11

Introduction

The basic macroeconomic relationships include the relationship between labor productivity, wage growth and the growth of total gross domestic product (GDP). Given the fact that many professional and scientific sources (Hanclova et al., 2014; Christiano et al., 1999; Yousefi, 2011) mention this characteristic of market economies, we decided to analyze in more detail the validity of this relationship with respect to Czech ICT workers (ICT).

The current dynamic development of ICT and their penetration into people's everyday life as well as into economic activities of virtually any kind are often referred to as the digitization of society (Bley et al., 2016), in manufacturing companies as Industry 4.0 (Pessl et al., 2017). We can agree with many authors (Yousefi, 2011; Bloom et al., 2010; Delina and Tkac, 2010) that ICT and their penetration into the economy significantly boost economic growth. We can see ICT helping to increase labor productivity in entire economies and not only in ICT (Hanclova et al., 2014; Lin and Chiang, 2011; Balesteros-Carrasco, 2013; Manďák and Nedomova, 2014) and to increase the volume of

production and services, but we still do not fully appreciate their impact on the environment, the quality of human life, further lifelong learning – the Industry 4.0 concept will require less but more skilled workers. It may seem insignificant at the moment, but we cannot further develop the digital transformation of the economy without educated ICT workers. That is also why the wages of ICT Professionals keep growing. We decided to analyze in our article the growth and growth rate of ICT Professionals' wages as well as GDP growth and GDP growth rate in the Czech Republic during the past 12 years.

For the purpose of our article, we formulated the following research questions:

RQ1: Did the wages of ICT Specialists in the Czech Republic grow faster than the wages of ICT Technicians during 2008-2019?

RQ2: What was the trend of ICT Professionals' wages in comparison with the trend of GDP in the Czech Republic during 2008-2019?

1. Methods of Research

To answer our research questions, we evaluated time series and performed a linear regression on such identified time series. The methodology of our article can be divided into three parts:

- Origin of data and the method of data identification in the Czech economy;
- Classification of ICT Professionals; and
- Method of conducting economic analyses.

1.1. Origin of data and the method of data identification in the Czech economy

The initial data used for our results include data from the ISPV (Average Earnings Information System) sample file that is processed by Trexima a.s. on a yearly basis. The second quarter is specific because it contains a minimum number of national holidays (it is the highest available working time fund) and usually the lowest bonuses paid in addition to basic salaries or wages. Therefore, this quarter is used for statistical surveys since wages and salaries in particular are closest to the basic values. The quarterly average earnings survey is harmonized with the European Union's structural survey called the Structure of Earnings Survey (see Commission Regulation (EC) No 1916/2000, as amended). The main monitored indicators in terms of earnings include gross monthly wage (salary) and hourly earnings. In addition to the differentiation of the gross monthly wage (salary), we also analyzed wage (salary) components, i.e. bonuses, extra pay and reimbursements. The gross monthly wage in our data file was calculated as a multiple of hourly earnings in the second quarter and average monthly working hours for each year. We rounded off the average working hours to a whole number. We analyzed the number and structure of hours worked (e.g. overtime) and not worked (e.g. sickness and vacation). The Average Earnings Information System includes

the Labor Cost Regional Statistics that provide detailed information about wage differences in the individual regions of the Czech Republic. The administrator of the Average Earnings Quarterly Survey is the Ministry of Labor and Social Affairs.

When conducting our analyses, we worked with a sample of data for ICT Professionals ranging from 21,950 records in 2008 to 67,257 records in 2019.

1.2. Classification of ICT Professionals

Another starting point that we used included the breakdown of data based on the main groups of ICT Professionals. We used the CZ-ISCO classification (CZSO, 2021) that breaks down the ICT profession into the following two main groups:

- ICT Specialists (CZ-ISCO 25) and
- ICT Technicians (CZ-ISCO 35).

ICT Specialists (CZ-ISCO 25) research, plan, design, create, test, provide consultations and improve IT systems, such as hardware, software and related concepts for specific applications; process related documentation, including principles, policies and procedures; design, develop, check, maintain and support databases and other information systems to ensure optimal performance and data integrity and security.

ICT Technicians (CZ-ISCO 35) support the regular operation of computer and communication systems and networks and perform technical tasks related to telecommunications and the transmission of image and sound and other types of telecommunications signals. They mostly perform routine technical activities.

1.3. Method of conducting economic analyses

We used data obtained from a sample survey on wages and salaries in the Czech Republic. Since these are data for the past 12 years, it was necessary to adjust them for inflation. The annual inflation is shown in Tab. 1.

Tab. 1: Annual Inflation Rate in the Czech Republic and Annual Average Czk/Eur Exchange Rate

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Annual Inflation Rate	6,3 %	1,0 %	1,5 %	1,9 %	3,3 %	1,4 %	0,4 %	0,3 %	0,7 %	2,5 %	2,1 %	2,8 %
CZK/EURO	24,94	26,45	25,29	24,59	25,14	25,97	27,53	27,28	27,03	26,33	25,64	25,67

Source: (CZSO, 2021), authors

The data were then analyzed using MS Excel tools and statistical functions. To approximate the trend of wages and GDP, we used the method of linear regression together with the method of least squares. In the method of linear regression, we used the general function $y = ax + b$, where the constant a represents the identified trend during the analyzed time period. All regression analysis calculations are performed at the 5% confidence level.

To process our outputs, we worked with two quantities – the average and the median. The reason for using the median is that the wages of ICT Professionals are extreme as compared to other wages in the Czech Republic (more than 8,000 EUR per month) and increase the average, but the wages of ordinary ICT workers are not even close to these wages. Therefore, the median wage is more indicative.

2. Results and discusion

Our first finding was how many ICT workers are employed in the Czech economy. Based on data from the Czech Statistical Office, we came to the conclusion shown in Fig. 1.

Fig. 1: Ratio Between the Number of ICT Professionals and the Total Number of Workers in the Czech Economy

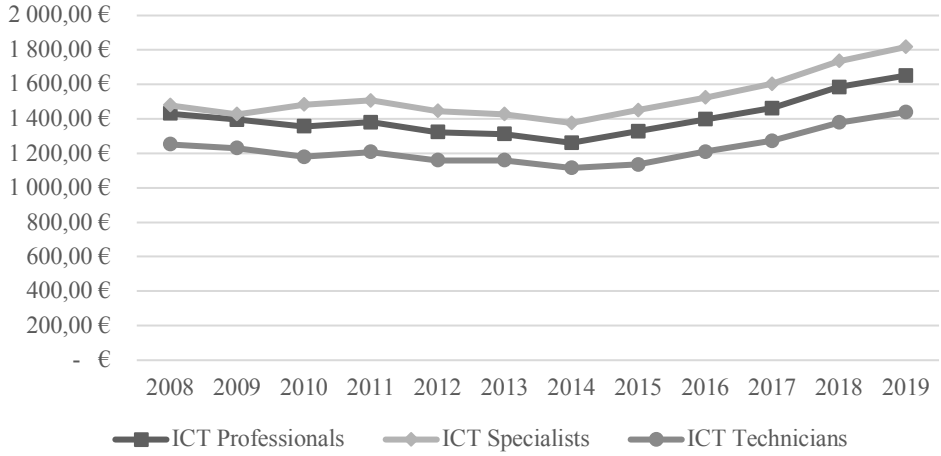
Source: (CZSO, 2021), authors

Fig. 1 shows the increase in the number of ICT Professionals in the Czech economy during the entire analyzed time period, with the exception of the years 2016 and 2017, during which the number of ICT Professionals stagnated. However, this could also be caused by the increase of the absolute number of workers in the Czech economy or the faster increase of the number of all workers as compared to the number of ICT Professionals.

RQ1: Did the wages of ICT Specialists in the Czech Republic grow faster than the wages of ICT Technicians during 2008-2019?

The trend of the average of gross wages, which were modified for the purposes of comparability in compliance with the mentioned data processing methodology, is shown in Fig. 2.

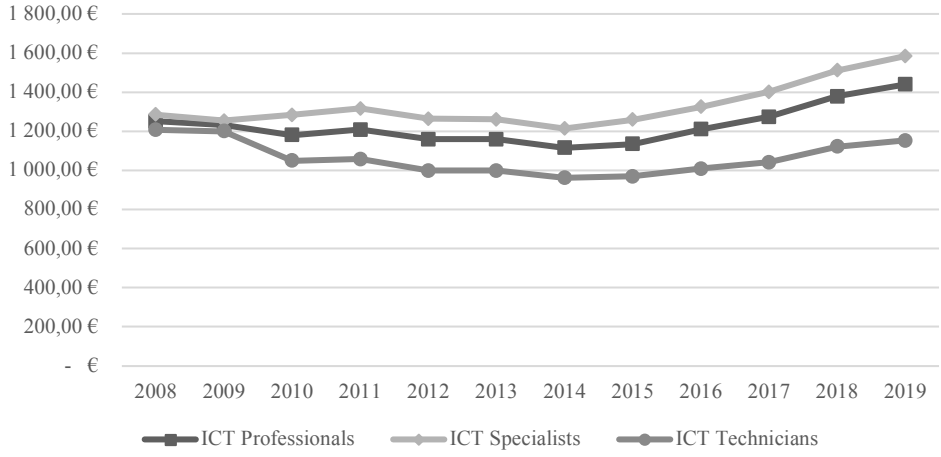
Fig. 2. Trend of the average of real gross wages of ICT Professionals during 2008-2019



Source: (CZSO, 2021), authors

The trend of the median of the same quantities is shown in Fig. 3.

Fig. 3. Trend of the median of real gross wages of ICT Professionals during 2008-2019



Source: (CZSO, 2021), authors

Both figures show a decline in both the average and the median of ICT Professionals' wages between 2008 and 2013, which was a result of the economic crisis. As soon as inflation slowed down in 2014, even the devaluation of the Czech Crown in 2014 could not stop the growth of ICT Professionals' real wages. Let's now look at the growth trends from 2014 (this year was the basis for calculating the percentage growth) to 2019.

Tab. 2: Trend Lines for 2014-2019

ICT Profesisonals Category	Average	Median
ICT Specialists	$y = 0{,}065x + 0{,}9237$ $R^2 = 0{,}9895$	$y = 0{,}0632x + 0{,}9174$ $R^2 = 0{,}9843$
ICT Technicians	$y = 0{,}0464x + 0{,}9467$ $R^2 = 0{,}9825$	$y = 0{,}0428x + 0{,}9338$ $R^2 = 0{,}9477$
ICT Professionals	$y = 0{,}0631x + 0{,}9269$ $R^2 = 0{,}989$	$y = 0{,}0618x + 0{,}9121$ $R^2 = 0{,}9747$

Source: (CZSO, 2021), authors

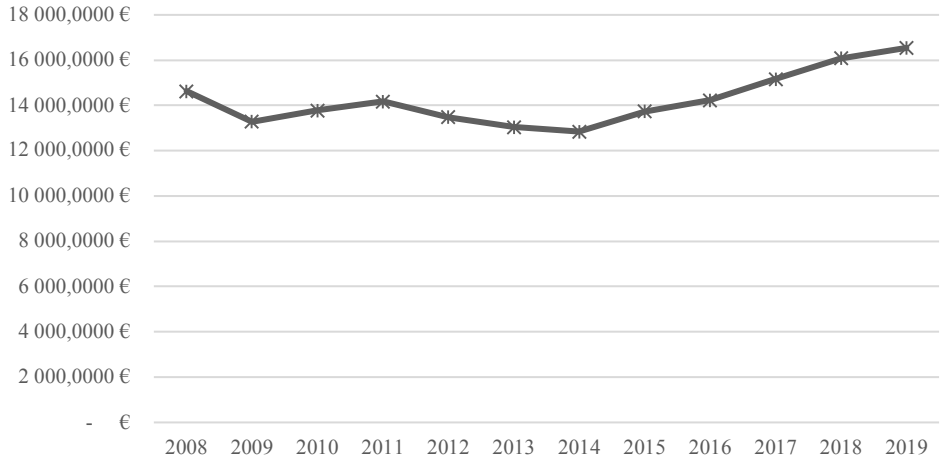
Therefore, the answer to RQ1 is that ICT Specialists' wages tend to grow faster than ICT Technicians' wages.

The limitation of the survey lies in the fact that although we have a relatively large sample for our research (approximately 28% of all ICT Professionals in the Czech Republic), the representativeness of the sample is not ensured, especially the representation of both genders, different regions and public and business sectors. These parameters of the sample may have an impact on the overall results, especially in the case of a more significant representation of the business sector at the expense of the public sector where wages are lower than in the business sector.

RQ2: What was the trend of ICT Professionals' wages in comparison with the trend of GDP in the Czech Republic during 2008-2019?

The trend of the Czech Republic's GDP adjusted for inflation is shown in Fig. 4, which shows that the trend of wages copies the main trend.

Fig. 4. Trend of the Czech Republic's GDP per capita during 2008-2019



Source: (CZSO, 2021), authors

Let's look at the trend line that we will interpolate from 2014 to 2019.

The trend line is expressed by the following function

$$y = 0{,}0589x + 0{,}9435 \; R^2 = 0{,}9921 \quad (1)$$

If we compare the calculated value of the trend line with the values of the trend lines from Table II., we will come to the conclusions provided in Table III.

Tab. 3: Comparison of the Trend Lines for The Years 2014 - 2019 With the GDP Trend

ICT Profesisonals Category	Average	Median
ICT Specialists	Higher	Higher
ICT Technicians	Lower	Lower
ICT Professionals	**Higher**	**Higher**

Source: authors

In general, we can say that the growth rate of ICT Specialists' wages in the Czech Republic was higher than the growth rate of GDP. On the other hand, the growth rate of ICT Technicians' wages was lower than the growth rate of GDP.

Although ICT Technicians represent approximately one-third of all ICT Professionals, the comparison of total wages shows that, despite the one-third share of ICT Technicians, the wage growth rate for the entire group of ICT Professionals was higher than the GDP growth rate.

Conclusion

Based on the data obtained at the Czech Statistical Office, we can say that the number of ICT Professionals in the Czech economy kept growing during the analyzed time period, which maintained the Czech economy's competitiveness and potential for its digitization and allowed for a broader promotion of Industry 4.0 in the Czech economy.

By analyzing the data for the answer to RQ1, we came to the conclusion that the wages of ICT Specialists grew faster than the wages of ICT Technicians. The work description of ICT Specialists and ICT Technicians shows that the work of ICT Specialists is more creative and therefore its contribution to economic development is greater, especially when the penetration of ICT into the business sector is higher - the implementation of new systems, the digitization of processes, etc.

The result of our data analysis for RQ2 shows that the growth of ICT Professionals' wages is on average higher than the growth of GDP. On one hand, this is good because the implementation of ICT helps to advance the economy and to increase labor productivity, but, on the other hand, the higher wage growth means that there are sectors or work areas where the wage growth is lower, which means that the wage gap in the economy is increasing and so is social inequality. However, the difference in the growth of ICT Professionals' wages as compared to the growth rate of GDP is by no means critical.

Our analysis of time series and evaluation of the impact of external factors - the annual inflation rate and the CZK/EUR exchange rate - show that even the big devaluation of the Czech Crown by 15% in October 2014 (according to the average annual exchange rate, the Czech Crown weakened by 6%) did not have any major impact on the growth of GDP and the growth of ICT Professionals' wages in the following years since the devaluated exchange rate reduced the inflation rate. Once the Czech Crown strengthened in 2017 (the CNB ended its intervention to weaken the Czech Crown against EUR), the inflation rate went up, but it had no impact on ICT Professionals' real wages.

Our next research will focus on another challenge - the gender pay gap in ICT Professionals in the Czech Republic. This is a very topical issue for our economy, as the Czech Republic belongs among the EU Member States with one of biggest gaps between the wages of women and men - approximately 20%.

Acknowledgment

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Monika Poradová
Department of Ecnomics, University of Zilina
Univerzitná 8215/1, 010 26 Žilina
email: monika.poradova@fpedas.uniza.sk

Development of Project Financing in the Countries of the European Union

Abstract
Project funding is a key area of any project. The aim of the translated article is to analyse the development of project financing in the countries of the European Union. Subsequently, analysis of the development of approved loans by the European Investment Bank from 2015 to 2019. It also aims to analyse the project debt-equity ratio carried out in individual EU countries between 2005 and 2015. Subsequently, on the basis of the results of the research, the determination of the dependence on the volume of funding under project funding and GDP. The submitted article is divided into 4 parts. The first part is aimed at clarifying the issue of project financing. The second part is aimed at analysing the development of the project financing process. Also, in the second part is described how the results of the analysis carried out are obtained. The fourth part of the article focuses on the discussion and the fifth part deals with the conclusions of the addressed issue of project financing development in the countries of the European Union. The article presented results in a comprehensive view of the development of project financing in the countries of the European Union. A descriptive method, analysis, mathematical-statistical methods, graphic methods, comparison and synthesis were used in the processing of the submitted paper creation.

Key Words
Development, Project financing, European Union, Project debt, Equity,

JEL Classification: G20; N20; O30

Introduction

In recent years, project funding has seen a significant increase. This argument relates in particular to the towing industry, energy, water management as well as development infrastructure projects. The growing interest in project finance has prompted economists and other authors to explore this alternative form of financing for investment-intensive projects. (Ionescu, 2020) Abroad, the area of project financing is processed by several authors. In their work, they pay particular attention to the various methods, advantages, disadvantages and the possibilities of using this form of financing. In publications, we may encounter several definitions of the concept of project financing. However, most authors agree and include this form of financing in the issue of investment banking.

Project financing as separate financing of the economic unit, which first takes into account the future earnings and cash flow of the project from which the loan will be repaid. Another definition of this type of financing considers project financing to be a legally independent project and stresses that the repayment of the loan is directly conditional on the funds created by the economic unit. (Esty, Sesia, 2010) Project financing is also

defined as financing for the development or use of rights, natural resources or other assets, where the bulk of the financing is not used from own resources and must be mainly covered by the revenues of the project in question. (Gavurova, Ivankova, Rigelsky, Privarova,2020) Project financing also includes the creation of a legally and economically independent project company. The project company is financed in a non-recourse way, usually in a single purpose with a fixed maturity. (Marquis, Raynard, 2015) Sponsors and creditors involved in the project.

Project financing within the EU, valid also for the conditions of the Slovak Republic, can be defined as the unification of financial capital by investing in an economically independent project. The provider of funds primarily monitors the cash flow of the project, from which the return on invested funds for profit is ensured. (European Union - Project Financing) Another definition of project financing from the EU environment is that it is the financing of an individual economic entity whose assets are collateral for granting the loan. In such a case, the lender takes into account the cash flow and proceeds from this project, which are the source of the repayment of the loan. (Ionescu, 2020)

Ultimately, we can define project financing in such a way that it is an innovative financing technique that is used to raise a large amount of capital. It also applies to funded long-term as well as specific, costly projects. This technique makes it possible to spread the investment risk between the different parties involved. (Ejdys, Ginevicius,Rozsa, Janoskova, 2019) The advantage of this type of financing is that creditors usually do not require historical information of the potential borrower, but when deciding whether or not to provide funds, the projected cash flow of the project is mainly assessed as a source of repayment of the loan.

1. Methods of Research

Several phases should be taken into account in the development of the project financing process. The three stages of development of the project financing process are most often reported. The first phase is the preparatory phase, which involves the processing of relevant studies and the production of documents. Documents define the reasons for the creation, context, objective and scope of the project. They shall specify all essential information required for the design and implementation of the project concerning raw materials, materials, energy requirements and the application of technologies and standards. If the project includes a license, a document containing licensing requirements must be created. The preparatory phase includes: technical project concept and capacity requirements, preliminary technological solutions, raw materials and products, quality requirements, energy consumption and availability, location and size of available sites, simplified technical scheme, environmental and health impacts, climate and other local conditions, applied standards and legislative requirements, draft implementation plan, the concept of process management and security and, last but not least, cost estimation. (Kliestik, Valaskova, Lazaroiu, Kovacova, Vrbka, 2020) The second phase is the implementation, in which the actual implementation of the project takes place in accordance with the project documentation and the expected outputs are achieved. Repayments of the project debt will then be paid from the cash flows from the project. The risk of this phase may be exceeding the budget, non-implementation of the expected performance, non-completion of the project, etc. The third phase is the final phase of

completion. The incurred project debt should already be repaid at this stage. During this phase, it is necessary to adjust the ownership rights of the project. It is usually a transfer of rights to a special project company or sponsors. Each of these phases is specific to certain characteristic activities and risks, but for success, it is important to perceive project financing as a whole, because only a complex development process can bring the desired results and outputs.

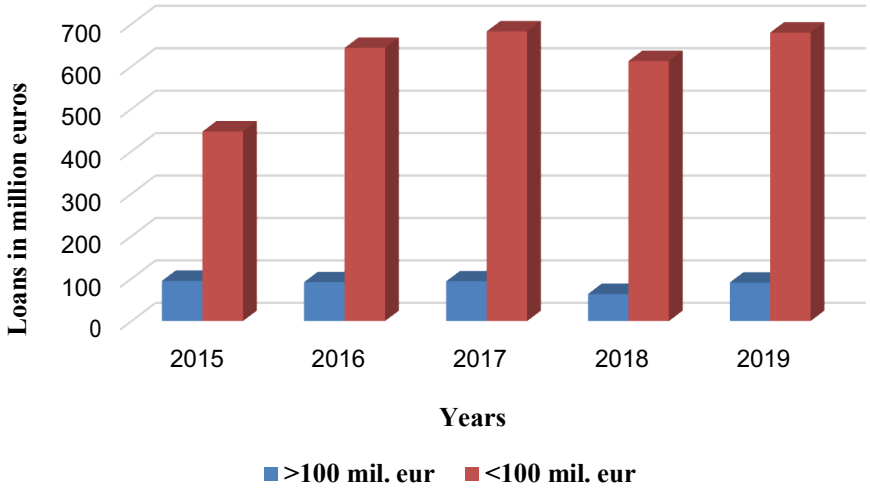
In the present paper we will use methods such as a descriptive method, analysis, mathematical-statistical methods - correlation coefficient, graphic methods, comparison and synthesis.

The aim of the translated article is to analyse the development of project financing in the countries of the European Union. Subsequently, the analysis of the development of loans approved by the European Investment Bank from 2015 to 2019. The aim is also to analyse the ratio of project debt and equity realized in individual EU countries in the period 2005 to 2015. The survey included the following countries: Estonia, Latvia, Luxembourg, Slovenia, Malta, Cyprus, Slovakia, Lithuania, Denmark, Austria, Croatia, Sweden, Finland, Bulgaria, Hungary, the Czech Republic, Romania, Belgium, Poland, the Netherlands, Ireland, Greece, Portugal, Germany, Italy, France, Spain and the United Kingdom. Subsequently, based on the results of the research, the finding of the dependence of the volume of funds within the project financing and GDP.

2. Results of the Research

Project financing abroad currently also works through EU resources. Funding in the Union is divided into different funds, from which various areas of interest of the EU Member States are subsidized. Based on the analysis of the most frequently used forms of project financing in Slovakia, where the third most frequently used form were grants, funds and Slovakia as a member of the European Community also has the opportunity to implement projects through these funds, the investment bank, which we see in Figure 1.

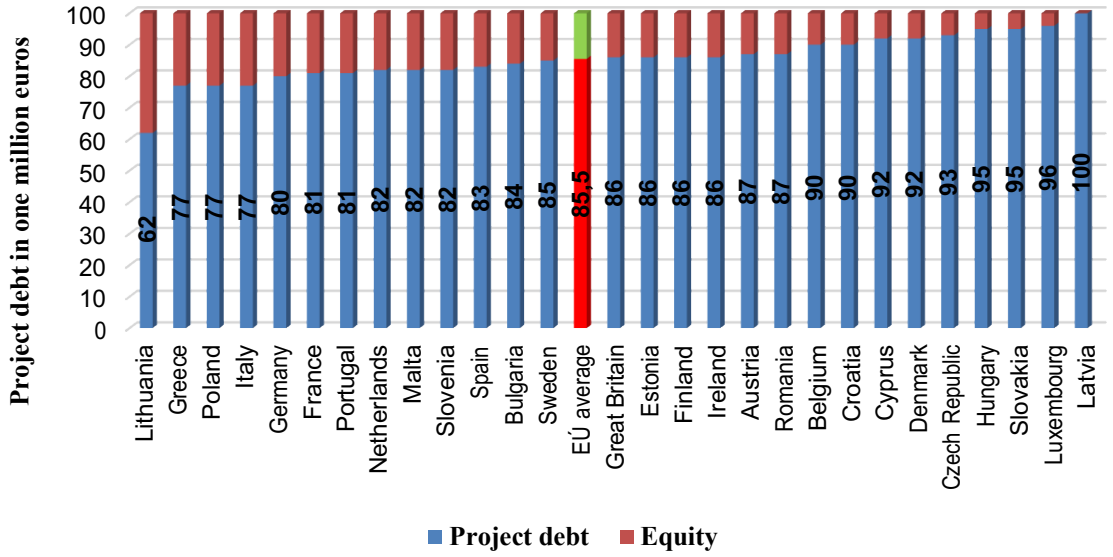
Fig. 1: Development of loans approved by the European Investment Bank



Source: authors' own processing according to data from European Investment Bank (2020))

The variables shown in Figure 2 represent the number of approved projects in EU countries with a loan amount of over 100 million euros and the number of approved projects with a number of loans below 100 million euros. In 2015, 542 loans were provided, of which 95 were over 100 million euros. Between 2016 and 2017, the total number of realized loans increased from 736 to 777. In 2018, a total of 677 loans were provided, while over 100 million 64 of them were 64. In 2019, 771 loans were provided, while over 100 million euros were 91 loans. The most frequently financed sectors were the transport, telecommunications and energy sectors. We can note that the development of loans provided for projects to EU countries through the European Investment Bank has a stable trend. As part of this research, the ratio of project debt to equity within individual EU countries was also analysed. The results of the research can be seen in Figure 2.

Fig. 2: The ratio of project debt and equity of individual EU countries

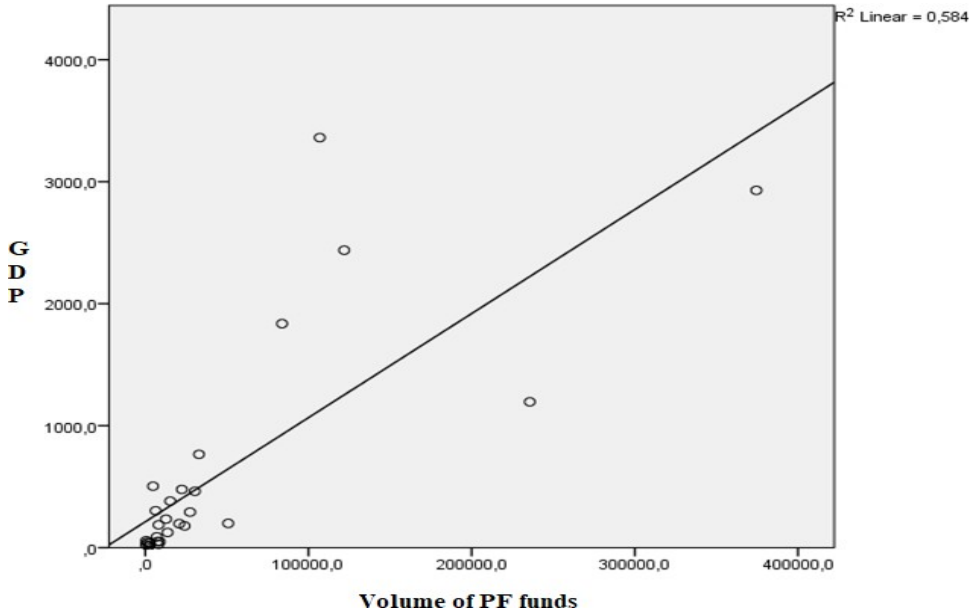


Source: authors' own processing according to data from Organisation for Economic Co-operation and Development.

The average share of external capital and equity in 2015 worldwide was 83.17%. As we can see in Figure 4, the rate is extremely diverse. The conclusion of this research was that the projects were carried out with a higher external capital ratio, which represented approximately 85.5%. In the period under review, EU countries used up to 95% of external resources to finance projects.

Subsequently, based on the results of the research, we decided to determine the dependence of the volume of funds within the project financing and GDP. We performed the dependence using the correlation coefficient. The most commonly used type of correlation coefficient is the Pearson (r) coefficient. We had the volume of funds available from the research of Kocsir and Vaga (2016), we had GDP from statistics from the Organization for Economic Co-operation and Development (OECD) as of 31 December 2015. The result of the correlation is in Figure 12 - processed in SPSS, which is shown in Figure 3.

Fig. 3: Comparison of the dependence of the volume of funds within project financing and GDP



Source: authors' own processing according to data from European Investment Bank (2020)

The value of R2 (coefficient of determination) determines the quality of the regression model, what percentage of the variability of the dependent variable is captured by this line. The closer R2 is to 1, the better (linear) the linear model captures the data. In our case, R2 = 0.584. The coefficient of determination R2 is the square of the correlation coefficient r, so r = 0.764, which indicates the direct direction of the linear dependence, and the dependence between the volume of project financing funds and HPD is therefore moderately strong.

Based on the above results, we decided to determine its statistical significance, where we calculated the Pearson coefficient. First, we set the null hypothesis that the variables GDP and Volume of PF funds are linearly independent. To this end, we have determined the alternative hypothesis that the variables are linearly dependent. We set the significance level at 0.05. We performed a test of the statistical significance of the correlation coefficient with a two-sided alternative hypothesis. The result is shown in table 1.

Tab. 1: Correlations

		GDP	Volume of PF funds
GDP	Pearson Correlation	1	,764**
	Sig. (2-tailed)		0,000
	N	28	28
Volume of PF funds	Pearson Correlation	,764**	1
	Sig. (2-tailed)	0,000	
	N	28	28

Source: authors' calculations using SPSS program

From the table we can determine that the test of statistical significance of the correlation coefficient is $p < \alpha$. Thus, we reject the null and accept the alternative hypothesis - the correlation is statistically significant and the variables are dependent.

3. Discussion

From the research, we can conclude that there are significant differences in project funding in the EU. The fact of project financing, stakeholders, type of project, financial sources of project financing, etc. can have a significant influence on the given fact. Within the conclusions of the published studies, the authors state, among other things, the fact that EU countries with highly developed and stable banking systems are actively involved in project financing. The research also showed a relatively lower level of project funding in member countries from the former Eastern bloc. The reason is probably the transformation of the political transition, the banking system and its dependence on foreign resources. (Janoskova, Kral, 2019), (Rosnerova, Vagner, 2020)

In the Slovak Republic, project financing has been applied to a greater extent since the beginning of the new millennium, more specifically since 2003. Project financing is applied mainly in the field of transport in Slovakia, mainly focused on the construction of motorways. Also, the renovation of railway stations in Žilina, Bratislava, Trenčín, Prievidza and Novo Mesto nad Váhom is the result of a combination of public and private resources. Through project financing, a branch of the Pilsen Regional Court in Ústí nad Labem or the construction of a sentencing institution with a capacity of 500 seats was financed in the Czech Republic. In Hungary, the introduction of a toll system on the M5 motorway was financed by project financing. The project was also funded at Szombathely Prison with a capacity of 800 places for prisoners and 350 places for staff. Poland has financed land transport on the A1, A2 and A4 motorways through project financing. Project financing is also used in the field of aviation. An air terminal with a capacity of 6.5 million. Was built in Warsaw. passengers annually. Through project financing, Portugal implements projects mainly in road transport, specifically for the toll collection system and the construction of motorway sections. As part of air transport, it was used to build Lisbon Airport. Spain has built part of the road network and airports. Several projects have focused on building hospitals as well as a prison in Figueres. Several projects have focused on building hospitals as well as a prison in Figueres. Italy has secured, through project financing, the construction of hospitals, lines and terminals in rail transport, e.g. in Rome. It has also built a toll system on motorways and built some motorway sections. As part of the use of project funding, Greece implemented a project aimed at building the Ionia Odos toll system and a motorway project measuring 380 km. The field of education has grown thanks to project funding by 23 schools in Macedonia Thrace Epirus. 6 buildings were also added at the Peloponnese University. Through project financing, the Netherlands has implemented the construction of various administrative buildings for the ministries of finance, tax administration and defence. In transport, the construction of the N31 and A59 motorways was accelerated, as was the construction of a tunnel in the A10 motorway section. The construction of a wastewater treatment plant in Delfanda was also completed. France has implemented transport projects aimed at building a toll system on the A585 motorway. Prisons in Vienna, Sarthe and Saint Aubin Routot were also built through project funding. (Kiselakova, Stec, Grzebyk, Sofrankova, 2020), (Kocsir, Vaga, 2016), (Rosnerova, Kollar, 2020), (Kral, Valjaskova, Janoskova, 2019), (Dobson-Lohman, 2020)

Conclusion

Project financing is specific and with its application, it is possible to implement investment-intensive projects. The application of project financing is relatively very wide. In addition to its place in financing mainly development projects, it is also widely used in the area of financing infrastructure, transport, energy, as well as in the extraction and processing of minerals.

Over the last twenty years, there has been a dynamic development of financial instruments on the market, which has significantly expanded the possibilities of obtaining funds for project financing. The choice of the appropriate method of financing depends on the specific structure and nature of the project. In practice, each project is unique. Lenders often look for projects with easily foreseeable political and economic risks. In general, we can say that project financing is an activity that deals with obtaining financial resources for the establishment, operation and development of the project, in the necessary volume, time and structure, at the optimal cost of their procurement and with a defined price for their use.

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MD. Sohanur Rahman and Arif Ibne Asad*

Faculty of Arts and Social Science, Department of Economics, Varendra University Bangladesh, 529/1, Kazla, Motihar, Rajshahi-6204, Bangladesh.
*Faculty of Management and Economics, Department of Economics, Tomas Bata University Zlin, Mostní 5139, 760 01 Zlín, the Czech Republic. Email: asad@utb.cz

The Impact of Macroeconomic Determinants of Export Earnings in the South Asia: A Study on Bangladesh, India and Pakistan

Abstract

The expansion of export earning has been emerged comparing to the previous decades in the South Asian developing countries. The study has been focused on three prominent South Asian countries, such Bangladesh, India, and Pakistan which formerly known as a unique geographical region "Indian Sub-continent". The countries have been chosen purposively as having identical pattern of socio-economic behaviours. The main objective of the present study is to estimate the impact of macroeconomic determinants (exchange rate, inflation rate and interest rate) on export earning of these economies. The time series data (1971-2019) was collected from several secondary sources, such as the World Development Indicators (WDI), Bangladesh Economic Review, Economic Survey of India, Pakistan Economic Survey, other relevant literatures, and online sources. Results of the study had been analysed through multivariable linear regression model (OLS). Researchers also postulated the econometric reliability tests of OLS model. In most cases the dependent variable export earning was recommended for establishing the theoretical relationship with the independent variables, such as exchange rate, inflation rate and interest rate. In case of Bangladesh, only the exchange rate implied significant relation, however; there had excellent results for India demonstrating significant for all independent variables. Pakistan, on the other hand, has a number of noteworthy correlations with macroeconomic features that are both relevant and appropriate to the current Pakistan economy.

Key Words

Export earning, macroeconomic determinants, South Asia, linear regression model.

JEL Classification: F31, F45, F62

Introduction

The most fundamental source of economic growth is export, Zada, Muhammad and Bahadar, (2011). It is critical to comprehend the factors that influence an economy's future export growth. One thing to remember is that the difficulty with exports is never in the volume, but in the structure. The system should be in place to absorb and adapt to changing circumstances that affect the country's trade balance, political circumstances, currency exchange rates, social/consumer behavior, factor endowments (labour, capital,

and land), productivity, trade policies, inflation, interest rate and demand are all examples of these elements The Economic Times, (2019). The three macroeconomic determinants, such as exchange, inflation and interest rate on export in South Asian emerging economies, Bangladesh, India, and Pakistan, are examined in this research. Once these countries were a unique home place, known as "Indian Sub-continent" and the study has purposively chosen these economies as having identical pattern of socio-economic behaviours and a way to understand how healthy the current export performance is.
Bangladesh, India, and Pakistan are developing countries in South Asia. Export is a potential weapon for fostering GDP growth and can play a critical role in poverty reduction in these countries. If imports fall at a slower rate, the strength of development will further increase. Aside from that, export might have a substantial impact on the account deficit, creation of employment and physical capital. The selection of three macroeconomic determinants (exchange rate, inflation rate, and interest rate) is essential since these variables have a direct impact on an economy's export performance, Rahman (2017).
There have been insignificant studies on the panel data with recent trend and cross-country analysis of these countries, however, Rahman (2010) examined that the exchange rate, overall import demand from partner nations, and the Bangladesh economy's openness are the key factors to Bangladesh's exports. Zada, Muhammad and Bahadar (2011) aimed to figure out what kind of relationship exists between exports and their determinants, taking into account both demand and supply.

Furthermore, researchers searched several literature sources, including Web of Science, Scopus, the Chartered Association of Business Schools, and the Polish Journal of Management Studies, but were unable to retrieve any papers on the macroeconomic determinants of the selected counties' export performance. The papers which address these issues in other countries, such as Allaro (2011) reveals that real output and nominal exchange rate have a favourable impact on Ethiopia's oilseed export performance. The study of Macedo, Gouveia, and Rebelo, (2020) examine recent changes in Port and Douro wine exports from 2006 to 2018, as well as their macroeconomic causes. The gravity equation reveals that the most important export determinant of both wines is the gross domestic product of importing countries, and Douro wine exports are negatively influenced by distance to the destination country, but positively influenced by sharing a common language and the level of wine production in importing countries. . Wignaraja, (1998), investigates the impact of macroeconomic determinants on Sri Lanka's manufactured export performance from 1974 to 1991 (real effective exchange rate, real wages, and real manufacturing output). It was found by Chankoson, (2019) that marketing, reliance, and intellectual capital all had a positive causal association with Thai export enterprises' strategic performance. Xie, Reddy, and Liang, (2017) study contributes to the institutional framework and political economy perspective of globalized production by analysing the key factors influence cross-border merger and acquisition activities around the world.

Fugazza (2004) implies that despite a broad expansion of international trade integration, the results show that, while trade barriers remain a concern, weak supply-side circumstances have typically been the more significant restraint on export performance in many regions, particularly in Africa and the Middle East. Apart from strong links to foreign markets, good transportation facilities, macroeconomic soundness, and highquality institutions appear to be important variables in the external sector's development. This study of Hassan, Wajid, and Kalim, (2017) finds evidence of a long run relationship between trade deficit and its causes in Pakistan, India, and Bangladesh, using a sample period of 1972 to 2013. The data show that depreciation of the real effective exchange rate reduces the trade deficit in Pakistan and Bangladesh significantly. Furthermore, the findings show that when economic growth accelerates, the trade imbalance in Pakistan, India, and Bangladesh reduces dramatically. The data also reveal that Pakistan's and India's trade deficits are exacerbated by increased money supply. The study of Mustafa, Nishat, & Kemal, (2004) found interesting cases for Pakistan volatility of exchange rate and export growth. There is a dearth of work concentrating on the subject using updated time series data and identical investigations of these three economies in Southeast Asia. The main objective of the present study is to determine the impact of macroeconomic determinants (exchange rate, inflation rate and interest rate) on export earning of these three South Asian economies.

Methods of Research

This paper is entirely based on secondary sources, such as the World Development Indicator (WDI), Bangladesh Economic Review, Indian Economic Review, Bangladesh Bureau of Statistics, World Bank, International Monetary Fund, and many periodicals have all been used to collect various forms of data typically since 1971 until 2019, and due to the unavailability of data, there is limited number of sample data in case of Pakistan. The purpose of choosing theses three economies is that before 1947, these countries altogether called “Indian Sub-Continent” and presently become emerging nations in South Asia and importantly, it is necessary to critically evaluate the macroeconomic determinants of exports as it is a crucial factor for the development of economic growth.

The multivariate linear regression model (OLS) was used to determine how macroeconomic variables such as exchange rate, inflation rate, and interest rate affect export earnings. The literature review has been gone through high quality papers from Web of Science, Scopus, the Chartered Association of Business Schools, and the Polish Journal of Management Studies.

Tab.1: **The description of the variables used in the linear regression model.**

Variables	Label	Nature of Variable	Measurement

Export Earnings	Export Earning percentage of GDP	Quantitative dependent variable	Percentage
Exchange Rate	Exchange Rate	Quantitative independent variable	Percentage
Inflation Rate	Inflation Rate	Quantitative independent variable	Percentage
Interest Rate	Interest Rate	Quantitative independent variable	Percentage

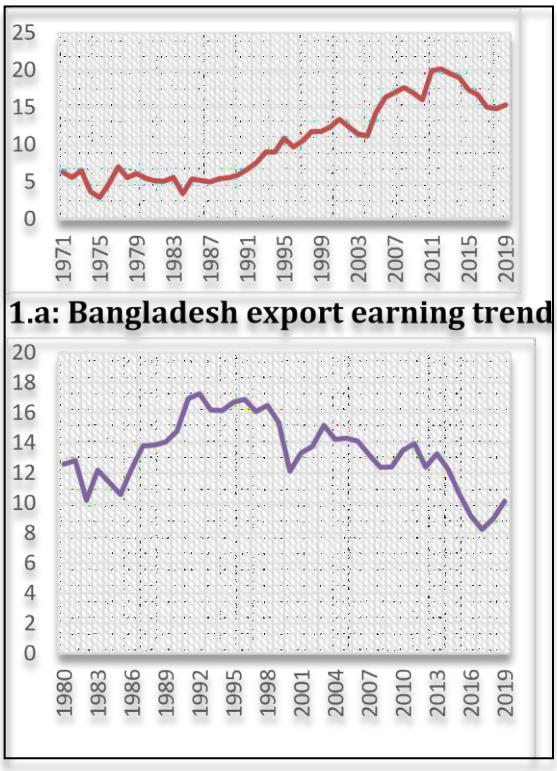
Source: Authors'(2021)

The data set has been analysed two ways, descriptive statistics by mean, percentage value and graphical presentation and secondly the econometric anlysis is done by multivariable linear regression model.

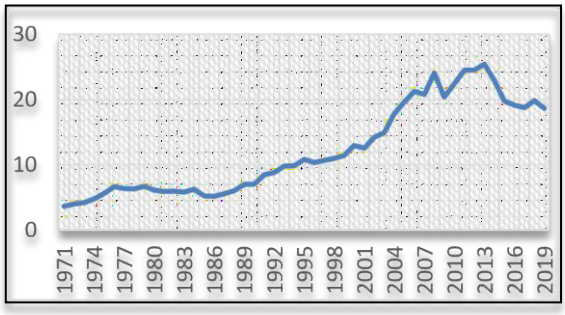
$$Exportearning = \beta_0 + \beta_1(exchangerate) + \beta_2(\text{inf}\,lationrate) + \beta_3(\text{int}erestrate) + \in_t$$

Where, $\in_t$ = *error term*

Figure 1: Export Earnings Trend of Bangladesh, India and Pakistan



1.a: Bangladesh export earning trend



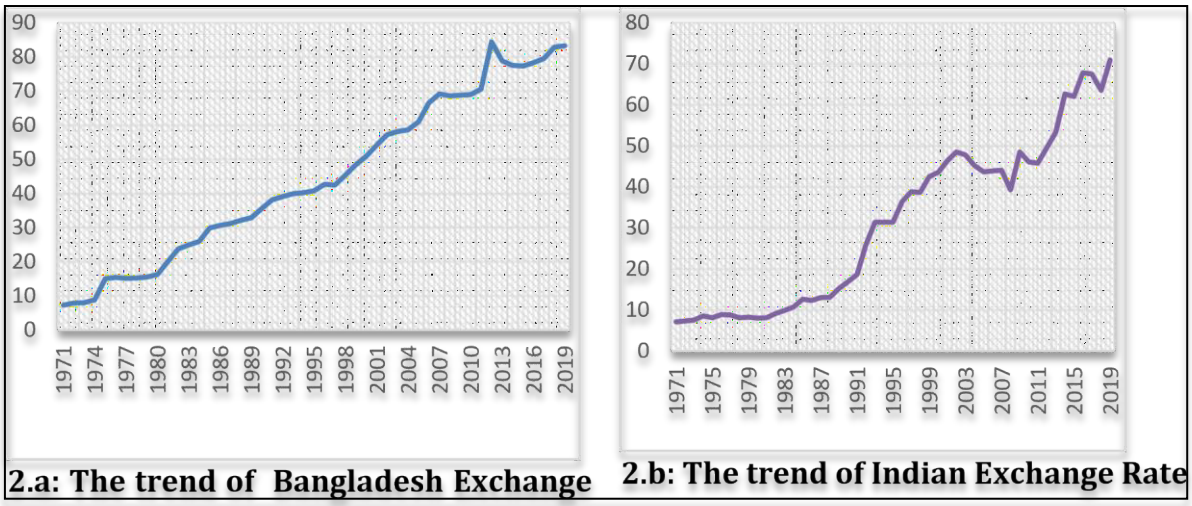
1.b:Indian export earning trend

1.c: Pakistan export earnings trend

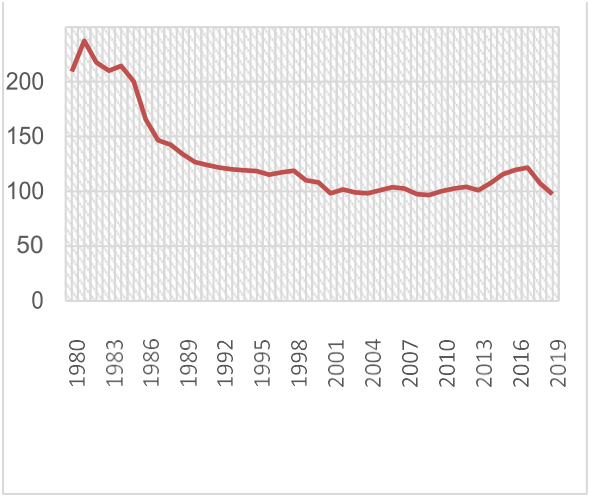
Export earnings in Bangladesh and India are increasing, whereas earnings in Pakistan are continuously changing. The data Exports of goods and services (percentage of GDP) is plotted on the vertical axis.

Source: Authors' self-estimation from WDI data (2021).

Figure. 2 Exchange Rate Trend of Bangladesh, India and Pakistan (In term of USD $)



2.a: The trend of Bangladesh Exchange **2.b: The trend of Indian Exchange Rate**

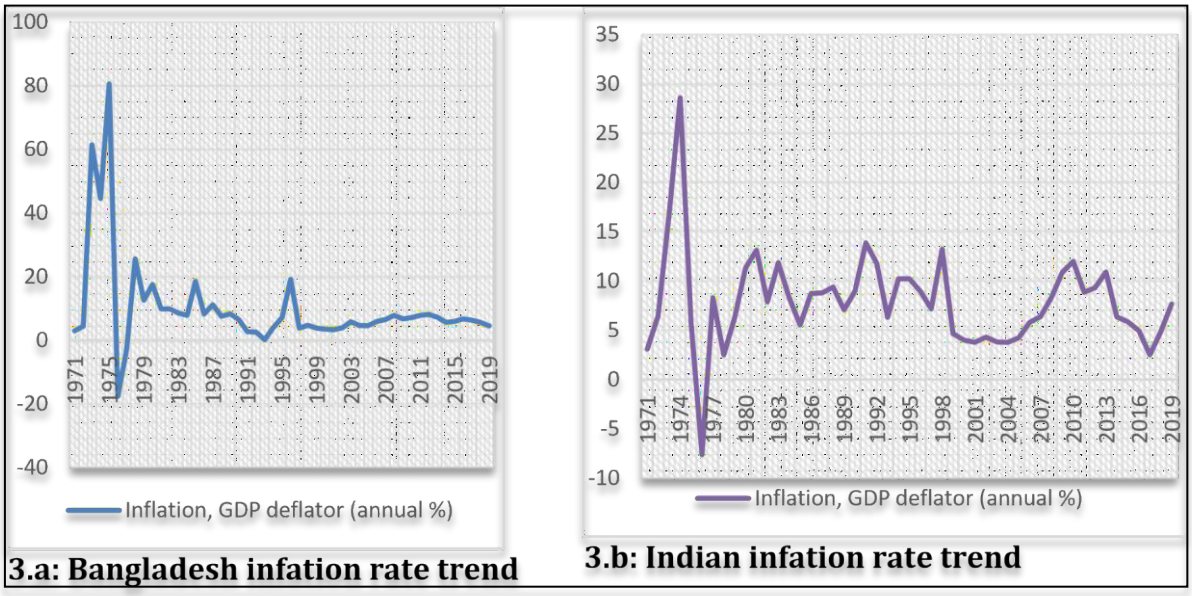


A weaker home currency encourages exports while raising the cost of imports; on the other hand, a strong local currency discourages exports while lowering the cost of imports. Bangladesh and Indian domestic currencies are becoming more weaker comparing to the US$, while Pakistan domestic currency is recovering the weakness of domestic currency comparing to the US$. In the vertical axis, the real effective exchange rate index is measured.

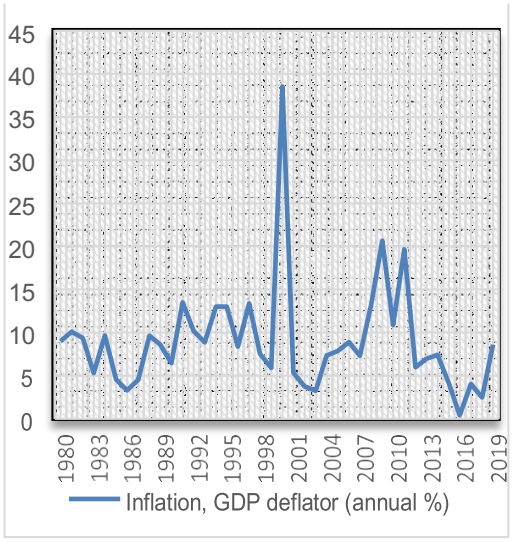
2.c: The trend of Pakistan exchange rate

Source: Authors' self- estimation from WDI data (2021).

Inflation Rate Trend of Bangladesh, India and Pakistan



3.a: Bangladesh infation rate trend **3.b: Indian infation rate trend**



Bangladesh's inflation rate is significantly lower than that of India and Pakistan. However, Pakistan's inflation rate has recently increased. Inflation, GDP deflator (annual %) is measured in the vertical axis.

3.c: Pakistan infation rate trend

Source: Authors' self estimation from WDI data (2021).

Results of the Research

Tab2: Regression Result Analysis of Bangladesh

Bangladesh					
EX	**Coef.**	**St.Err**	**t-value**	**p-value**	**Sig.**
ER	0. .2067028	0.0137931	14.99	0.000	***
INF	0.0048747	0.0222721	0.22	0.828	
INT	0.0671566	0.0618308	1.09	0.283	
_CONS	0.6195794	0.9801158	0.63	0.530	
R-squared		0.862	Number of obs		49
			Prob> F		0.000

Note: ***p<0.001, **p<0.05, *p<0.1 Source: Authors' self-estimation through STATA-14 (2021).

Tab3: Regression Result Analysis of India

India					
EX	**Coef.**	**St.Err**	**t-value**	**p-value**	**Sig.**
ER	0.2066905	0.0408418	5.06	0.000	***
INF	0.3556755	0.1607915	2.21	0.033	**
INT	-0.9513366	0.2918154	-3.26	0.002	***
_CONS	14.07334	5.036268	2.79	0.008	***
R-squared		0.833	Number of obs		43
F-test			Prob> F		0.000

Note: ***p<0.001, **p<0.05, *p<0.1 Source: Authors' self estimation through STATA-14 (2021).

Tab4: Regression Result Analysis of Pakistan

Pakistan					
EX	**Coef.**	**St.Err**	**t-value**	**p-value**	**Sig.**
ER	-0.015549	0.0086871	-1.79	0.082	*
INF	0.0516225	0.0538649	0.96	0.344	
INT	-0.4738092	0.1860722	-2.55	0.015	**
_CONS	16.45365	1.513774	10.87	0.000	***
R-squared		0.224	Number of obs		40
F-test		2.12	Prob> F		0.000

Note: ***p<0.001, **p<0.05, *p<0.1 Source: Authors' self estimation through STATA-14 (2021).

Discussion

Export Earnings (EX) is the dependent variable, while Exchange Rate (ER), Inflation Rate (INF), and Interest Rate (INT) are the independent variables. In the instance of Bangladesh, there are a total of 49 observations. The Exchange Rate coefficient is 0.2067028, which is positive in relation to EX and also significant at the 1% level. INF and INT are similarly positively associated to EX, though their effects are minor. In the Indian data set, the number of total observation is 43, there is significant relationship between the dependent and independent variables with most cases the positive cooperation but the exception is Indian interest rate with having negative relationship. Interest rates in India are falling, so consumers are buying more durable products and are less concerned in bank deposits. Instead, they are investing in enterprises, which will improve export profits, this relationship is also identical for Pakistan. Finally, in Pakistan having total observation 40 , only EX and INF have a positive but negligible link, whereas the other two independent variables, ER and INT, have a negative but statistically significant correlation. The interpretation of negative relationship between export earnings and exchange rate is typical that the rising of imports and growing trade deficit will have a negative impact on country's exchange rate and the stronger Pakistani currency discourages exports and makes import cheaper.

Tab.5: Diagnostic Checking

Diagnostic Checking	Bangladesh	India	Pakistan
Normality Test	Residuals are normally distributed	Residuals are normally distributed	Residuals are normally distributed
Heteroscedasticity Test	Residuals are homoscedastic	Residuals are homoscedastic	Residuals are homoscedastic
Autocorrelation Test	There was serial correlation or autocorrelation in the data but it has been possible to remove serial correlation after taking one lag of dependent variable.	There was serial correlation or autocorrelation in the data but it has been possible to remove serial correlation after taking one lag of dependent variable.	There was serial correlation or autocorrelation in the data but it has been possible to remove serial correlation after taking one lag of dependent variable.
Multicollinearity test	The problem of multicollinearity is not present in the model.	The problem of multicollinearity is not present in the model.	The problem of multicollinearity is not present in the model.

Source: Authors 'estimation from Stata-14 (2021).

Conclusion

The analysis section yielded a combination of significant and inconsequential results, and in most cases, the dependent variable export earnings was recommended for developing a theoretical relationship with dependent variables including exchange rate, inflation rate, and interest rate. Only the exchange rate implied a substantial relationship in the case of Bangladesh; however, the results for India were outstanding, revealing significant for all independent variables. On the other hand, in Pakistan there are some critical interpretations of dependent and independent, which must ought to be further researched. The study will be again developed by assigning the time series analysis tools.

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Juraj Dedinský, Róbert Hula, Marko D. Vateha, Mário Zeman

University of Economics in Bratislava, Faculty of National Economy, Department of Banking and International Finance
Dolnozemská cesta 1, 852 35 Bratislava, Slovak Republic
email: juraj.dedinsky@euba.sk, robert.hula@euba.sk, markodavid.vateha@euba.sk, mario.zeman@euba.sk

European Union "Unanimously" Entering the Post-Pandemic Recovery Period: An Empirical Evidence on Heterogeneity of EU Members

Abstract
In the wake of Recovery and Resilience Facility, and unprecedent monetary policy conducted by ECB, the study examines with statistical modelling whether the European union is homogenous enough so that cohesive plan leads to equal bounce back effect across all countries. This paper measures the degree of dissimilarity among European union members by hierarchical clustering and visualizes the results in form of a dendrogram. The analysis considers fundamental macroeconomic indicators and the variability of these indicators in analysed periods as a basis for calculation of dissimilarity matrix. Three distinct clusters are detected before the launch of a single currency – the euro, with Luxemburg being an outlier. It was assumed that the introduction of the European Monetary Union (EMU) and strengthening the position of European institutions would straighten out the differences among member states, yet the paper releases compelling evidence to the contrary. The results exhibit rising dissimilarities not only among initial clusters but also within the groups themselves. Having experienced the economic shock of coronavirus, it is inevitable for policy makers to understand those discrepancies in order to propose the plan, which would fight the plausible asynchronous business cycle inside the Union.

Key Words
heterogeneity, European union, recovery, optimal currency area, cluster analysis

JEL Classification: E52, E63, F53, C38

Introduction

The optimal currency area (OCA) can be defined as a monetary union formed by a group of countries within which there is a single currency. The primary goal of the optimal monetary area is to maximize the economic efficiency of the member states. Initially, this theory was formed by Mundell (1961), who defined the factors needed to create OCA, considering labour mobility to be the most important. This theory was supplemented by McKinnon (1963), who distinguished between geographical and sectoral labour mobility. At the same time, he argues that the openness of the economy is the most crucial factor for OCA. Kennen (1969) proved that workers in the OCA countries must be homogeneous. Otherwise, perfect labour mobility is not possible and therefore it is not feasible to create an OCA. Kennen also believes that it is important for OCA countries to have a diversified product, thus reducing the risk of crises.

The OCA theory developed more markedly in the 1970s. Corden (1972) argued that the creation of a monetary union causes a loss of direct control over monetary policy and the level of the exchange rate. As a result, the asymmetric shock would cause rising unemployment, changes in prices, or significant fiscal measures. For this reason, Corden considered the price and the wage flexibility to be an important prerequisite for an OCA. If countries have different inflation preferences, then monetary union alone will be costly. Ishiyama (1975) was the first to claim that there was no single criterion for the formation of OCA. The author discussed various economic and social factors that need to be considered when creating a monetary union.

The lack of real-life examples of monetary unions in the world has slowed down the research on the topic. A significant shift occurred in the 1990s when the possibility of creating the European Monetary Union began to emerge. A significant milestone was the work "One Market, One Currency" by the European Community (1990), which focused on the benefits of creating a monetary union in Europe. Alesina, Barro and Tenreyero (2002) claimed that the costs of monetary union are lower the higher the potential of economic shock arising among countries if each uses its own currency. However, Mélitz (1991) argued that despite symmetric shocks, it is possible that each country should adopt different monetary policy response, because their economies are different. Calvo and Reinhart (2002) defined the so-called “fear of floating”. For some smaller countries, it is more advantageous to be in a monetary union for fear of failing to conduct their own monetary policy. In European Union we can find some smaller and open economies, hence we consider this as a valid point to be added to the strand of others. Obstfeld and Roggoff (1996) summarized the benefits of OCA, including reduced transaction costs, reduced accounting costs, better price predictability, and reduced risk of speculative bubbles.

The authors generally agree that the creation of OCA requires individual countries to be to some extent economically and socially homogeneous. At the same time, they must be adequately integrated and to have a mobile labour market and developed financial markets. At the same time, the individual countries of the monetary union should gradually converge economically, as the conduct of monetary policy is transferred to a supranational central bank. Yet asymmetric shocks can make monetary union unable to pursue a monetary policy that helps one country and does not harm another.

Most authors do not consider the current version of the euro area to be the OCA. Eichengreen (1991) argues that Europe is significantly more heterogeneous than the United States or Canada. Thus, a monetary union may not work in the long run. The economic, political, and social integration of EU countries will be particularly important. Krugman (1993) opposed the creation of EMU. On the contrary, Frankel and Rose (1998) contend that EMU can significantly increase trade, which will be reflected in a higher correlated economic cycle between member countries. The countries were expected to converge economically after the creation of the monetary union. It should be added, however, that these assumptions have not been met to a large extent. Handler (2013) says that economic disparities between euro area members are now more pronounced than before. At the same time, financial markets are not integrated, and the labour market is not mobile enough.

Over time, two contradictory concepts have developed (De Grauwe, 2009) that describe changes after economic integration of several countries. Those concepts can be also applied to judge the monetary union:

I. **Endogeneity hypothesis**: After economic integration, countries gradually converge towards each other. Economic cycles are unifying. In principle, the joint implementation of monetary policy does not harm any country.
II. **Specialization hypothesis**: Greater economic integration of countries leads to significant specialization. In case of demand shocks within selected sectors, asymmetric effects may arise. This prevents the functioning of the monetary union.

At present, the European Monetary Union is relatively stable. However, based on empirical research, EMU cannot yet be considered as the OCA. The countries forming the EMU are heterogeneous (Coudert, 2020). However, this would not be such a significant issue if the individual countries converged over time, which would confirm the endogeneity hypothesis. This would presume that the member states may form the OCA in the future.

In our research, we are answering the question whether the current EU countries converge over time and whether there is a precondition for confirming the endogeneity hypothesis. Through analysis, we monitor whether individual member states are ironing out the dissimilarities. We also analyse EU countries that are not members of the eurozone. The reason is the assumption that over time, these states are obliged to become members of the euro area.

The member states are divided into two groups – early members (joined the EU before 2004) and late joiners (coming after 2004). Eventually, we analyse the original countries and newcomers EU countries together. We examine the level of heterogeneity in several periods to inspect if individual countries converge or diverge towards each other. At the same time, we try to find possible clusters of countries that are moving in the same direction over time. We determined the individual periods examined based on noteworthy events that affected the development in the EU. These include the creation of the euro area (1998), the accession of CEE countries to the EU (2004), the outbreak of the global financial crisis (2009), or the launch of the quantitative easing program APP as a response to the debt crisis (2014). Based on the data obtained, we are assessing whether there is an economic convergence of countries within the EU, or rather divergence prevails over time.

1. Methods of Research

Clustering is a popular technique, which is commonly used in the field of statistical data analysis to group similar objects into a single cluster and separate them from dissimilar ones, which are assigned to different cluster(s). The first attempts were presented in the 1930s (Zubin, 1938). Clustering has gained a significant popularity in the aftermath of high-speed computers (not earlier than in the 1960s) as the computational expensiveness can by polynomial or even more complex depending on the problem to cluster (Mahajan, 2009) and can be expected to hit up to $O(n^2 \log(n))$ as presented by Murtagh (1983).

In the paper, we rely on the principles of Hierarchical algorithms (HA) which are built to find successive clusters in relation to already formed ones. HA can be of two types (i) the agglomerative or (ii) the divisive (Madhulatha, 2012). The former represents the bottom-up approach and is also employed in our analysis, the latter is of top-down style. Agglomerative approach starts with every observation in dataset forming cluster of its own and, in every iteration, these clusters are enlarged by the most similar instance(s) until all observations are in only one cluster. The history of grouping suggests which instances are more similar than the others. To make decision-making more intuitive, we visualize the results in form of a dendrogram. Dendrograms visually represent hierarchy in a tree-like structure (Phipps, 1971).

For calculating the distances between countries in n-dimensional space, we use the standard metric – Euclidean distance. We are aware that other metrics exist (Kumar, 2014; Cha, 2007), Euclidean distance is seen as the most suitable for our analysis, inasmuch as the data are continuous and properly scaled in all dimensions. The Euclidean distance, D_e, between two observations x_i and x_j, is defined as following (Kumar, 2014):

$$D_e(x_i, x_j) = \left(\sum_{l=1}^{n} |x_{il} - x_{jl}|^2 \right)^{\frac{1}{2}} \quad (1)$$

where the letter l in subscript of variables x_{il} and x_{jl} represent l^{th} dimension in n-dimensional space of x_i and x_j observation, respectively.

Having defined distance measure (which in our case also meats 4 conditions of the real metric), we must decide on cluster analysis procedure. A number of agglomerative clustering methods (single linkage, complete linkage, weighted and unweighted pair-group average, weighted and unweighted pair-group centroid, Ward´s method, etc.) are available (Saracli, 2013).

Single linkage method was introduced in 1950's by Florek (1951) and is still commonly used (Jarman, 2020). This method is sometimes referred to as Nearest Point Algorithm because it depends on the smallest distance between points of two distinct clusters. The distance, $D(u, v)$, between cluster u and v is calculated:

$$D(u, v) = min\left(dist(u_i, v_j)\right) \quad (2)$$

where u_i, v_j are individual observations inside the respective cluster, either u or v.

In the contrary, the farthest distance between two points from two clusters is of interest in the so-called Complete linkage method (Murtagh, 1983).

$$D(u,v) = max\left(dist(u_i, v_j)\right) \tag{3}$$

Average linkage is an interesting method which does not focus on a distance between two points, as it was the case before, but rather scrutinizes distances among all points in both clusters and calculates the average distance for those instances (Blashfield, 1988).

$$D(u,v) = \sum_{ij} \frac{dist(u_i, v_j)}{(|u| * |v|)} \tag{4}$$

The last method we introduce in the paper is the Ward´s method. By its nature, it is a very general method, which decides on merging the cluster during clustering procedure based on the optimal value of optimization function (Szekely, 2005). It was originally designed to optimize the minimum variance within the clusters (Ward, 1963).

$$D(u,v) = \sqrt{\frac{|v| + |s|}{T} * d(v,s)^2 + \frac{|v| + |t|}{T} * d(v,t)^2 - \frac{|v|}{T} * d(s,t)^2} \tag{5}$$

where s and t denote clusters from original forest, which are combined into a new (single) cluster u, and the cluster v is then unused cluster in that iteration, $T = |v| + |s| + |t|$.

As presented later, in Fig. 1, all four methods release comparable information. For the sake of saving space, the rest of the paper relies merely on Ward´s method. There is also a foundation for that in literature. It was demonstrated that Ward´s method performs better than the others (e. g. Blashfield, 1976; Hands 1987) based on assumption there are no clear outliers in the sample (Milligan, 1980).

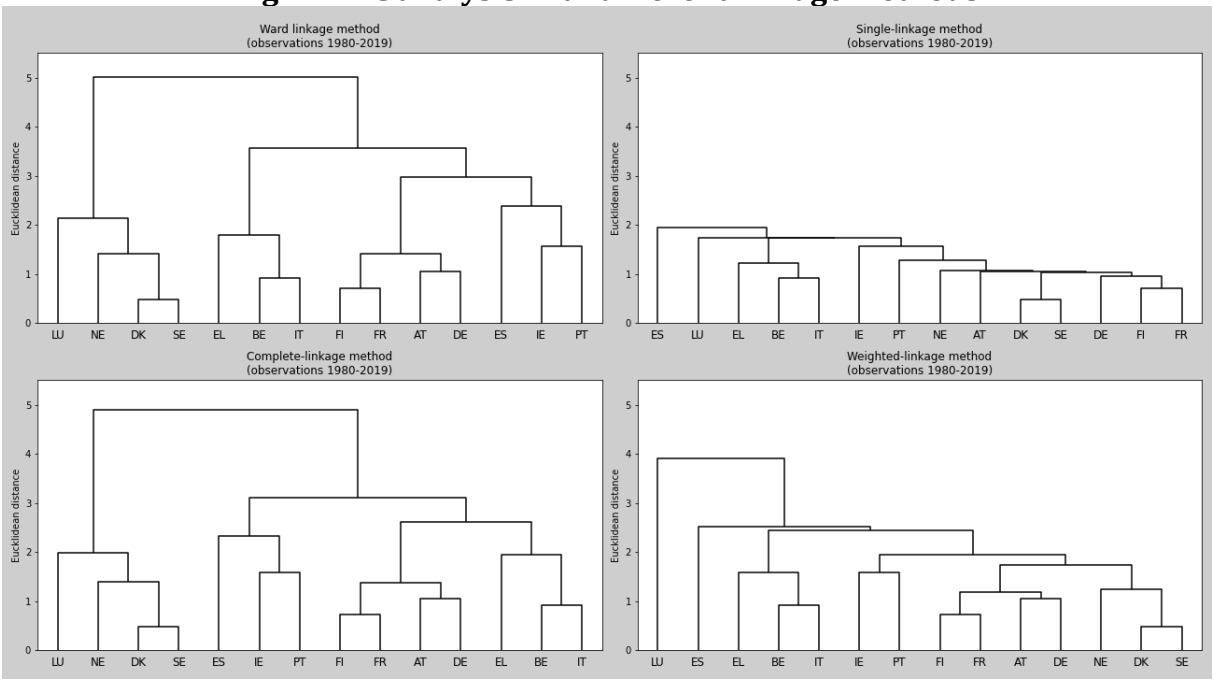
Our analysis is centred on the list of EU member states right after 2004 intake. We aim to analyze countries of EU which are members for long enough to have sufficient history in the union to uncover the impact of being a member state. Hence, we leave Bulgaria, Romania (2007) and Croatia (2013) as current members of EU out from the sample. We refer to the countries via their abbreviations presented in the European Commission glossary. For the abovementioned countries we collect fundamental macroeconomic data, such as inflation, unemployment, GDP growth, public debt, private debt, and the balance of current account. The data are gathered from two main sources, IMF, and Eurostat on an annual basis. We break down the analysis on three samples of countries, i. e. early members, late joiners and all countries together. We start our analysis with the subset of countries that joined the union prior the 2004 enlargement. This is followed by the analysis of 10 countries which accomplished accession to EU in 2004. Finally, we conclude with the joint analysis of all countries.

The countries are analysed and clustered in different time windows. We start with the period 1980–1998, which preceded the launch of the monetary union. Afterwards, we try to apprehend how countries evolved over time. Therefore, we repeat the same procedure in clustering over several other time periods (i) prior to the global financial crisis 1999-2008 (ii) in the wake of debt crisis 2009-2014, and (iii) up to now – period 2015-2019. With the already mentioned pre-euro period, we review in the article 4 timeframes. Each country is in every period characterized by the mean values of indicators and their standard deviations to capture the dynamics inside the time interval. The panel is then properly scaled in all dimensions to prevent clustering algorithm to behave erratically.

2. Results of the Research

In this chapter, we analyse the dissimilarities among EU members by performing cluster analysis. As a method chosen out of clustering universe, we employ hierarchical ascendant clustering (HAC) and its visualization in form of a dendrogram. We aim to answer two important questions (i) whether the European Union is divided into groups inside which cluster peers are notably more similar than members of other clusters, and (ii) whether there is any sign of convergence or divergence in time.

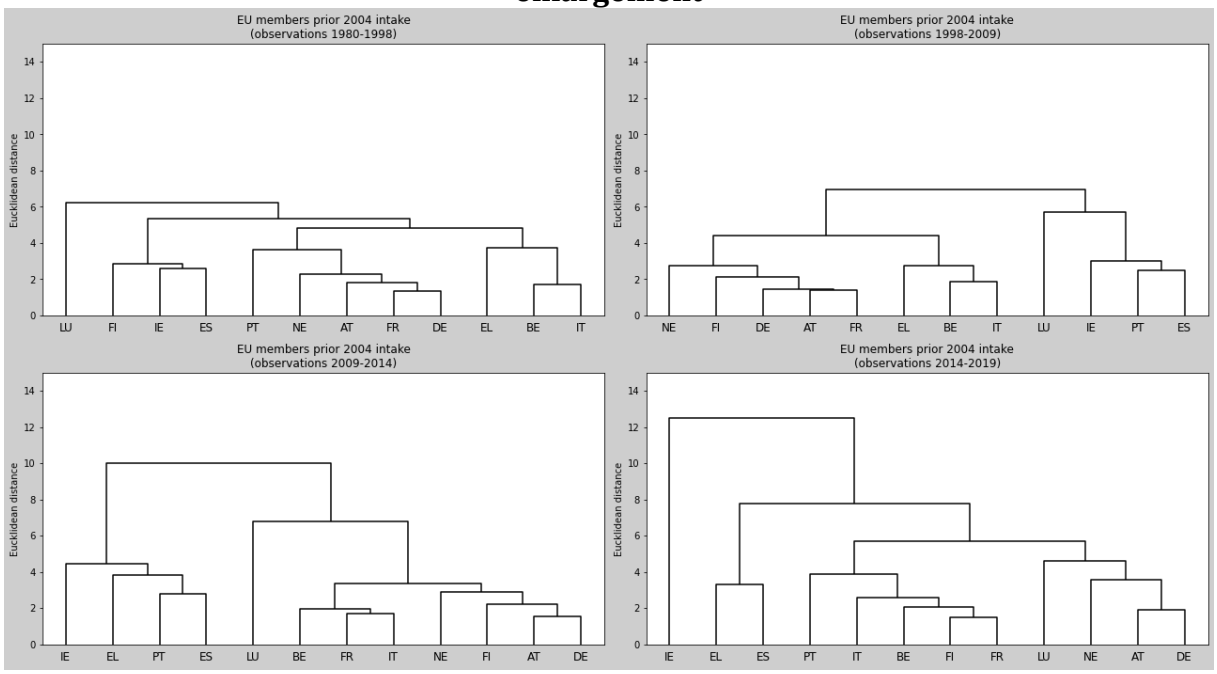
Fig. 1: HAC analysis with different linkage methods



Source: own calculation in python 3.8, data from (EUROSTAT, IMF, 2021)

As Fig. 1 depicts, all four methods described in methodology section release comparable conclusion. The countries form in every subplot four clusters of similar representation. The first cluster shaped by Germany, France, Finland, and Austria might be seen as the core one. Secondly, we can see Sweden and Denmark (EU members which do not have euro currency in circulation) being linked one to another. Moreover, the block of Spain, Portugal, and Greece seems to be stable across all charts as well.

Fig. 2: HAC analysis in different timeframes of EU members prior 2004 enlargement

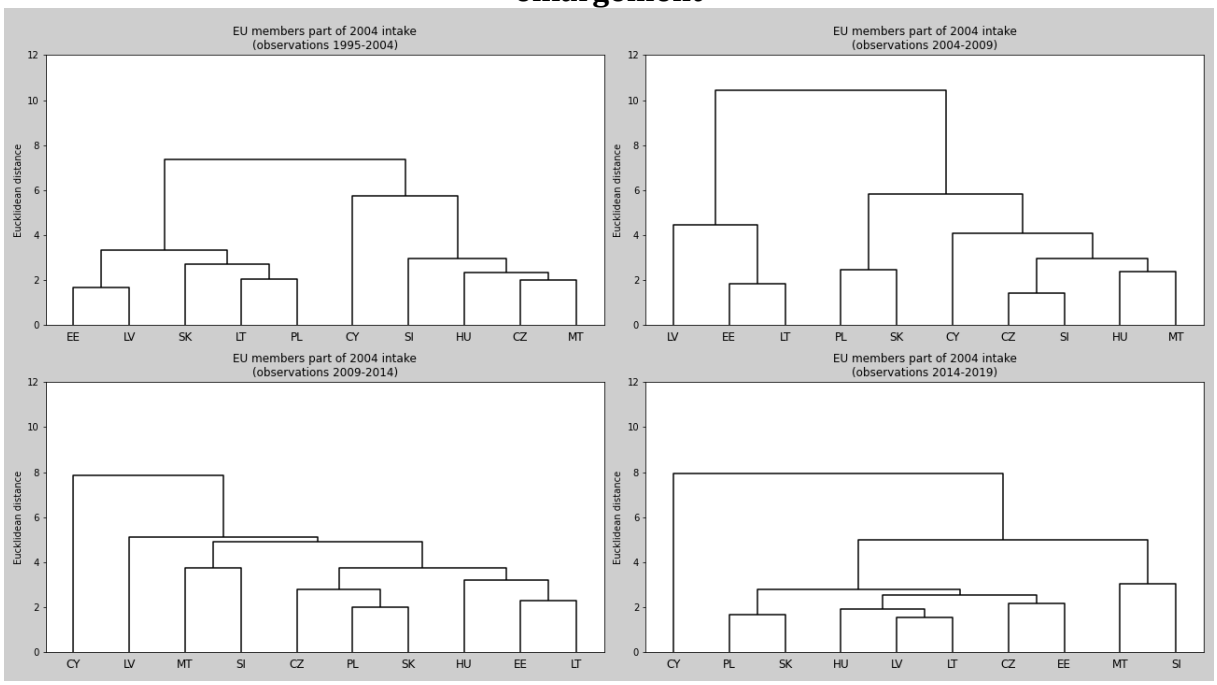


Source: own calculation in python 3.8, data from (EUROSTAT, IMF, 2021)

If we look at EU members prior 2004 intake through the time, we can clearly see three distinct clusters to be formed, with Luxemburg being the most idiosyncratic country. Germany, Austria, and Netherlands form a stable group throughout all periods, with various countries joining and leaving them. Observations between 2009 and 2014 show the impact of the debt crisis in the European Union, thus countries known as PIIGS formed temporary their own cluster. We assume this happened due to the rising government debt and related difficulties in financing through financial markets. After the years marked by high volatility following the financial crisis, Ireland has recovered quickly and is currently achieving an exceptional growth rates accompanied by a significant decline in private debt. Hence, stepping out as a positive outlier.

The dissimilarity measures are visually captured by the heights of the links. The longer the "branch" of the dendrogram, the higher the level of dissimilarity. The Fig. 2 provides the time perspective, where we see the rising height of the links. This pattern suggests a stronger divergence across countries, which originally created the eurozone. The findings put into the question the widespread believe that European countries would form a viable monetary union once they had adopted single currency.

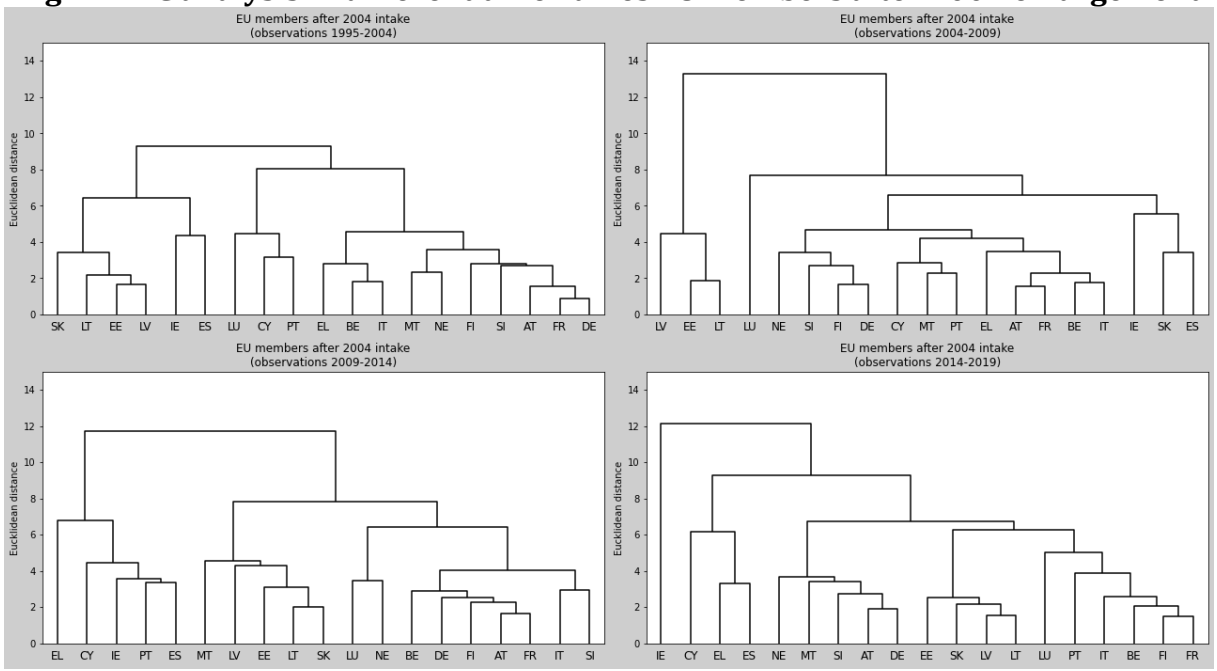
Fig. 3: HAC analysis in different timeframes EU members involved in 2004 enlargement



Source: own calculation in python 3.8, data from (EUROSTAT, IMF, 2021)

HAC analysis of EU members involved in 2004 intake shows long-lasting resemblance between Slovakia and Poland. Other countries from the Visegrad Group - Hungary and the Czech Republic do not share these similarities, yet in the period after the global financial crisis Czech Republic joined the cluster. As the results show, Cyprus has been a clear outlier since the enlargement of the EU in 2004, which it was part of. Cyprus differs from the other countries mainly because of the elevated level of government and private debt, not typical for the rest of the group.

Fig. 4: HAC analysis in different timeframes EU members after 2004 enlargement



Source: own calculation in python 3.8, data from (EUROSTAT, IMF, 2021)

A single joint analysis of all countries manifests the division of European Union members into the core countries and periphery. In the period of 2014-2019 four clusters of countries are visible, thereof the group of Cyprus, Spain, and Greece is a strong outlier, assuming this is the result of high public and private debt distinctive for all of them. Ireland, which shares some similarities with those countries, has experienced remarkable growth positioning itself as a positive outlier. The countries, which took part in 2004 enlargement of EU, demonstrate an above-average level of homogeneity. As the most stable connection emerges the one among Slovakia, Lithuania, Latvia, and Estonia.

The recent tendency of Portugal advancing back towards the core countries might be the positive signal out of the analysis. The data suggests that the government debt still poses major risks to the future of country that lies on Iberian Peninsula. Slovenia and Malta in this period reached the core of Europe, sharing similarities with Germany, Austria, and the Netherlands. These countries exhibit non-negative current account balances over the course of the last 5 years.

An interesting story to follow might be the development of Italy, which, thanks to its increasing government debt and the third highest unemployment in the EU, is diverging gradually from the core.

3. Discussion

According to the results of empirical study, we conclude that the euro area should not be considered a perfect OCA. The results visible in Fig. 2 and Fig. 4 exhibit diverging tendencies not only among initial clusters but also within the groups themselves. The rising hight of the "branches" of the tree-like visualization supports the claims of Eichengreen (1991) and Krugman (1993).

The conclusion of the research is in line with the other empirical analyses we are familiar with (e. g. Jondeau, 2008; Coudert, 2020). Where we see our contribution to the strand of literature is the extended list of countries we analysed and in the moving window, which brings the time perspective. The paper offers an extensive view on macroeconomic and monetary conditions inside the EU per se.

In the study we do not account for the labour mobility, which has been seen as the prerequisite of any monetary union that aims to be successful (e. g. McKinnon 1963). We purely rely on statistical modelling, which did not accommodate for more complex relations among countries. We simply calculate the dissimilarity matrix of selected macroeconomic indicators and plot the obtained results. Considering the rationale of the OCA, we see this as a room for improvement in proposed modelling approach.

Furthermore, we recommend, if further research takes on, applying PCA analysis to uncover and to better understand which indicators and variables contribute to the formation of such clusters. The analysis of HAC, which was presented in the paper, is not the most transparent in regard to variables that were decisive in clustering. PCA helps to identify variables, which are loaded to any given component helping reduce dimensionally to the level which is visually understandable – two-dimensional data.

Conclusion

To summarize, the empirical results do not provide any supporting evidence that countries are moving structurally closer to each other since the inception of monetary union, in turn, the rising dissimilarities have been identified. According to the results of the research, we presume the specialization hypothesis of the OCA prevails. The study unveils the European single-currency project is characterised by the heterogeneity of its members, which should be of interest of European Union policymakers in post-pandemic planning to combat the asynchronous business cycle.

Moreover, the paper presents the significant resemblance of countries that were part of the simultaneous accession in 2004. The uniformity of the group has the appearance of being even stronger after global financial crisis. European Union appears to be partitioned into couple of groups of relatively homogenous countries. Besides the so-called A10 countries, which exhibited high degree of similarity, the other moderately homogenous group that stands out from the sample is formed by Portugal, Spain, Greece, Ireland, and Cyprus. These countries experienced major financial distress after 2009 and since that time showed eminent dissimilarity from the rest of the EU members. We identify the cluster of Germany, France, Finland, and Austria and associate it with the core of EU. However, the cluster is not stable across different time windows we analysed in the paper. Hence, we believe that the core is more fragmented than before.

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Section IV

Human Resources in the Digital Era

John Anchor and Samar Soliman

University of Huddersfield, Huddersfield Business School
Queensgate, Huddersfield, HD1 3DH, United Kingdom
email: John.anchor@hud.ac.uk
email: Samar.soliman@hud.ac.uk

The International Competitiveness of Universities: How do We Measure It?

Abstract

The competitiveness of Universities is important in both a domestic and an international context. There is no agreed measure of competitiveness, but rankings (league tables) are used as proxis for it – rightly or wrongly. The international league tables which have been developed during the last 15 years reflect both the increasing internationalisation of universities and growing international competition for mobile students and research funding. These league tables include measures of internationalisation, but they mainly focus on the numbers of international students and the numbers of international staff. The international element of the rankings is also a small proportion of the total. This paper proposes an alternative measure of internationalisation. It includes three elements – range, profile, and institutionalisation. Range measures the types of international activities which universities engage with. Profile identifies the most senior person who is responsible for a university's international strategy and their portfolio of responsibilities. Institutionalisation is a measure of the degree to which internationalisation is embedded in a university's overall strategy. For example, does it have an identifiable international strategy? Six UK universities are examined to assess the usefulness of the range, profile, and institutionalisation typology. It is concluded that the use of range, profile, and institutionalisation, as measures of internationalisation, provides a more nuanced picture of a complex and multi-faceted phenomenon which has hitherto been measured in relatively simplistic ways.

Keywords: competitiveness, universities, internationalisation, rankings

JEL Classification: I23

Introduction

Universities operate in different domestic contexts. In some countries, they are publicly funded ie by taxation. In Germany, for example, all 16 states (or Länder) prohibit tuition fees, although some Länder charge an administration fee for registration or a contribution for the use of the institution's social facilities. In other countries, universities are funded partly or wholly by private sources, especially the tuition fees of students. Although there are only four private universities (out of 106) in England, the public universities operate in a semi marketized environment and charge high tuition fees. In the Czech Republic, the 26 public universities are not allowed to charge tuition fees for programmes which are taught in the Czech language, although they may do so for

programmes which are taught in English (mainly to international students). The private universities in the country may however charge fees for all their programmes.

Despite these important differences in their domestic funding systems, universities all operate in a competitive international environment. They compete for both internationally mobile students and for international research funding. The outcomes of that competition reflect the international competitiveness of universities, which is reflected in the international rankings or league tables which have been developed during the last 15 years. These are in turn a reflection of the increasing internationalisation of universities. However, the league tables are not only an outcome of a competitive process. They are also a key input to international competition in higher education because a university's current ranking influences its ability to recruit international students and to be awarded international research funding.

The academic literature lacks an organised effort by researchers and policy makers to investigate how the internationalisation of universities can be measured. To a considerable extent, the measurement of internationalisation has been left to the commercial providers of the major international league tables. This poses ethical problems - the consultancy activities of the major ranking organisations may lead to conflicts of interest which in turn distort the global university rankings (Chirikov, 2021; Jacqmin, 2021). The league tables also have methodological limitations, as indicated below. Hence, this study aims to develop criteria that can be used to measure internationalisation in higher education institutions.

1. Methods of Research

There are three main international league tables or rankings of universities. The Academic Ranking of World Universities (ARWU), also known as the Shanghai Jiao Tong Index, uses six indicators to rank world universities (Shanghai Ranking, 2020). However, these are all indicators of research prowess. ARWU does not measure teaching or internationalisation per se, although it can be argued that certain research measures are proxies for internationalisation. Therefore, the focus of this paper will be on the other two measures: the Times Higher Education (THE) World University Ranking and the QS World University Ranking.

The THE World University Ranking provides a comparison between universities against thirteen key performance indicators and ranks universities worldwide (THE, 2020). The QS World University Ranking provides a comparison between universities against six key performance indicators and ranks universities worldwide (QS Top Universities, 2020b). The universities identified by THE's World University Ranking and the QS World University Ranking are predominantly research-intensive universities. This suggests that the rankings, particularly THE, are a better measure of research power than internationalisation per se. In mitigation, however, there is a correlation between research power and internationalisation.

Both rankings consist of several weighted key performance indicator areas for each university (Table 1). One drawback of these criteria is that the 'international' element accounts for a small percentage of the overall assessment 7.5% for THE and 10% for QS. This does not allow sufficient space to assess the extent to which universities are internationalised.

Table 1: Composition of THE and QS world university rankings

THE World University Rankings	QS World University Ranking
Teaching 30%	Academic reputation 40%
Research 30%	Employer reputation 10%
Citations 30%	Faculty/Student ratio 20%
International outlook 7.5%	Citation per faculty 20%
Industry income 2.5%	International faculty ratio 5%
	International student ratio 5%

Source: The rankings

Table 2 provides a summary of the key performance indicators (KPIs) employed to assess the 'international' element of each ranking. Both the THE and QS rankings rely heavily on data concerning numbers of international students and staff.

Table 2: KPIs in the 'International' element of THE and QS world university rankings

THE World University Rankings	QS World University Ranking
International-to-domestic-student ratio: 2.5%	International-to-domestic-faculty ratio: 5%
International-to-domestic-staff ratio: 2.5%	International-to-domestic- student ratio: 5%
International collaboration: 2.5%	

Source: The rankings

The drawbacks of both the THE and QS rankings mean that they cannot be relied on to assess the extent to which universities are internationalised. To overcome these limitations, Soliman, Anchor and Taylor's (2019) study of the trajectory of internationalisation in four English universities between 2000 and 2015 is developed for this purpose. They concluded that internationalisation has gone through three phases, as the approaches of universities to this phenomenon have matured and progressed from operational to strategic' (Soliman, Anchor and Taylor, 2019). The characteristics identified in the final, mature (or strategic) phase of internationalisation are developed to measure the phenomenon. These are the range, profile, and institutionalisation of internationalisation.

2. Results of Research

2.1 Range of internationalisation

Internationalisation in higher education includes the undertaking of a range of international activities, whether on the home campus or overseas. These include international student recruitment, international student mobility programmes, overseas delivery of programmes, international branch campuses, internationalised curricula, intercultural programmes, global employability measures, international research bids and projects, publications with an international co-author, percentage of research citations which are international, and joint supervisory arrangements for research students. Range is a measure of how many of these activities are being undertaken by a university. However, there are difficulties in operationalising this measure. First, the list of international activities is potentially a long one and the categorisation of an activity as "international" may vary from university to university. Secondly there is no "common currency" to measure the combined size of each of these activities. Money could be used to measure some, but not all, of them. However even those to which a monetary value can be allocated are not comparable. Therefore, a qualitative and "wholistic" approach to the measurement of range is best.

2.2 Profile of internationalisation

This reflects the strategic priority of internationalisation within a university. Profile is measured by the seniority of the person responsible for the international strategy of a university. This indicates the priority which the institution gives to internationalisation. The content of that person's portfolio is also an indicator of the range of international activities undertaken by a university. However, it may be that not all activities which can be described as "international" are within the portfolio of the most senior person who is responsible for internationalisation. For example, the curriculum is usually the responsibility of the most senior person responsible for teaching and learning and citations are the responsibility of the most senior person responsible for research and knowledge exchange.

3) Institutionalisation of internationalisation

This identifies the extent to which internationalisation is embedded within a university's strategy. A high level of embedding or institutionalisation means that the University has an identifiable section of its strategy which is devoted to internationalisation or has a separate international strategy. In this case, it can be described as "foregrounded". In some cases, internationalisation may be mentioned in a university's strategy document, but is not a key strategic priority. In other cases, it is not mentioned at all. So, we propose

a three-point scale to measure the level of institutionalisation: “foregrounded”, “mentioned” and “not at all”.

The QS Stars Rating provides an assessment of the performance of universities against a set standard in different categories (QS Top Universities, 2020a). The QS Stars rating was developed because it can be argued that ‘‘universities are different to one another and therefore need to be assessed on a range of categories that recognize distinct strengths’’ (QS Top Universities, 2021). The QS star rating system covers a wider range of variables than either the THE or the QS World University Rankings. The variables are teaching, research, employability, internationalisation, facilities, online/distance learning, social responsibility, innovation, arts and culture, and inclusiveness. Universities are awarded a star rating for each of these indicators of their performance on a scale of 1 to 5. The internationalisation rating is based on several indicators. These are proportion of international students; proportion of international staff; numbers of exchange students arriving and departing; number of nationalities represented in the student body; number and strength of international partnerships with other universities; presence of religious facilities.

3. Discussion

The 23 UK universities that were identified by the QS Stars 5* Internationalisation Rating in 2018 were assessed against these newly articulated criteria since they include a range of university types, as identified by history and mission. The data have been analysed according to our new measures of internationalisation.

Each of these universities has a “Vice Rector” (to use the Czech term) who is responsible for internationalisation. Their subsidiary title (in brackets) is International or International Development or Global Engagement. Broadly speaking, these all mean the same thing. However there does seem to be a trend in the UK sector towards the use of the term Global Engagement, which reflects the phenomenon known as globalisation.

In five of the six case study universities, an international strategy is foregrounded, either as a key element of an institutional strategy or as a separate document. In University B, internationalisation only gets a passing mention in the institutional strategy. It should be noted, however, that at the time of the data collection (summer 2018), a new institutional strategy was under development. Five years seems to be the standard period for a university strategy in the UK.

There is a considerable range of international activities in each of the universities. From the lists provided, it is difficult to identify a hierarchy of internationalisation and therefore to rank the universities in this context.

Conclusion

The use of range, profile, and institutionalisation, as measures of internationalisation, provides a more nuanced picture of a complex and multi-faceted phenomenon which has hitherto been measured in relatively simplistic ways. The measurement of the internationalisation of universities has practical implications for both the Universities themselves and for policy makers who may wish to encourage – or in some cases discourage – the phenomenon. Internationalisation has become a hot topic in the study of higher education. Although the literature has included descriptive measures of

internationalisation from time to time, this has not been done on a systematic basis. The use of range, profile, and institutionalisation as "measures" of internationalisation is an original contribution to the literature on this important phenomenon.

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Matthias Bender

Comenius University, Faculty of Management
Odbojarov 10, P.O. Box 95, 820 05 Bratislava
email: bender2@uniba.sk

Ľubica Bajzíková

Comenius University, Faculty of Management
Odbojarov 10, P.O. Box 95, 820 05 Bratislava
email: lubica.bajzikova@fm.uniba.sk

Talent Management – Is a Holistic Approach Possible in Business Cooperation of SMEs?

Abstract

Social trends, such as demographic change or the shift towards a knowledge society, significantly impact the labor market. At the moment, more and more companies are looking for and having to fight for high-performing and valuable employees (talents) for the company. This is tackled with so-called talent management. SMEs (small and mid-sized Enterprise) have the disadvantage that they tend to have fewer resources to fight for these same employees against large companies. To survive in the market in general, it has become routine for SMEs to cooperate to offer the customer an overall solution for a construction project or to obtain raw materials or services jointly, cheaply, due to economies of scale. Talent management is a process that is very important, very resource-intensive, and ultimately only successful if it is implemented holistically. Therefore, as an SME, the question arises whether the talent management process can be outsourced to an external service provider? To answer this question, the Internet searched for business associations that provide human resources services. The found websites were subjected to a qualitative content analysis with the help of the software MAXQDA. As a result of the investigation, it can be noted that companies are joining forces to use external human resources services. According to the current state of knowledge, these are not solely geared to the talents in the companies, and the focus is on employee development. Evidence that external business cooperation is operating talent management for the participating companies could not be found with this investigation.

Key Words

SME, Business cooperation, talent management, human resources management, employee development

JEL Classification: M10, M53

Introduction

Demographic change and the change in society to the knowledge society mean that companies are increasingly struggling for the necessary personnel/talents. These challenges met with so-called talent management. Studies show that *"successful talent management systems ensure the achievement of the company's goals and increase the*

profitability of the companies "[1] (Kahl, 2011, S. 1). The problem is that SMEs usually have fewer resources than large companies to operate such a system. They are even more reliant on competent staff, as the performance of an individual in a small business has a much greater impact than in large enterprises. (cf. Lackner, 2014). Nevertheless, they have to assert themselves in the labor market to not get down on the "war of talent" (cf. (Ritz & Sinelli, 2010). True to the motto: *„Where the big ones merge, the little ones have to cooperate"*[2] (Becker, Damer, Howaldt, Killich, & Loose, 2005), business cooperation is a tried and tested means to compensate for the size disadvantage.

Olbert- Bock et al. carried out a detailed study to examine how personnel development can be promoted in an SME network. They see human resources development networks as an opportunity for SMEs. *„The vision of talent management in the network lies in systematizing and expanding the PE of SMEs by* promoting staff across companies*"*[3] (Olbert- Bock, Redzepi, Cloots, & Martin, 2015). However, the study also found that the focus was on cooperation in continuing training and no cross-company approach to personnel development (cf. Olbert- Bock, Redzepi, Cloots, & Martin, 2015).

The approach itself is not new. For example, the "*Mach 2*" network of entrepreneurs has been in existence since 1993 (cf. Helbich, 2005). Companies can benefit differently when they join a human resources development network. A significant advantage is that companies only have to bear the costs of a full-time HR- consultant on a pro-rata basis, and their staff is relieved of these tasks. In addition, a full-time HR- consultant guarantees quality and continuity in consulting services, which does not have to be ensured by the individual company. Since participants from different companies take part in the training courses in a network, a knowledge exchange occurs automatically, which can become the basis for innovations in one's own company. Finally, it should be mentioned that the association can negotiate more favorable terms, in negotiations with external consultants or trainers, than if a company were to deal alone (cf. Helbich, 2005).

How can we classify human resources development and talent management? Employee development is initially a major task in human resources management and includes the aspects of the promotion, training, and further education of the workforce (cf. Jung, 2006). Human resources management itself is defined as the „*sum of all personal design fields and individual measures to support current and future business development (business development) and the associated change processes (organizational development)*"[4]

[1] Original Text: *„erfolgreiche Talent-Management-Systeme die Erreichung der Unternehmensziele sichern und die Profitabilität der Unternehmen steigern"*

[2] Original Text: *„Wo die Großen fusionieren, müssen die Kleinen kooperieren."*

[3] Original Text: *„Die Vision des Talentmanagements im Netzwerk liegt darin die PE von KMU zu systematisieren und in ihren Möglichkeiten zu erweitern, indem eine unternehmensübergreifende Förderung von Personal stattfindet."*

[4] Original Text: *"Summe aller personalen Gestaltungsfelder und Einzelmaßnahmen zur Unterstützung der aktuellen und zukünftigen Unternehmensentwicklung (Business Development) und der damit einhergehenden Veränderungsprozesse (Organisationsentwicklung)."*

(Bartscher & Nissen, 2018). In addition to employee development, human resources management also includes workforce planning, recruitment, outplacement, leadership, compensation management, performance management, and employee administration (cf. Jung, 2006). Talent management is defined as *"internal and external strategies, methods and measures by which a company ensures that the key positions critical to business success are filled with the right employees: goal-oriented action to discover, attract, develop, promote, optimally place and retain the company"*[5] (Hattburg, 2018). When we talk about talent management in the following, it is assumed that this consists of the following four functions: "identify/ attracting", "assessment/ insertion", "develop", "motivating/ retaining" (cf. Ewerlin, 2013). To talk about talent management, it is essential that all elements of talent management are implemented holistically and not only a part of it (cf. Bender, 2021). But who can implement this external personnel development or external talent management, if SMEs are not able to do it on their own? According to STATISTA, there have been around 2000 HR- services in Germany since 2008 (cf. STATISTA, 2021), which are generally available for these tasks.

What conclusions can be drawn when assessing the explanations made so far?

- A service is only offered permanently on the free market if there is a need for it. Over the last years, there has been a constant number of HR- consultants. This means, there must be a need for these services.
- If you compare human resources management and talent management, you will notice that partial aspects are identical. A main difference is that human resources management targets the entire workforce, while talent management focuses on a particular group.
- From the perspective of an HR- consultancy, it is probably more lucrative if the target group is the entire workforce of a company and not just a part of it.
- Implementing holistic talent management is likely to be more challenging to implement than single aspects of human resources management. This implementation is ultimately not in the hands of HR consultants.

Based on the reviews just made, the following general questions arise:

- What services are in demand by companies of both personnel and talent management?
- What is the target group in the business cooperations - all employees, or talents?
- Is there business cooperation in which explecite measures for talent management are implemented?
- Are there business cooperations in which a holistic talent management is realized?

[5] Original Text: *„darunter versteht man intern und extern gerichtete Strategien, Methoden und Maßnahmen, mit denen ein Unternehmen sicherstellt, dass die für den Geschäftserfolg kritischen Schlüsselpositionen mit den richtigen Mitarbeitern besetzt sind: das zielorientierte Handeln, um Talente zu entdecken, zu gewinnen, zu entwickeln, zu fördern, optimal zu platzieren und an das Unternehmen zu binden."*

The last of the questions just formulated is essential for further work.

1. Methods of Research

Therefore, the research question for this article is: "Can SMEs ensure holistic talent management with the help of external partners"? To answer this question, the following hypotheses will be worked on:

H1: When talent management measures are offered by external HR- consultants, those are limited to the function "Develop".

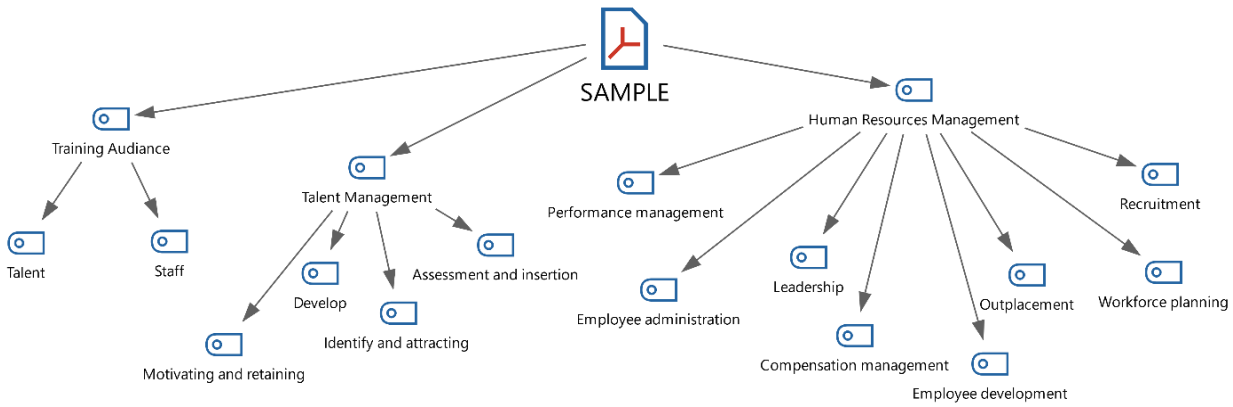
H2: If there are offers for human resources management measures by external HR-consultants, those are limited to the main task of "Development".

The research is to be conducted with qualitative content analysis (cf. Mayring, 2015). The sample was selected according to concrete- content instead of abstract-methodological criteria (cf. Flick, 2019). The descriptions of the services offered are essential. Using Google searching tool, it was searched for corresponding business cooperation in which personnel management tasks will be carried out jointly. The following keywords were used for this purpose:

- Personnel development in a business cooperation
- Talent management in a business cooperation
- Recruitment in a business cooperation
- Outplacement in a business cooperation
- Personnel requirements planning in a business cooperation

Based on the impression gained so far, it is considered most likely that personnel development is in the foreground. Therefore, this term was first queried. Repeated hits between the keywords were not considered. The first 300 hits displayed by Google were checked for suitability and, if suitable, the found profiles were transferred to a word document. In addition to the identification of suitable examples, it was evaluated in parallel whether personnel or talent management should be made possible in the respective corporate cooperation. To analyze the selected examples with MAXQDA, codes and subcodes have been set inductively and deductively (see Fig.1):

Fig. 1: MaxQDA Map for "SAMPLE"



Source: own presentation

2. Results of the Research

Based on our research it can be said that it is comparatively easy to find HR- consultants who offer different personnel management measures as service providers. For example, the BDU (Federal Association of German Business Consultants BDU e.V.) has a HR-consultant database, through which you can find a contact person very quickly (https://www.bdu.de/services/wie-wir-unternehmen-unterstuetzen/personalberaterdatenbank/). Identifing business corporations, which are providing those services, has become much more difficult (see Tab. 1):

Tab. 1: Google Results Overview (in numbers)

Keyword	Hit display according to Google	matching alliances
Employee development in a business cooperation	286000	9 + 1[6]
Talent management in a business cooperation	290000	0
Recruitment in a business cooperation	88000	1
Outplacement in a business cooperation	5820	1
Workforce planning in a business cooperation	930000	0

Source: own presentation

[6] *"+1"* stands for the business cooperation Mach 2. This cooperation was found in the literature and not via Goolge.

General description:

A total of 12 websites were analyzed. The extent of the description varied between 69 (business cooperation 11) and 2312 words (business cooperation 2). The number of codes and subcodes assigned varied between 8 (business cooperation 11) and 90 (business cooperation 2). Codes on human resources management were mainly carried out. The topic of talent management plays a minor role. An exact list of codes and subcodes can be found in table 2:

Tab. 2: MAXQDA Overview Codes and Subcodes

Code	Subcode	Frequence	Code	Subcode	Frequence
Training Audiance		0	Human Resources Management		3
	Talent	5		Employee administration	0
	Staff	102		Performance management	34
Talent Management		1		Compensation management	1
	Motivating and retaining	3		Leadership	15
	Develop	4		Outplacement	6
	Assessment and insertion	0		Employee development	295
	Identify and attracting	2		Recruitment	12
				Workforce planning	5

Source: own presentation

In further analysis, it was found that Internet presence No. 6 is not business cooperation and was therefore no longer considered in the further considerations. 11 out of 11 business cooperations target the entire workforce. 7 out of 11 offer measures specifically for managers. In 2 out of 11, aspects of talent management are further elaborated. All business cooperations offer personnel development measures as a basic offer (see Table 3).

Tab. 3: Summary of Services offered

Internet presence	Target group	Services	Separate mention of executives	Remarks
1	staff	Recruitment Employee Development	no	Primary Focus Recruitment by Internship
2	staff	Workforce Planning Performance management Recruitment Employee Development	yes	Consideration about key positions and Career Models Consideration about a particular group of the staff = talent

3	staff	Employee Development Leadership (training perspective)	yes	Consideration about a particular group of the staff = talent
4	staff	Performance management Recruitment Employee Development Leadership (training perspective)	yes	The reason for corporate cooperation is to reduce the costs for development
5	staff	Employee Development	no	The reason for corporate cooperation is to reduce the costs for development
6	staff	Recruitment Employee Development Outplacement Leadership (training perspective)	yes	no corporate cooperation, but an HR-consultant
7	staff	Employee Development	no	
8	staff	Employee Development	yes	Offer for Talent Management, Strategic HR- Development
9	staff	Employee Development Recruitment Performance management	yes	Consideration about Talent Pool
10	staff	Employee Development Performance management Recruitment Leadership (training perspective)	yes	
11	staff	Employee Development	no	
12	staff	Performance management Employee Development Outplacement	yes	

Source: own presentation

Results for H1: When talent management measures are offered, those are limited to the function "Develop".

In 2 of the 11 websites, explanations about the talent management functions development, motivating/ binding, and identify/ win could be found (see Tab. 2). Business cooperation 8 explains the following on the topic of talent management: „*Within the framework of its strategic personnel development, the Group [...] supports selected employees from all fields of work of the Group through systematic training, consulting and coaching*"[7] (development). In business cooperation 9, the possibility of forming a talent

[7] Original Text: *„Die Unternehmensgruppe [...] fördert im Rahmen ihrer strategischen Personalentwicklung ausgewählte Mitarbeitende aus allen Arbeitsfeldern der Unternehmensgruppe durch systematische Weiterbildung, Beratung und Coaching"*

pool is discussed. The question is asked here, *"who are the right talents, and are they interested in leadership positions at all?"*[8] (motivating/ binding and identify/ win).

Although talent management is not of particular importance in this context, three of the four talent management functions are addressed and not only the function of development. Based on the research, hypothesis 1 will be rejected.

Result for H2: If there are offers for human resources management measures, those are limited to the main task of development.

The websites examined address seven of the eight main tasks of human resources management. The personnel administration is not considered in the offers. However, the main task of personnel development is the most important and is the dominant theme. The remaining tasks are of little or no importance (see Table 2).

Although personnel development is the most frequently addressed, this main task is not exclusively offered. Based on the research, hypothesis 2 will be rejected.

3. Discussion

Although personnel development was the most frequently discussed from both a personnel and talent management point of view, this main task/function is not exclusively offered. Interestingly, the distribution of the mentioned talent management functions is more even than the distribution of the main tasks of human resources management mentioned.

This difference can be made on the one hand by the smaller amount of raw data found about talent management. However, it should not be forgotten that talent management must be implemented holistically if it is to be successful (cf. Bender, 2021). Thus, the implementation of talent management measures may be viewed holistically, whereas human resources management measures tend to stand for themselves.

Conclusion

The aim was to determine whether SMEs can implement holistic talent management with external partners. At this stage, this question must be denied. On the one hand, the business cooperations analyzed do not focus exclusively on the group of talents in the participating companies. On the other hand, not all talent management functions (cf. Ewerlin, 2013) are offered. Especially for the cross-company use of personnel/talents, no indication could be found that this is realized in everyday life. It can therefore be assumed that there is no need for this. Otherwise, this would undoubtedly be offered. Since

[8] Original Text: *„wer sind die geeigneten Talente und haben selbige überhaupt Interesse an Führungspositionen?"*

business cooperations are common in other business areas, this would require a more detailed examination of what prevents companies from entering a business cooperation for implementing a holistic talent management across companies.

Since personnel development measures are offered in all analysed business cooperations, it can be assumed that this is the aspect that is expected and sought by potential customers. To be found on the Internet, one should therefore take care as a HR- consultant that one can be found quickly under the keyword "personnel development". Whether other keywords are helpful would have to be examined on a case-by-case basis.

Although a clear trend can be inferred from the analysed data, it cannot be ruled out that the small sample has led to a distortion. Therefore, in addition to researching the reasons why talent management is not in demand/offered across companies, the findings gained should be reviewed against a larger sample.

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Tereza Horáková, Vladimíra Hovorková Valentová
Technical University of Liberec, Department of Business Administration and Management, Department of Economic Statistics
Studentská 1402/2, Liberec 1, 46117, Czech Republic
email: tereza.horakova3@tul.cz, vladimira.valentova@tul.cz

Knowledge Sharing Behavior among University Students during Covid-19 pandemic

Abstract
These days, knowledge management and especially its part related to knowledge sharing have become a vital part of the success of various organisations, especially in the ongoing Covid-19 pandemic, which changed the way of work and learning completely. Learning went through a significant transition because face-to-face teaching was no longer possible. Thanks to this, learning shifted to an online form that had caused a considerable challenge in digitalisation and internal knowledge management processes. Students' knowledge-sharing activities are essential as knowledge transfer between them helps foster a culture of knowledge sharing in the university. Universities play a crucial role in the knowledge economy as knowledge created through research is then transferred and shared through teaching, publishing or various collaboration primary or public sector. This paper aims to map the knowledge sharing behaviour in the university environment, namely among students of the Faculty of Economics, the Techanical University of Liberec. The presented paper is based on an analysis of literature review, data from conducted focus groups between chosen groups of students, and primary data collected by the authors given the results of knowledge-sharing practices between higher education students during the Covid-19 pandemic. The pilot research data was used to construct the final version of the questionnaire. It identified the main factors that facilitate the knowledge sharing process at the university and the most used online tools between students.

Key Words
Covid-19 pandemic, knowledge management, online knowledge sharing, university environment

JEL Classification: A20, C83, D83, I23

Introduction

The systematisation of knowledge sharing is ranked among the activities of knowledge management. The primary and public sector as well as universities are currently facing many challenges in terms of knowledge-sharing. Nowadays, an equally important issue is online learning which has gained intensity and importance due to the coronavirus crisis. The success of online learning environments depends on the knowledge-sharing process and students' interaction in the online environment. Covid-19 has changed teaching in primary, secondary and higher education worldwide, which caused a significant challenge in digitising learning and internal processes of knowledge management. Knowledge sharing is considered a social phenomenon related to interpersonal relationships and social interactions. A key challenge in online and traditional learning is

promoting knowledge sharing through social interactions in various forms (Lin et al., 2012; Ghadirian et al. 2014).

1. Knowledge-sharing Behaviour at Universities

Abubakar et al. (2019) states that knowledge management (furthermore KM) consists of the following processes: knowledge creation, capturing knowledge, knowledge organisation, preservation of knowledge, knowledge sharing and application of knowledge. Based on the existing literature on knowledge management practices, there seem to be two main sets of such practices widely employed in organisations. One is related to information technology and computer-supported communication, and the other one is related to human resource management. Both of the KM procedures mentioned above enable managing knowledge effectively (Andreeva & Kianto, 2012). According to Arief et al. (2018 by Becerra-Fernandez and Sabherwal 2015) knowledge sharing is described as a process when an individual disseminates knowledge (i.e., know-what, know-how, and know-why) to others. Sadly, many organisations, including research universities, have not grasped the importance of knowledge sharing and knowledge management in general, which results in the slow absorption of knowledge management activities and initiatives. According to Tan (2016 by Patel & Ragsdell 2011) knowledge sharing should be considered a vital process in the university environment. Each research university has its own set of faculty members working on various projects with a particular set of knowledge and diverse working experience in research. Through research collaboration, the research universities can support their academic staff in knowledge sharing behaviour; thus, the knowledge sharing process allows them to create new ideas and establish new research principles (Tan, 2016).

Knowledge sharing occurs not only in face-to-face communication but also through virtual sharing media such as social media. Despite the significant growth in the number of online communities, few have successfully motivated members to share and contribute knowledge. Nguyen & Malik (2020) define online knowledge sharing as the process by which employees can transfer their opinions, experience, know-how and skills via online tools to other colleagues within the organisation. This process is undertaken to provide mutual help in problem-solving within the team or the whole organisation and encourage idea development. Online knowledge sharing could also enhance interpersonal contact in an organisation as continuous interpersonal interaction could occur, facilitating the knowledge sharing process (Nguyen & Malik, 2020). In every case, knowledge sharing activity aims to share knowledge, absorb and use by other individuals. Joint construction of knowledge occurs when students think about newly acquired knowledge, justify and define it, re-evaluate their ideas with it and externalize it by transforming internal processes into public ones (Choi et al., 2005; Ghadirian et al., 2014).

In addition, students' ability to share knowledge is linked to the corporate world's interest in recruiting employees who have diversified social communication skills and can communicate messages to others in a clear and unambiguous form (Begoña & Carmen 2011; Ghadirian et al., 2014). From the above information, it is clear how vital knowledge sharing is not only for developing the educational process. Ghadirian et al. (2014) state that research on knowledge sharing in educational institutions among students is significantly less than research conducted among employees in the corporate world.

Universities play a crucial role in the knowledge economy by creating knowledge that was created through research and then transferred and shared through teaching, publishing or collaboration with government and industry (Gamlath & Wilson, 2017; Yücel & Usluel, 2016). Knowledge sharing is considered an essential attribute of a graduate's profile of higher education student, which can help students succeed in their future careers by contributing to an individual's career competencies and professional development (Brouwer & Jansen, 2019). Knowledge transfer between students helps to foster a culture of knowledge sharing on campus and is the primary means by which universities help create knowledge workers who can significantly contribute to the modern knowledge economy. One of the possible challenges associated with knowledge sharing is the accumulation of knowledge in employees who refuse to share them with others (Postolache, 2020). Table 1 shows the types of knowledge sharing barriers, which could be personal, organisational and technological.

Table 1 - Barriers of knowledge sharing

Type of knowledge-sharing barriers		
Personal	**Organisational**	**Technological**
Lack of time Fear that knowledge sharing will jeopardize or reduce job security	Lack of leadership Direction of leadership Lack of transparent remuneration system	Lack of system and process compatibility Reluctance to use IT systems due to lack of knowledge and experience

Source: own elaboration based on Postolache, 2020

An essential aspect of knowledge sharing among students is the degree of formalization of sharing. Some knowledge-sharing processes exist as part of formal university structures, such as group work during teaching, and others are based on informality. An informal form of knowledge sharing takes place, for example, through a Facebook group or during a meeting in a café. Many university courses now require the involvement of students in group work; the primary goal is the development of teamwork and communication skills of individuals. During group work, a higher willingness to share knowledge can be expected regarding the group evaluation of their joint work. Individuals should be motivated to share their knowledge to achieve good evaluation. However, whether group assessments encourage students to engage in knowledge sharing in a higher education environment is debatable. Various online tools are widely used to facilitate knowledge sharing among students. Although these technologies are essential for online teaching, they can also promote education in mixed learning environments. If students do not have access to such tools, they can use an alternative platform for knowledge sharing – social media (Gamlath & Wilson, 2017; Yücel & Usluel, 2016). The above-mentioned online forms of teaching have gained intensity and importance, especially in the ongoing Covid-19 pandemic.

2. Methods of Research

First, it is necessary to mention that most of the activities in the project are implemented in cooperation with colleagues from the Norwegian University of Technology (furthermore NTNU) where they are preparing the same project. One of the project goals is to compare the research outputs at NTNU and at the Faculty of Economics, the Technical University of Liberec (furthermore EF TUL). The main hypothesis that we attempt to verify with the help of the project is: Does the Coronavirus pandemic situation change our personal/group/collective behaviour in knowledge sharing?

The essential tool for verifying the primary hypothesis and other partial hypotheses is a questionnaire survey. The questions in the first version of the questionnaire were derived from several in-depth interviews with NTNU students conducted by colleagues from NTNU and in-depth interviews with EF TUL students conducted by the Czech team. In-depth interviews in Norway were attended by two first-year students, two 2nd-year students and two 3rd-year bachelor's students. Seven Erasmus students of the 1st-year of master studies of the Business Administration course took part in the interview at EF TUL. These students were chosen on purpose as they represent a valuable source of information in the field of knowledge sharing beyond traditional students of EF TUL. The interview consisted of five parts. The first part focused on a description of the casual study week before the outbreak of the Covid-19 pandemic. Students were asked to describe their study situation and study methods. The second part of the interview was about the knowledge sharing culture. Students expressed their attitude to knowledge sharing with classmates, what technologies they use to share knowledge, and also how they perceive the culture of knowledge sharing at the university. The third part of the interview focused on barriers to knowledge sharing. Students stated what limits them in sharing knowledge - i.e. personal, technical and organisational barriers. In the fourth part of the interview, students could express how they would imagine the ideal situation when sharing knowledge with their classmates. The final part mapped the changes in knowledge sharing behaviour following the outbreak of the Covid-19 pandemic.

After creating the first version of the questionnaire, the content of which was determined based on the mentioned in-depth interviews and literature research, a pilot survey was conducted among students of the 1st, 2nd and 3rd year of the bachelor's study program at EF TUL. The results of this pilot survey are presented in the following chapter.

The pilot survey aims to show the weaknesses of the questionnaire. In our case, answers to the two questions were changed. The first one was related to the identification of an information-sharing tool. Among the possible answers was the "e-learning" option. Based on the given responses, we ruled out this possibility because the conflicting frequencies of introducing this variant of the answer alerted us that only teachers can use e-learning to share information, but not students. In the case of e-learning, they are only passive recipients of the information. The second modification concerned the expansion of the offer of tools for online communication. Following options have initially been mentioned in the questionnaire: Google Meet, Zoom, MS Teams and Discord. Based on the students' responses in the "other" column, the options were expanded to: e-mail, One Drive, Windows Sharepoint Services, Project Management Applications (i. e. Trello, Asana, Notion, Project Manager, etc.), Note-taking applications (i. e. Evernote), Multifunctional

Applications, Meeting Scheduling applications (i. e. Basecamp, Zoho Workplace, Cisco, etc.) and Knowledge Sharing Applications (i. e. BoostHQ, Bloomfire, Elium, etc.).

After the pilot survey, the questionnaire was modified and expanded with additional questions, divided into three factors influencing knowledge sharing: individual, collective and study context. This questionnaire is now distributed to all bachelor's and master's students of EF TUL and to students of 1st, 2nd and 3rd year of bachelor study program at NTNU. It will also be sent to students of other TUL faculties during the following weeks.

3. Results of the Research

A total of 81 students from the first three years of bachelor's studies (41 women, 40 men) took part in the pilot survey. The first question of the pilot questionnaire consisted of 12 statements by which students could express a certain degree of identification with the statement on a scale from 1 to 5, where 1 meant "*I agree with the statement completely* " and 5 *"I do not agree with the statement at all*". For the statement *"It is more convenient for me to share my knowledge with students I know."* rating 1 (44.4% of answers) appeared most often, followed by rating 2 (37.0% of responses). In total, the answers of 1 + 2 created 81.4%, which indicates that most students are more comfortable sharing knowledge with those they know personally. This is also proved by the average degree of identification with the statement of 1.89. The median response was 2, which means that 50% of students reported answer 2 or answer 1. When comparing responses by gender, there were no significant differences in responses between men and women. The second statement was as follows: *"By sharing knowledge, I can be more popular within the classroom."* The most frequent answer was 2, meaning students rather agree with the statement (33.3% of answers). Quite often, however, students also chose the neutral answer 3 (32.1%). The average rate of identification with the statement was 2.81 and the median 3. It is, therefore, possible to conclude that in our selected group of students, more of them expect the benefit of knowledge sharing in the form of increasing the popularity of their person.

For the third statement, *"I prefer to meet my classmates in person than in an online environment."* most students chose answer 1 (50.6%). Let us add that the average rate of identification with the statement is 2.07 and the median 1. Answer 1 + 2 were given by a total of 67.9% of students. Thus, it could be said that most students prefer to meet their classmates in person than through online tools. In the fourth statement, we found out that most students have no preference for individual work over group work as the proportion of students in both ways of studying was identical. For the fifth statement, *"I'd rather study alone,"* students most often marked answer 2, which means that most students prefer to prepare on their own rather than in a group. The average rate of identification with the statement is 2.63 and the median 3. More students marked answers 1 + 2 (48.8%) than 4 + 5 (22.5%).

The sixth statement *"I share my knowledge with others because it strengthens our relationships."* had the most frequent answer 2 (33.3%), the average 2.27 and the median 2. Answer 1 + 2 was chosen by 61.7% of students, while responses 4+ 5 were mentioned by 13.6% of students. Therefore, it is possible to conclude that the interviewed students consider knowledge sharing to be a good tool for improving mutual relations. For the

seventh statement *"I perceive my classmates as my competitors rather than colleagues with whom it is advantageous to cooperate."* We recorded the most frequent answer 5 (53.1%), the average 4.07 and the median 5. An answer 4+5 was selected by a total of 77.8 % of students, while answers 1 + 2 only by 14.8%. Only a fraction of students perceive their classmates as competitors in a given group. The results obtained in the 8th statement were not so interesting; therefore, they were not included concerning the limited scope of the article.

For the ninth statement, *"I share my knowledge more than before the Covid-19 pandemic.",* the most common answer was 3, which could be interpreted that most students share their knowledge as much as they did before the pandemic. Interestingly, 32.2% of students gave answers 1 + 2 together, while answers 4 + 5 were selected by 40.7% of students. Then, it seems that in the selected group of students, there are more students who paradoxically share their knowledge less than before the pandemic. As for the tenth statement *"Online teaching suits me better than personal teaching.",* most respondents chose answer 3 (24.7%). However, this was only slightly more than for answer 1, chosen by 22.2% of students. It is interesting that-43.2% of students chose 1 + 2 answers, while 32.2% of respondents chose 4 + 5. In the selected group, there are more students to which online teaching suits more than the personal way of teaching.

For the eleventh statement, *"One day I would like to work in a company that supports knowledge sharing",* option 1 (37.5%) won convincingly in the response rate. Option 2 also had a high proportion of responses (26.3%). The answer 1 + 2 was chosen by 63.8% of students, while 4 + 5 was chosen by 11.3% of students. In the last statement of question 1 *"I perceive that the importance of knowledge sharing has increased due to the Covid-19 pandemic."*, answers 1 + 3 (they have the same frequency, so the mode can not be determined) appear most often, which 29.6% of students selected. Answer 1 + 2 is recorded in 54.3% of cases and answers 4 + 5 were chosen by 16% of students. Most students realise that knowledge sharing is crucial nowadays.

In question two, the students commented on the topic of their motivation to share knowledge. Most (44.4%) students chose the answer *"By sharing knowledge; I will practice the subject better".* A significant number of students (35.8%) also stated that they want to help their classmates selflessly. Question three, which focused on stimulating knowledge-sharing, the most common answer is "the opportunity to meet more people through knowledge sharing" (27.2%). Furthermore, 25.9% of students stated that they wanted a positive evaluation from the teacher, 18.5% of students would welcome a financial reward to support knowledge sharing, 17.3% of respondents would like recognition from classmates/teachers. The results of the question three were not so interesting; therefore, they were not included concerning the limited scope of the article.

Question five examined the extent to which students use different tools for knowledge-sharing. Most students often use Google documents (31.7%); email is also used very often by most respondents (42.7%), but on the other hand platforms such as One Drive and Dropbox are not used by most respondents at all (44.7% and 74.7%). The same conclusion could be made according to portals such as Air Mail, Uložto, etc. Social networks and communication channels such as Facebook, Whatsapp, Instagram, etc. are the most favourite channels for knowledge sharing among students as they very often use them (82.7% of students). In question six, students commented on whether they use these

tools more or less than before the pandemic. The most common answer was "a little more than before the pandemic" (39.5%). Many students also chose the answer "significantly more than before the pandemic" (35.8%).

Question seven concerned the level of use of these online communication tools. The collected responses show that Google Meet is the most favourite tool among students, as the most frequent response was according to daily usage (52.5%). On the other hand, platforms Zoom, MS Teams and Discord are the least favourite ones as students rarely use them or do not use them at all. In the eighth question, 80.3% of students stated that the intensity of their use of online knowledge sharing tools had increased in the last year, only 19.7% indicated that they had not increased their usage.

Fascinating information was provided by question nine, where students were asked to state the most significant barrier to sharing their knowledge. The most common answer is *"low self-confidence, introversion, lack of confidence in their abilities, distrust in the correctness of own results"* (35.6%). Other responses included: impersonal contact, technical problems.

4. Discussion

When comparing the answers of 1st and 2nd year bachelor students, the biggest difference was noted in the statement, *"I would like to work in an organisation that supports knowledge sharing."* The most frequent answer for 1st year students was 3, while for 2nd year students, it was 1. The sum of responses 1 + 2 is higher for 2nd year students than for 1st year (63.1% vs 44.6%). From this, it might be concluded that 2nd year students are much more aware of the importance of knowledge sharing than 1st year students. Equally, in the statement *"It is more convenient for me to share my knowledge with students I know."*, there could also be seen a difference in responses of 1st and 2nd year bachelor students. In the 1st year of study, the most frequent answer is 2, and in the 2nd year of study, the most frequent answer is 1. Based on this, it is clear that students who had the opportunity to meet at school before the Covid-19 pandemic prefer to share knowledge with those they know. Overall when comparing responses by gender, there were no significant differences in responses between men and women.

The results of the Al-Busaidi et al. (2010) study on the sample of 104 employees show that the most significant factor for encouragement to share knowledge was a reward policy. There could be seen a considerable difference between university and business environment as only 18.5% of students would welcome a financial reward to support their knowledge sharing behaviour. However, another significant result of the Al-Busaidi et al.'s (2010) study was knowledge-sharing experience in general. It corresponds with our results regarding the students' motivation to share knowledge. Most of the students (44.4%) share their knowledge because it helps them practice the subject.

Results related to knowledge-sharing barriers are also very interesting as the low self-confidence/lack of confidence/distrust/introversion (35.6%) is considered the most significant barrier to students' knowledge sharing. In other words, these factors could be named fear which is one of the personal barriers in knowledge sharing according

to Postolache (2020). Based on organisational barriers discussed by Postolache (2020), lack of leadership does not appear in the university environment. There is always a student who would set up, for example, a Facebook chat group, and all the students would communicate and share their knowledge, as social media are the most favourite channel to communicate. It is quite the same with the second organisational barrier when direction of leadership in the university environment is not as vital as in the business environment. Compared to business environment, students have their own motivation to share knowledge, for example, the practice of a particular subject, meeting new people, or to help their classmates selflessly. Lack of remuneration system is another barrier that does not appear in the university environment because the university works differently than the company. It is not easy to imagine that there would be a system of remuneration based on the openness of knowledge sharing, as based on the responses, students do not take their classmates as competitors.

Conclusion

The article intended to discuss and present the pilot research results of the knowledge sharing process between chosen students at the EF TUL. The pilot survey examined the dependence of the answers to all questions on gender and the year of study. For all responses to the questions, the basic descriptive characteristics for each year of study were calculated. The finding, which resulted from the comparison of selected descriptive statistics for individual study years, is an overview of the variability of responses. The most significant variability of answers was recorded in statement 3 in question 1 – the coefficient of variation exceeds the value of 60% in both years. This means that for the statement "I prefer to meet my classmates in person than in the online environment", the students' answers differed the most. On the contrary, the answers to question 1, statements 2 and 7 were the most consistent in both groups as the value of the coefficient of variation only slightly exceeds 30%. The most significant difference in the variability of answers between years is recorded in question 1, statement 1, where the variability of responses of 1st year students can still be classified as small (coefficient of variation is 48.6 %), but for the 2nd year students, it is large (coefficient of variation is 61.6%). Significant differences in the variability of answers could also be found in statements 5 and 6. No other significant differences could not be justified, which could be caused by the fact that the pilot survey was conducted only among students in the 1st - 3rd year of bachelor's study. The vast majority of students were from the 1st and 2nd year of study, which means that there really may not be a big difference between the two years answers. This is because 1st year students immediately started online studying, and 2nd year students studied personally only for 1 semester; otherwise, their studying took place online.

The subject of the whole survey are students of all study years of bachelor's and master's study programs the TUL and between all bachelor students of NTNU Gjovik, and we already assume that significant differences may occur. We also believe that the gender of respondents will not affect the difference in answers, in contrast to the year of study, where we assume a difference in responses. The findings based on a literature review show how crucial knowledge sharing is, especially in the online environment, as online learning success depends on the knowledge-sharing process and students' interaction in

the online environment. The paper contributes to the up to date topic of knowledge sharing from the perspective of university environment and give the authors space for the further research.

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Terezie Krestová, Aleš Kresta

VSB - Technical University of Ostrava, Faculty of Economics,
Department of Management, Department of Finance
Sokolská třída 33, 702 00 Ostrava, Czech Republic
email: terezie.krestova.st@vsb.cz, ales.kresta@vsb.cz

Application of Age Management as a Way to Eliminate the Risk Associated with the Demographic Development of the Population

Abstract

Managers must monitor contemporary changes in the environment when managing an organization. One of the significant changes that need to be taken into account in the management of the organization in recent years is demographic change. The population is aging and the age structure of the population, and thus also employees, are changing. The organization is facing the fact that workers are aging and at the same time there are fewer graduates to gradually replace them. However, we can observe not only changes in the age of employees but also in the behavior of individual generations and their needs. All these aspects are taken into account by age management. In this paper, we conduct a survey that focuses on how age management is applied in organizations, which are signatories of the Diversity Charter. The benefits of age management and the used measures are identified. As the difference to the previous surveys, we find out that surveyed organizations consider the costs incurred in connection with age management to be negligible and they are aware of costs that could arise if age management measures were not applied. Furthermore, it can be noted that the use of age management reduces the risk of failure to utilize the potential of employees, missing manpower, and turnover growth.

Key Words
age management, demographic trends, human resource management, risk

JEL Classification: J14, M12

Introduction

Organizations still have to adapt to many changes in the environment. Two significant changes, that must be considered, are the demographic trends and the entry of Generation Y and, soon, Generation Z into the labor market. In terms of demographic development, we are seeing an aging population worldwide. This is due to both lower birth rates and prolonging life expectancy. Related to these facts are the shifting of the retirement age on the one hand and the need to do more to attract younger employees who just enter the labor market on the other. It should be mentioned that the behavior of new graduates is changing. While Generation X, individuals born before the 1980s, was willing to work hard, overtime, sacrifice their interests and leisure, members of Generation Y (born in the late 1980s and 1990s) have in work completely different expectations (Motýl, 2014). They place far more emphasis on their health, family, friendly ties and expect the

employer to respect all this and allow them to combine work and private life. But they are more flexible in many ways as generation X. They have no problem with changing jobs, commuting, are ready for lifelong learning, etc. Generation Z, who are individuals born in the 21st century, has not significantly affected the labor market yet. However, they are individuals who have lived in the digital world since the beginning. They spend time on social networks, and during the covid-19 pandemic, the transition to the online world, at least technically, was easy and self-evident. The members of this generation are greater individualists, we can say that they are not loyal (Horváthová et al., 2016). More than the opinion of the older generation, they care about the opinion of friends. It is a self-confident generation, prone to impatience and self-centeredness. These are all features and qualities that the future employer will have to reckon with. However, on the other hand, they can adapt quickly to new situations, are perfectly fluent in the language, and tend to specialize soon. They are very likely to excel in their field, but they may lack a general view. All these aspects will need to be considered in human resources management in the coming years. How to take into account the needs of employees in different age categories, so that both employees and organizations benefit from it, is solved with the help of age management.

The aim of the paper is to map the application of age management in organizations that are signatories of the Diversity Charter, find out the benefits of the application, used measures, related costs, and consequences of age management not being applied. The paper is organized as follows. First, an age management concept and its benefits are introduced and the application of age management in the organization is described. In the second section, the application of age management in an organization is described. In the third part, the results of the survey focused on age management applications are presented. At the end, the discussion over the results is made and recommendations for organizations are suggested.

1. Age management as a human resource management concept

Age management belongs to the concept of diversity management, which promotes diversity in the workplace as one of the means for greater efficiency. Creating diverse teams and respecting this personal and cultural diversity leads to success (Szymańska, 2016). An important aspect is that the term diversity looks at variety, difference, and individuality positively. Gender diversity or ethnic diversity is most often mentioned. Recently, however, the concept of age diversity has also become known and we will continue to address this.

In age management, „age-related factors should be taken into consideration in daily management, including work arrangements and individual work tasks, so that everybody, regardless of age, feels empowered in reaching their own and corporate goals (Ilmarinen, 2012, p. 2). Age management is often associated only with aging workers (50+). This concept is not entirely correct. Age management measures must be aimed at all groups of workers. The goal of the organization and its personnel policy should be to use the strengths of employees, whatever their age (Štorová, 2013). The concept of age management is related to the concept of Work Ability (Ilmarinen et al., 1997). It is a

balance between the employee's resources and the work requirements that are placed on him. The definition of work ability and the components that affect it is based on a long-term study (Gould et al., 2008), which mainly concerned older workers. The acquired knowledge was organized into the Work Ability House model, which shows both the individual influences that affect a person and affect his working ability, as well as the links between them. The goal is to maintain the long-term work ability of each individual, which is a benefit for him as well as for the organization and also for the whole society.

1.1 The benefits of age management on an individual and societal level

If we address the benefits at each level, we can mention these. In terms of individual level, age management enables more effective use of employees' abilities and enables their longer-term employment. To prolong an individual's working life, age management measures cannot be applied only to aging workers. There is a need for long-term and lifelong care for their work ability, which consists of changing attitudes towards planning their future, lifelong learning, and also towards their health (Nilsson, 2020). The individual interest is to achieve satisfaction given by a reasonable quality of professional and personal life.

From the company's perspective, the application of age management is very important. Due to demographic development, age management has become a macroeconomic issue of labor market policy (Fabisiak and Prokurat, 2012). The public interest and the contribution of aging workers to economic and social development are combined here. Pension and social policy instruments need to be used to maximize these benefits.

1.2 The benefits of age management at the organizational level

At the organizational level, age management often comes to the forefront of interest when experienced and highly qualified employees are lost or organizational changes are made. Then the HR managers start taking measures related to the HR activities. The adoption of these measures results in socially responsible behavior of employers, which outcomes in the retention and development of employees, improving the image of the organization and also its internal climate. This will be reflected in better relationships with employees and their greater satisfaction and loyalty, which also affects individuals' desire for career growth. Another benefit is that satisfied and healthy employees contribute to the prosperity of the company through their higher work productivity and efficiency, and indirectly, through reduced incapacity for work and presenteeism (Horváthová et al., 2021).

Age management is a way to cope with demographic change in the organization. The planned approach to age management allows organizations to look ahead and thrive in global market competition and reduce the risks associated with leaving employees (Pillinger, 2008). Appropriate measures can prolong the working life of employees, allow the use of the potential of parents on parental leave or workers they take care of both their families and aging parents, and last but not least, attention is paid to a group of graduates who come to the labor market. The application of age management builds an organizational culture in which members of each generation are welcomed and mutually enriching each other. This increases the competitiveness, productivity, motivation,

innovation, and creativity of employees and thus reduces costs. Cost reductions can be reflected also in lower absenteeism rates or turnover. A low turnover rate is desirable both in terms of costs and in terms of employee stability. As reported by Novotný et al. (2014), measuring turnover and the resulting costs can be one way to assess the benefits of age management for an organization. With increasing turnover, not only the costs associated with finding and adapting a new employee increase, but also the motivation of the leaving worker decreases, and with a greater degree of turnover, the motivation of the entire team also decreases. With the exit of employees, there is also an outflow of knowledge, experience, but also contacts that are important for the organization. Using age management, an organization can attract and retain the most experienced and best employees of all ages. In the field of education, this then leads to the application of the concept of lifelong learning.

Each generation, resp. age category has its specifics. If we talk about older employees, they are used to working hard, often at the expense of their health and personal life. They are goal-oriented and more individualists used to working independently. However, this generation has poorer computer literacy, which can cause problems and frustration in the digital age. The stress factor may also be the requirement to be constantly online (Soja and Soja, 2020; Tams et al., 2020). This can then result in a reluctance to stay at work longer than necessary, and a distraction from the team. In terms of education, older employees prefer face-to-face training. In contrast, the younger generation is very adept at using computer technology. They have no problem adapting to new technologies, they are looking for workshops or online training. Their weakness is the preference for teamwork and the problem of bearing individual responsibility for the result. Age management measures support intergenerational cooperation. Individual groups can support each other and pass on specific skills. Older employees act as mentors for younger ones, and conversely, reverse mentoring can be used, for example in the field of computer technology, where younger employees can help with their management, provide training, and support older employees in this area.

2. Application of age management in organizations

The application of age management is a relatively new matter. However, many organizations have already applied it. Its introduction into the organization was associated either with the need to address the aging of employees and their retirement or was introduced preventively when managers realized the potential loss in various age categories of employees.

The survey was conducted in 2020 on how age management is applied in practice and the aim was to find out what age management measures are applied, what are their benefits, what would be the consequences of not applying age management in the organization, etc. The questionnaire was sent to the 65 signatories of the Diversity Charter. The diversity charter was established in 2015 and signatories undertake to create an environment that is open to everyone regardless of gender, race, color, nationality, ethnic origin, religion, worldview, health, age, or sexual orientation. (Diverzita, 2020). It is therefore assumed that the organizations signed under this charter apply age management to some extent.

The questionnaire was created based on a literature review that describes the current state of the application of age management in the Czech Republic and abroad (Urbancová, 2017; Blomé et. Al., 2020; Ciutiene and Railaite, 2016; Fabisiak and Prokurat, 2012). It contained 10 questions (6 research questions, 4 identification questions). For most questions, respondents could choose from several options (more suitable answers could be chosen) and also could comment on these questions independently.

The questionnaire survey was conducted using the Survio platform, which allows anonymous data collection. Of the 65 addressed organizations, 54 responded to the questionnaire. This is an 83% return on the questionnaires. The survey took place in December 2020, respondents had 10 days to send a questionnaire. The questionnaires were then evaluated.

3. Results of the Research

The following information emerged from the survey. Based on the identification questions, it was found that 17 organizations from the secondary sector, 35 organizations from the tertiary sector, and 2 organizations from the quinterus sector took part in the survey. Regarding the size of organizations, 18 of the addressed organizations have 50-250 employees and 36 organizations have over 250 employees and in terms of turnover, 4 organizations have a turnover of up to 10 million euros per year, 14 organizations have a turnover of up to 50 million euros per year and 34 organizations have turnover over 50 million Euros per year. Two of the monitored organizations do not monitor turnover, as they are government budget organizations. Furthermore, attention will be paid to research questions.

The first question was about *how long age management has been applied in the organization*. How long and how many organizations apply age management can be seen in Tab. 1, in which we recorded all the exact answers. It is clear from the results that age management is a relatively new issue and 26 organizations (48%) of organizations have been using it for 5 years or less. The addressed organizations have been practicing age management for an average of 11 years, with a median of 10. Some have mentioned that many measures are practiced for a longer period, but purposefully within age management, it is a shorter period. Addressed representatives of organizations most often answered that age management has been practiced in their organization for 5 years. This answer appeared a total of 16 times.

Tab. 1: How long is age management applied in the organization

Number of years of age management application	Number of organizations	
	Absolutely	Relatively
Less than 5 years	10	18.6%
5 years	16	29.6%
10 years	8	14.8%
12 years	2	3.7%
15 years	6	11.1%
More than 15 years	12	22.2%

Source: authors' research

In the second question, it was asked whether *age management is applied to all employees in the organization or only certain groups are included*. Age management was created as a reaction to aging employees and this is how organizations have understood it for a long time. However, a shift can now be seen in the fact that age management focuses not only on aging workers. It was found that in 30 organizations (55.6%) the focus is on all employees. Just 10 organizations focus on aging employees only. In other organizations, the focus is on selected groups. The results are recorded in Tab. 2, which shows both the absolute and relative frequency of recorded responses.

Tab. 2: Target groups focused on age management

Target groups of age management in the organization	Number of organizations	
	Absolutely	Relatively
It focuses on all employees	30	55.6%
School graduates	12	22.2%
Women (men) on parental leave	8	14.8%
Sandwich generation	2	3.7%
Employees 50+	18	33.3%

Source: authors' research

In the third question, the aim was to find out *what measures are specifically being applied*. It was found that organizations apply an average of 4.6 measures, most often applying 4 measures. The absolute and relative frequency of applied measures is given in Tab. 3. Based on the obtained data, it can be stated that 41 organizations (76%) apply the measure the possibility of personal and career development and professional growth at any age, 39 organizations (72.2%) apply employee health care, support of physical condition, and healthy eating, 36 organizations (66.7%) adapt the work program of employees and in 35 organizations (64.8%) the emphasis is on the development of health and safety measures. A more detailed analysis of the data revealed that 22 of the addressed organizations (40.7%) applied all of the four most frequently used.

Additional information showed that the use of reverse mentoring has proved successful, which supports intergenerational cooperation, and emphasis is placed on micro-project work, which enriches the work of employees and promotes good relationships and exchange of experience. The organizations also stated in their answers that attention is paid to the area of care and health of employees, both in the form of support for healthy eating and support for improving physical condition. In some organizations, programs

have specific names or special positions are created that are associated with the application of specific programs. Last but not least, attention is also paid to parents for whom kindergartens or children's groups are being set up, which should make it easier for them to return to work after maternity or parental leave. measures together.

Tab. 3: Frequency of age management measures in organizations

Age management measures	Frequency of appearance	
	Absolutely	Relatively
Possibility of personal and career development, qualification growth at any age	41	75.9%
Employee health care, support of physical condition, and healthy eating	39	72.2%
Adaptation of the work program, eg adjustment of the working environment or working hours	36	66.7%
Development of health and safety measures	35	64.8%
Creation of tools supporting intergenerational learning	28	51.9%
Reassignment of workers to another, suitable job position	24	44.4%
Workforce planning with regard to age diversity and support for a positive age policy	19	35.2%
Incentive programs according to the needs of different generations	14	25.9%
Adapted further education of older workers	9	16.7%
Special forms of admission procedure for different age groups	4	7.4%

Source: authors' research

In the fourth question, *the benefits of the application of age management for the organization were evaluated*. Based on the answers obtained, it can be stated that the respondents chose an average of 5.4 benefits and the most common value was 5 benefits that result from the application of age management in the organization. The five benefits were most frequently mentioned: retention of key employees (45 responses), increasing employee motivation (40 responses), improving organizational culture and positive impact on employee values (36 responses), improving education and development of knowledge and skills of employees (35 responses) and reduction of employee turnover (35 responses). In Tab. 4, the individual alternatives are arranged according to frequency. Additional information showed that building diverse teams increases work efficiency, increases employee engagement and loyalty, and satisfaction.

In the fifth question, the aim was to find out *what costs are associated with the introduction and application of age management*. There were very few concrete answers to this question in the survey. Only 5 organizations provided a specific number (in the range of CZK 300,000 to millions, when costs were estimated not only for Czech branches). Some companies did not answer this question at all or stated that they do not observe, quantify, or are unable to estimate them. Sometimes age management activities overlap with other personnel activities and the costs could not be specifically allocated. So vaguely responded 33 companies. Other organizations (11 in total) replied that the costs of age management did not arise or were negligible. Some organizations answer that it is viewed oppositely in the organization. It means that there is not an extra cost, but on the contrary, the costs would be incurred if age management were not applied (5 responses).

Tab. 4: Frequency of age management measures in organizations

Benefits of age management in organizations	Frequency of appearance	
	Absolutely	Relatively
Retention of key employees	45	83.3%
Increasing employee motivation	40	74.1%
Improving organizational culture and positive impact on employee values	36	66.7%
Improving education, development of knowledge and skills (competencies) of employees	35	64.8%
Reduction of employee turnover	35	64.8%
Improving the organization's name	33	61.1%
Improving employee health	23	42.6%
Gaining new talent	23	42.6%
Employee performance growth	22	40.7%

Source: authors' research

If we consider which costs may arise, besides the direct costs associated with specific measures (eg contribution to sports activities, the possibility of psychologist consultation, healthy eating service, part-time full pay, etc.), we can see costs that are associated with conflicts that arise as a result of poor communication and coordination of organizational activities (Lančarič et al., 2015). Employees from diverse backgrounds may not understand or trust each other. Additional costs may arise with the implementation of diversity programs and include diversity training of managers and employees, modifying corporate policies to be sensitive to cultural differences, infrastructural costs for accommodating workers with disabilities and women with young children, and others. The last question was *what the consequences would be if the organization did not apply age management*. The results showed the three most common consequences (31 responses), namely failure to use the potential of employees, missing manpower, and turnover growth. On average, respondents stated 1.85 consequences and the most frequently mentioned were 2 of the offered answers. The results are summarized in Tab. 5. Respondents also supplemented their answers as a loss of know-how, a negative impact on organizational culture, or a decrease in employee motivation.

Tab. 5: Consequences of not applying age management in the organization

Consequences	Frequency of appearance	
	Absolutely	Relatively
Failure to use the potential of employees	31	57.4%
Missing manpower	31	57.4%
Turnover growth	31	57.4%
The growth of absenteeism	7	13%

Source: authors' research

4. Discussion

The survey was addressed to organizations that declare the promotion of diversity management in their organizations. Based on the survey, it can be stated that age management has found its application in these organizations. Organizations are aware of its benefits as well as the consequences that would occur if they did not apply age management. As it was found, the potential of employees, the lack of manpower, and the increase in turnover would occur.

For comparison, we can mention research focused on the application of age management in the Czech Republic (Urbancová, 2017). It was found that age management is practiced in 161 of 549 addressed organizations (29.3%). Organizations that apply age management see a risk that affects the fulfillment of age management goals, especially in the lack of qualified people in this area, organizational culture, and finance. The research showed that 37.9% of organizations spend a maximum of 1% of profits per year on age management and 42.2% of organizations spend 2 to 5% of profits per year. However, according to the same research, only 21.4% of organizations that do not practice age management think that its application is time and money-consuming. It can be assumed that every new organization that will introduce age management will also evaluate its financial demands. However, based on the answers found in own research, the financial aspect is rather negligible for organizations, as they see it as an investment in HR that makes sense for them and found that the 3rd most common benefit is improved organizational culture and positive impact on employee values. The difference may be given by the fact that age management has become a more common practice in HRM.

Furthermore, it can be stated (Soja and Soja, 2020) that current trends, which include the widespread use of ICT at work, are often not less favorable for older workers and see them as a limitation for their work development. The development of new skills is along three lines. First, workers need to acquire so-called "generic ICT skills" to be able to use such technologies in their daily work. Second, the production of ICT products and services requires "ICT specialist skills" to develop applications and manage networks. Third, the use of ICT is changing the way work is carried out and raising the demand for "ICT-complementary skills". Such skills are particularly important due to the significant increase in the demand for non-standard interpersonal and analytical skills in the digital economy. It is, therefore, appropriate to use age management practices (adapting the education of older workers, the possibility of professional growth, support for intergenerational cooperation, etc.), which will maintain the work capacity of older workers and allow building a diverse organizational culture in the organization, which will benefit the whole organization.

Conclusion

The aim of the paper was to introduce the concept of age management and to show its application in eliminating the risks associated with the demographic development of the population. Age management was defined, its benefits were explained from the point of view of individual, organizational and whole society. Furthermore, the results of a survey focusing on the application of age management in selected organizations were presented

and a comparison with other authors' researches dealing with age management was made.

The survey found out what are the benefits of age management, what measures are used by organizations, what is the financial demands of these activities, and what consequences the organization would have to deal with if age management was not practiced. It was found that age management most often affects all employees of the organization. The most common benefits of age management are retention of key employees, increasing employee motivation, improving organizational culture and positive impact on employee values, improving education, developing employee knowledge and skills, reduction of employee turnover, and improving the organization's name. The identified benefits can serve as a basis for setting age management goals, if organizations decide to implement it, or in the ongoing evaluation of the application of age management in the company.

To achieve these goals, the following activities are most often used: the possibility of personal and career development, professional growth at any age, employee health care, support of physical condition and healthy eating, adaptation of the work program, eg adjustment of working environment or working hours and development of health and safety measures. Most organizations do not directly monitor the costs associated with age management, and many say that the costs would be incurred if age management were not applied. Furthermore, it was found that if age management were not applied, the risk associated with not using the potential of employees, missing manpower, and turnover would have increased. Elimination of these risks will lead to a decrease in the costs of the organization, to its greater stability, and thus to the higher performance.

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Anna Kubjatková and Anna Križanová

University of Zilina, Faculty of operation and economics of transport and communications, Department of economics
Univerzitna 1/8215, 010 26 Zilina, Slovak Republic
email: anna.kubjatkova@fpedas.uniza.sk

The Employer Brand of a Socially Responsible Company as a Tool for Influencing Employees

Abstract

An integral part of building a brand is getting them into consciousness while building an employer's brand is a current trend in this area. The employer's brand is not only presented to the general public but also the employees themselves and thus to the company's internal environment. A strong employer brand is the best tool for ensuring success and optimizing managerial decision-making processes for those companies that can create a quality workplace environment. The basic goal of this work is to analyze the use of the employer's brand from the perspective of employees. A questionnaire survey was used for the analysis, while the questionnaire itself consists of three parts. The questionnaire is focused on the perception of the selection process by job seekers, on the assessment of the company as an employer, and also on the active participation of the employees themselves in the company. The main goal of this work is to recommend a set of measures to improve the effectiveness of the employer's brand based on the results of the survey. Several methods were used in this work, such as the method of one-dimensional descriptive statistics used for graphical processing of survey results, methods of induction, deduction, comparison, synthesis, and analysis. We consider the result of the work to be a set of recommendations for building the employer's brand, and these recommendations can be considered a benefit not only in keeping current employees but also in acquiring new talented employees.

Key Words

employer brand, brand, employer branding, employees, social responsibility

JEL Classification: M3, M31

Introduction

In the conditions of globalization and ever-increasing competition in all areas of the market, human capital is a crucial factor in the success and competitiveness of a company. Along with environmental responsibility, responsibility for human capital is constantly coming to the fore. (Abughniem, Al Aishat, Hamdam, 2019) A socially responsible society focuses primarily on social and environmental issues, not its financial situation. (Nadanyiova, Durana, 2019) Dynamic market development and constant changes in the company lead companies to realize the value of quality and qualified human resources. Within the marketing approach in the field of human resources, the concept of the employer's brand and its building is appearing more and more often.

Employer branding is a major theme in any business, as all organizations recognize the importance of future success in recruiting and retaining qualified employees, without whom the employer would not be able to build its brand. As a result of high

internationalization, the process of acquiring a quality workforce for the needs of a successful business is irreplaceable, while the most successful employers are those who have chosen a suitable strategy in the form of creating a company image not only in their surroundings but also in the workplace.

The basic precondition for building a successful brand is to define a clear vision and business strategy, from which all the company's activities result, especially its behavior and communication. (Kral, Janoskova, Lazaroiu, Suler, 2020) It is the way the company presents itself to the public. The primary competitive advantage for any business is to recruit and retain talented employees who play a key role in building the company's success. Brand loyalty is still a topical issue in research areas and also for companies themselves. (Gajanova, Nadanyiova, Moravcikova, 2019) The trend where customers were the only authoritative element (often in retail) is slowly receding and attention is focused more on employees. (Gregova, Dengov, Tulyakova, Mustafaev, 2020)

Today, employer branding is one of the most important aspects of acquiring a qualified and quality workforce in a company. Due to the lack of job opportunities and the high unemployment rate in Slovakia, companies are increasingly faced with the problem of filling selected frequented job positions. This problem can be of a long-term or recurring nature and is an obstacle for businesses that cannot be easily and eliminated. This is not only a problem of filling job positions but also of ensuring a smooth succession and low turnover of the company's employees. The trend today is that young potential employees are looking for a suitable employer more than the job position itself. That is why it is important for companies to constantly make progress in building the best possible working environment and atmosphere in the workplace. Young people are usually more interested in the work environment, benefits, and team than in the level of workload. This is mainly because these people primarily want to feel good in the workplace and have good relationships with employers and colleagues, more than ever before. It is therefore natural that young companies and startups, in particular, take note of social responsibility. For these companies, it is crucial to get talented people and keep the best current employees.

Jobseekers are increasingly being offered a choice by a larger number of employers. When looking for the most suitable employer, these candidates take into account a large number of aspects that are often decisive when deciding between individual employers. In the case of a skilled workforce, companies should therefore strive for the most positive presentation not only to already employed workers but also to potential ones. The time when candidates decided between individual employers based on salary evaluation has passed, modern candidates focus on a much wider range of aspects of sympathy for the future employer. (Backhaus, Tikoo, 2004) The company's name, company culture, career growth, non-financial benefits, and, above all, the company's relationship with its employees and the very values of this company with an emphasis on the personnel side are increasingly important for potential employees.

The role of the employer brand is therefore to present the company strategically as an exceptional employer in the labor market and also as a professional in the field of human resources management. At present, employer branding can be considered a long-term oriented strategy of the company aimed at building a unique and desired corporate identity and also influencing how the organization is perceived by potential and current

employees to gain a competitive advantage in the labor market. The goal of employer branding is to increase the efficiency of obtaining quality and talented employees and also to ensure their long-term retention in the company. (Edwards, 2010) The company must therefore focus on improving working conditions for employees and creating value that employees perceive and identify with. Through this positive presentation to the public, the company can attract adequate job seekers, but also satisfy the needs of current employees and create a suitable working environment for them.

Successful employer branding of the company brings not only quality candidates and satisfied employees, but the expected effects also include creating and maintaining a favorable company image, reduced employee turnover, strengthening the financial performance of the organization, increasing return on investment and returns for shareholders, higher profitability and customer satisfaction, reducing costs employee acquisition, improving employee relations, improving organizational culture, employer engagement with employees, shortening the hiring process, and more. (Ghadeer, 2016) Thus, for companies, employer branding is an opportunity to improve in many ways.

1. Methods of Research

In the context of the present article, the subject is the analysis of the employer's brand within the company, and this analysis consists, inter alia, of a quantitative research method of marketing research.

The primary goal of the research is to analyze the current state of use of the employer's brand from the perspective of employees and also to propose a set of recommendations for effective employer branding to keep current employees and acquire new quality employees.

The marketing survey is carried out in a Slovak company, focusing primarily on the perception of the employer's brand by the employees of this company. The survey was conducted from 1 September to 31 December 2020 and was attended by all 64 employees aged 21-52, of which 22 were women and 42 men. The survey consists of 11 questions, of which 1 is open and 10 closed.

Marketing research can be considered as the systematic identification, collection, analysis, and evaluation of data related to a particular problem. Author Richter (2007) states that marketing research originated and exists precisely to help solve specific marketing problems. The function of marketing research is therefore to provide data that will help marketing managers make informed decisions.

For research, methods of collecting information and data are used to create a theoretical basis for the issue, and also the method of excerpting is used in the selection of relevant information and data obtained from available information sources. Methods of synthesis, analysis, and comparative analysis are also used, especially in connecting, analyzing, and comparing the ideas of domestic and foreign authors. The method of explanation is used in deriving conclusions of a theoretical nature, based on knowledge from domestic and foreign authors on the subject matter, and methods of induction and deduction are also

used. To visualize the results of marketing research, the methods of one-dimensional descriptive statistics, specifically bar graphs, are used. An integral part is also a verbal interpretation of the results obtained from marketing research.

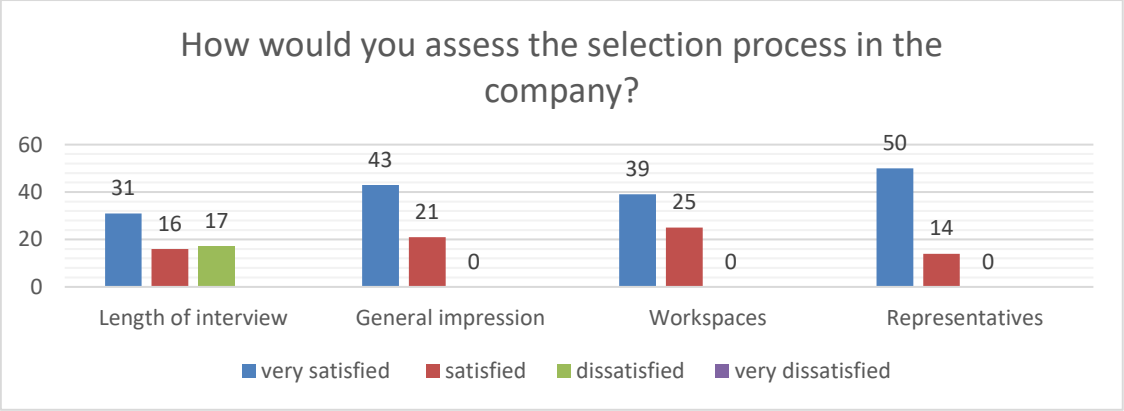
2. Results of the Research

As part of the marketing survey, the questionnaire consisted of three parts, where in the first part consisting of 4 questions, the questionnaire focuses on **the perception of the company's selection process from the perspective of employees as job seekers in this company**. The first question focused on the employee's perception of joining the company. As many as 45 employees (70%) answered that they did not know the company before they started working in it, the remaining 19 employees (30%) already knew the company.

When asked how employees found work in this company, 14 (22%) of them answered that they found a job through a job portal, 14 (22%) through a website, 10 (16%) through a friend or family member, and up to 26 employees (40%) found work on their initiative, when they contacted the company with an interest in getting a job.

The third question focused on the assessment of the selection process by employees, where almost all answers were positive, negative answers were recorded only with the length of the job interview. Areas such as the length of the process, the impression of the interview, the premises of the company, and also the representatives of the company themselves were evaluated. Only 17 employees (27%) were dissatisfied with the length of the job interview, the others seemed reasonable. The overall impression was positive, up to 43 employees (67%) were very satisfied with it. The workspaces also pleased the employees, 25 (39%) were satisfied with the workspaces, and 39 of the respondents (61%) were very satisfied. Up to 50 employees (78%) were very satisfied with the approach of the company's representatives, the other 14 (22%) were satisfied. A graphic representation of the answers can be found in figure 1.

Fig. 1: Assessment of the selection process by the company's employees



Source: authors' calculations, data from the survey results

When asked why employees decided to employ a company, 23 of them (36%) answered that due to career opportunities, 22 employees (35%) due to people in the company and

17 (27%) due to the corporate atmosphere, and only 2 employees (3%) decided to accept a job offer in the company due to salary evaluation and benefits.

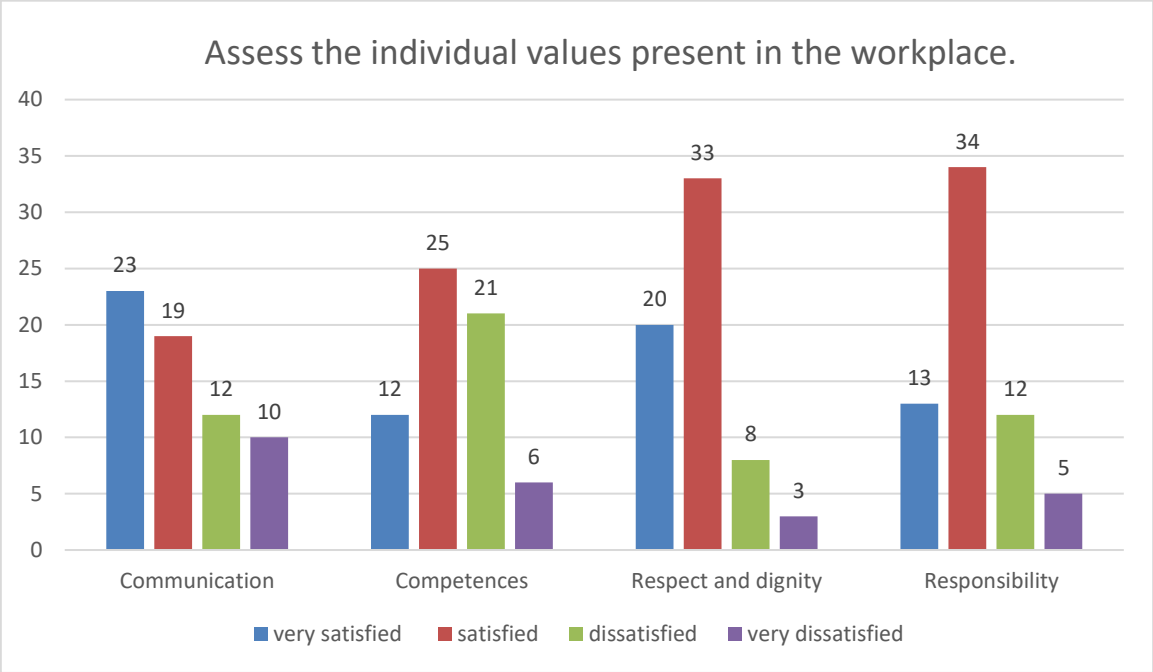
The second part of the questionnaire, consisting of 3 questions, focused on **the perception of the company as an employer**. The first question of the second part was the evaluation of various aspects of work in the company, while the first aspect was work-life balance, where up to 33% (21) of employees were very satisfied, 17% (11) dissatisfied and the remaining employees (32) were satisfied. Another aspect is the working time with which only 10 employees (16%) were dissatisfied, the rest were satisfied (48%) or very satisfied (36%). The third aspect was the company's workspaces and equipment, with only 11% of employees dissatisfied. Up to 10 employees were very dissatisfied and 14 dissatisfied with the possibilities of development and education. The penultimate aspect is the salary evaluation, while most employees are satisfied with the salary (46%). Benefits were the last aspect of working in a company, with up to ¼ employees dissatisfied with them and 9 employees (14%) very dissatisfied. The answers of employees are shown in figure 2.

Fig. 2: Assessment of aspects of work by company's employees

Source: authors' calculations, data from the survey results

The second question in this part of the questionnaire focused on the assessment of the values present in the workplace. The first assessed value was communication, with which the majority of employees are very satisfied (36%). Another value is competencies, with the most people being satisfied (39%) and the least people being very dissatisfied (9%). More than half of the employees (52%) are satisfied with respect and dignity in the workplace, only 5% of respondents are very dissatisfied. When it comes to responsibility, most employees are satisfied (53%). A graphic representation of the answers can be found in figure 3.

Fig. 3: Assessment of values present at the workplace by company's employees



Source: authors' calculations, data from the survey results

Another question focused on whether employees feel that they are part of the company, ie that they have certainly added value for it. As many as 33 employees (51%) think they are a benefit to the company and 12 employees (19%) think they are more of a benefit. 19 employees of the company (30 %) think that they are not very beneficial to the company, but no employee thinks that he would have any benefit to the company.

The last part of the questionnaire consists of 4 questions and focused on the **active participation of employees in the company**. The first question in this part of the questionnaire focused on whether employees participate in company events, and the answer was positive in all cases.

The following open-ended question focused on what events and activities employees would welcome in the company. Employees most often answered that they would welcome teambuilding, while they could take place in nature, also employees would welcome more frequent training and workshops and more frequent brainstormings. Responses such as birthday celebrations of department heads, Christmas gatherings, various competitions with material rewards, a company ball, and the like were also recorded.

The third question in the last part of the questionnaire was whether employees bring new ideas and innovations to the company, where surprisingly up to 90% (57) answered positively and the rest negatively. If so, employees moved on to the fourth question to see if their ideas and innovations were received positively. As many as 80% (46) of employees confirmed that their ideas were accepted positively, 12% (7) of employees said more positively, and 8% (4) more negatively.

3. Discussion

Based on previous research, certain measures and solutions can be proposed for the employer branding process in the company, which would attract the company to qualified and talented candidates and would also strengthen the relationship and retain its current employees. It is clear from the results of the questionnaire survey that the company must work on the presentation of its company to the general public. The use of digital technologies is generally beneficial for companies. (Horick, 2020) (Ionescu, 2019). It needs to raise awareness of its existence through the use of social networks, which is cost-effective. It is also possible to raise awareness by setting up a blog about the company, where it would provide information about current events and various events. Within social networks, we recommend the largest and most well-known, such as Facebook and Instagram, where opening an account is free. The biggest participants in these media are mainly young creative people, so it is a great way to promote quality employees. All employees should have the opportunity to share their experiences and experiences from the company within the blog and social networks, thus achieving a more personal character.

We also recommend some improvements to the company's website, especially regarding the clarity of the page, which can be problematic for some people. We recommend setting up an online form for job seekers on the site, as young people prefer to communicate online before making phone calls to staff or sending email.

Under the recruitment system, interviews were generally positive, and the length of the interview should be fixed so that job seekers do not feel uncomfortable or lose concentration. At the end of the interview, it would be useful to ask candidates for feedback, from which the company's representatives would be able to draw some improvements in the event of further interviews. Of course, the feedback does not have to take place immediately, so that the applicant is not affected by the ignorance of acceptance or. not accepted for the job. Applicants could receive an anonymous questionnaire online after the admission procedure has ended.

A necessary recommendation for the company is to streamline communication in the company between superiors and subordinates through regular meetings aimed at summarizing the results for the period and submitting appropriate proposals, which would lead to discussion and improve the level of communication in the company. Some employees also feel that the authority given to them in the company is not sufficient, which they perceive as a negative aspect in the workplace. Subordinates should be given more room to self-implement and design their solutions, and the responsibility that employees have in their actions should also be reconsidered.

We recommend the company to organize more events in which employees can participate because they have an undeniable interest in it. The organization of teambuilding will not only improve communication and strengthen the team at the workplace, but also make the employer's brand visible to the environment. There is an opportunity to invite family members to similar events, which would benefit the company even more in its promotion and employer branding process. Events such as Christmas gatherings are a form of teambuilding and at the same time a reward for employees, while the costs could be covered by a fund that could be set up for this purpose if the employees agreed. The

employer could also contribute to this fund, which would motivate employees to an even greater extent.

Today's trend in maintaining a competitive position in the market is also respect for the environment. In today's society, green marketing is a quality tool not only in the competitive market. (Moravcikova, Krizanova, Kliestikova, Rypakova, 2017) (Nadanyiova, Gajanova, Majerova, 2020) If companies want to be more productive and have a good reputation, they must also take this aspect into account. (Holotova, Nagyova, Holota, 2020) In general, the efforts of companies to improve the environmental situation have a positive effect on potential but also current employees. Therefore, we also recommend the company focus on certain steps to improve the impact of its actions on the environment. These steps do not have to be costly and invasive, any effort in this area is attractive to employees and involving them in helping the environment is often a strong motivational tool.

In conclusion, we recommend that the company be aware of its strengths, while it is necessary for it to constantly advance in the field of employer branding. It is, therefore, necessary for the company to be interested in the wider environment and job seekers, as well as in its existing employees because the quality and creative staff are irreplaceable.

Conclusion

Employer branding is a process that ensures companies combine internally and externally oriented brand building, while its importance is becoming more and more striking for companies. Organizations are beginning to realize the importance of internal marketing and the employer's internally oriented brand, especially given the era of progressive growth of the services segment across the market. Therefore, employees are becoming more and more key to the value provided to end customers.

For this reason, the primary goal for companies in the field of employer branding is to take into account the needs of existing and potential employees and create an environment in which they want to work and which they prefer over competitive offers.

The conducted marketing research, therefore, focused on the needs, opinions, and requirements of the employees themselves, who can provide an insight into the employer's brand from their perspective, and thus contribute to an effective employer branding process not only in this particular case but also in general. Their opinions and attitudes draw attention to the areas of perception of the company as a potential and current employer, thus contributing to a comprehensive image of companies and an opinion on the right image of the company, taking into account the needs of all groups of workers.

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Anastasiia Mazurchenko, Pavla Švermová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentská 1402/2, 461 17 Liberec 1, Czech Republic
email: anastasiia.mazurchenko@tul.cz,pavla.svermova@tul.cz

Expected Impact of a Digital Transformation on SMEs Competitiveness and Employees' Competencies

Abstract

The companies' competitiveness in the digital transformation era is inextricably linked to the need for employees' training, especially in digital competencies. This paper aims to determine whether digitalisation as a phenomenon of the current decade affects employees' skills and business competitiveness or would affect them sometime soon. The research was conducted in September 2019 by distributing printed questionnaires during a knowledge transfer week at the Faculty of Economics at the Technical University of Liberec. Three research hypotheses were formulated and verified through the statistical methods of Pearson's Chi-square test and Mann-Whitney U test using IBM SPSS Statistics and Microsoft Office Excel. The research sample mainly included human resource (HR) managers or owners of chosen small and medium-sized enterprises (i.e., SMEs) operating in the Czech Republic. The pilot survey results show a statistically significant relationship between the use of digital technologies for everyday business activities and systematic employees' training in their use by selected Czech companies. However, effective use of digital technologies in daily practice was not found to depend on the company's size (i.e., the number of employees). Moreover, there was a statistically significant difference in the personnel and senior management's views on employees' readiness for work in an almost entirely digital workplace.

Key Words

digital technologies, human resources, business model, employees' training

JEL Classification: M53, O15

Introduction

Recent studies highlight the increasing complexity and dynamism of changes initiated by the digital transformation of economies and the business environment (Parida et al., 2019; Warner and Wager, 2019), influencing society as a whole through new digital technologies (Caputo et al., 2021). Digital technologies improve competitiveness by opening new possibilities in employee competencies' acquisition (Herve et al., 2020). Even though the competitiveness concept is well known, it is permanently measuring has not become widespread yet. An existing scientific analysis on strategic management, affecting both the employees and the company's market position, is somewhat limited. Although numerous benefits of digital technologies have been recognised, their further implementation in business processes entails an increasing need for a qualified workforce with at least a basic level of digital competencies (Nyikes, 2018).

This paper investigates the present utilisation of digital technologies by chosen Czech companies to influence business competitiveness and the employee competency

development. The theoretical framework in the first section is followed by the research methodology, which is based on the primary data collection and verification of the three statistical hypotheses using Pearson's Chi-square test of independence and the Mann-Whitney U test presented in the results section. This section is followed by a discussion of findings from previous studies, the limitations of this study that are defining the direction for further research and a conclusion.

1. Literature Review

In the modern economy, companies that want to be successful need to undergo a digital transformation. Warner and Wager (2019) define *digital transformation* as a strategic process addressing organisational changes implemented through digital projects and enabling significant business improvements. Fenech et al. (2019) describe *digital transformation* as converting of business processes, operations and structures to accomplish new technology benefits. Finally, Pinzaru et al. (2018) claim that *digital transformation* requires severe preparation and readiness for risky decision-making, first of all from senior management.

Pertinent business models are necessary to obtain economic and social advantages from digitalisation and rise in the companies' competitive advantage (Parida et al., 2019). Overall, a *business model* differs from company to company, defines the companies' relations with customers, partners and competitors and decides how to create and share value in a profitable way (Koprivnjak and Peterka, 2020). Because of the growth in digital technologies, the general rules of competition adjust and the risk of being left behind away from rapid digital transformation is becoming higher for modern organisations (Sen, 2020). According to Bris et al. (2017), *digital competitiveness* demonstrates the economy's capacity to accept and explore digital technologies that lead to the transformation of business models and society on the whole. It is expected that modern employees will be agile in learning and open to continuous retraining when a new skillset need arises due to applying new digital technologies at the workplace (Levit, 2019).

In general, evaluating the impact of new digital technologies on HR competencies is becoming more vital and strategic (Fareri et al., 2020). According to Ilomaki et al. (2016), *digital competencies* are connected with the ability to critically evaluate digital technologies, use them in a meaningful way, and have the technical capacity to manage motivation to be engaged in a digital culture. *Digital competencies* include information skills, content creation, communication, ethical skills, problem-solving and technical skills (Sánchez-Caballé et al., 2020). Since the impact of digital competencies is absolute for effective digital transformation, the most common skills required from the modern workforce are web development, cybersecurity, programming, cloud computing, database, digital networks and also the management of technologies like big data analytics, artificial intelligence, Internet of Things, augmented reality (Flores et al., 2019).

The literature analysis makes it possible to identify the changes in business competitiveness and desired employee competencies caused by the digital transformation. As a result, modern companies have to focus on redesigning business models and preparing to deal with disruption from emerging digital technologies.

2. Methods of Research

The paper's primary goal is to examine how selected Czech business entities perceive and evaluate digital technologies in business practice and their influence on the business models' and employee competencies' development. The main research questions are:

1. What is the current state of digital technologies' use in chosen Czech companies?
2. What are the future expectations regarding the investment in digital technologies in these companies?
3. How is these companies' competitiveness evaluated in the digital era?

An anonymous structured questionnaire in printed form was chosen as the method of quantitative research. A pilot survey was performed during a knowledge transfer week held at the Faculty of Economics at the Technical University of Liberec (EF TUL) in September 2019. The target group was mainly HR managers or SMEs' owners actively operating in the Czech Republic. The quantitative research comprised 48 respondents who were asked to answer 15 questions, including closed questions with multiple-choice options, scales (questions that express the respondent's attitude) and identification questions that characterise the respondents.

As a result, 30 responses were obtained. Subsequently, the return of the completed questionnaires represents 63%. Around half of the respondents represent medium companies with less than 250 employees. Although, in most cases, ordinary employees (37%) filled in the questionnaire, 53% of the respondents were representatives of senior management or HR management. The most significant interest in participating in this pilot survey was shown by employees of companies from trade (17%), manufacturing (13%), and professional, scientific and technical (13%) sectors.

The responses received were coded, analysed, and processed in IBM SPSS Statistics 25 and Microsoft Office Excel. Non-parametric tests were chosen because they do not require compliance with almost any assumptions about the studied random variables. *Pearson's Chi-square test of independence* is used to decide whether there is a dependence between two alternative unpaired categorical variables. The null hypothesis (H0) assumes that there will be no difference between the observed and expected frequencies (i.e., the variables will be independent). The calculation of the p-value is based on a comparison of two contingency tables with the observed frequencies and the expected frequencies. The following assumptions were verified before using Person's Chi-Square test: at least 80% of the expected frequencies should be five or higher, for a PivotTable of type 2*2, it is recommended that they do not fall below 10; no theoretical frequency may be less than 1; if the expected frequencies are less than 5, Fischer's test can be used.

The Mann-Whitney U compares the medians in two independent sets. The null hypothesis assumes that the medians of both sets are equal. The important thing is that this test is not expected to meet the requirements for the normal distribution of data and is suitable for ordinal scales and small samples. The results of the verification of the research hypotheses are presented in the following chapters.

3. Results of the Research

The current state of digital technologies' use demonstrates that the vast majority of the respondents (i.e., 97%) utilise digital technology daily, with information technologies, software and mobile applications and social media being the most important. However, artificial intelligence, the Internet of Things, and cloud services are not considered significant. Digital technologies are mainly used for marketing and sales, product development, financial management in the companies that participated in this survey. Nevertheless, one in five respondents stated that they are not used for HR management, which indicates an unrealised potential in this area.

The correlation between a company's size and digital technologies' daily use was assessed using Pearson's Chi-square test. As a result, these research hypotheses were established:

H0: Using digital technologies for daily business activities does not depend on the company size.
H1: There is a statistically significant relation between using digital technologies for daily business activities and their size.

After the value of the test criterion x^2 was calculated in the software IBM SPSS Statistics, a critical value of x^2 for the confidence level 0.05 with knowledge of the number of degrees of freedom (see Tab. 1) equal to 7.81 was determined from the statistical tables. As a result, the p-value is equal to 0.081, which is higher than a selected level of significance of 5%. Consequently, there is no statistically significant relationship between using digital technologies for daily business activities and the company size.

Tab. 1: Verification of statistical dependence between digital technologies for the everyday activities of companies and their size

Statistical method	Value	Degree of freedom	P-value
Pearson Chi-Square	6.724	3	0.081
Fisher's Exact test	5.019	-	0.233

Source: authors' own elaboration

For each of the six cells of the pivot Tab. 1, the expected count is less than five, and the minimum expected frequency is 0.1. Under such conditions, Pearson's Chi-square test of independence is unreliable due to the small sample size, and it is better to use Fischer's exact test. As the p-value for Fischer's test is equal to 0.233, which is higher than the selected level of significance of 5%, the null hypothesis is not rejected.

Employee training and development in digitalisation in the workplace is another aspect to be taken into account. The following hypotheses have been tested:

H0: Using digital technologies for everyday business activities does not depend on systematic training in their use and employees' professional growth.
H1: There is a statistically significant relation between using digital technologies for everyday business activities and the employees' training in their use.

Tab. 2: Verification of statistical dependence between using digital technologies for the everyday companies' activities and systematic employees' training

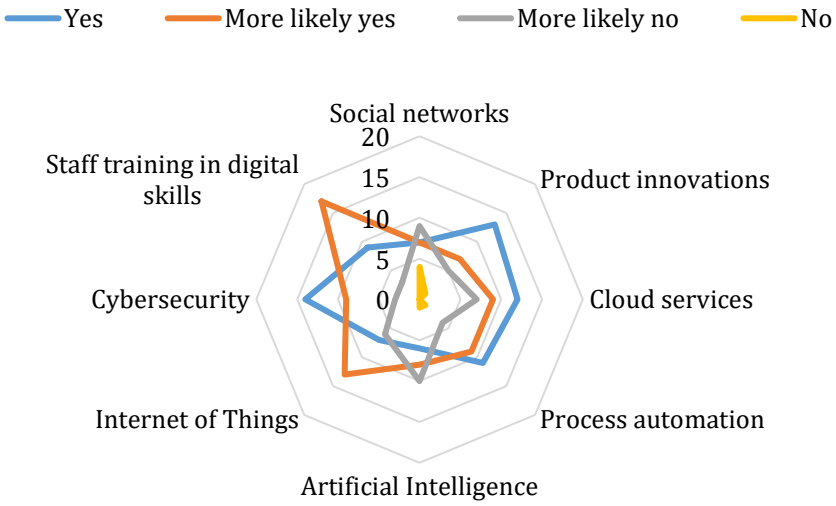
Statistical method	Value	Degree of freedom	P-value
Pearson Chi-Square	14.483	2	0.001
Fisher's Exact test	6.436	-	0.067
Cramer's Contingency Coefficient (V)	0.695		

Source: authors' own elaboration

The value of the test criterion x^2 is 14.483 (see Tab. 2), and a critical value of x^2 for the confidence level 0.05 for two degrees of freedom was established at the level 5.99. Consequently, the p-value is equal to 0.001, which is lower than a selected level of significance of 5% and the null hypothesis is rejected. The correlation between systematic education in digitalisation and the daily use of digital technologies in companies is evaluated with the value V = 0.695, a medium-term dependence.

Surprisingly, the implementation of digital technologies is not considered a significant challenge by half of the companies that took part in this research, as the respondents' opinion is that employees are already ready for them (77%). Nevertheless, more than half of the respondents (57%) are keen to continue investing in software to train employees in digital competencies (see Fig. 1). Another priority regarding the expected investment in digital technologies in the future is cybersecurity (47%).

Fig. 1: Readiness to invest in different digital technologies in the next five years



Source: authors' own elaboration

Shortage of funds (20%) or too high costs for utilising digital technologies compared to their benefits (6.67%) are among the main factors influencing future investment in the companies surveyed. At the same time, a lack of information about modern technologies and a preference for traditional paper processes are not deterrents.

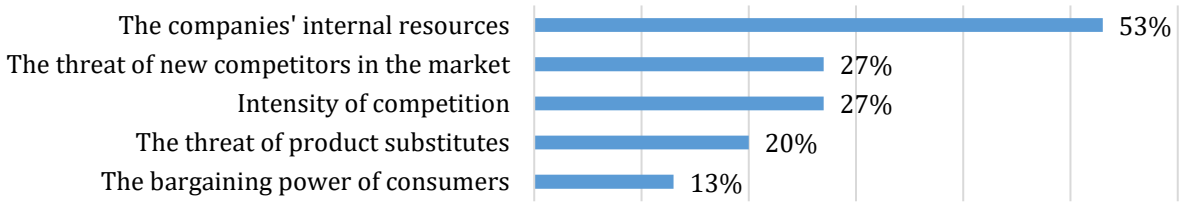
It was also assumed that employees and company management have various opinions about the level of employee training to work in a digital environment. The following hypotheses were established to verify this assumption by using the Mann-Whitney U test:

H0: The views of top management and employees in the statement 'The company's employees are ready for new digital technologies do not differ.
H1: The views of top management and employees in the statement 'The company's employees are ready for new digital technologies' differ.

The p-value calculated in the software IBM SPSS Statistics (i.e., Asymp. Sig.) is equal to 0.016, which is lower than the chosen level of significance of the α test 5%. Therefore, the null hypothesis is rejected in favor of the alternative. So a statistically significant difference was found between top management and employees in the statement 'The company's employees are ready for new digital technologies'.

The competitiveness of the Czech companies that participated in this survey is mainly measured based on a combination of financial and non-financial indicators (50%). Financial indicators are usually obtained from financial statements such as profit and loss statements, balance sheets, cash flow and are strongly preferred by 23.3% of the respondents. Non-financial indicators such as management style and quality, corporate culture, work relationships are perceived as critical measures of business competitiveness by every seventh respondent (13.3%). The authors used Porter's five-factor model of the competitive environment as an analysis tool in this research. The respondents were asked to evaluate the influence of the different factors due to digitalisation (see Fig. 2). The companies' internal resources (i.e., technologies, employees' experience, reputation, business network) are considered a significant competitive advantage by more than half of the respondents.

Fig. 2: The most critical factors in terms of Czech business competitiveness



Source: authors' own elaboration

Also, it is pretty surprising that to a greater extent, the bargaining power of suppliers is considered unimportant (16.7%) compared to other factors of business competitiveness. These factors include the companies' sources (3.3%), the threat of new competitors on the market (6.7%) and the intensity of competition between existing competitors (10%).

4. Discussion

The findings from this paper confirm that new approaches in digital technology innovation play a strategic role in gaining a competitive advantage. Even though small and large companies have equal capabilities to implement technological innovations (Rungi, 2019), SMEs' pace of new technology adoption is still relatively slow (Akpan et al., 2020). Labour market and business regulations and the lack of external finance are among the main barriers delaying employees' digital technology adoption (Ambrosio et al., 2020). Finding an appropriate way of getting a competitive advantage remains one of the most

significant challenges modern companies have to cope with (Adamik and Nowicki, 2018). According to Fareri et al. (2020), companies that have invested in digital innovations in the last five years are focused on maximising the return on investments by aligning their employees' competencies. Around half of the current employees (52%) believe that the training programs provided by their employers are not helping them gain new digital skills (Buvat et al., 2017). At the same time, employers consider that employees' resistance to learning new skills is among the main barriers to upskilling.

The presented research is limited because it targets selected respondents potentially interested in this topic who participated in a knowledge transfer week organised by the EF TUL in 2019. No random selection was performed. Moreover, the number of respondents does not allow generalisation of the results obtained. A future research direction is to conduct a survey to analyse the current situation in digitalisation of HR in Czech companies and identify their demand on the employees' digital competencies.

Conclusion

Implementing digital technologies to improve competitiveness represents an opportunity and a challenge for organisations (Akpan et al., 2020). Only modern digital technologies are not enough to change employees' mindsets and subsequently achieve successful digital transformation (Sen, 2020). To remain competitive, organisations have to support their employees' development in effective communication, collaboration, and solving problems in a digital environment (Wheeler, 2019). Even with a limited research sample (i.e., 30 respondents), it is possible to assume that using digital technologies for everyday companies' activities does not depend on their size. Nevertheless, it is directly dependent on whether employees usually undergo systematic training in their use and companies support their professional growth.

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Světlana Myslivcová
Technical University of Liberec, Faculty of Economics, Department of Marketing and International Trade
Studentská 1402/2, Liberec 1, 46117, Czech Republic
email: svetlana.myslivcova@tul.cz
Kateřina Mašíková
Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentská 1402/2, Liberec 1, 46117, Czech Republic
email: katerina.marsikova@tul.cz
Jaroslav Demel
Technical University of Liberec, Faculty of Economics, Department of Marketing and International Trade
Studentská 1402/2, Liberec 1, 46117, Czech Republic
email: jaroslav.demel@tul.cz

Employability of University Graduates: The Influence of Covid-19 Pandemic

Abstract
Increasing the level of university-educated population brings positive effects and needs to be carefully considered together with employers and labour market needs. The paper aims to introduce a topical issue of employability of graduates in the labour market and analyse effects in connection with the pandemia Covid-19 on university graduates from various fields. It also searches for an answer whether social and especially the economic situation resulting from it has already been reflected in the employability of graduates of selected faculties in various fields of study at the Technical University of Liberec (TUL). The comparison is based on students' data from the TUL in years 20218-2021. Unexpected situation connected to the Covid-19 pandemic could also influence the adoption of university graduates in the working environment. On selected aspects (tools, period of searching for a job and earnings) of TUL graduates, these possible effects are analysed and discussed in the paper and limitations of presented results.

Key Words
university graduates, employability, tertiary education, earnings, Covid-19 pandemic, employers

JEL Classification: I23, J24

Introduction

Development trends in the field of the transformation of tertiary education and the harmonisation between the content of study programs and the requirements of companies for the knowledge and skills of graduates have been monitored since 1989 (Pavelka, 2014). Employability of university graduates is dependent on many factors, mainly on the field of study, abilities and knowledge of graduates, quality of higher education and situation on the labour market and employer requirements. As data from

Europe and the whole world illustrate, the numbers of university-educated people has changed rapidly in the last decade.

For many years, it has been heard from companies that Czech universities send into practice graduates with other profiles than those they need. Employers most often complained about the unpreparedness and lack of competencies of graduates (Šnýdrová, et al., 2017), or lack of sufficient experience (Doležalová, 2014). According to companies, there is a shortage of technical and natural sciences graduates, and, according to companies, they still lack soft skills (Gejdoš et al., 2021). On the contrary, an absence of technical and technological foundation was typical for fresh economists. Employers' expectations regarding students' employability skills have diverged and continue to differ from actual equipment of students as well as students' perceptions (Šafránková and Šikýř, 2017). And this is valid worldwide (Lisá, et al., 2019, Zaharim, et al., 2009, Jusoh, et al., 2011).

However, it has been gradually becoming more and more difficult for companies to occupy free positions with graduates of Czech universities. And surprisingly, it was not due to an inadequate profile but because human resources have been generally missing in the Czech labour market. As a result, the economy grew, and the unemployment of university graduates has been lower and lower. Thus, we have been in an unprecedented period of human development affected by the Covid-19 pandemic for the second year in a row. It is also situated into the beginning of the economic downturn, symptoms of which were recorded as early as 2019.

This article aims to answer whether the mentioned social but especially the economic situation resulting from it has already been reflected in the employability of graduates of selected faculties of the Technical University in Liberec.

Keller a Tvrdý (2008) stated that university education is still highly prestigious in the Czech Republic and works as an "elevator ", taking the graduate into higher social levels with higher financial income. It is also confirmed by Zelenka and Ryška (2012). And the employability and the success rate of graduates in the job market in the professional field of their studies are still the essential criteria for evaluating Czech universities by the public (Pavelka, 2014).

1. Methods of Research

The paper is based on the literature review and primary data collected within the own authors' research. The research was carried out in 2018-2021 at six faculties of the Technical University of Liberec. A positivist approach was applied in the implementation of the research (Molnár et al., 2012). The study used a quantitative data collection method - a questionnaire survey (Tahal et al., 2017). The purpose of the research was descriptive (Saunders et al., 2002). The task of descriptive analysis was to describe and quantify as faithfully as possible (Tahal et al., 2017) differences in selected factors (length of finding a job, method of finding a job and salary) for graduates of TUL and separately of six faculties of the Technical University of Liberec (Faculty of Economics, Faculty of Mechanical Engineering, Faculty of Textile, Faculty of Arts and Architecture, Faculty

of Mechatronics, Informatics and Interdisciplinary Studies and Faculty of Health Studies). They entered the labour market after graduating from university in different period. At the same time, the task of descriptive research was to identify, quantify and describe differences in the above factors and faculties in the period before COVID-19 and during the pandemic situation (in spring 2021 from respondents graduating in June/August 2020).

For the implementation of quantitative research, online electronic surveying, so-called CAWI (Computer Assisted Web Interviewing), a survey on a web form was used (Kozel et al., 2011). Information from respondents was obtained via a link in an e-mail linking respondents to a questionnaire located on SurveyMonkey. Respondents were graduates of the Faculty of Economics, Faculty of Mechanical Engineering, Faculty of Textile Industry, Faculty of Mechatronics, Informatics and Interdisciplinary Studies, Faculty of Arts and Architecture and Faculty of Health Studies in 2018-2021. They were contacted based on previous agreement and providing their e-mail contact also for research purposes. Tab. 1 shows the number of respondents, the number of answers obtained by individual faculties and the response rate in %.

Tab. 1: Number of respondents

Faculty	Number of contacted graduates	Number of responses	The response rate in %
Faculty of Economics	668	310	46.4 %
Faculty of Textile Industry	376	118	31.3 %
Faculty of Mechanical Engineering	286	134	46.9 %
Faculty of Mechatronics, Informatics and Interdisciplinary Studies	172	59	34.3 %
Faculty of Health Studies	132	79	59.8 %
Faculty of Arts and Architecture	114	53	46.5%
Total	**1748**	**753**	**43.1%**

Source: authors' own calculations

The authors got 753 responses from these faculties in the period October 2018 – February 2021. The response rate was between 31% -60% on selected faculties.

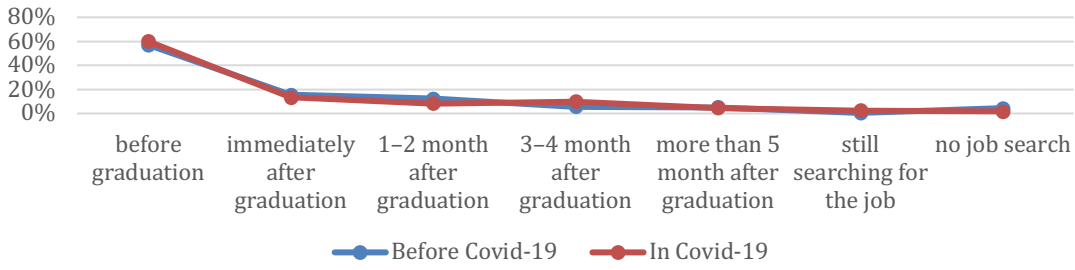
2. Results of the Research

The pandemic has directly impacted organisations' staff needs, leading to a change in students' and graduates' recruitment and retention. The crisis had severe implications on students' access to employment opportunities across the board (internships, traineeships, part-time students' jobs and young-professional jobs) (Green, S. et. al., 2021). Based on the data analysis from TUL graduates, the authors compared the situation in selected factors before the Covid-19 pandemic and during the pandemic. The data analysis focused on comparing the position of graduates of faculties chosen in the period before the Covid-19 pandemic, the length and method of finding a job, and the earnings approximately six months after entering the labour market. The questions were selected to verify whether there was a change in the job search length, the way of looking for a job, and the graduates' earnings during the pandemic. It is also exciting to compare data

between individual faculties because their graduates have their specifics when establishing contact with employers in terms of employment in the

Suppose it is compared the situation before Covid-19 and in Covid-19 pandemic without details about selected faculties (i.e. aggregated data for graduates of the entire TUL). According to Fig. 1, no significant changes have occurred taken place so far. For the selected three questions (time and ways of getting a job and reached salary), the shapes of the curves are very similar. The differences are minimal, but they may indicate some changes in the future.

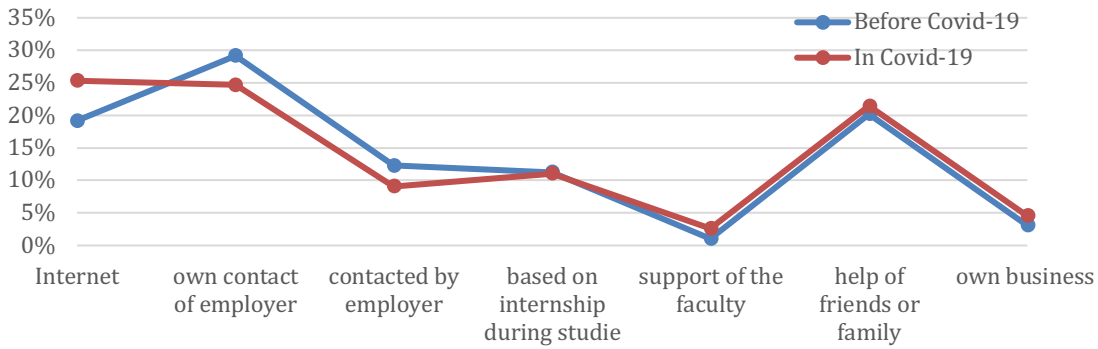
Fig. 1: How long graduates of TUL searched for a job before and in the Covid-19 pandemic



Source: authors' own calculations

The most crucial period of job search is the period before the end of the study, i.e. during the studies. When getting a job after graduation, the search period in Covid-19 is slightly longer.

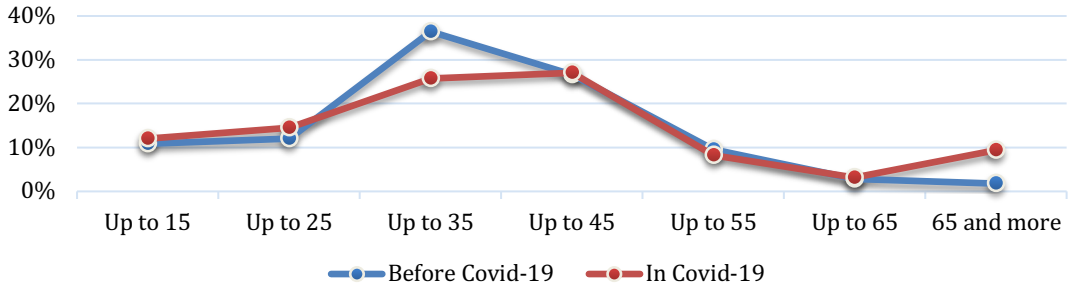
Fig. 2: The way to find a job before and in Covid-19 pandemic – graduates of TUL



Source: authors' own calculations

Fig. 2 shows that the trend to find a job has moved slightly from own contacts to the Internet in terms of job search and employment. Job add in the newspaper, labour office, and personal agency were the options used by the graduates of TUL to the minimal extend (from 0-2%) both in pandemia and before pandemia.

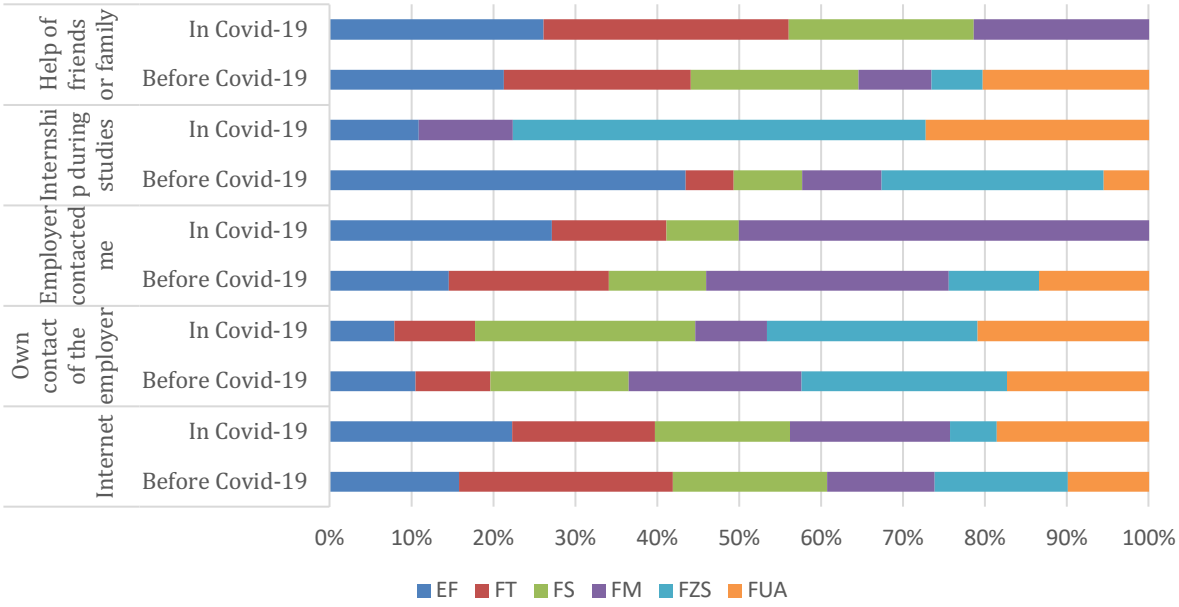
Fig. 3: Earings of TUL graduates in CZK before and in the Covid-19 pandemic



Source: authors' own calculations

Wage levels describe in the Fig. 3 moved to lower areas (a significant jump highest income area in Covid-19 compared to the previous period seems to be a system exception requiring verification of the plausibility of the answers, which unfortunately is not possible). However, a more detailed explanation of the changes there is offered in a detailed comparison between the selected faculties.

Fig. 4: The way to find a job at selected TUL faculties before and in the Covid-19 pandemic



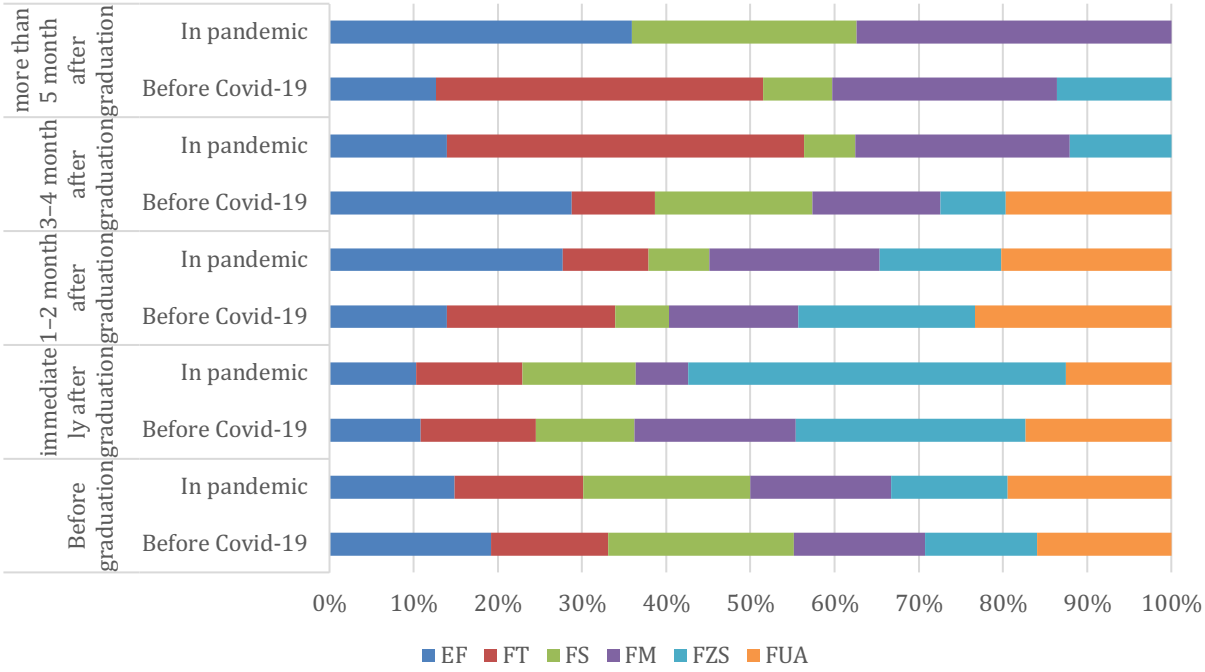
Source: authors' own calculations

From Fig. 4 it is possible to see that the way of finding a job at faculties changed more significantly during the pandemic. In the Faculty of Economics (FE) students, Faculty of Architecture and Faculty of Mechanical Engineering, the tools for a searching job via the Internet (social media, career websites, job portals increased their importance. It is interesting to see a significant increase in finding a job during the internship between students of the Faculty of Health studies, which means critically needed in the pandemic period. On the other hand, the possibility of an internship during the pandemic was

minimal. The students of the Faculty of Economics and Faculty of Textile Engineering did not use this option.

The second issue analysed in the paper is the length of searching for a job in the case of graduates. Graduates were asked how long it has taken to find a full-time job for them. As Fig. 5 shows at some faculties, during the Covid-19 pandemic, graduates searched longer for jobs comparing the situation before the pandemia.

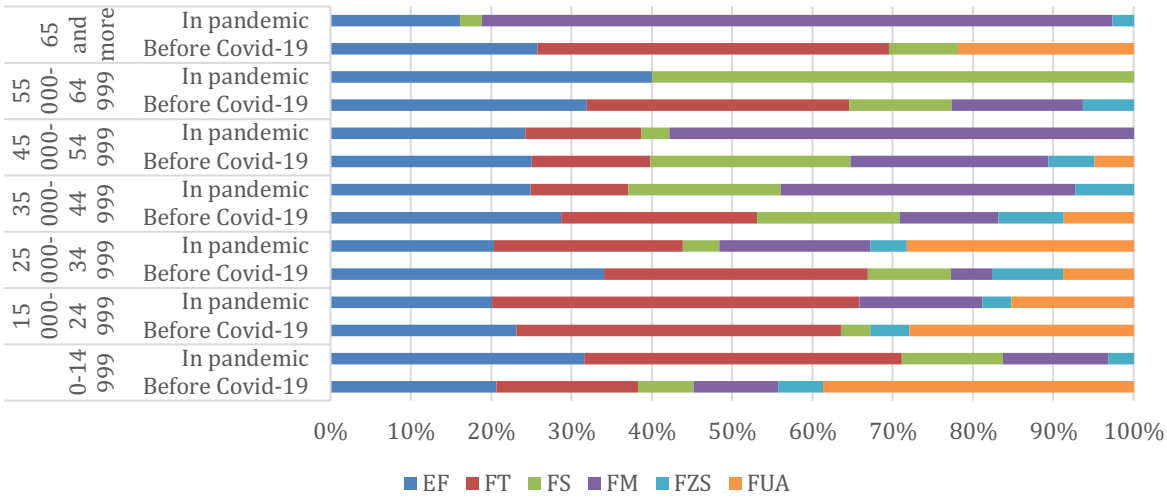
Fig. 5: How long graduates of selected TUL faculties searched for a job before and in the pandemic



Source: authors' own calculations

Fig. 6 pays attention to the earings, and it could be identified that they decreased in most cases. The only faculty where students confirmed an increase of earnings was the Facutly of Mechatronics, where there were also the students with incomes higher than 65,000 CZK/month.

Fig. 6: Earings of graduates of selected TUL faculties earn in CZK before and in the Covid-19 pandemic



Source: authors' own calculations

3. Discussion

Key concepts for relations between universities, their graduates and employers are the employability of graduates, i.e. the success in obtaining a job, the circumstances in which university graduates gain employment after graduation. Also, it is essential to consider the whole process - the amount of income of graduates in the acquired job positions. These facts must become the basis for the indicators according to which employability will be assessed. The research pointed to the fact that a large number of graduates of the Technical University of Liberec (Faculty of Economics, Faculty of Mechanical Engineering, Faculty of Textile, Faculty of Arts and Architecture, Faculty of Mechatronics, Informatics and Interdisciplinary Studies and Faculty of Health Studies) already have jobs. At the time of graduation (see Figure 2). In the pre-ancestral period, it was on average 53.4% of graduates. In the pandemic period, it was even 60%. These results correspond to the Summary Report of the Graduate 2018 survey (Zelenka et al., 2019). It states that approximately 51.8% of students have a job before graduation (the report was created as part of research conducted by 37 universities in the Czech Republic).

Although the presented data are limited in their scope and the possibility of generalising the results, they provide exciting and up-to-date data on the situation and employment of graduates of the selected university (TUL) and a mutual comparison between faculties. It is the study of the field that significantly influences the applicability on the labour market, the length and the way of looking for a job. Likewise, the earnings achieved also depend on the field of study, perhaps most of these factors.

Conclusion

The situation of university graduates has been changing in the last few years. Since 2020, the Covid-19 pandemic has been influencing university education and the position of university graduates in the labour market. The situation with graduates is similar in the Czech Republic and the EU as a whole. The cooperation of faculties across TUL gives the potential to further explore graduates' perspective, not only six months after graduation when these graduates were interviewed but also after several years from graduation, which is the subject of further research by the authors. It will also be very inspiring to see whether the Covid -19 pandemic effect will be even more pronounced in the selected factors for other interviewed graduates (e.g. the length of job search will be extended). Moreover, if earnings of graduates in various fields will change in connection with the changes in the labour market in the last two years.

Acknowledgement

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Eliška Nacházelová, Alice Reissová

Jan Evangelista Purkyně Univeristy in Ústí nad Labem, Faculty of Social and Economic Studies, Department of Economics and Management
Pasteurova 3544/1, 400 96 Ústí nad Labem, Czech Republic
email: eliska.nachazelova@ujep.cz, reissovaa@g.ujep.cz

Image as a Possible Company Strategy for Brain Drain Prevention

Abstract

Nowadays, many countries deal with the outflow of qualified workers. However, this is not only an issue of these countries, but particularly of companies, which compete for experts within the region or between regions. Belonging to such firms is an automotive company in the Czech Republic, which employs over 35 000 people and its image is at the core of the benefits package. IT employees have become the most requested experts, being responsible for countless operations. This article focuses on the importance and the satisfaction when it comes to company image in an automotive firm counting 241 IT staff. These employees were questioned about the impact of the corporate image on their decision to remain at the firm. Using the semantic differential, an above-average rating of the company by the employees was uncovered. To discover the importance of identical properties, we employed the Friedman Test, which revealed the highest values regarding similar attributes that employees are satisfied with. The relations between the company's characteristics and their importance were calculated according to the Spearman's rank correlation coefficient, where most relations are statistically significant. Based on sociodemographic indicators, an important connection between age, gender, and seniority, along with the preference for certain company's attributes, was found. In accordance with the results, the corporate image appears notable in relation to the retention of the company's IT experts. The research outcomes will serve the HR department to differentiate communication strategies among employees and in the recruitment process.

Key Words

retention of employees, IT employees, image of the company, brain drain

JEL Classification: C14, O15

Introduction

Recruiting employees in the labour market is currently difficult. In a time of low unemployment, only 2.0% (1st trimester 2020, 4th trimester 3.0%) according to the Czech Statistical Office (CZSO, 2021), the importance of staff retention increases. In these circumstances, a qualified employee is in great demand and the companies realize that it is the high-quality workers, who deliver high-quality products.

One way of retaining workers is through various motivation factors. These include also benefits, which enable the company to differentiate itself from its competitors by other means than by salary. The offer of benefits is gradually innovated and expanded to satisfy as much as possible the changing environment and people in the company. It is no longer about the classic meal tickets or the use of company laptop for private purposes.

Increasingly, employees are rather interested in intangible benefits and services, which facilitate the balance between work and personal life.

Another attribute, which has been recently gaining importance, is the prestige of the firm; that is, its image. Benefits, along with the corporate image, influence employees, their loyalty and overall job satisfaction (Putra, Baridwan & Prastiwi, 2021). The aim of this article is to examine if, and possibly, how can image affect the stabilization of staff.

According to Čempelová (2013), one of important attributes in fulfilling business plans is the identification of staff with the company values. Without the understanding of the company's goals, employees are not motivated in the right way, nor are they willing to partake in their achievement. The company's reputation itself is a motivation factor. In their study, Wong, Wan and Gao (2017) discovered that the company's image and its reputation is key when job applicants select their future employers.

In companies, both the positive reviews of image and the ability to retain current staff pay an important role in attracting applicants. Tejnorová (2013) claims that insufficiently motivated employees affect corporate culture. Encouraging brand pride is essential to boost employees' motivation and stability. Internal benefits are considered benefits with a major stabilizing factor; these include company products for employees at an advantageous price. Thanks to this benefit, identification of the worker with the company's brand is reinforced. According to Nebeský (2013), such employee advantages represent the basic form of benefits which allow the companies to transform their employees into clients. When considering employees as customers, the company's image is equally important to achieve their satisfaction (yusti Diana, Pamungkas & Sokhibi, 2020).

Diverse studies (Siekierski, Lima & Borini, 2018; Szwajca, 2018; Wilden, Gudergan & Lings, 2010) offer similar views on image as a strategic tactics for boosting attractiveness and competitiveness of an organization or an entire country (Marynenko, Tsikh & Kramar, 2019) in the prevention of Brain Drain. The results of Wilden, Gudergan and Lings (2010) support for example the assumption which presumes the increase of image attractiveness in case of a high quality of work rating in a company. Hitka and Balážová (2015) explored the relation between sociodemographic traits and factors as the company's name, growing attractiveness of the employer, and prestige. The greatest differences were discovered in the assessment of the company's name, which was more important to the employees with over 10 years of service. Another confirmation of the image's importance is the research of Bourhis and Mekkaoui (2010), who investigated the connection between image and attractiveness of a firm. They concluded that the company's good image has also an impact on the growth of its attractiveness. Schlechter, Thompson and Bussin (2015) revealed significant differences between the ranking of the employer's attractiveness and the respondents' gender, as women assessed companies as more attractive than men.

1. Methods of Research

The complete survey sample is the IT staff in an automotive company in the Czech Republic. An IT employee is considered an employee who is hired for a specialized position in the IT department. The size of the sample group is 536 IT employees. The representative sample consists of the entire complete sample. The questionnaire was completed by 224 employees from the IT department. Thus, the respond rate is 41.8%.

The representative sample representing 41.8% of all IT employees of the company consisted predominantly of men (79.5%), aged 31 – 40 (32.1%), with higher education (68.7%). Most surveyed employees have worked for the company for 1 – 5 years (37.9%), the respondent average equals 11.4 years.

The staff filled in the survey based on a 7-point scale in all questions considering importance and satisfaction, with 1 = unimportant benefit/ they are not satisfied with it and 7 = important benefit/ they are satisfied with it. Next, the semantic differential was employed in the questionnaire revealing how employees rate the company. The factors for this method were selected from the company's annual report. In case of the semantic differential, the 7-point scale was also used, but here 1 corresponded with a negative factor, while 7 with a positive one.

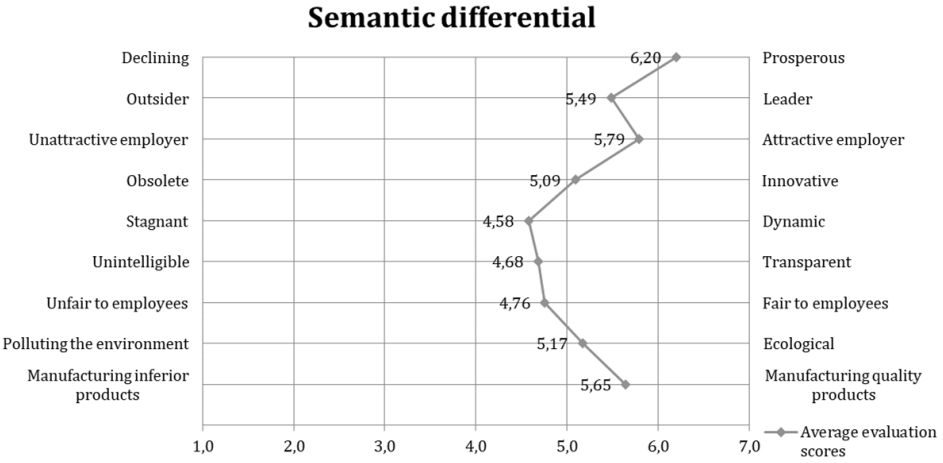
Data were assessed using nonparametric tests – Friedman test (H1) and Kruskal-Wallis test (H2-H4). When it comes to the research of image, Spearman's rank correlation coefficient was employed to uncover whether the importance of company's characteristics for employees correlates with their rating of the company. This method assisted in the evaluation of H1. Discovering the importance of certain characteristics and simultaneously their positive rating in the company signifies the mentioned positive effect on stabilization.

H1: Corporate image has a positive influence on the stabilization of IT staff.
H2: The relation between age and rating of the importance of corporate image in connection with stabilization is statistically significant.
H3: The relation between gender and rating of the importance of corporate image in connection with stabilization is statistically significant.
H4: The relation between seniority and rating of the importance of corporate image in connection with stabilization is statistically significant.

2. Results of the Research

To answer the hypothesis 1, we will combine two approaches to corporate image rating. The first point is the result of the semantic differential (see Fig. 1). As a second step to the calculation, the result of the importance of employer's characteristics will be used together with a comparison with the mentioned semantic differential (see Tab. 1). Based on the semantic differential, the respondents were supposed record rankings of 9 opposite pairs of attributes.

Fig. 1: Company assessment based on the semantic differential



Source: authors' own calculations

All attributes are evaluated by employees as above average (see Fig. 1). Most of all, employees consider the employer as a prosperous, attractive company, which manufactures high-quality products. Now, the assessment of the importance of characteristics is necessary; hence how important it is for their employer to have particularly these attributes. For employees, it is most important, that the company is fair to employees, prosperous, and that it produces high-quality products (see Tab. 1).

Tab. 1: Importance of employer's attributes in comparison with the semantic differential

Attribute	Ø of importance	Friedman Test (Sig.)	Ø in semantic differential	Friedman Test (Sig.)
Prosperous	**6.2**	313.6 (0.000)	**6.2**	525.7 (0.000)
Leader	5.2		5.5	
Attractive employer	5.6		**5.8**	
Innovative	5.7		5.1	
Dynamic	5.5		4.6	
Transparent	5.9		4.7	
Fair to employees	**6.4**		4.8	
Ecological	5.0		5.2	
Manufacturing quality products	**6.0**		**5.6**	

Source: authors' calculations

Through post-hoc analysis, similarity in the evaluation of attributes and their respective importance was investigated. The sphere of importance of employer's attributes produced 4 pairs, which are similar: prosperity and the quality of manufactured products; innovativeness and attractiveness; attractiveness and dynamism; and finally, leadership and eco-friendliness. As for the company's evaluation, 3 groups arose: attractiveness and quality; eco-friendliness and innovativeness; and fairness with transparency and dynamism. This means that there are no statistically significant differences inside the mentioned pairs and one trio.

Now we connect both spheres, the company's rating, and the importance of employer's characteristics to the employees. Based on Spearman's rank correlation coefficient, we discovered mutual relations between these spheres. Table (see Tab. 2) lists direct dependencies in most relations and simultaneously significant values concerning the significance level 0.05 (*) or 0.01 (**).

Tab. 2: Relations between the company's attributes and their importance

It is important, that the employer is…:→ / Company is…:↓		Prosperous	Leader	Attractive	Innovative	Dynamic	Transparent	Fair	Ecological	Manufacturing quality products
Prosperous	C	.306**	.208**	.174**	.151*	.131*	.181**	.250**	.197**	.319**
	S	.000	.002	.009	.024	.050	.007	.000	.003	.000
Leader	C	.230**	.197**	.209**	.105	.092	.172**	.215**	.127	.224**
	S	.001	.003	.002	.118	.170	.010	.001	.058	.001
Attractive employer	C	**.366****	.230**	.325**	.175**	.137*	.188**	.261**	.183**	.354**
	S	.000	.001	.000	.009	.040	.005	.000	.006	.000
Innovative	C	.173**	.130	.161*	.079	.070	.028	.170*	.164*	.234**
	S	.009	.053	.016	.241	.294	.677	.011	.014	.000
Dynamic	C	.254**	.125	.162*	.009	.085	.124	.125	.274**	**.364****
	S	.000	.063	.015	.891	.204	.064	.062	.000	.000
Transparent	C	.319**	.129	.220**	.093	.095	.124	.209**	.240**	**.435****
	S	.000	.054	.001	.164	.158	.065	.002	.000	.000
Fair to employees	C	.296**	.142*	.148*	.065	.006	.184**	.159*	.228**	**.372****
	S	.000	.034	.027	.336	.933	.006	.018	.001	.000
Ecological	C	.338**	.211**	.211**	.110	.115	.226**	.169*	.142*	**.366****
	S	.000	.001	.001	.100	.087	.001	.011	.034	.000
Manufacturing quality products	C	.253**	.223**	.271**	.131	.182**	.219**	.264**	.192**	.247**
	S	.000	.001	.000	.050	.006	.001	.000	.004	.000

*Note: C=Correlation Coefficient; S=Sig.; *=correlation 0.05; **=correlation 0.01*
Source: authors' calculations

The highest significance values are always connected to the manufacturing of quality products, and on the other hand, to the company's rating when it comes to dynamism, transparency, fairness, or eco-friendliness. Those employees who marked as important that their employer manufactures quality products, also assess the company as dynamic, transparent, fair, and ecological.

There are significant differences between age and the importance of attributes – prosperity (Kruskal-Wallis H: 25.8; Sig.: 0.000), transparency (13.7; 0.003), eco-friendliness (17.9; 0.000), fairness (9.7; 0.021) and again the manufacturing of quality products (24.1; 0.000), are all more important to employees over the age of 50. This age group rated best not only the importance of attributes but all company's characteristics within the semantic differential. Substantial differences were also discovered regarding women's perception of qualities such as prosperity (Kruskal-Wallis H: 9.4; Sig.: 0.002), attractiveness (13.9; 0.000) and eco-friendliness (6.8; 0.009). With respect to seniority, significant differences were also found. Specifically, innovativeness is mostly appreciated by newcomers in the company (1-5 years: Kruskal-Wallis H: 11.2; Sig.: 0.048) whereas

eco-friendliness is preferred by employees with more than 25 years of experience in the company (13.3; 0.021). Last attribute, quality of the manufactures products is important for employees who have been with the company for 21-25 years (15.1; 0.010).

3. Discussion

Together with 74% of statistically significant correlations (see Tab. 2) between the company's rating and the importance of attributes, the hypothesis nº 1 was partially confirmed, image has a positive influence on the stabilization of IT employees. Every employer's quality assessed as important by the employees, and simultaneously rated as above average in their current company, contributes to the increase of stabilization.

According to Wilden et al. (2010), respondents better evaluated the company's attractiveness when they also rated positively the quality of work, as we can see in the table nº 2. Wilden et al. (2010) proposes conclusions considering job applicants but does not mention the assessment of image, as it was done in the case of this investigation. Frejtichová (2013) discovered that the employer's attractiveness increases when transparency is guaranteed in diverse processes of the company. In table 2 both attributes are mutually in direct dependency, and, at the same time, they are significantly related. According to the study of Hitka and Balážová (2015), the company, respectively its name, has been better evaluated by those who have been working there for over 10 years. A similar conclusion was also reached in this research, as employees with over 10 years of service rate better all company's characteristics.

The calculations achieved thanks to the Kruskal-Wallis test confirm the hypotheses nº 2-4 only partly, as a statistically significant relation was not found with regard to all presented attributes.

Between the assessment of the importance of certain attributes and the rating of the company in question, there are many direct dependencies (see Tab. 2). These may, with the employee's change of importance preferences, also transform how the employee perceives the company. An interesting outcome is, that employees who find important that their employer manufactures quality products, also rate positively all proposed company's attributes. This is the same for employees when it comes to the importance of prosperity and attractiveness. Thus, is can be said, that these employees may be easier to retain in the company, as it provides them with values, which they expect.

Conclusion

It is of utmost importance for the employees that their employer is fair to them; next, that the company is prosperous and manufactures quality products. Despite the high score of fairness within the sphere of importance, this attribute took only seventh place out of nine when it comes to the company's rating. Although the employees continue rating the company as above average, they are not so content with the state of the firm, in comparison to other characteristics.

With respect to image, the investigated company is performing above average in the employees' rating. Nevertheless, it is essential to keep striving for high-quality activities, both personal and those affecting the company's external environment. Innovativeness was evaluated well by employees given the growth of innovative interventions and visions for the future. Afterall, IT employees have a good knowledge of technological novelties, which are in the making and they can be a part of, and at the same time progress in work.

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Olga Revutska

Technical University of Liberec, Faculty of Economics, Department of Informatics
Studentska 1402/2, 46001 Liberec, Czech Republic
email: olga.revutska@tul.cz

Human Resource Management: a Shift Towards Agility due to a Pandemic of COVID-19

Abstract

The dramatic changes caused by the rapid spread of the COVID-19 virus have had a profound and immediate effect on organizations and employees worldwide. The pandemic has created a particularly challenging environment for human resource management (HRM), as leaders had to adapt quickly to technical, physical, and socio-psychological alterations in the workplace. HR practitioners have been confronted with new perspectives on the meaning of work, organizational leadership and engagement, contactless collaboration and learning, and mental health issues. Employees working remotely have been exposed to work-family effects and emotional impacts while maintaining productivity and absorbing new digital skills. The paper aims to outline the implications of COVID-19 on employees and the workplace and point out the shift of HRM towards agility in response to the global health crisis. The literature review presented in the paper confirmed that companies around the world had demonstrated extraordinary agility in HRM at a time of unprecedented business disruption. The shift of HRM towards agility includes proactive anticipation, determining variable strategies, capability planning, and flexible response to external impulses. These are necessary prerequisites for thriving in the post-COVID-19 workplace. The paper means to stimulate further in-depth research to assess empirical findings in a practical context.

Key Words

agility, human resource, millennials, pandemic, COVID-19

JEL Classification: O15, J24

Introduction

Dramatic changes caused by the recent coronavirus pandemic have unprecedented effects on companies around the world and have profoundly affected human resource management (HRM). As public authorities are taking decisive anti-epidemic measures to respond to the emerging health threat, business leaders and human resource (HR) managers are challenged with navigating their human capital through the uncertain present and unpredictable future by managing people to cope with stress and to continue working remotely so that business goes on with its operations. The recent changes brought by the pandemic lockdown have forced organizations to accelerate their digital transitions (Gigauri, 2020). HRM is intended to play an essential role in helping employees use digital platforms to access their jobs and to support companies in their efforts to continue business processes (Gigauri, 2020). The COVID-19 pandemic has further emphasized the importance of mental health (Spence, 2020). During the crisis, people have struggled with grief at the loss of loved ones, isolation and loneliness,

general anxiety about the future, and financial difficulties. Some struggle with excessive workload, others may have feared losing their jobs.

As organizations adapt to the ongoing COVID-19 crisis, their agility can be a source of competitive advantage (Comella-Dorda et al., 2020). The term *agile* is described in Otto's encyclopedic dictionary (1888, p. 446) as nimble, adept, and energetic. Agile means quick, active, flexible, and responsive to change. This definition accurately captures the fundamental essence of agile management: the ability to respond quickly to changing external environments, varying requirements, etc. The HR professionals are capable of supporting the organizational leaders in shifting the workforce towards agile personnel strategies (Yawson, 2020).

The paper aims to outline the effects that COVID-19 has on human resource management, as organizations need to respond agilely to a "new normal."

1. Literature review

The COVID-19 pandemic has created a particularly challenging environment for HRM. Leaders had to react quickly to the technical, physical, and socio-psychological alterations in the workplace and society (Carnevale & Hatak, 2020). In this case, HR professionals' mission resides in helping employees adapt to radically changed work conditions and finding a balance between the needs of individuals and the smooth running of the business.

Although around 45% of employed millennials and Generation Z have never worked remotely before the pandemic, more than 60% of them would prefer to work from home after the COVID-19 disruption, especially to improve work-life balance and reduce stress; they would also like to use videoconferencing instead of traveling (Deloitte, 2020). Remote work requires the digital and collaborative skills of the workforce (Sheppard, 2020). The digital technologies enable virtual work as well as automate tasks and decision-making (Parry & Battista, 2019). Consequently, HR professionals play a leading role in reskilling or upskilling the employees and facilitating transformation (Parry & Battista, 2019). In the context of prevailing remote work, it is not easy to maintain the physical and social boundaries between professional and personal life. This draws attention to the long-term risk associated with employees' burnout (Giurge & Bohns, 2020). A survey by Qualtrics in April 2020 found that 44.4% of newly remote workers said their mental health had declined since the outbreak of the pandemic (Spence, 2020).

Moreover, there were unprecedented global employment losses in 2020 of 114 million jobs relative to 2019. Employment losses were highest in the Americas, and the lowest in Europe and Central Asia, due to governmental temporary unemployment programs. Working-hour losses in 2020 were approximately four times greater than during the global financial crisis in 2009. In relative terms, employment losses were higher for women (5.0%) than for men and for young workers (8.7%) than for older workers (International Labour Organization, 2021). The increasing unemployment imposes more pressure on people.

According to the results of a pulse survey conducted by Deloitte in April to May 2020, almost 30% of Generation Z and 25% of younger millennials (25-30 years old) were reporting either losing their jobs or placing on temporary, unpaid leave (Deloitte, 2020). Another 27% of millennials and 23% of Generation Z said they worked fewer hours, while some (8% of millennials and 5% of generation Z) worked more extended hours without a corresponding pay increase. Only a third of millennials and 38% of generation Z reported that their employment and income status had not been affected by the lockdown (Deloitte, 2020).

HR practitioners need to facilitate and support business continuity, employee well-being, and customer focus while maintaining the workforce's motivation and productivity (Singer-Velush et al., 2020). Online dashboards and digital data can be used to assess performance, while daily metrics should ideally be balanced with medium- to long-term key performance indicators (Narayandas et al., 2020). A high degree of uncertainty and change requires leaders to act against agile and flexible objectives rather than fixed targets (Narayandas et al., 2020). According to Donovan (2019), the only way to create an authentic culture of flexibility is to enable variability, creativity, and agility. Consequently, flexibility results in a happier, healthier, and more productive workforce (Donovan, 2019). A Gartner research (2020) revealed that 82% of surveyed companies intended to allow a certain level of teleworking after returning to the offices, and almost half (47%) planned to allow employees to work full time remotely, with only 13% of business leaders expressing concerns over sustaining productivity (Gartner, 2020).

The HRM should take the lead in helping organizations to navigate employees through this extraordinary situation, with regard to the future capability demands and meaningful employer value proposition. The role of HR professionals is to facilitate and improve organizational agility and health.

2. Data and methodology

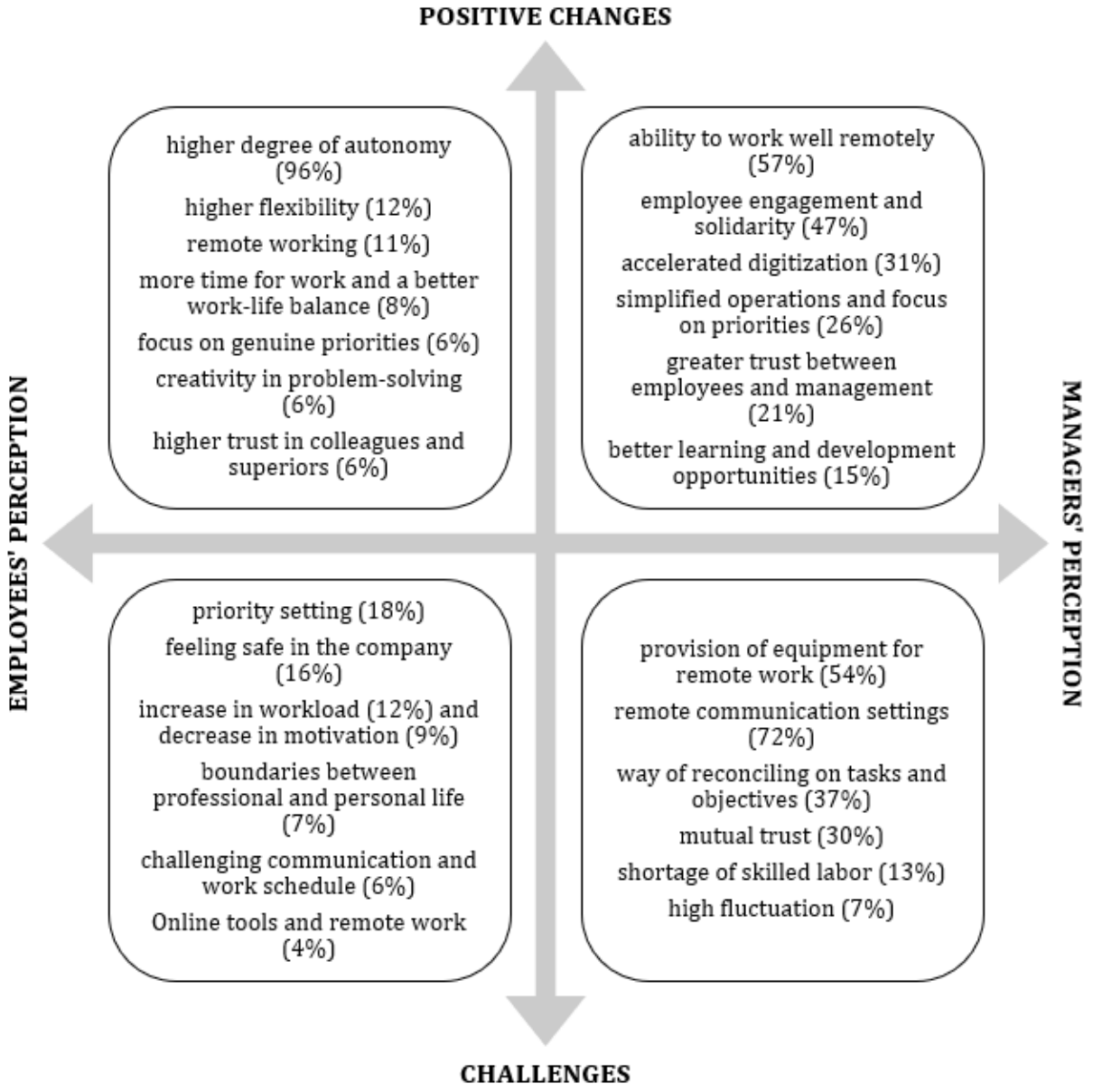
A survey conducted by LMC in September 2020 pointed to the labor market changes in the Czech Republic caused by the coronavirus crisis. Twenty-five percent of the 1,003 surveyed employees aged 18-65 years experienced adverse effects of COVID-19 in the form of reduced earnings (20%), layoffs (2%), or job changes due to a pandemic (3%) (LMC, 2020). Positive changes in employment are less numerous: 3% of respondents stated an increase in income, and 1% of the unemployed found a job (LMC, 2020). Most employees work the same as before the crisis (62%), or the content of their work has changed (9%) (LMC, 2020).

Remarkably, employers' post-COVID intentions are in favor of agility: companies plan more frequent home office (34%), more online learning (24%), and a greater emphasis on open communication and leadership (24%) (LMC, 2020).

Figure 1 provides an overview of the most commonly perceived positive implications and challenges from the perspective of employees and companies in the Czech Republic (see Fig. 1). The top two squares indicate positive changes from employees' perspective

(left) and managers' perspective (right); the bottom squares respectively highlight the most frequent challenges.

Fig. 1: The most frequently perceived positives and challenges in a pandemic from the perspective of employees and company managers in the Czech Republic



Source: author's own elaboration according to (LMC, 2020)

3. Results of the research

In response to the COVID-19 pandemic, HR professionals seek new solutions to challenges arising across many areas of their operations. They must find ways to manage the workforce in the face of business disruption effectively and guide companies

to thriving in the post-COVID-19 workplace. The following table introduces essential reflections and actions responding to human capital challenges (see Tab. 1).

Tab. 1: Key responses to human capital challenges caused by Coronavirus

Dimensions of the HR challenge	Respond & Recover	Thrive & Reinforcement	Respective publications
Staffing & Performance	explore staffing alternatives and flexible workforce planning; take measures to resize the current workforce; align performance management with midterm capabilities and assess talent gaps; use online dashboards and digital data to evaluate performance metrics	assess long term capability demands and plan for the future business strategies (internally/externally); reassess current organization values; define new employee experience; set agile and flexible goals instead of fixed targets	Iza Gigauri, *Effects of COVID-19 on human resource management from the perspective of digitalization and work-life balance;* Schwartz, J., Hatfield, S., N. Scoble-Williams, and E. Volini, *Workforce strategies for post COVID-19 recovery*
Leadership & Engagement	build and roll out rapid and transparent communication plan; coach leadership in how to remain a purpose-driven organization and loyal to the organization mission; monitor employee engagement and measure the impact of the actions	develop an employer value proposition; enhance a culture of trust and engagement; reinforce succession planning for strategic and critical positions; assess leadership potential for the organization of a "new normal."	Robert M Yawson, *Strategic flexibility analysis of HRD research and practice post-COVID-19 pandemic;* Vandaele, N., and A. Verbruggen, *Managing your Human Capital through COVID-19*
Decision making	reduce bureaucracy; delegate decision-making authority to the middle management level; reduce numerous reviews or approvals at many levels	steer towards more data-driven decision-making; use digital tools to automate decision-making when possible; enable innovation at speed and scale	Schwartz, J., Hatfield, S., N. Scoble-Williams, and E. Volini, *Workforce strategies for post COVID-19 recovery;* Narayandas, D., V. Hebbar, and L. Li, *Lessons from Chinese Companies' Response to COVID-19*
Physical & mental health	deploy workplace health and safety protocols; rearrange office furniture to support physical distancing; focus on well-being and constant engagement	introduce mental wellness support as an integral part of the return-to-work programs (extend respective benefits, reorganize the physical workspace and support behavioral changes to make employees feel safer)	Giurge, L. M., and V. K. Bohns, *3 Tips to Avoid WFH Burnout;* Carnevale, J. B., and I. Hatak, *Employee adjustment and well-being in the era of COVID-19: Implications for HR management;* Spence, P., *How COVID-19 reshapes the mental health needs of workers*
Digital transformation & Remote working	align HR policies on homeworking; ensure employees are equipped with the right tools and techniques to enable remote working; initiate a workforce redeployment planning	accelerate digital strategy and organizational agility; define a new operating model and redesign ways of working; shift to platform-based business models; install contactless	Parry, E., and V. Battista, *The impact of emerging technologies on work: A review of the evidence and implications for the human resource function;* Sheppard, B., *A 4-step guide to thriving in the*

		technologies and collaboration platforms	*post-COVID-19 workplace*
Collaboration	redefine job responsibilities and work processes to encourage collaboration across functions	set up strategic workforce planning; build cross-departmental agile project teams	Comella-Dorda, S., Garg, L., S. Thareja, and B. Vasquez-McCall, *The abrupt shift to remote agile teams*
Learning	support learning needs with integrated HR tools; upskill employees in the area of digital skills required to motivate and manage distributed teams	launch organization agility programs; train employees to support future business strategies; develop virtual training tools; promote lifelong learning	McGuire, D., M.-L. Germain, and K. Reynolds, *Reshaping HRD in Light of the COVID-19 Pandemic: An Ethics of Care Approach*

Source: own elaboration according to (Giurge & Bohns, 2020; Narayandas et al., 2020; Schwartz et al., 2020; Sheppard, 2020; Spence, 2020; Vandaele & Verbruggen, 2020)

4. Discussion

The Deloitte pulse survey confirmed that Millennials and Generation Z valued the speed at which companies acted in response to the global health crisis and how they supported employees (Deloitte, 2020). However, from a career perspective, a pandemic will be considered a negative phenomenon. Akkermans et al. (2020) classifies the pandemic as a career shock due to its disruptive impact on job security, loss of income, and increased general anxiety. In particular, less-skilled blue-collar workers are most exposed to the adverse effects of the COVID-19, such as layoffs or reduced salaries (McGuire et al., 2020). There are also discussions about essential workers such as nurses, cleaners, postal workers, delivery drivers, and grocery store assistants, who often receive lower earnings despite having a higher exposure to infection risks (McGuire et al., 2020).

The pandemic can also have positive consequences for employees, such as spending more time with the immediate family and reducing commuting (Akkermans et al., 2020). Remarkably, the crisis has made Millennials and generation Z more financially prudent, reinforced the sense of individual responsibility, increased empathy, and eagerness to positively impact society (Deloitte, 2020).

Agile teams are usually well equipped for periods of disruption due to their adaptability to fast-changing business priorities and good digital skills. However, an abrupt transition to remote work has also forced agile teams to recalibrate their processes to maintain productivity, sustain agile culture, and support organizational targets (Comella-Dorda et al., 2020).

Conclusion

The paper aimed to outline the shift in HRM towards agility in the context of technical, physical, and socio-psychological alterations in the workplace and society caused by the unprecedented health crisis. The COVID-19 has brought a new perspective on the meaning of work, organizational leadership, contactless commerce and education, and corporate volunteerism (Yawson, 2020). In response to the pandemic, companies worldwide have demonstrated extraordinary agility in changing business models,

introducing remote work arrangements, relocating their operations to less affected geographic areas, and cross-sectoral redeployment of furloughed employees (Deloitte, 2020). HR leaders have been confronted with challenges of effectively managing human capital in the face of business disruption and guiding organizations to prosperity in the post-COVID-19 workplace. The shift of HRM towards agility includes proactive anticipation, formulation of strategies for different scenarios, strategic capability planning, and flexible response to ever-changing external impulses. The health crisis has placed great emphasis on knowledge. The theoretical foundations and overview of secondary data presented in this paper can support the reinforcement of agility of personnel management.

This exploratory research is limited to a literature review. The pandemic and its impact on business and society is a relatively new phenomenon, and therefore the number of publications devoted to this topic is still limited. The paper means to stimulate further in-depth research to assess empirical findings in a practical context.

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Josef Voráček

Charles University, Faculty of Physical Education and Sport, Department of Sport Management
José Martího 31, Prague 6, 162 52, Czech Republic
email: pepino.voracek@gmail.com

Aspects of Motivation and Self-Assessment of Managers in Non-Profit Sports Organisations

Abstract

The research seeks to examine the importance of economic and non-economic incentives for managers operating in non-profit sports organisations. It also focuses on how managers in such organisations view the gap between compensation and specific aspects of managerial work, such as the amount of work done, the authority and responsibility vested in them, the required competencies and the level of their personal initiative. A questionnaire survey organised among managers of Czech non-profit sports organisations has been chosen as the research method. In total, the research group included 270 respondents. The analysis provides overall results of the survey along with more detailed results broken down by management level and part-time/full-time employees. The results show a strong preference for non-economic incentives, especially meaningful work, helping others, self-actualisation and responsibility, mission, conviction. By contrast, the respondents attributed the least importance to contributions towards insurance premiums, holiday bonuses and other services provided by the organisation at reduced prices, or for free, and holiday. The self-assessment of the interplay between compensation and various aspects of managerial work showed the respondents viewed their work as undervalued, most notably with respect to the level of responsibility, the work done and their own personal initiative. The perceived undervaluation is viewed especially strongly for volunteers in managerial positions, who, due to the nature of volunteering, collect only minimal, mostly symbolic wages. This trend especially manifests itself strongly at higher tiers of management and with part-time workers.

Key Words

Human resources management, volunteer, management levels, non-profit sports organisations, motivation

JEL Classification: J28, L31, L83, M12

Introduction

Both for-profit and non-profit organisations operate in the Czech physical education and sports sector, with the vast majority of them being non-profit organisations (Čáslavová, 2009). For the work of managers, this means completely different conditions and options (Čáslavová, 2009). According to Čáslavová (2009), the non-profit sector offers advantages such as less competitive work environment compared to for-profit organisations, tax benefits as incentives for managers and a wide range of services and programmes. Among the disadvantages, Čáslavová (2009) includes, in particular, tight and very limited budgets, absence of usual career advancement options, management processes influenced by decisions and regulations of the government and state

organisations, volunteers and non-professionals promoted to managerial positions and overall low performance of non-profit organisations.

The less competitive working and economic conditions overall in non-profit organisations compared to for-profit organisations place high demands on motivating managers, incentivising aspects and factors being crucial to the organisations' ability to entice and retain managers (Sun, Fuschi, 2015). Some authors (Proença, Cristina, 2013; Renard, Snelgar, 2016; Sun, Fuschi, 2015; Tippet, Kluvers, 2007; Weisberg, Dent, 2016) primarily focus on intrinsic and extrinsic concepts of motivating managers. While extrinsic incentivising factors mainly refer to economic elements such as salary, wage, cash bonuses, contributions towards insurance premiums, etc., intrinsic motivating elements include non-economic incentives such as recognition, respect, self-esteem, self-actualisation, mission, helping others, etc. Other authors consider internal and external (Legnerova, 2016), or implicit and explicit incentivising factors (Lukes, Stephan, 2012). However, all of the aforementioned authors agree on one point, namely the significant prevalence of non-economic incentives on the part of both employees and, still more importantly, managers in non-profit organisations. The development and maintenance of non-economic incentives is therefore key to securing and, above all, retaining managers in non-profit organisations, especially in sports.

However, as confirmed by Tippet and Kluvers (2007), economic incentives are also integral factors in employee and manager motivation. The question that arises in view of the above, however, is to what extent can non-economic incentives compensate for a lower level of economic incentives with respect to various aspects of managerial work, such as the level of authority and responsibility, required competencies, amount of work done and personal initiative. These are all essential elements in managerial work (Bělohlávek, Košťan, Šuleř, 2006; Donnelly, Gibson, Ivancevich, 2008; Koontz, Weihrich, Cannice, 2020).

It is characteristic of the sports sector that it largely relies on the work of volunteers, including in managerial positions, as mentioned above (Čáslavová, 2009). This only corroborates the findings of authors and their studies in the field of non-economic incentivisation. The dominant elements in incentivising volunteers involve gaining new experience, involvement in interesting projects and helping others (Čáslavová, Kraft, Voráček, Bártová, 2014). The research presented here has looked into the overall situation concerning managers in non-profit sports organisations in terms of the incentives and the managers' own assessment of the interplay between compensation and the major aspects of their managerial work.

1. Methods of Research

Research objective

The main objective of the research is to establish what incentives are important for managers in non-profit sports organisations and how managers in these organisations view the interplay between compensation and other aspects of managerial work.

The incentives are divided into economic and non-economic, as implied by the review of dedicated literary sources, while the specific incentives have been identified following a group discussion with experts on sports management in the Czech Republic; the same goes for the aspects of managerial work.

Methods

To achieve the objective of the research, a questionnaire survey was conducted among managers of non-profit sports organisations in the Czech Republic. The respondents were selected using the intentional technique so as to solely reach out to employees who actually hold managerial positions in sports organisations operating in the non-profit sector. A group of trained interviewers was used to distribute the questionnaires, who assisted the respondents in completing them. The trained questioners used the technique of suitable opportunity (availability) for selection of the employees who actually hold managerial positions in sports organisations operating in the non-profit sector. The total size of the research group was 270 respondents.

The respondents were further broken down (with a view to ensuring a more detailed analysis of the results) by the level of management at which they worked for their respective organisations, and also by whether they were part-time or full-time employees. The resultant structure of the research group was as shown in Tab. 1.

Tab. 1: Structure of the research group

Management level	**Absolute frequency**	**Relative frequency**
Top management	101	37.407
Middle management	90	33.333
Operations management	79	29.259
Total	270	100
Part-time/full-time employees		
Full-time job	120	44.444
Part-time job	57	21.111
Volunteer	89	32.963
Self-employed	4	1.481
Total	270	100

Source: authors' calculations

The incentives were measured on a seven-point scale, where the respondents indicated the level of materiality for each incentive, how much they motivate them to work for a given non-profit sports organisation (1 – least important, 7 – most important). The perceived interplay between compensation and other aspects of managerial work was measured on a ten-point scale, always separately for compensation and for one other aspects of managerial work (1 – lowest level, 10 – highest level). The differences and ratios between these two scales were then calculated, expressing the perceived match/mismatch between compensation and the given aspect of managerial work, i.e., the actual self-assessment.

The results were analysed both for all respondents in total and in more detail for each management level and part-time/full-time employees. Only three levels (full-time job, part-time job and volunteer) are included in the analysis of the full-time/part-time results, as the self-employed category only contains 4 respondents, which is not enough for the results to be representative. In this part, the research only worked with 266 respondents.

2. Results of the Research

Incentives

The overall results clearly show (see Tab. 2) that managers in non-profit sports organisations are primarily motivated by non-economic incentives. The average values for these elements ranged within the M = <2.307; 5.759> interval. Economic incentives showed average M values at only <1.922; 3.052>.

Tab. 2: Overall results for incentives as viewed by managers in non-profit sports organisations

Incentive	Mean (*M*)	Standard deviation (*SD*)
Economic		
Salary, wage	3.052	1.877
Cash premiums, bonuses	2.641	1.839
Contributions towards insurance premiums, holiday bonuses, etc.	1.922	1.398
Services provided at reduced prices or for free	2.300	1.671
Non-economic		
Recognition, respect	4.926	1.602
Self-actualisation and hobby	5.652	1.455
Opportunity to succeed	4.600	1.768
Freedom and independence	4.537	1.836
Physical environment, tools and equipment	3.674	1.566
Education and development beyond the framework of current work	4.163	1.805
Career advancement opportunity	3.359	1.811
Responsibility, mission, conviction	5.237	1.577
Meaningful work, helping others	5.759	1.442
Space for implementing and developing one's skills	5.078	1.558
Previous experience	4.437	1.734
Holiday	2.307	1.696

Source: author's calculations

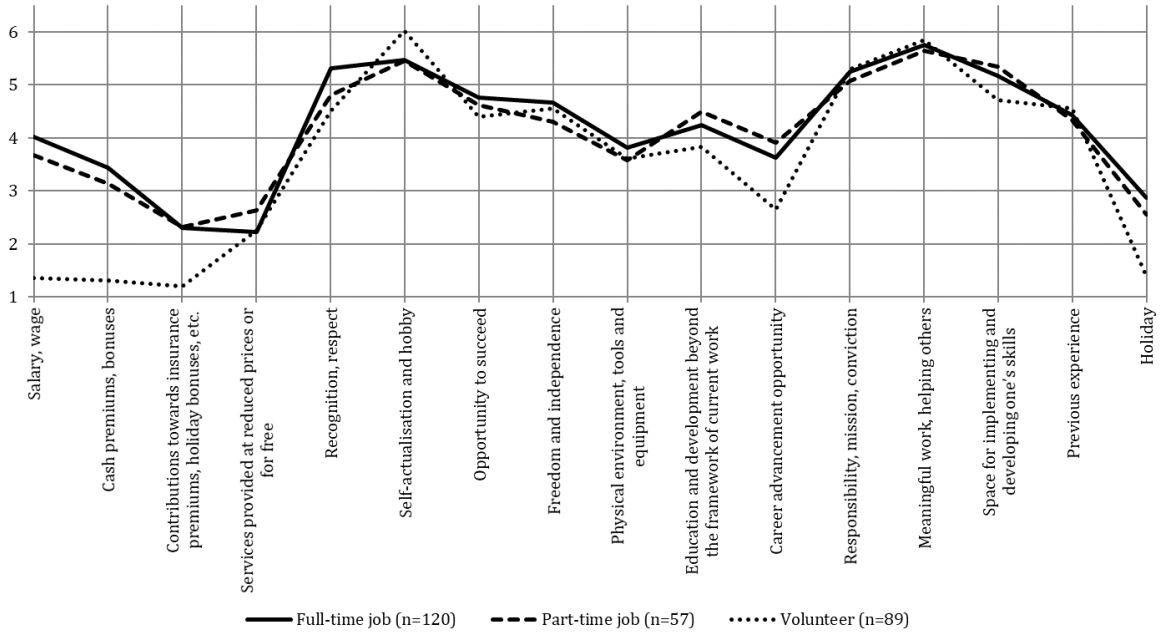
The respondents have identified as the most important incentives meaningful work, helping others (M = 5.759, SD = 1.442), self-actualisation (M = 5.652, SD = 1.455) and responsibility, mission, conviction (M = 5.237, SD = 1.577). On the contrary, the elements viewed as the least important by the respondents were contributions towards insurance

premiums, holiday and other bonuses (*M* = 1.922, *SD* = 1.398), services provided by the organisation at reduced prices or for free (*M* = 2.300, *SD* = 1.671) and holiday (*M* = 2.307, *SD* = 1.696). A correlation analysis showed only one strong correlation, namely between salary, wages and cash premiums and bonuses (*r* = 0.822 at *p* < 0.001).

Comparing each incentive across various management levels showed interesting differences for recognition, respect, where the respondents originating from top management (*M* = 5.168, *SD* = 1.537) and middle management (*M* = 5.044, *SD* = 1.208) viewed this element as more important than those at the operations management level (*M* = 4.481, *SD* = 1.967), these differencies are statistically significant (by t-test) – top management *p* = 0.009, middle management *p* = 0.002. Another significant difference was observed for freedom and independence, where the viewed importance of this incentive increased at higher management levels – operations management (*M* = 4.089, *SD* = 2.058), middle management (*M* = 4.411, *SD* = 1.528) and top management (*M* = 5.000, *SD* = 1.817), statistically significant differencies are between top and operations management, where *p* = 0.002 and between top management and middle management, where *p* = 0.01. A similar upward trend was also observed for responsibility, mission, conviction – operations management (*M* = 4.886, *SD* = 1.732), middle management (*M* = 5.133, *SD* = 1.486, *p* = 0.03 against top management) and top management (*M* = 5.604, *SD* = 1.463, *p* = 0.003 against operations management) – and also for meaningful work, helping others – operations management (*M* = 5.481, *SD* = 1.640), middle management (*M* = 5.700, *SD* = 1.267) and top management (*M* = 6.030, *SD* = 1.389, *p* = 0.02 against operations management).

In terms of part-time/full-time workers/volunteers, major differences were, of course, observed for the economic incentives, especially between volunteers and "paid" managers (whether full-time or part-time). Yet, some differences could even be identified in non-economic incentives, see Fig. 1.

Fig. 1: Importance of the incentives by full/part-time/volunteer work



Source: author's own calculations

Self-assessment

The respondents' self-assessment brought the anticipated results in that compensation was viewed as less important an incentive compared to the various aspects of managerial work. As shown by Tab. 3, the average difference (on a 10-point scale) between compensation and the measured aspect and the average ratio of the two elements ranged within M = <-3.233; -2.515> and M = <0.626; 0.705>, respectively.

Tab. 3: Overall results of the compared self-assessment aspects for managers in non-profit sports organisations

Self-assessment aspect	Mean (*M*)	Standard deviation (*SD*)
Compensation – Level of personal initiative	-3.011	3.171
Compensation / Level of personal initiative	0.645	0.512
Compensation – Amount of work done	-3.093	3.110
Compensation / Amount of work done	0.627	0.422
Compensation – Competence	-2.515	3.196
Compensation / Competence	0.705	0.481
Compensation – Level of authority	-2.585	3.203
Compensation / Level of authority	0.694	0.448
Compensation – Level of responsibility	-3.233	3.217
Compensation / Level of responsibility	0.626	0.412

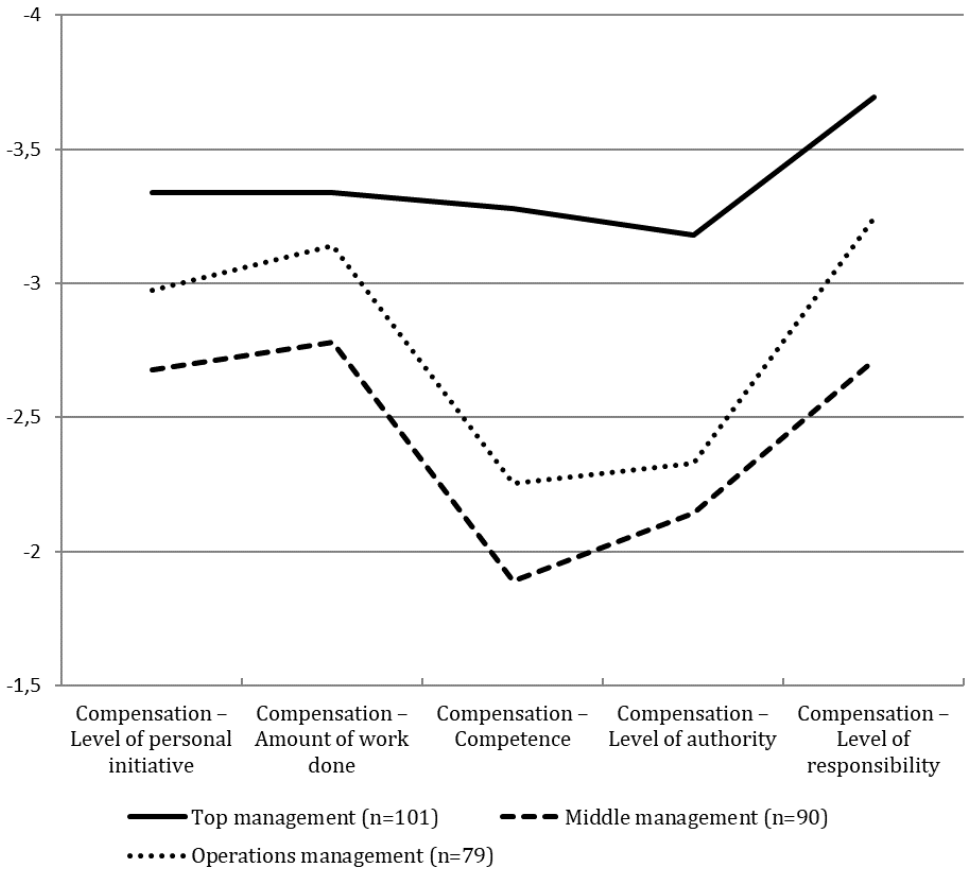
Source: author's calculations

The respondents viewed the biggest gap between compensation and level of responsibility (M = -3.233, SD = 3.217); consequently, the compensation / level of responsibility ratio was the lowest (M = 0.626, SD = 0.412). However, for the remaining aspects under assessment, the values obtained were similar.

The analysis of self-assessment by management levels provides for an interesting comparison. In all the aspects under assessment, the largest gap perceived between compensation and the given aspect under consideration was identified for respondents originating from top management; by contrast, the smallest differences were identified for middle managers, as shown in Fig. 2.

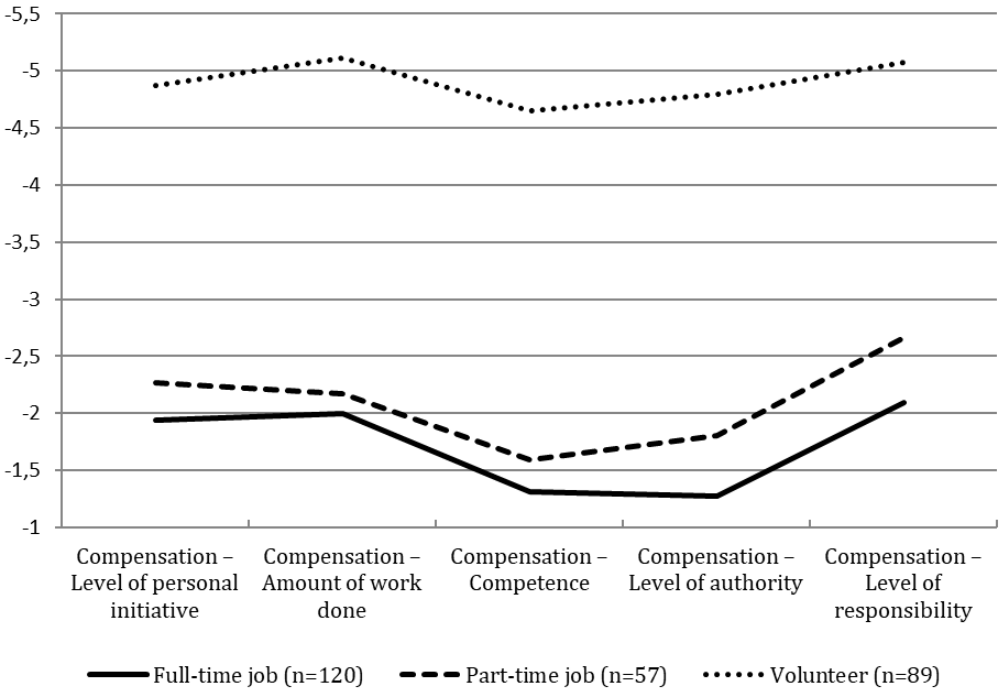
The situation is radically different for an analysis by full-time/part-time/volunteer workers. Full-time employees indicated the smallest gap between compensation and the aspect under consideration; by contrast, volunteers saw the gap as very large – M = <-5.112; -4,652>. On the contrary, the values reported for part-time and full-time employees almost closed the gap. This is shown in Fig. 3.

Fig. 2: Self-assessment by management levels



Source: author's calculations

Fig. 3: Self-assessment by part-time/full-time/volunteer workers



Source: author's calculations

3. Discussion

The research results obtained in the sports sector quite clearly confirm the trends in, and characteristics of, incentives in the non-profit sector in general. Similarly to the referenced studies (Legnerova, 2016; Lukes, Stephan, 2012; Proença, Cristina, 2013; Renard, Snelgar, 2016; Sun, Fuschi, 2015; Tippet, Kluvers, 2007; Weisberg, Dent, 2016), the research showed the importance of non-economic incentives for managers in such non-profit organisations. One interesting fact is the growing trend observed in the importance of some non-economic incentives with higher levels of management, specifically when it comes to recognition, respect, freedom and independence, responsibility, mission and convictions, and also meaningful work and helping others. On the contrary, the large differences in how economic incentives are viewed by volunteers and paid managers are hardly surprising, corroborating the non-economic nature of the motivation of volunteers in sports (Čáslavová, Kraft, Voráček, Bártová, 2014).

Self-assessment measured by the relationship between compensation and the perceived levels of importance for specific aspects of managerial work brought fairly expected overall results in that compensation is viewed to be much less important than the individual aspects of managerial work. On average, compensation in non-profit sports organisations can compensate for about 62-70% of the aspects of managerial work. However, the comparison by management levels yielded interesting results, where managers at the middle level of management viewed the gap in importance between compensation and the level of managerial work to be the smallest of all three levels of management. In terms of part-time/full-time/volunteer work, the results show that the identified large gaps are primarily down to the effects of volunteer work, whose (expectedly) extreme values increase the overall average gap between compensation and aspects of managerial work. By contrast, paid managers view the divide to be much smaller.

The selected questionnaire survey method brought valuable insights, which, however, only confirm the facts already well established in theory and in previous studies conducted in the non-profit sector. While, due to the intentional selection and technique of suitable opportunity (availability) for selection of respondents (which is not representative technique for research sample), the research cannot be regarded as representative of the entire non-profit sector in Czech sports, the feedback from 270 managers is a valuable contribution to the discussion.

Conclusion

A great deal of attention needs to be devoted to non-economic incentives for managers in the non-profit sector in Czech sports. According to the results obtained from the research, the importance of such elements significantly exceeds that of economic incentives. Managers at all levels are therefore primarily motivated by meaningful work, the opportunity to help others, their own self-actualisation and responsibility, mission and convictions. Self-actualisation plays a central role in incentivising volunteers in managerial positions. The respondents view individual aspects of managerial work as undervalued in terms of compensation; however, moving from part-time to full-time

workers, the perception is significantly weaker. The respondents viewed the largest the gap to be between compensation and level of responsibility; also, the managers thought that the amount of work done was substantially greater than the compensation received. Consequently, the results suggest that a great deal of attention needs to be devoted to non-economic incentives in the strategic management of human resources at the level of managers in non-profit sports organisations.

Acknowledgment

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Section V

Tourism and Corporate Social Responsibility

Vera Braun

TU Dresden, IHI Zittau, Chair of Environmental Management
Markt 23, 02763 Zittau, Germany
email: vera.braun@tu-dresden.de

Mining Transformation and Biodiversity Management: A Systematic Review and a Case Study of Lusatia

Abstract

Throughout the life cycle of a mining project, mining activity, especially of open-cast mines, directly impacts biodiversity through land clearance and emission to air and water. Mine closure offers the opportunity to rehabilitate biodiversity affected by activities during the project developing and operation stage. Therefore, it is particular important to adopt biodiversity management at the closure stage. To consider the broader perspective of post-closure land use, stakeholders should be involved in the early stage of the closure process. In this context, special attention has to be paid to Lusatia in the east of Germany, which is one of the country's core regions for lignite mining. The end of coal power generation by 2038 in Germany spotlights the topic of open-cast mine closure and post-closure land use. Biodiversity management that plays a major role in this transformation process is often neglected. The purpose of this study is to analyse drivers and barriers of mining companies for adopting biodiversity management at the open-cast mine closure stage, to identify biodiversity management strategies for planning and implementing closure, and to examine stakeholder engagement in this process. At a first stage, a systematic review is applied, and descriptive as well as thematic analyses are employed to present key findings. At a second stage, a case study of Lusatia is conducted to show how outcome of the systematic review are put into practice in this region.

Key Words

Corporate Biodiversity Management, Open-cast Mining, Restoration, Post-mining Area, Lusatia

JEL Classification: C21, R13

Introduction

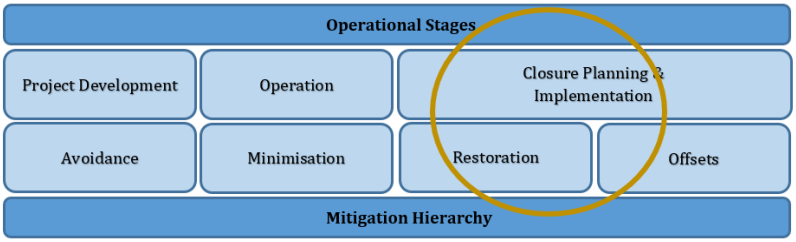
Our Earth has entered the age of the 6th species extinction (Atkins & Maroun, 2018; Fischer & Oberhansberg, 2020; Segerer & Rosenkranz, 2019). Since the first signs of species extinction in the 19th century, the decline of biodiversity has continued. During the second half of the 20th century, this process accelerated. Globally, 67 percent of sufficiently studied invertebrate species show an average decline of 45 percent (Segerer & Rosenkranz, 2019). The Convention on Biological Diversity (CBD) defines biodiversity as "[t]he variability among living organisms from all sources including, inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems" (CBD, 1992). Biodiversity is a prerequisite for the functioning of our ecosystems. Therefore, the 6th species extinction is one of the greatest challenges of our time. Ecosystems provide us with valuable services and natural resources, such as clean air and water, food, medicine, and flood protection (Fischer & Oberhansberg, 2020; Segerer &

Rosenkranz, 2019). A team of researchers put the global annual ecosystem services for human well-being at over 140 trillion U.S. Dollars in 2011. In comparison, the global gross domestic product was 73 trillion U.S. Dollars in the same year. This amounts only half of the ecosystem services (Fischer & Oberhansberg, 2020). Ecosystem functions bring direct economic benefits, and business activities depend on natural resources and ecosystems. Therefore, the loss of biodiversity and decrease in ecosystem services not only impact human well-being but pose a risk to business activities (Kramer et al., 2017; Segerer & Rosenkranz, 2019).

Not only are business activities facing risks due to biodiversity loss but are strongly impacting biodiversity (Adler et al., 2018; Atkins & Maroun, 2018; KPMG, 2020; TEEB, 2010). The main causes for biodiversity loss are overuse of natural resources, change of land use, pollution, climate change, and invasive species. Business activities strongly impact these factors. (Kramer et al., 2017; Schaltegger & Beständig, 2010). In recent years, corporate biodiversity management starts to gain attention (Borial & Heras-Saizarbitoria, 2017b; ICMM, 2006). Corporate biodiversity management "involves the methodical design of processes, products and projects to ensure business success while protecting biodiversity. It systematically analyses the impact of business activities on biodiversity as well as its structural and social conditions in order to find strategic measures that lead to sustainable development for both business and society" (Schaltegger & Beständig, 2010, p.10). However, the ability to implement biodiversity strategies depends on the sector and the extent of business operations. Companies, especially those operating closely with and relying highly on natural resources, started to take action to mitigate their direct impact on biodiversity (Borial & Heras-Saizarbitoria, 2017a).

The mining sector has a direct impact on biodiversity (Borial & Heras-Saizarbitoria, 2017a, 2017b; Ekstrom et al., 2015; IMCC, 2006). Throughout the life cycle of a mining project, mining activity directly impacts biodiversity through land clearances and emissions to air and water (IMCC, 2006). The International Council on Mining and Metals (IMCC) identified three major operations stages of a mining project: project development, operation, and closure. Biodiversity management strategies can be applied at each of these stages (IMCC, 2006). In addition, the Biodiversity Consultancy developed a mitigation hierarchy for biodiversity management in the mining industry (Ekstrom et al., 2015). The mitigation hierarchy is closely related to the operation stages (c.f. Figure I). This article focuses on the closure and restoration of open-cast mines. In 2020, the German government passed a law (Kohleausstiegsgesetz) to end power generation from coal by 2038 (Deutscher Bundestag, 2020). Therefore, the closure of open-cast mines is an upcoming topic and the implementation of biodiversity management strategies should not be missed in this process.

Figure I: Operational Steps and Mitigation Hierarchy of Biodiversity in Mining



Source: Own figure in accordance with ICMM, 2006 & Ekstrom et al., 2015.

Closure planning and implementation offers the opportunity to rehabilitate biodiversity affected by activities during the project developing and operation stages. Therefore, a biodiversity management strategy should be developed. To consider the broader perspective of post-closure land uses, stakeholders should be involved in the early stage of the closure process. Stakeholder engagement can lead to competing interests regarding post-closure land use, e.g. the establishment of conservation areas versus productive agricultural or forestry use. Biodiversity management strategies need to include biodiversity objectives for the whole range of post-closure land use perspectives (ICMM, 2006).

In this context, special attention has to be paid to the Lusatia (Lausitz) in the east of Germany, which is one of the country's core regions for lignite mining. Lusatia is regarded as a 'European pilot region for structural change' (Landesregierung Brandenburg, 2019). In the former German Democratic Republic (DDR), Lusatia became a prestigious region due to lignite mining and energy generation. The state party SED focused the country's industrial activities on the mining and energy sectors. Owing to its rich lignite resources, Lusatia developed into a significant industrial site and experienced a significant population growth (Müller & Steinberg, 2020; Wolle, 2020). Before the political change in 1989, 80,000 workers were directly employed in the mining industry. The reunification of Germany put a sudden stop to the mining activities. Numerous open-cast mines and power plants were shut down and 90 percent of the employees in these sectors lost their jobs (Gürtler et al., 2020). The population drastically dropped within a few years, and especially young people emigrated. Lusatia has remained an economically underdeveloped region. Nevertheless, despite the decrease in mining activities since the 1990s, the mining sector still is a major economic factor and employer in Lusatia (Müller & Steinberg, 2020; Pollmer, 2020).

The decision to end coal power by 2038 is especially crucial for the structurally weak Lusatia since it will strongly impact the region's economy. Within the next decades, Lusatia will face a second wave of transformation. However, this also offers the chance for a sustainable transformation. A development towards a green economy may enable the region to fulfil the image of a pilot region for structural change. Contrary to the early 1990s, this time transformation can be planned and organised. In order to develop the region, the German state provides around 17 billion Euros (Bundesregierung, 2020; Gürtler et al., 2020; Pollmer, 2020). On the one hand, these financial resources should be spent thoroughly to sustainably stimulate the region's economy and to create employment opportunities. On the other hand, in times of global warming and species extinction, it is inevitable for large infrastructure programmes to be climate- and environment-friendly. Environmental management concepts, such as biodiversity strategies, may promote the region's image and foster economic development while protecting the environment. In the context of the transformation, public debate and scholarly activities mainly focus on the topics of climate change mitigation and climate adjustment. Biodiversity loss and biodiversity management that also play a major role in the transformation are often neglected. Therefore, this article aims to explore the role of biodiversity management in open-cast mine closure with special focus on the Lusatia. The following questions guide this research:

- Q1: What drivers and barriers face mining companies to apply biodiversity management at the closure stage?

- Q2: What biodiversity management strategies are frequently employed for developing post-mining areas?
- Q3: How are stakeholders involved in planning and implementing biodiversity management strategies for open-cast mine closure?

This research applies two methodological approaches: a systematic literature review to address the research questions and a case study of Lusatia to analyse how outcome of the systematic review is put into practice.

(1) Applying systematic literature review, this research identifies drivers and barriers of mining companies to adopt biodiversity management for open-cast mine closure. These findings may serve the scientific community as basis for developing solutions to minimise challenges of biodiversity management implementation. Furthermore, the evidence may support mining companies to learn about the benefits of adopting biodiversity management and to overcome barriers. Moreover, the results may lead politicians to provide suitable incentives. In addition, this research delivers an overview of biodiversity management strategies for planning and implementing open-cast mine closure and of stakeholder engagement in this process. These outcomes may support mining companies and its stakeholders in employing biodiversity management strategies at the closure stage and in fostering cooperation among mining companies and their stakeholders.

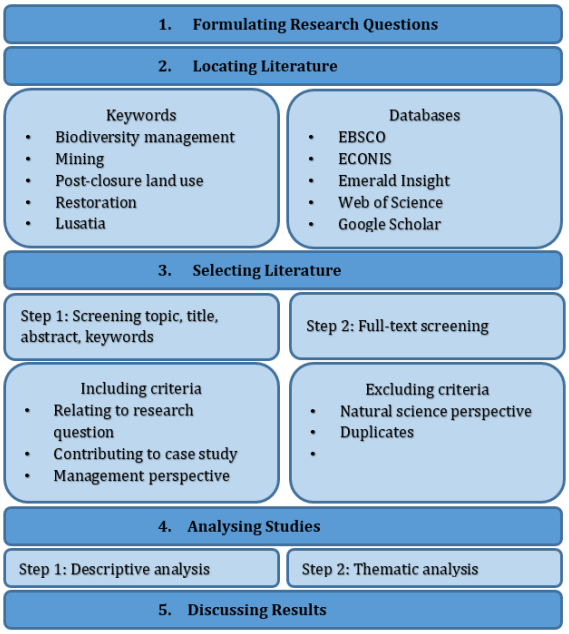
(2) Using Lusatia as a case study, this research shows how outcome of the systematic review is put into practice. The focus of the case study is on the practical implementation of open-cast mine closure and post-mining land use in Lusatia, starting from the German reunification until recent years. Applying findings of drivers and barriers to the current situation in Lusatia may support Lusatia's mining company to learn about the benefits of adopting biodiversity management. Moreover, it may lead German political decision-makers on the federal, state, and regional level to provide incentives for the implementation of biodiversity management by Lusatia's mining company. Summarising biodiversity management strategies for open-cast mine closure can add to the perspective on how to use the future post-mining area in Lusatia in an environmentally and biodiversity friendly way. Furthermore, describing biodiversity management strategies that have already been employed in post-closure land use in Lusatia may help to broaden the debate on Lusatia's upcoming transformation. Moreover, decision makers such as politicians, regional planners, and the mining company may learn from past developments. The identification of stakeholder engagement in the process of planning and implementing closure may help to raise awareness for the chance to mutually develop biodiversity management strategies for the variety of post-mining land use objectives in Lusatia.

1. Methods of Research

Systematic Review: A systematic review is applied to gain an overview of biodiversity management strategies for and stakeholder engagement in open-cast mine closure as well as to identify drivers and barriers of mining companies to employ biodiversity strategies. Systematic review is "a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthesises data, and reports the evidence in such

a way that allows reasonably clear conclusions to be reached about what is and is not known" (Denyer & Tranfield, 2009, p.671). Hence, it is an explanatory method to map and accumulate existing knowledge in a specific field and to identify knowledge gaps (Kunisch et al., 2018; Tranfield et al., 2003). Compared to a traditional narrative review, a systematic review is regarded as a transparent and replicable procedure that minimises bias by the researcher and, therefore, results in high-quality evidence (Denyer & Tranfield, 2009; Tranfield et al., 2003). For this study, systematic review allows to map and discuss existing knowledge of biodiversity management and mine closure. Furthermore, knowledge gaps in this field can be identified. In the following, the planned procedure, in accordance with Denyer & Tranfield (2009), is described.

Figure II: Systematic Review Process



Source: Own figure in accordance with Denyer & Tranfield, 2009.

(1) Formulating the research questions: The first step is to define the research questions as discussed above.

(2) Locating literature: In the second step material is collected. This requires the definition of search criteria and the selection of databases.

Search criteria: The keywords are derived from the guidelines for mining and biodiversity by the ICMM and the Biodiversity Consultancy (ICMM, 2006; Ekstrom et al., 2015). Furthermore, keywords are discussed within scholarly peer meetings. For the search, combinations of the following keywords are applied: 'biodiversity management', 'stakeholder engagement', 'stakeholder involvement', 'coal min*', 'lignite min*', 'open-cast min*', 'post-mining land use', 'post-closure land use', 'post-mining area', 'recultivation', 'restoration', 'rehabilitation', 'Lusatia'. Keywords are used in English and German.

Databases: Several databases are used to determine and include a wide range of literature and to gain valid results: EBSCO Business Source Complete covers almost 2,000 peer-reviewed management journals; ECONIS includes more than 1,700 leading international economic journals; Emerald Insight covers around 300 management journals; Web of

Science counts more than 17,000 journals in various research fields; Google Scholar is used to identify 'grey literature' related to the topic (Dienes et al., 2016).

A systematic review can go beyond searching databases and using peer-reviewed articles. Books, conference papers, discussion papers, workshop reports, and further so-called 'grey literature' can play a significant role (Denyer & Tranfield, 2009; Tranfield et al., 2003). Regarding this topic, answering the research questions and finding appropriate literature for the case study, these sources have to be considered. Biodiversity management strategies for mining companies may not only be discussed in peer-reviewed journals. Especially information on adopted biodiversity management strategies in Lusatia is expected to be found in 'grey literature'. This selected databases, on the one hand, enables to identify relevant journals in the environmental management discipline by using EBSCO, ECONIS, and Emerald Insight. On the other hand, using Web of Science and Google Scholar ensures a wide selection of literature (Dienes et al., 2016).

(3) Selecting and evaluating literature: In the first step, identified publications are screened for the search criteria in title, topic, abstract, and keywords. Available literature that serves the research questions and the case study and provides a management perspective is included for further screening. Reversely, literature lacking a management perspective, e.g. publications with a natural science perspective, is excluded. Furthermore, duplicates occurring due to the use of several databases are eliminated. In the second step, full-text screening is applied and the remaining literature is selected by including and excluding criteria.

(4) Analysing and synthesising results: Firstly, a data extraction sheet is created to collect relevant information from the included literature. The purpose of this sheet is to structure the systematic review, promote transparency, and reduce bias (Denyer & Tranfield, 2009; Tranfield et al., 2003). The data extraction sheet contains the following information: (a) bibliographic data: author, title, year of publication, journal, language, country; (b) methodological data: research design, sample, data collection method, data analysis method; (c) thematic topic of study and key findings. Secondly, data is analysed in two ways. A descriptive analysis is conducted to illustrate key categories, using information from the extraction sheet. A thematic analysis is carried out to map and connect central findings of the literature analysis.

(5) Reporting and discussing results: In the final step, findings are discussed with regards to the research questions and the lack of information is highlighted. In addition, implications for companies and political decision-makers are derived from the results. Moreover, reliability, generalisability, and validity are discussed, limitations of the research approach are considered and future research potential is suggested.

Case Study: Using Lusatia as a case study, this research shows how outcome of the systematic review is put into practice. The focus of the case study is on the practical implementation of open-cast mine closure and post-mining land use in Lusatia, starting from the German reunification until recent years. Therefore, literature identified by the systematic review applying the keyword 'Lusatia' is used for this case study. Moreover, additional internet sources, such as the websites of the two companies in charge of open-cast mine restoration in Lusatia and of involved stakeholders are analysed.

2. Results of the Research

Results of the systematic review will be presented in two ways: a descriptive analysis is conducted to illustrate key categories, a thematic analysis is carried out to map and connect central findings of the literature analysis. Regarding the presentation of the case study results, no information can be delivered at this stage of the research process.

3. Discussion

Findings will be discussed with regards to the research questions, and the lack of information will be highlighted. Furthermore, practical implementation with regards to the case study will be discussed. In addition, implications for companies and its stakeholders will be derived from the results. Moreover, reliability, generalisability, and validity are discussed, limitations of the research approach are considered and future research potential is suggested.

Conclusion

The end of coal power generation by 2038 in Germany spotlights the topic of open-cast mine closure and post-closure land use. Biodiversity management that play a major role in this transformation process is often neglected. This research contributes to the topic of biodiversity management in the closure process of open-cast mines. The scientific community, mining companies, regional planners, political desicion-makers, and NGOs may benifit from the this research.

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Pavel Hrdlička

Czech University of Life Sciences Prague, Faculty of Economics and Management,
Department of Economic Theories
Kamýcká 129, 165 00 Praha – Suchdol, Czech Republic
email: hrdlicka@pef.czu.cz

Determining the Economic Impact of a Specific Geocaching Form of Tourism for a Given Area

Abstract

This paper aims to determine the economic impact of geocaching tourism for a specific geographically defined area. Geocaching is a specific form of tourism. The basic premise of geocaching is to search for hidden geocaches (containers) located in publicly accessible areas using geolocation devices and to publish a log in an online logbook for each geocache found. The paper uses these logs to conduct quantitative research for game participants in a given geographical area, creating an accurate map of how game participants spend time with respect to their expenses related to participation in the game. It determines the exact expenses of tourism participants arising in connection with their participation in a geocaching game in a given area. Expenses that are identified in this way represent the direct economic impact for the given area arising from the geocaching game. This paper also determines the magnitude of multiplier effects of the realized expenditures of participants in a geocaching game using the method of symmetric input-output tables (SIOT) and data from the Czech Statistical Office for individual sectors affected by the expenditures. The paper uses the values of the multiplier effect to determine the value of the indirect economic impact resulting from the economic activity of related sectors. It determines the total economic impact for a given area as the sum of direct and indirect economic impacts. Economic impacts are recalculated for a period of one calendar year. As a result, the direct, indirect and total economic impact of the geocaches placed in the given area during the current calendar year are determined. The paper concludes with recommendations for areas with a low level of involvement in tourism.

Key Words

economic benefit, economic effect, geocaching, multiplying effect, tourism

JEL Classification: Z30, Z32, O33

Introduction

Geocaching is a social game that combines the use of global satellite positioning systems, Internet technologies, and mobile geolocation devices (Dyer, 2004). The premise of this game is to find containers (geocaches) hidden in publicly accessible spaces. There are many types of geocaches, but this article deals only with the "traditional type of geocaches". Geocache logbooks are published on Geocaching.com (and other websites, but this paper only deals with this game system). The geocache name, description, properties, exact geolocation coordinates, clues for finding the geocache and the log made by the participants who found the geocache are published for each geocache (Lunsford, 2019). There are three basic types of participants in the game: the founder of the geocache, who creates a geocache under the conditions set by the game and publishes the

documentation for this geocache on Geocaching.com. The second role is the role of administrator, who checks whether the placed geocache meets all the rules of the game. If all game rules are followed, the geocache is published in the list of active geocaches on Geocaching.com. The last role is for game participants who actively search for these geocaches and, if found, they publish their username, the date and time of finding the geocache, and any comments on the process of finding the geocache in the logbook of geocache finders (Cameron, 2004). With the established method, the author of the paper determines the economic benefit, including the multiplier macroeconomic impact of this specific form of tourism motivated by an active search for these geocaches.

The United Nations World Tourism Organization (UNWTO) defines tourism as a way of spending free time and making business trips away from the place of the traveller's usual residence and travelling for any reason other than following an occupation remunerated from within the country visited for a period not exceeding one year. Travellers engaging in tourism transfer part of their income generated in their occupation to the places visited (UNWTO, 1994). It is a redistribution of income to industries with the characteristic activities of tourism, typically to accommodation services, catering and restaurant services, leisure activities and others. Organisation de Coopération et de Développement Economiques (OECD) defines this redistribution as tourism expenditure. This is the total cost of purchasing consumer goods and services expended by a visitor or on behalf of a visitor during his/her trip and stay at the destination of the trip, regardless of when the payment is made. (OECD 1998).

Tourism expenditures are part of the national economy and create the economic impact of tourism (Palátková, 2011-a). The economic impact of tourism can be divided into direct economic impact and indirect economic impact. Direct economic impact is created by direct economic contact between people engaging in tourism and tourism service providers. Indirect economic impact represent economic activity in all related sectors of the economy. It arises from customer-supplier relationships, where on the customer's side, there is an entity directly involved in the tourism sector and, on the supplier's side, there is an entity producing goods or services used directly by the entity involved with tourists. The sum of direct and indirect effects is the tourism expenditure (Palátková, 2011-b).

The more money coming primarily from tourists changes hands and is repeatedly spent, the greater the resulting size of the production of goods and services. Tourism expenditures generate revenues for secondary, tertiary and other related sectors in a given region and create a multiplier effect of primary tourism expenditures (Sládek, 2000).

The aim of this paper is to identify the overall economic impact (the sum of the direct and indirect economic impacts) of a specific form of tourism (geocaching tourism) for a defined area over a defined time period. The defined time period is one calendar year. The defined wider area is the town of Sušice. Sušice is the second largest town in the Klatovy district (Pilsen region). The city is especially valuable for the preserved historic square. There are several tourist destinations in the area, for example the largest castle ruin in Bohemia Rabí, castle ruin Kašperk, lookout tower Sedlo, lookout tower Svatobor. The town of Sušice is a frequent starting point for canoeing down the Otava River.

1. Methods of Research

The premise of the game is to find geocaches and log them in the logbook of the given geocache. This logbook is publicly available, and the date on which the geocache is found and the username of the participant are displayed. The game participant can be contacted via an internal message from the Geocaching.com portal or via an email message. Every participant who found a traditional geocache in the cadastre of the town of Sušice in the period from 01.06.2019 to 31.03.2020 was asked to participate in quantitative research through a message in the Geocaching.com portal, and if the participant did not respond to this message within 20 consecutive calendar days, then he/she was contacted by e-mail. The aim of the quantitative research is to accurately identify the total expenditure associated with tourism for the primary purpose of searching for geocaches.

The expenditure of tourists for the primary purpose of searching for geocaches in a specified area for a specified period of time **(EG)** is determined by the qualitative research. If the geocaching was associated with tourism to a given area (the logs of local residents not engaged in tourism are included) and, at the same time, it was the main reason for tourism in the given area, the person was included in the research. Persons for whom geocaching was not the primary reason for engaging in tourism are not included. If a group of people (people in a partnership or family relationship, close friends, etc.) participates in the game, usually only one log is made in the logbook. Within the quantitative research, the number of persons for each unique log was ascertained (see Tab. 1) to determine the correct item price and the total expenditure for the group. Groups usually find multiple monitored geocaches and log information about each geocache found. The widest identified time span for logs for a single username was 5 consecutive calendar days. Duplicate logs were filtered out, and game participants were included in the quantitative research only once.

As part of the quantitative research, the way in which people who engaged in geocaching tourism spend their time was mapped. It was determined how these people spent their time. A map of activities was created for each participating group with a quantitative research tool. The value of expenditures in CZK was determined for each activity related to expenditures (see Table 1). The questionnaire tool listed all the possible ways one can spend time that are associated with generating expenditures in an azimuth of 15 km from the centre of Sušice. In the part on accommodation, hospitality and restaurant activities, culture, and monuments, the questionnaire tool contained a precise definition of the places visited with a basic structure of options for how time was spent, and in the area of stores, it was only possible to characterize the categories of the purchased assortment. Local public transport was included in the transport options. The subject of the questionnaire survey could complete each category with options not specified by the tool. The value of expenditures for each activity was determined on the basis of the price currently offered (see Table 1). In the case of restaurant catering, the usual combination of products was chosen for the offer price on the basis of a method of expert estimation. In the category accommodation and in the category sports activities (public swimming pool, rope park, scooter rental, lookout towers, winter lift and so on) the diferent price of the seasonal entrance fee was taken into account when calculating the expenses. Child participants were also taken into account when calculating the expenses.

Tab. 1: Example of the identified expenditures of one group of people

Type	Description	Persons within the group	Item price CZK	Number of occurrences	Realized expenditure for the group CZK (XG)
Accommodation	Guesthouse U Jezu	2	300*	3	1,800
Food and beverages	Breakfast – superret	2	76	2	304
Food and beverages	Lunch – fastfood Občersvení MC Vítek	2	142	2	568
Food and beverages	Dinner – restaurant Hostinec Vystřelený Vočko	2	175	1	350
Food and beverages	Dinner – brewery Pivovar u Švelchů	2	225	1	450
Food and beverages	Foodstuffs - supermarket	2	39	2	156
Food and beverages	Coffee house Café ĽAmour	2	79	1	158
Consumer goods	Tourist stamp – visitor centre Sušice	1**	30	1	30
Experiences	Castle Kašperk	2	125	1	250
Experiences	Castle Rábí	2	120	1	240
Travel costs	Castle Kašperk parking	1**	40	1	40
Consumer goods	Castle Kašperk tourist stamp	1**	40	1	40
Consumer goods	Hrad Rabí tourist stamp	1**	40	1	40
Food and beverages	Snacks, ice cream, drinks	2	60	2	120

** double room, price per room 600 CZK ** common item for the group Source: authors' calculations*

Comment on Tab 1: a group consisting of two people, accommodated in the town of Sušice for 3 nights, without boarding. The price of accommodation is identified by the price list of the landlord for 3 nights, including all additional fees. In the questionnaire tool, breakfast is chosen in the large variant and repeated in the same type of shop. Lunch is chosen repeatedly in a local fast food establishment, and the price is for regular food (including drinks). At a dinner in the village of Rabí (beer garden Hostinec Vystřelený Vočko), a non-alcoholic beverage was calculated, and at a dinner in the town of Sušiče (brewery Pivovar u Švelchů), a local beer was calculated. Supermarket groceries were calculated according to the questionnaire - a small snack and bottled water. A cafe was calculated according to the questionnaire options coffee and coffee with dessert. Entrance fees and tourist stamps were calculated according to the price lists valid at the time of the visit. The snacks item includes snacks and beverages purchased during the stay, such as ice cream. Parking was calculated according to a parking price list.

The total number of unique usernames in the defined time period, the defined area, and for the given types of geocaches **(TGU)** was 1,232. The total number of groups active in the quantitative research **(TGR)** was 876. The coefficient of the share of players not involved in the quantitative research **(NR)** is

$$NR = 1 - \frac{TGR}{TGU} \quad (1)$$

The coefficient of players not involved in the quantitative research is 0.29 (29 %).

The total number of tourist groups engaged in tourism for the primary purpose of searching for geocaches in the monitored period and in the designated area and active in the qualitative survey was 94 (representatives of 94 groups of people in the qualitative survey stated that geocaching was the primary reason to visit defined area, the research was conducted from June 1, 2019 to March 31, 2020). The sum of expenditures of these 94 groups was arranged according to the categories of symmetric input-output tables (SIOT) of the Czech Statistical Office (see Tab. 2). The SIOTs contain 82 monitored sectors, and all the identified research expenditures belonged to the following sectors:

1. Accommodation
2. Catering and hospitality
3. Wholesale and retail trade, with the exception of motor vehicles
4. Sports, entertainment and recreational activities
5. Land and pipeline transport

The amount of identified expenses **(TIE)** was increased to include expenses of groups playing the game that did not participate in the quantitative research. The total expenditures of people engaged in tourism for the primary purpose of searching for geocaches in the given area for the monitored time period were obtained. **(EG)**

$$EG = TIE * (1 + NR) \quad (2)$$

Tab. 2: The expenditures of people engaged in tourism for the primary purpose of searching for geocaches in the given area for the monitored time period

Category	**Total identified expenses CZK**	**Total expenses for the category CZK**
Accommodation	74,880	96,595
Catering and hospitality	62,112	80,124
Wholesale and retail trade, with the exception of motor vehicles	5,793	7,473
Sports, entertainment and recreational activities	23, 860	30,779
Land and pipeline transport	7,680	9,907
Total expenses CZK	174,325	**224,878**

Source: authors' calculations

The calculation of the multiplication effect is realized by means of symmetric input-output tables (SIOT) of the Czech Statistical Office and a table of the type sector x sector for 82 monitored sectors. This table characterizes the overall performance of the economy in individual sectors. The data are compiled in the interval of 5 years at the latest. The data of the Czech Statistical Office for individual sectors form the matrix of intermediate consumption. The intermediate consumption matrix is normalized according to columns by the share of the value of intermediate consumption in the intermediate consumption matrix by the value of production of the given sector

$$k_{ij} = \frac{z_{ij}}{x_j} \quad (3)$$

where the result is a matrix of input coefficients K with the dimensions 82 x 82

$$K = \begin{bmatrix} k_{11} & k_{12} & \dots & k_{1n} \\ k_{21} & k_{22} & \dots & k_{2n} \\ \dots & \dots & \dots & \dots \\ k_{n1} & k_{n2} & \dots & k_{nn} \end{bmatrix}$$

a Leontief Inverse Matrix is created from this matrix by subtracting matrix K from unit matrix I and creating an inverse matrix

$$L = (L - K)^{-1} \tag{4}$$

multiplier effect of the given sector **(ME_S)** represents the ratio between the indirect effects of the sector and the sum of direct effects of the sector **(D_{ES})** and indirect effects of the sector **(I_{ES})** (Heilburn, 2001).

$$ME_S = \frac{D_{ES}}{I_{ES}} \tag{5}$$

The multiplier effect expresses how much of the total economic impact will be created by one monetary unit of expenditure (Adkins, 2020). The amount of related expenditures for individual sectors is shown in Table 2 (see Table 2). The expenditures represent the direct impact of the sector **(DI_S)** (Palátková, 2011-b). The indirect impact of the sector **(II_S)** is defined as

$$II_S = DI_S * ME_S - DI_S \tag{6}$$

the total economic impact of the sector **(TEI_S)** is the sum of direct and indirect impacts.

$$TEI_S = DI_S + II_S \tag{7}$$

the total economic impact **(TEI)** is the sum of the total economic impacts of the individual sectors **(TEI_S)**.

$$TEI = \sum_{i=1}^{n} TEI_S \tag{8}$$

Tab. 3: the total economic impacts of people engaged in tourism for the primary purpose of searching for geocaches in the given area for the monitored time period

Category	Direct effect CZK	Multiplier effect	Indirect effect CZK	Total effect CZK
Accommodation	96,595	1.22	21,251	117,846
Catering and hospitality	80,124	1.36	28,845	108,969
Wholesale and retail trade, with the exception of motor vehicles	7,473	7.76	50,517	57,990
Sports, entertainment and recreational activities	30,779	1.1	3,078	33,857
Land and pipeline transport	9,907	3.13	21,102	31,009
The total value of the economic effect CZK	224,878		124,793	**349,671**

Source: authors' calculations

The total economic impact (see Tab. 3) is related to the monitored period. The quantitative research was started on 1 June 2019. Due to the restrictions resulting from the Covid-19 pandemic, the research was terminated on 31 March 2020. The total number of research days **(RD)** was 304. The total economic impact of the monitored period is recalculated to the total economic impact for the calendar year **(TEI_Y)**

$$TEI_Y = \frac{TEI}{RD} * 365 \quad (9)$$

$$\boldsymbol{TEI_Y = 419,835\ CZK}$$

2. Results of the Research

The total economic impact of geocaching tourism for the wider area of the town of Sušice for the period of 1 calendar year is **CZK 419,835** (see Tab. 4). Of this, CZK 224,878 represents the direct economic impact in CZK (see Table 4), i.e. the expenditures of persons engaged in tourism for the defined reason. The amount of CZK 124,793 represents the indirect impact (see Tab. 4), i.e. the multiplied economic impact of related sectors of the economy.

Tab. 4: the total economic impacts of people engaged in tourism for the primary purpose of searching for geocaches in the given area for the period of 1 calender year

Category	Direct effect CZK	Indirect effect CZK	Total effect CZK
Accommodation	115,978	25,515	141,493
Catering and hospitality	96,202	34,633	130,834
Wholesale and retail trade, with the exception of motor vehicles	8,973	60,654	69,627
Sports, entertainment and recreational activities	36,955	3,696	40,651
Land and pipeline transport	11,895	25,336	37,231
The total value of the economic effect CZK	**270,002**	**149,833**	**419,835**

Source: authors' calculations

3. Discussion

There are several approaches to estimating the economic benefits of tourism. Stynes defines 4 basic methods for estimating the economic benefits of tourism according to the degree of accuracy of the obtained results, ranked from the least accurate method to the most accurate method.

Tab. 5: Approaches to estimating the economic impact of tourism

Method name	Determining the number of tourism entities	Determining the expenditures of tourism entities	Determining the multiplication effects
Expert estimate	Expert estimate	Expert estimate	Expert estimate
Aggregated secondary data method	Existing summary statistics for the given	Data taken from existing studies of the same market or a comparable market	Data taken from existing studies for the same

	area or a comparable area		market or a comparable market
Specific secondary data method	Existing specific statistics for the given area or a comparable area	Data taken from existing studies for individual categories of expenditures and the segment of the tourism entities	Sector multipliers
Primary data method	Our own survey of the number and segment of tourism entities	Our own findings according to the categories of expenditures and the segment of tourism entities	Input-Output model

Source: Stynes, 1997

According to Steynes, the author chose the most accurate method of estimating the economic impact of tourism. Another possible approach to determining the multiplier effect is ad hoc models based on the Keynesian approach. They are used in particular in situations where the author's detailed input-output analysis is too demanding to implement (Vanhove, 2005). Another approach is to use tourism satellite accounts. It is a comprehensive tool for measuring the impact of tourism on the local, regional or national economy. By comparing the basic macroeconomic indicators of the tourism economy against the overall indicators, it determines the weight of tourism for a given economy (Oxford Economics, 2020). Vučetić divides tourism into several categories. They are primarily divided into domestic and foreign tourism. Domestic tourism is created by people travelling only within the territory of the state in which they have citizenship. The opposite is foreign tourism, where the people engaged in tourism cross the borders of their home state (Vučetić, 2021). All the people in the quantitative research were engaged in domestic tourism.

Conclusion

It was found that the placed geocaches are a source of incoming tourism to the area. This incoming tourism has economic impacts in the given area. For an area with a low penetration of tourist attractions, the location of geocaches can be an important motive for the influx of tourists and the revival of tourism. The research has shown that in the area around the town of Sušice with a number of important tourist destinations, the existing geocaches bring an additional source of tourism for traditional tourist destinations. The mutual synergistic effect between geocaching and traditional tourist destinations is evident. Thanks to the mutual synergy, the placement of new geocaches in less attractive tourist areas can lead to the construction of a tourist infrastructure and tourist attractions and a consequent increase in the attractiveness of a given area for participation in tourism. An important role in strengthening inbound tourism for such areas can be played by the fact that it is mainly domestic tourists who engage in geocaching tourism. Due to their geographical proximity, it is easy for them to travel to local alternatives to mainstream tourist destinations. This fact is also gaining significance in connection with the restrictions on cross-border travel due to the Covid-19 pandemic.

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Mohsin Javed, Zuzana Tučková, Zuhair Abbas, Muhammad Shoaib
Tomas Bata University in Zlin, Faculty of Management and Economics, Department of Business Administration
Mostní 5139, 76001 Zlín, Czech Republic
email: javed@utb.cz, tuckova@utb.cz, abbas@utb.cz, shoaib@utb.cz

Digital Technologies and Sustainable Development of Tourism: A Systematic Literature Review and Future Research Agenda

Abstract
This study aims to explore the role of digital technologies in the sustainable development of tourism through a systematic literature review. Due to the dearth of literature on the issue, this systematic literature review attempts to highlight the current state of knowledge on the topic using ATLAS.ti 9.1. qualitative data analysis software, along with future research agenda to foster knowledge development. Firstly, the systematic literature review identified through work cloud that tourism, sustainability, digital technology, information, and development are the quite frequently used words in the literature. Secondly, the developed framework of digital technologies and sustainable development of tourism is based on the identified codes, provides an avenue to carry out an empirical study. Thirdly, the future research direction based on the identified gaps is of great worth to work on many important issues related to the theme for giving strong theoretical contributions by future researchers along with significant implications for policymakers, tourist practitioners, and relevant stakeholders. The end part of the article also discusses the limitation of the study.

Key Words
Digital technologies, Sustainable development, Tourism sector, Systematic literature review, Future research agenda

JEL Classification: Z1, Z3

Introduction

Digital technologies and ICT innovations have impacted the business models and sustainable development, and altered the consumers' behavior and their psychology in an unprecedented way (Zuboff, 2019; Cusumano et al., 2019; Turkle, 2016). At the same time, such behavioral, psychological, economic, and environmental impacts of digital technologies are widespread and complex (Gossling, 2021). The digitalization and initiatives in the ICT have impacted almost all the fields of life and changed the way of doing business, communication, and collaboration amongst different stakeholders.

The use of digital technologies in the tourism industry has also increased much, especially in information dissemination and digital facilitation. The enormous digitalization has created facilitation in the search of destinations, obtaining information about cheap and

comfortable flights as well as accommodation options. The important aspect of digital technologies is the convenience and comfort to search for desired destinations by using the internet and smartphones. Hence, the use of such technologies is very important for tourism in the contemporary era as such digital technologies help to achieve sustainable development and competitiveness (Rantala et al., 2018).

The scenario of increased digitalization in the tourism industry demands stakeholders to fully exploit these platforms to entice more tourists as well as stay competitive in the industry. At the company level, the reluctance to adopt such digital innovations has serious disadvantages (Eller et al., 2020). Importantly, the tourist centers and destination management companies provide all detailed information along with multiple options within a single package. In light of this, it can be rightly argued that tourists, especially millennials have full access to such information through excellent apps and mobile-friendly websites (Javed et al., 2020).

The impacts of such digitalization are considerable for society, human well-being, economic growth, and sustainable development (Anaddon et al., 2016; Shrivastava et al., 2016). Moreover, the adoption of digital technologies also helps to enhance competitiveness (Jun, 2018). Several authors asserted to consider the technological aspect of sustainability in general and particularly in the context of tourism (Rantala et al., 2018; Javed, 2020; Ali & Frew, 2013). Therefore, the technological aspect of sustainability should be considered in the tourism industry due to its impact on sustainable growth and development.

Despite such significant importance the studies are lacking discussing the role of digital technologies in the sustainable development of tourism. Precisely, the new cutting edge technologies and digital tools have played the role to shape this technological paradigm; thus created opportunities at the multistakeholder level (Serravalle et al., 2019). Therefore, it deems necessary to investigate the theme of digital technologies in the tourism industry and their key role in the sustainable development of tourism. In light of this, the present study conducts a systematic literature review to have a look at the existing state of knowledge and formulate a future research agenda.

In light of the aforementioned gaps, this study attempts to address the following research questions.

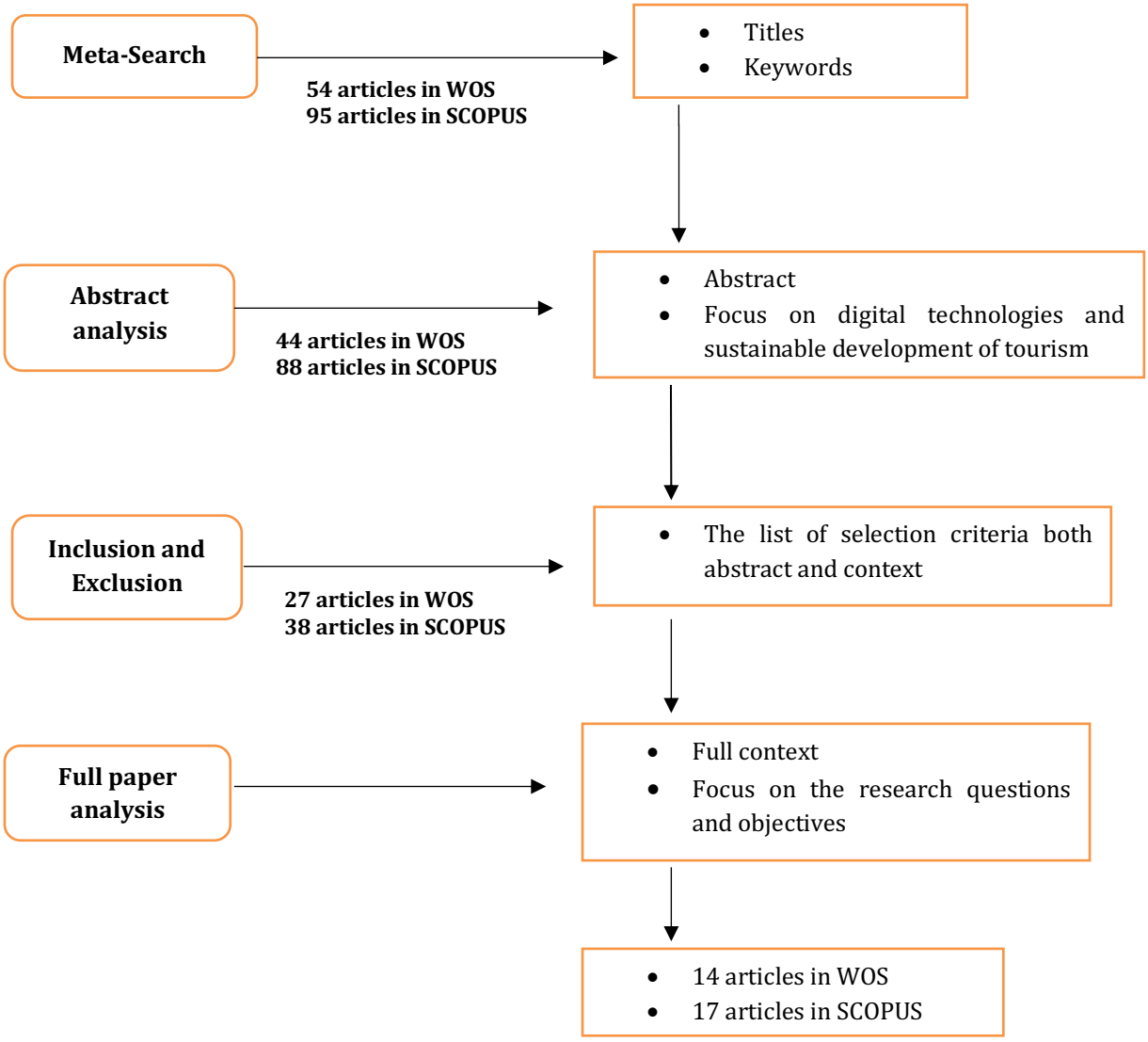
1) What are the relationships between digital technologies and the sustainable development of tourism?
2) What will be the future research agenda related to digital technologies and sustainable development of tourism to policymakers, scholars, and tourism experts?

1. Methods of Research

This study is based on the systematic literature review with the help of preferred reporting items for systematic literature reviews (Moher et al., 2009). This study employed ATLAS 9.1. for qualitative data analysis. This software provides robust findings

and to contribute methodological gap, which is lacking in the previous studies. The main steps used for the PRISMA framework are defined below.

Fig. 1: Systematic Literature Review by PRISMA



Source: authors' own from the previous literature

a) Inclusion Criteria:

This study comprised only peer-reviewed journal articles. The relationality of including journal articles is due to novelty as a significant source (Ngai, 2008). This criterion included papers until the year 2020 by including only articles and hospitality, leisure sports tourism. Further, it included articles only published in the English language.

b) Search Strategy:

The study included the search terms "digital technologies", "sustainable development" and "tourism". The search strategy included two renowned databases, i.e., Scopus and Web of Science. Then, following search strings employed in Scopus and Web of Science- TITLE-ABS-KEY ("digital technologies", and "sustainable development", and "Tourism" AND (PUBYEAR, "<2021") AND (LIMIT-TO (DOCTYPE, "articles")). AND (LIMIT TO

(LANGUAGE, "English")) AND (LIMIT-TO (SRCTYPE, "journals")) AND (LIMIT-TO (CATE, "hospitality, leisure, sports tourism".

c) Study Selection:

The selected studies are from two phases. During the first stage, the securitizing of articles was based on their titles and abstracts to keep them relevant. After selecting articles in the stage, we read them in detail keeping in view the eligibility criteria. We found 54 articles in Web of Science and 95 articles in the Scopus database by using the search string mentioned earlier. We have selected 14 articles from the Web of Science and 17 articles from the Scopus database after constructively reviewing the relevant articles matched with the emerging phenomenon of digital technologies and sustainable development of tourism.

2. Results of the Research

The results of the study are providing interesting insights. Based on the selected articles, as mentioned through the PRISMA framework, the authors further analyzed by using ATLAS software 9.1 to get insights through word cloud, proposed frameworks, and the future research agenda. The figure 2 below is the word cloud about sustainable technologies and sustainable development of tourism through the extraction of ATLAS 9.1. According to the figure, mostly occurring words were identified through the selected studies. In this vein, the word 'tourism', 'pron', 'sustainability', 'digital', 'technology, 'information', and 'development' are found to be used frequently.

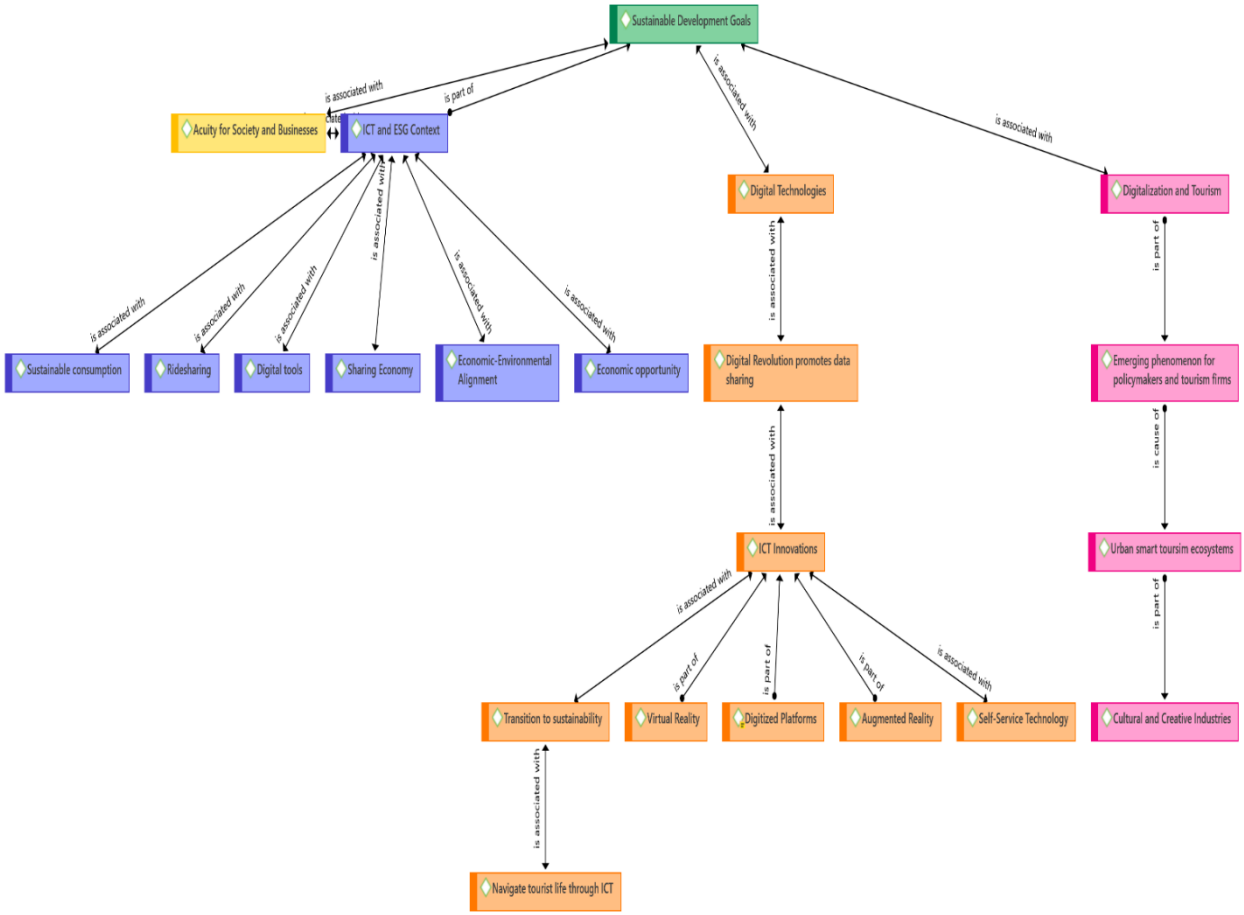
Fig. 2: Word Cloud Sustainable Technologies and Sustainable Development of Tourism

Source: Authors' Extraction from Atlas.ti 9.1

Similarly, figure 3 provides an interesting framework based on the codes identified through the review of the literature in the ATLAS 9.1. According to the framework, the sustainable development goals under the context of sustainable development of tourism,

have associations with digital technologies, digitalization and tourism, ICT and ESG context, and acuity for society and businesses. Importantly, digitalization and tourism are part of emerging phenomenon for policymakers and tourism firms. That considers urban smart tourism ecosystems, as well as cultural and creative industries.

Fig. 2: Framework of Digital technologies and Sustainable Development of Tourism



Source: Author's Extraction from Atlas.ti 9.1

Moreover, digital technologies have an association with the digital revolution promoting data sharing that promotes ICT innovations based on virtual reality, augmented reality, digitized platforms, and self-service technology with the transition to sustainability, which is further associated with the navigation of tourist life through ICT. In addition, the ICT and ESG context came up with association with sustainable consumption, ridesharing, digital tools, sharing economy, economic-environmental alignment along with providing economic opportunities for the local business and community. Apart from this, the gaps identified through extensive literature review also provide opportunities for future research and policymakers to proceed with the debate in the context of digital technologies and sustainable development of tourism.

3. Discussion and Conclusion

The main purpose of this study was to highlight the present state of research on digital technologies and the sustainable development of tourism through a systematic literature review. The frequently used words 'tourism', 'pron', 'sustainability', 'digital', 'technology, 'information', and 'development' are quite noticeable in the studies of De Las Heras et al. (2021), Gossling (2021), Gossling (2020), Foris et al. (2020), Bruno et al. (2020), McNaughton et al., (2020), and Gonzalez-Delgado (2020).

Similarly, the developed framework is quite helpful for understanding the codes developed and analyze the possible association and relations to understand the phenomenon better. Such as developed framework (see Fig. 2), helps the researcher community to understand the important association related to digitalization of tourism, digital technologies, ICT and ESG context and acuity for society and businesses under the vein of so-called sustainable development goals or sustainable development of tourism. Hence, it can be concluded that the present study is helpful to understand the research being carried out on the theme under study, related to digital technologies and sustainable development of tourism.

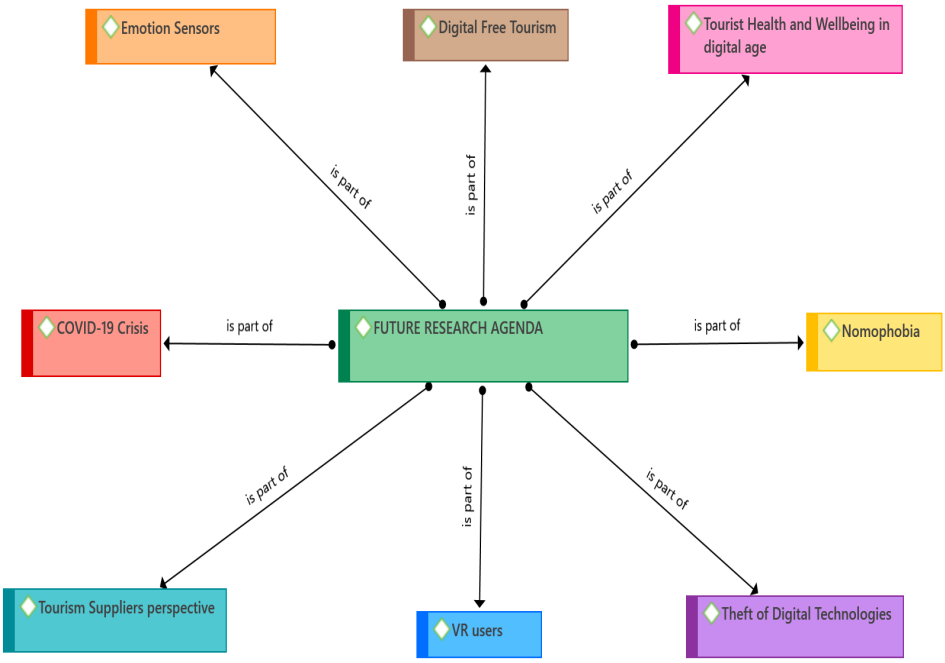
The limitations of the study include the consideration of only journal articles, essays, book chapters, proceedings, and other published sources that have not been considered in the study. Moreover, this study only considered two databases Web of Science (WoS) and SCOPUS, so other databases have not been considered. Further, only literature in the English language has been considered.

Future research agenda

The present study also provides future research agenda to proceed with the debate and explore further interesting relationships on the theme of digital technologies and sustainable development of tourism.

Some interesting areas for future researchers identified through a systematic literature review of great worth exploring. Tourist health and wellbeing in the digital age, digital free tourism, emotion sensors, covid-19 crisis, nomophobia, theft of digital technologies, virtual reality users, and perspective of tourism suppliers perspective can provide important avenues for future research and such exploration will of the great worth of policymakers, tourism practitioners, and relevant stakeholders due to the enhanced focus on the sustainable development of tourism.

Fig. 3: Future Research Agenda



Source: Author's Extraction from Atlas.ti 9.1

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Radka MacGregor Pelikánová & Filip Rubáček

Metropolitan University Prague, Department of International Business
Dubečská 100/90, 100 00 Prague 10, Czech Republic
email: radka.macgregor@mup.cz

Unofficial CSR Reporting by Top Czech Companies – A Website Case Study

Abstract

The thousand year-long evolving public concept of sustainability has been, during the last few decades, synergetically matched by the private concept of corporate social responsibility (CSR). The global endeavors for sustainability typically initiated or orchestrated by the United Nations (UN) have been projected in regional and national policies and laws, which impose on certain businesses a duty to do a specific mandatory CSR reporting and publish it via official reports. However, recently many businesses in the EU have voluntarily moved as well to unofficial CSR reporting via their Websites and have clearly made their CSR proclamations an integral part of their strategies and marketing endeavors. It is highly illustrative to perform a Czech case study of such facultative CSR reporting via their own Internet domains by 20 top Czech companies based on their annual revenues and to identify and assess their preferences regarding sustainability and CSR in general, as well regarding each of the 6 CSR categories. The pool of those 20 companies represents a relevant sample to address three hypotheses. The quantitative frequency calculation of qualified sustainability and CSR key words on their Websites, as projected in comparative charts and, along with glossatory Meta-Analysis, moderates prior propositions about merely passable interest in unofficial CSR reporting (H1), confirms prior findings about a fragmental approach (H2) and strongly rejects the significance of the annual revenues on the unofficial CSR reporting of these Czech top companies (H3). Further, this brings pioneering propositions about both pragmatic and fragmented CSR drives and points to culture differences and the attribution theory.

Key Words

corporate social responsibility, reporting, sustainability, website

JEL Classification: D22, M14, Q56

Introduction

Our postmodern, IS/IT, global society is a society of knowledge (MacGregor Pelikánová et al, 2021) with fierce competition dominated by the search for a competitive advantage (MacGregor Pelikánová, 2019a), which depends more upon specific expertise and knowledge, typically categorized as IP (MacGregor Pelikánová, 2019b) and well advanced in the digital setting, rather than merely upon manufacturing cost differentials in the conventional more tangible setting (Franzoni & Kaushik, 2016). Although the desired result for companies has always been maximizing profits, other demands and desires have emerged. Namely, the biblical concept of sustainability, materialized in a myriad of both Old Testament and New Testament parables, has marked significantly the Roman Empire (MacGregor Pelikánová, 2017) as well as states and cultures that followed. The Hanseatic League strongly contributed to the development of the concept of sustainability

aka *Nachhaltigkeit* and led to the 18th century influential book *Sylvicultura Oeconomica* by the German Colberist - Hans Carl von Carlowitz (MacGregor Pelikánová et al, 2021) and to the 19th century influential book *Einfachste den höchsten Ertrag und die Nachhaltigkeit ganz sicher stellende Forstwirthschafts-Methode* by Emil André, which was initially published in Prague (Balcerzak & MacGregor Pelikánová, 2020). Ultimately, the *Nachhaltigkeit* became linked to the *universal perpetuitas*, i.e. the move from the long-term to the eternal responsibility, and the move from thinking regionally to globally was completed in the 20th century (Schüz, 2012). In 1948, the United Nations ("UN") with its Universal Declaration of Human Rights ("UDHR") pushed the, so far, rather economic concept of sustainability to the modern concept of sustainability based on three pillars: environmental (planet), social (people) and economic (profit) (Krechovská et al, 2019), while focusing on the reconciliation of available resources as an increasing world population emerged (Meadows et al, 1972). The human rights concerns became accompanied by social progressive values in the context of the political awareness under the auspices of "communitarism" (MacGregor Pelikánová et al, 2021). In the 1970s, this was transformed into an individualist focus due to a myriad of world and regional crises and a move from Keynesian economic theory to neoliberal theory (Balcerzak & MacGregor Pelikánová, 2020). In response to it, the UN initiated a set of critical instruments for the modern concept of sustainability, such as (i) 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") and (ii) the Resolution Transforming our world: the 2030 Agenda for Sustainable development ("UN Agenda 2030") – a shared blue-print for peace and prosperity for people and the planet, now and in the future (Taušl Procházková & Machová, 2019). The EU and EU member states have, at least partially, incorporated the 17 Sustainable Development Goals (SDGs) and 169 associated targets of the UN Agenda 2030 into their policies and laws (MacGregor Pelikánová et al, 2021). However, this would be futile without the support of the concept of sustainability by all stakeholders and the employment of a multi-stakeholder model and cross-sector partnership (Van Tulder et al, 2016; Van Tulder & Keen, 2018). This clearly implies the need to induce, or perhaps even order, companies to consider the sustainable needs of the entire society and consequently make them committed to Corporate Social Responsibility („CSR").

Unlike the rather global concept of sustainability with millennial continental law roots, the more national concept of CSR has centennial common law roots (Taušl Procházková & Machová, 2019). CSR emerged towards the end of the 19th century in the US context of deplorable working conditions in industrial production and of the increasing philanthropic move, along with the emergence of the antitrust regulation, see endeavors of the Republican Senator John Sherman and the resulting Sherman Antitrust Act. The milestone in the evolution of CSR was the publication of the landmark book *Social Responsibilities of the Businessman* by Howard R. Bowen in 1953, pointing out that the largest US businesses are centers of power and decision-making and touch the lives of all (Carroll, 2016). This led to the burning question "what responsibilities to society may businessmen reasonably be expected to assume?", which three decades later took on a new dimension due to official recognition of the concept of sustainability on the level of Internal law, see the Brundtland Report 1987. This led to the current two opposing approaches. One keeps endorsing the traditional theory which identifies only the responsibility to maximize profits while acting honestly and in good faith (Theodore Levitt) and leaving social and environmental issues to the state or other institutions, but

not businesses (Milton Friedman). The other one advances the stakeholder theory, pursuant to which CSR leads to a value creation, an improvement of the business' reputation and branding as well as competition success (Gallardo et al, 2019) and ultimately to an increase in market share (Ting et al, 2019). Consequently, some studies suggest that CSR is an area with growing importance closely monitored by the public (Švermová, 2019) and that CSR brings benefits for all stakeholders, enhances financial performance and contributes to sustainability. In contrast to that, other studies are more skeptical, they point to the agency conflicts and tensions between managers, shareholders, environmental activists, etc. (Strouhal et al, 2015) and underline the issue of the possible lack of effectiveness, efficiency and legitimacy regarding resource allocation due to CSR (MacGregor Pelikánová et al, 2021). In short, for some CSR leads to „a more sophisticated form of capitalism" (Porter & Kramer 2011), while for others CSR is a burden and can be contra-productive. However, there is a consensus that the beneficiary effect of CSR activities is excluded without reporting –either via official non-financial reports or via unofficial reports posted on Websites (Krechová et al, 2019).

Both the EU and EU member states use their policies and laws to induce companies to pursue CSR and report about it, but impose only on certain large strategic businesses a minimal official reporting duty and this without a real enforcing mechanism, see EU Directive 2013/34/EU (Art. 19a) and the Czech Accounting Act No. 563/1991 Coll. (Art.18 et foll.) (MacGregor Pelikánová, 2019a). However, besides this (weak) mandatory official CSR reporting duty, companies are free to decide whether they would provide unofficial CSR reports on their own Internet Websites. It is up to each company to decide whether it will do unofficial CSR reporting and, if yes, then what will be included. Recently published studies bring interesting propositions about the unofficial CSR reporting, especially with respect to the largest Czech companies (Krechová et al, 2019; MacGregor Pelikánová, 2019). Indeed, considering the attribution theory and other means to assess the evolving intent and commitment of companies, as well as the flexibility of the unofficial reporting, Websites represent a very interesting platform for the study of the development of CSR preferences and this especially via a case study of a sufficiently representative and significant pool of companies from one jurisdiction.

1. Methods of Research

There are two pathways for CSR reporting – via official CSR reporting, aka non-financial reporting included either as a part of management reports included in annual reports or as a separate special sustainability reports or CSR reports and (ii) via unofficial reporting represented by a posting on the Internet Website of companies. Since the creation and updating of unofficial reporting is flexible and not regulated by the law, it is a vehicle par excellence for companies to be or not be used. It is an intrinsical instrument reflecting the free consideration of companies and thus a perfect platform for a holistic and empirical exploration and Meta-Analysis of the CSR from the inside perspective. The format of a case study and content analysis of these Websites has been successfully used in this respect (Vourvachis & Woodward, 2015), e.g. regarding top Czech companies, and has already brought forth a set of relevant propositions (Krechová et al, 2019; MacGregor Pelikánová, 2019). The following three hypotheses could be implied from them concerning top Czech companies and perhaps even other companies from Czech or other jurisdictions:

H1 Companies have a merely passable interest in unofficial CSR reporting.
H2 Commitment to the sustainability, CSR and CSR categories differs.
H3 The amount of the annual revenues positively impacts the unofficial CSR reporting.

The cluster composed of the Czech companies with the highest annual revenues has been successfully used repeatedly because it heterogeneously covers a myriad of industries and at the same time is size-wise and jurisdictionally homogenous. Namely, it includes large companies from various industries and covered by the same legal regime, including the duty to do official reporting. The format of the case is appropriate for such an exploration, the quantity of 20 is at least partially able to lead to more than random results, and the choice of the highest annual revenues for 2019 (1st place, Škoda, reaches 459 billion, while the 20th, Inventec, reaches 22 billion) leads to the currency of the study of leaders in various Czech industries. As a matter of fact, the cluster includes companies which (i) upon their annual revenues ranked in 2019 between the 37 Czech companies with the largest annual revenues and (ii) have an English version of their Website, allowing for exploration, on 15th March, 2021. The necessity to exclude companies not having a Website in English is due to the command of the comparative content text analysis using well-established 8 CSR key words (Vourvachis & Woodward, 2015). The two general CSR key words are obviously „sustainability" and „CSR" and the six special CSR key words matching 6 CSR categories: „environment protection", „employee matters", „social", „human rights", „anti-corruption" and „R&D" (MacGregor Pelikánová, 2019a). The first 5 CSR categories are implied by the EU legislation and the last, the 6th, is implied by the inevitable demand for innovations and digitalization (MacGregor Pelikánová, 2019, Rydavalová & Žižka, 2014).

Reports and statements about the CSR, regardless whether official or unofficial, are predominantly explored and assessed by quantitative methods employing the automatic scanning of CSR key words and calculating the number of times a selected CSR key word occurs. Hence, in the given source is calculated the total number of the appearances of such a word, i.e. its absolute frequency (frq), is the method par excellence. This methodologic strategy is convenient and perceived as objective, but it can be as well formalistic, superficial and apt to lead to misleading results. This can be partially offset by considering the ratio between the total number of the appearances of pre-set key words in the given source and the total number of all words included in the given source (aw) – formula: ration = frq / aw. Another way for improving the academic robustness of the frq indicator is the complementary engagement with qualitative methods, such as Delphi (Okoli & Pawlowski, 2004). Both the rather quantitative automatic scanning (frq, ratio) and the rather qualitative reading (Delphi method with a scoring by a panel) can lead to binary data allowing for the logistic regression (Sobol method/indexes) and to more variable data allowing the analysis of variance ANOVA and the Latent Dirichlet Allocation ("LDA"), i.e. a generative statistical model linked to the machine learning toolbox and to the artificial intelligence toolbox could be employed. Certainly, as well, indexes, such as CSRHub/ESG Index, can be brought into play. In sum, the case study entailing unofficial CSR reports of the 20 top Czech companies can entail various methods. Considering the character and typology of Websites, the obvious choice is to focus only on the text, i.e. to restrict the advanced content analysis to the written part of Websites while avoiding pictures and graphic effects, to critically compare visualizations focusing on CSR categories v. companies and to at least partially employ the Meta-Analysis which truly

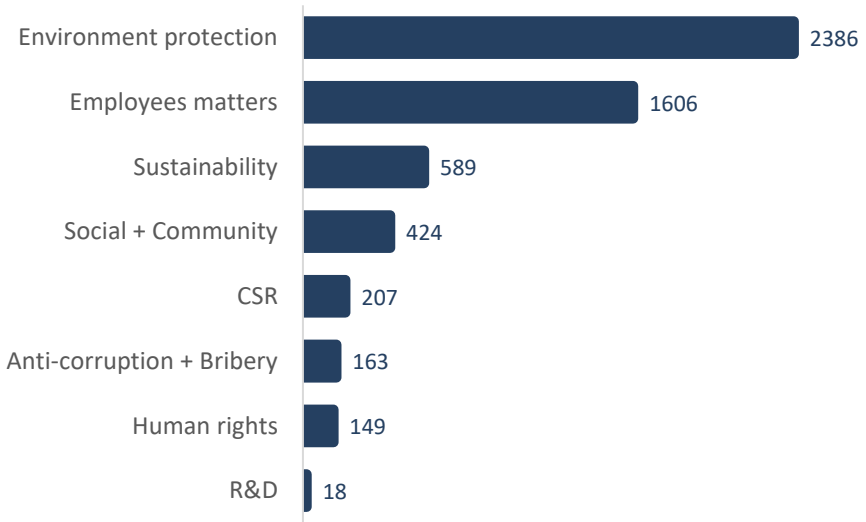
proves that here we know and have more information then what we initially believed (Silverman, 2013).

The cluster composed of the top Czech companies composed of 20 companies belonging to the pool of the 37 Czech Companies with the highest annual revenue and, at the same time, having Websites in English, allows for the advanced content analysis using frq as of 15th March 2021 and comparing data while using visualization of two perspectives – the view of each CSR category by all companies and the view of all CSR categories by each company. This juxtaposition along with fresh glossing opens via the Meta-Analysis the pathway to address all three hypotheses – do we have a merely passable interest in unofficial CSR reporting (H1), differences in the popularity and commitment to various CSR categories (H2) and a positive impact of the amount of annual revenue on unofficial CSR reporting (H3)?

2. Results of the Research

The Websites of the 20 top Czech companies were identified and the frq of the CSR key words was calculated in order to figure out how frequently these companies mention the general sustainability and CSR and the particular CSR categories on their Websites. The resulting data was placed and visualized in two charts based on the focus perspective. Firstly, the combined frq for each category, i.e. the frq of each key word, was calculated. Considering H1, the chart below places the categories in order based on this frq and so demonstrates the results – starting with the environment protection being mentioned on these 20 Websites 2386 times and ending with R&D achieving only 18 appearances (Fig. 1).

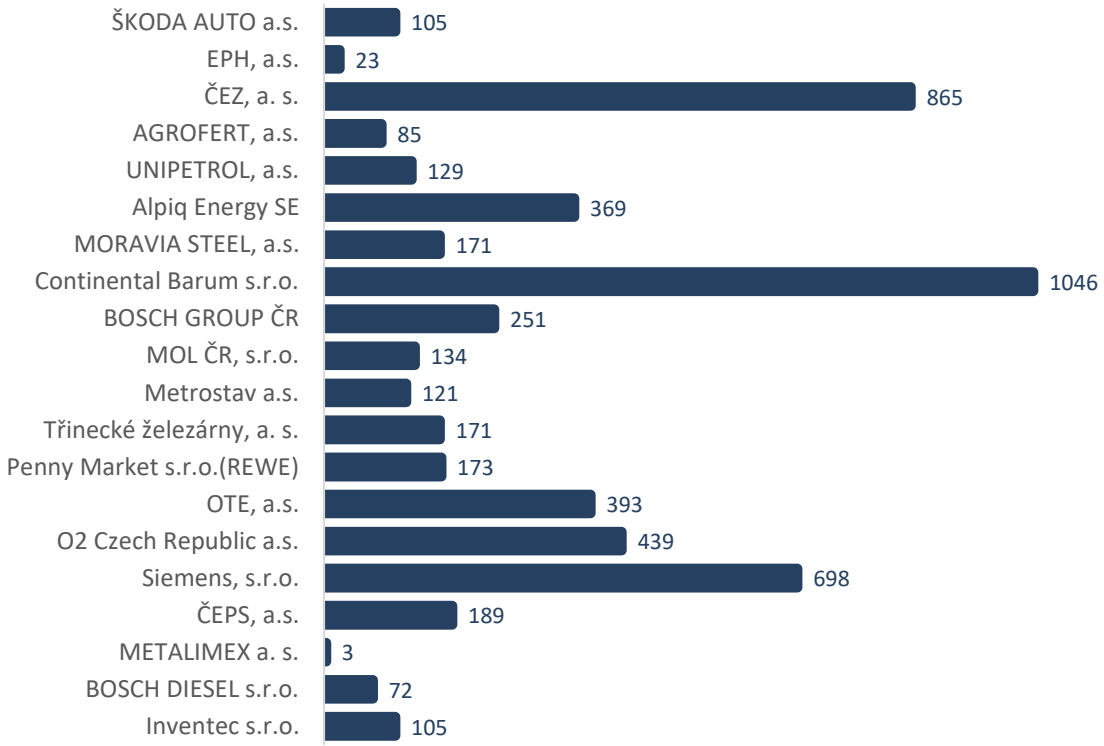
Fig. 1: Each category for all top 20 Czech companies (frq/category)



Source: authors 'own calculation and processing based on Websites

Secondly, the combined frq of all categories was calculated for each company, i.e. how many key words are present on the Website of the particular company from the cluster of the 20 top Czech companies. Considering H2 and H3, the chart below puts the companies in order based on their annual reports and indicates the totals for each company – starting with ŠKODA AUTO a.s. with 105 and ending with Inventec s.r.o. with 105 (!)(Fig. 2).

Fig. 2: All categories combined for each of the top 20 Czech companies (frq/company)



Source: authors 'own calculation and processing based on Websites

Well, the juxtaposition of the visualization of these two perspectives via charts (Fig. 1 and Fig. 2) offers interesting propositions and facilitates the addressing of the set hypotheses (H1, H2 and H3).

3. Discussion

Pursuant to recent prior studies (2018-2020), although Czech companies include sustainability in their corporate strategy, only 64% of the top hundred companies have reported about it, and this was done in 89% of the cases via an official annual report (Krechová et al, 2019). In their reports, these companies have demonstrated various trends and preferences regarding sustainability and CSR in general, as well as regarding each of the 6 CSR categories in particular with only a common denominator – the pivotal

role of the CSR category „employee matters“ (MacGregor Pelikánová, 2019). Further, it was concluded that, within the pool of the top hundred companies, there is a clear co-relationship between annual revenues and reporting, i.e. the higher the annual revenue the more likely is the reporting by the given company (Krechová et al, 2019). These findings have been projected in H1, H2 and H3 and re-tested by this fresh case study exploring the Websites of the top part of them (20) in March 2021.

Although the prior studies implied a merely passable interest in unofficial CSR reporting, the fresh case study revealed that, in 2021, the majority of the top Czech companies not only provided unofficial reporting, but this even in English. Indeed, 20 of the 37 Czech companies with the highest annual revenue in 2019 have engaged in the facultative unofficial reporting in at least two languages (Czech and English). As a matter of fact, each and every one of these 37 companies has a Website and each of these Websites has at least an indirect reference to the sustainability and/or CSR and/or CSR categories. Hence, the proposition embodied by H1 should be moderated, if not rejected. The evolution over the last three years, along with critical events, such as COVID, have led to a significant increase in the digitalization and e-posting of CSR information by top Czech companies.

Similar to the prior studies, this fresh study reveals fragmentation and differences in the approach of top Czech companies to CSR and its reporting. Certain categories are much more popular than others (environment protection and employee matters vs anti-corruption and R&D) and each company is very particular about its CSR choice and its e-reporting on Websites. In this respect, it can be confirmed that the commitment to the sustainability, CSR and CSR categories keeps differing on the Websites of top Czech companies as proposed by H2. At the same time, it needs to be emphasized that even the only prior common denominator – the leading preference for „employee matters“ CSR category – does not take pride of place anymore. Indeed, the fresh study shows that the unofficial reporting, via Websites, has a clear CSR category winner and this is not „employee matters“, instead it is „environment protection.“

The most surprising outcome of the freshly perfumed case study represents a total rejection of the well-established proposition that annual revenue has a direct positive impact on CSR reporting of top Czech companies, i.e. the larger the revenue the stronger the commitment to the CSR reporting (H3). At least regarding unofficial CSR reporting via Websites of the top 20 Czech companies in 2021, this is totally denied. The first one and the last one in this cluster had exactly the same revenue in 2019, while the winners are Continental Barum s.r.o. (8th pursuant to annual revenue), ČEZ a.s. (3rd pursuant to annual revenue) and Siemens s.r.o. (16th pursuant to annual revenue). There are even indices that unofficial CSR reporting via Websites is (positively) impacted neither by the annual revenue nor by other key businesses declarations dealing with CSR values, such as Code of Ethics, see e.g. Agrofert (Balcerzak & MacGregor Pelikánová, 2020). In sum, the unofficial CSR reporting is a very complexed phenomenon governed by mechanisms, which are often subjective and very particular with respect to the pertinent business. Although it is necessary to humbly admit the Socratic “*Scio me nihil scire*“ (I know that I know nothing), still it is critical to further study CSR reporting and in general CSR attitude of businesses - “*Arbor ex fructu cognoscitur*“ (A tree from the fruit is known), so stakeholders, including investors and customers, can reward pro-CSR businesses and reject anti-CSR businesses.

Conclusion

The fresh case study of the unofficial CSR reporting by the 20 top Czech companies via their Websites indicates an interesting evolution towards an increase in interest. Namely, these companies go more for digital unofficial reporting of their CSR than only a few years ago. The quantitative frequency calculation of qualified sustainability and CSR key words on their Websites, as projected in comparative charts and, along with Meta-Analysis and glossing, moderates prior propositions about merely passable interest in unofficial CSR reporting (H1). As well, it confirms prior findings about a fragmented approach (H2) and points to the swap of the interest between the most popular CSR categories – environment protection is becoming more heavily reported than employee matters. As a surprise came the rejection of the proposed significance of the annual revenues on the reporting (H3). This suggests that the size and availability of funds is just a pre-requirement for unofficial CSR reporting. It appears that the unofficial reporting is catching up and matching with the official reporting and ultimately the reporting, especially the mandatory unofficial, is a revelation of the particular internal preferences of each company and is to be explained by the intrinsical culture and attribution theory rather than a simplistic measurement of annual revenues. Naturally, the performed fresh case study involved originally 37 and ultimately 20 top Czech companies and is rather indicative than conclusive. It should be followed by further longitudinal studies of a larger sample of companies from various EU member states' jurisdictions. Considering the critical importance of CSR for the EU competitiveness and global sustainability, such a future research and analysis is highly desirable.

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Petr Scholz[1,2], Viktória Čudková[1], Lenka Červová[2]

[1]College of Polytechnics Jihlava, Department of Travel and Tourism, Tolstého 16, 586 01 Jihlava, Czechia
[2]Technical University of Liberec, Faculty of Economics, Department of Marketing and Trade, Voroněžská 13, 460 01 Liberec, Czechia
email: petr.scholz@vspj.cz; lenka.cervova@tul.cz

CSR Assessment in Yellowstone National Park

Abstract
CSR is the voluntary integration of social and environmental considerations into day-to-day corporate operations and interactions with corporate stakeholders. The objective of this paper is to evaluate the usage of Corporate Social Responsibility practices in a chosen protected landscape area, Yellowstone National Park. It will namely investigate the more prominent for-profit corporation operating in the park, Xanterra Travel Collection (also Xanterra Parks & Resorts), which is the only concessioner offering lodging in the park. We used structured and semi-structured interviews with the managerial staff and the lower-level staff (n=3). Additional information was acquired by way of a questionnaire survey to managerial level staff members (n=9). The research was conducted in two parts during the summer season in Yellowstone National Park. The first part took place in the timeframe from July to September 2018. The second part took place from June to September 2019. Xanterra emphasizes the company's environmental policies and the sustainable image, but other bottom lines are not entirely overlooked. It is obvious Xanterra is trying hard to do well with their employees during the policymaking. They provide many leisure activities and work standards according to American law. The company has set values and missions, but that is not always communicated to the base staff members.

Key Words
corporate social responsibility, ethics, business ethics, Yellowstone National Park

JEL Classification: M14, Q56

Introduction

Sustainability has become a global topic. The majority of service providers and other entities in the tourism industry are focused on fulfilling global sustainable development goals, so-called SDGs. These goals can be achieved by various initiatives, but it is essential to realize that every individual and entity can contribute to their achievement (Chen et al., 2018). Furthermore, this increasing pressure from different stakeholders and society has turned corporate social responsibility (CSR) into a strategic imperative for many businesses today. More and more organizations worldwide are leveraging CSR to gain legitimacy and competitive advantage and achieve long-term success (Serra-Cantallops et al., 2018). The importance of the social responsibility of companies for businesses and society is considered an essential factor for sustainable growth (Činčalová and Hedija, 2020).

From the business theory standpoint, the concept of CSR is still relatively new and keeps evolving. First attempts at establishing it emerged in the early 1950s in America. It

evolved from previous discussions on the firm's responsibilities to their employees and customers. On the other hand, we have to state that the concept of CSR is not new and found its origin in ancient Mesopotamia around 1700 BC (Tripathi and Bains, 2013). At first, the environmental area of CSR was not included in the theory and only appeared with the rise of environmental movements. Primarily a post-WWII phenomenon, corporate social responsibility (CSR) has grown over the past half-century in importance, significance, and scholarship. The idea that businesses have some responsibilities to society which span beyond making profits for their shareholders has been around for centuries (Carroll and Shabana, 2010). However, until the late 1970s, CSR has been derided as an oxymoron and a contradiction of the investment and business community (Lydenberg, 2005). Nowadays, CSR, hand in hand with the sustainability concept, is widely accepted and reported on, shaping around the similar idea of three balanced areas of interest: economy, environment, and society. The concept of CSR does not have one solid definition that could be used collectively by any legislation, let alone in practice. One needs to keep in mind that different countries view CSR differently and, therefore, have varying norms and standards.

Still, there are multiple ways to evaluate a firm's practices. As authors Savitz and Weber (2006) state, people tend to slack off when no one is looking, and so what is measured gets done. In the US, the most effective and most straightforward law in the environmental sphere is the "*Right to Know*." It requires companies to report on the number of hazardous chemicals they have within each facility annually. This law does not specify anything about removing said chemicals, but businesses immediately started shaping their processes to present fewer chemicals. No company would fancy being on the worst polluters list for all customers and business partners to see. This voluntary improvement saw a 59% reduction of hazardous chemicals between the years 1988 and 2003. Similar laws and the newfound need to report on a company's activities drove firms to create sustainability programs, sometimes to have something good to report.

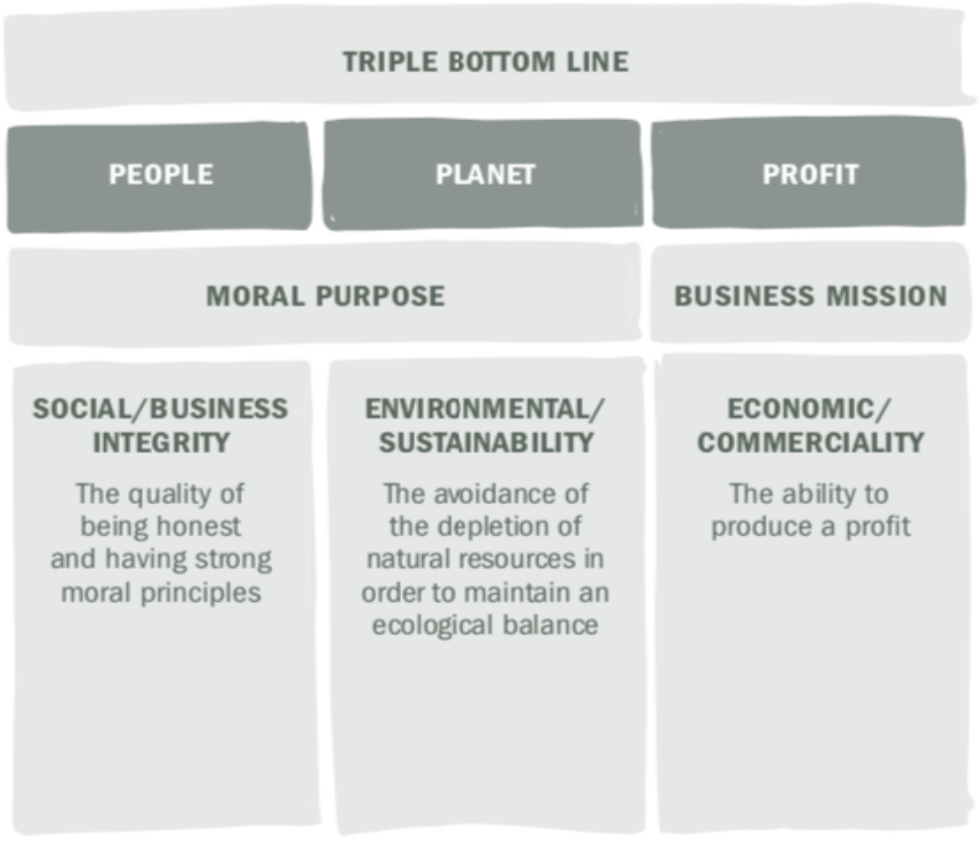
A tool used in the EU and worldwide is the Environmental Impact Assessment (EIA). It is a procedure ensuring that the environmental implications are taken into consideration before any decisions are made. The assessment can tackle an individual project like building dams, factories, or any significant buildings or tackling public plans and programs. The commission group brings in environmental experts from the national administration and meets twice a year (European Commission, 2020). Another widely used standards are those of the International Organization for Standardization (ISO). This organization dates to 1946 and has introduced over 23,000 measures covering almost all aspects of technology and manufacturing. There are two main norms worth mentioning regarding CSR practices: ISO 26000 and ISO 14001 Family. ISO 14001 deals with an effective environmental management system for any business regardless of their activity or sector and provides certification. It lays out requirements with guidance relating to the environmental systems. The ISO 26000 only provides advice and not requirements and hence cannot be certified. This norm on sustainability has seen negotiations between stakeholders from across the world and represents an international consensus. It deals with the clarification of social responsibility globally and can be utilized by any firm, no matter its size or activity (ISO, 2020).

Apart from the international certification and report standards, enterprises can collect specific national or regional certifications on their particular product or service. The responsibility practices are voluntary and go over the set minimum. Thanks to that,

companies are usually pressured to behave sustainably by outside forces like the society or governments' administrative decisions. This pressure usually lies on more prominent companies that employ an enormous number of people. As the corporations evolved and gained in size over time, the need to satisfy other society's needs other than producing goods and services surged. The companies should not focus on profit only and, in the process, neglect other areas of concern. A certain level of balance is necessary as if the polluting enterprises dismantled, there would be no jobs or income leading to issues in the social sphere (Farmer and Dickerson Hogue, 1985).

The triple bottom line (a term first coined by sustainability thought-leader John Elkington) is a business model that consists of healthy profits and high business integrity, and environmental sensitivity, resulting in both successful business strategy and ethical business practice. Elkinton (1998) starts off his book by examining if capitalism can ever be sustainable. His triple bottom line (see Fig. 1) directly comes from the definition of sustainability that says it is "… *the principle of ensuring that our actions today do not limit the range of economic, social, and environmental options open to future generations."*

Fig. 1: Triple Bottom Line



Source: Duncan (2019)

Juggling the commercial and moral imperatives of People, the Planet, and Profits needs time and thought to get right. However, it provides the company with the best platform for future responsible business development and all the associated benefits (Duncan, 2019).

1. Methods of Research

This paper aims to evaluate the usage of CSR practices in a chosen protected landscape area, Yellowstone National Park. Namely by a for-profit corporation, Xanterra Travel Collection (also Xanterra), which is the only concessioner offering lodging in the park. We have chosen the following research questions: (1) How is Xanterra applying the CSR principles and tools in their day-to-day operation? (2) Does the public image of Xanterra truly represent their day-to-day operation?

The research for this paper was conducted by structured and semi-structured interviews with both the managerial staff and the lower-level staff (n=3). We chose this as our primary method of collecting data. We felt a questionnaire would not properly reflect the array of data needed for this paper to the same effect a structured or semi-structured interview would. Mainly, the focus was put on the company's internal part to evaluate the current standing on their CSR practices in terms of greenwashing, so much of the anticipated outcome was subjective. Another reason for choosing this method was the convenience as all staff working at the individual park locations was required to live in very close proximity in said locations. Due to this proximity, it was more comfortable to use interviews as it made the participants more approachable. All interviews were done in person for the same reasons. Duration of interviews ranged from half an hour to an hour. We have compiled a range of questions following the topic structure of the Awareness-raising questionnaire, on topics of customers, employees, community support, and environment. We tailored the prepared questions to several departments of interest within Xanterra's operation in the park, such as Food and Beverage (F&B), Housekeeping, and Retail. We also utilized the European Commission questionnaire on the topic of Corporate Social Responsibility for collecting additional data. The questionnaire was used in its original form. It consisted of 26 questions divided into five topics: company values, workplace, the environmental, marketplace, and community policies. The questionnaire also included a half-page to a page of summary on each topic. All interviews and questionnaires were anonymous. Filling each questionnaire took about 10 minutes. Due to their nature they were given to managerial level staff members (n=9). The research was conducted in two parts during the summer season in Yellowstone National Park. The first part took place in the timeframe from July to September in the year 2018. The second part took place from June to September in the year 2019.

2. Results of the Research

In this paper, we focused on Xanterra's triple bottom line as they present to the public, with available audits, reports, and general information on their practices, as well as information readily available to guests and travelers in the park. We will be looking at all three areas, profit, planet, and people.

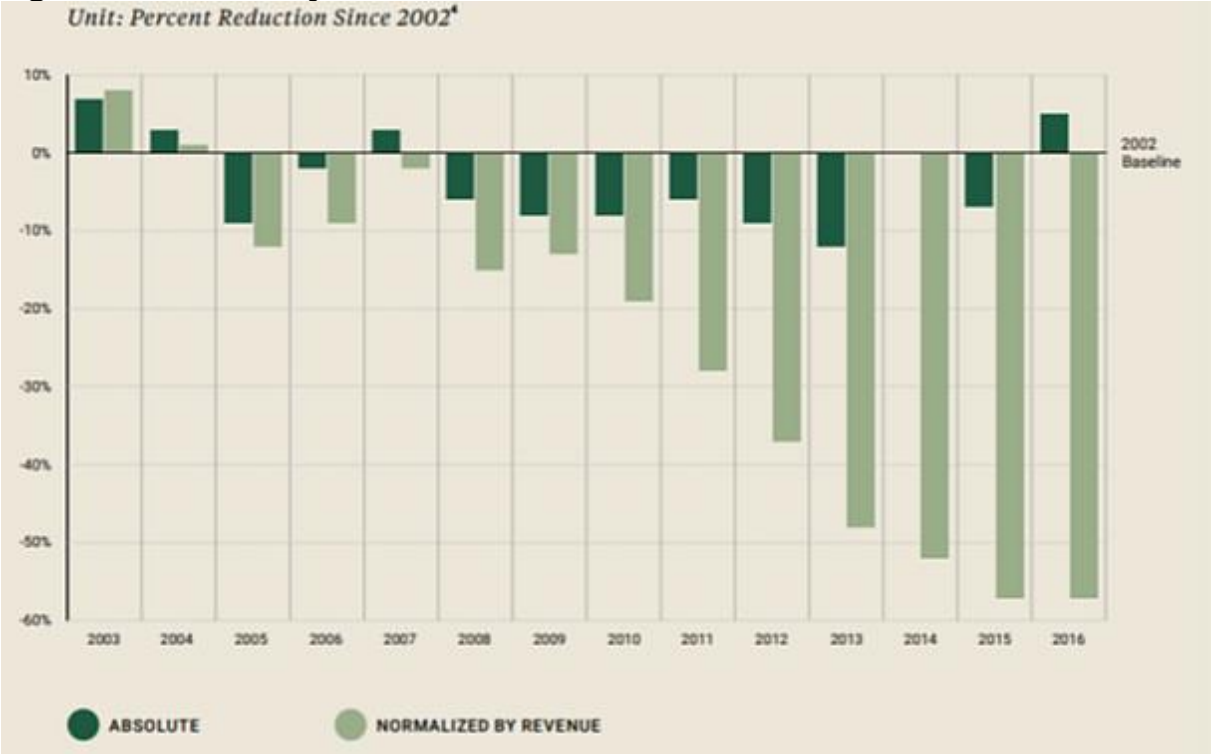
a) Profit. As any for-profit corporation, the first bottom line regarding economic gain is at the forefront of Xanterra's practices. The company started solely focused on earning and executing concessioner contracts in national and state parks. After 2008, when the Anschutz Company acquired Xanterra Parks & Resorts, the enterprise started to transform into a multi-faceted travel and leisure company. In the Yellowstone National

Park, they are the only concessionaire providing lodging. They offer accommodation ranging in the budget, from hotel rooms and cabins to the campgrounds. In some cases, the hotel rooms are in newly built buildings with eco-friendly aspects in mind, and in other cases, they are part of the historic building in the villages. Those are more sought after by the tourist and experience a higher markup. All interviewed managers agreed that the "most expensive" location is Lake Village, specifically the services and accommodation of the historic Lady of Lake Yellowstone hotel. Due to that, this hotel also sees the strictest rules on front-office employee's appearance. Apart from lodging, Xanterra offers food services from cafeterias to fine dining. According to Food & Beverage managers, the most grossing and high-class restaurant is in Lake Village, Old Faithfull Inn's and Grant's restaurants coming next according to Food & Beverage managers.

b) Planet. The newest report is from 2017 and includes some data documented in previous years for comparison. The report is started with information about the company incorporating goals set in 2015 that the corporation would like to tackle by the year 2025, based on the baseline from the 2014 report. Annually, Xanterra wants to cut the usage of energy and water by 5%, 25% of assets will be certified landfill-free, an 80% waste diversion of noncertified assets will be reached, CO2 emissions will reduce by 50%, the cuisine will be 70% sustainable, and there will be 93% (weighted) overall guest satisfaction. Xanterra has provided data on multiple different areas through their environmental management, analysis process, and Ecometrix. Firstly, reporting on carbon productivity describing it as a ratio between a business having increasing revenues and simultaneously decreasing greenhouse gas emissions. In use, the company monitors the income earned per unit of carbon emitted. Second, they track the CO2 emissions, where since 2000, their greenhouse gas emissions went down by 35%. Next in the report was energy consumption, where the values also went down. The company attributes this to its upgrades in lighting technologies. Water consumption (see Fig. 2) is up next, and the decreasing trend follows. This time different locations reported both consumptions going up and down. Still, the final number added up to be an overall reduction compared to previous years. The report deals with all Xanterra's operations, not only those in Yellowstone, which is why we will not be looking deeper at the specific numbers. However, seeing that Yellowstone's concerns are water consumption due to the dry mountain climate, I would like to present Xanterra's standing on this matter (Xanterra Travel Collection, 2020). In Yellowstone specifically, the laundry and linens washing system was upgraded to lower water usage from 3 gallons per pound to one-third gallon per pound. Water reservation is part of the construction panning as well. From 2014 and 2019, water consumption was lowered by 35% (Yellowstone National Park Lodges, 2020).

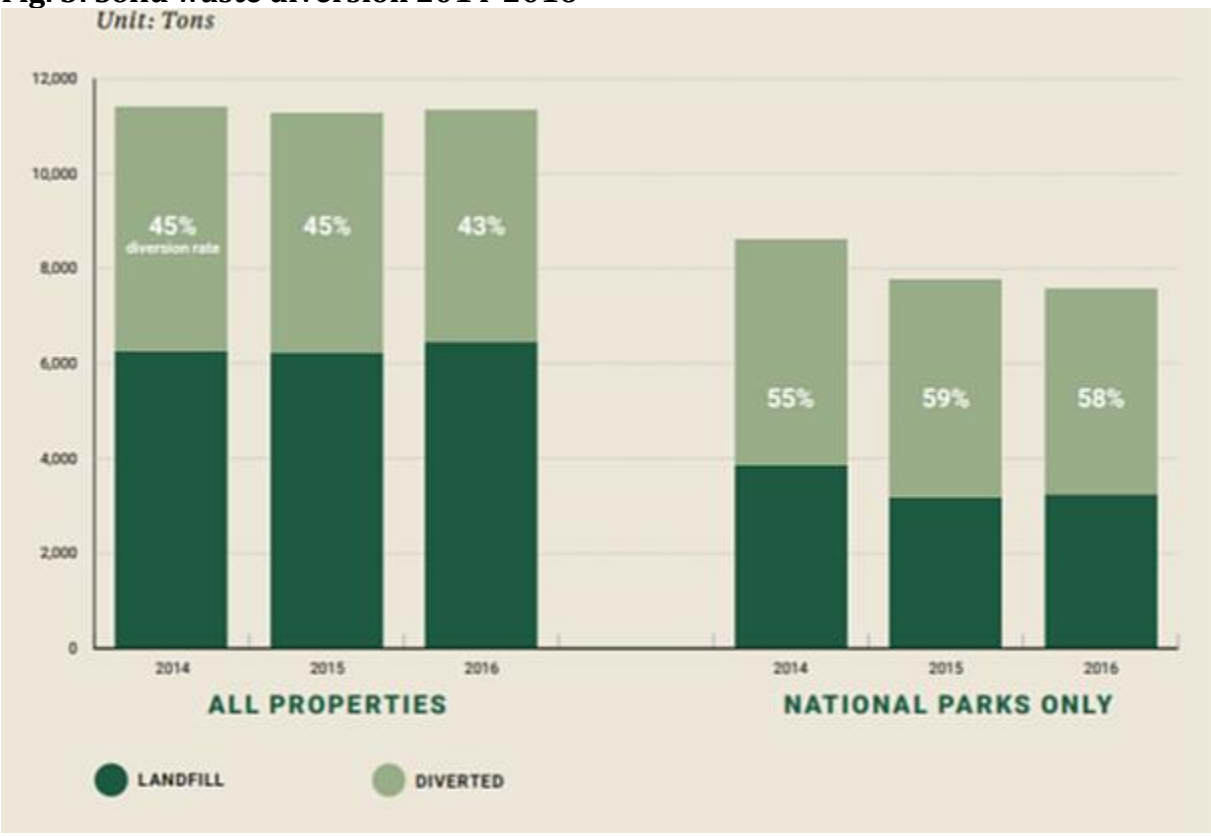
Solid waste data (see Fig. 3) shows an interesting comparison between Xanterra's operations in protected areas and all properties combined. It was divided twice. The first division dealt with waste company-wide and in the national parks. The second type of division was based on the type, one being landfill and the other diverted, including recyclables, compost, and everything able to be donated (Xanterra Travel Collection, 2020). As of 2019, 63% of waste was diverted from landfills. Apart from typically recycled materials, the enterprise also tackles electronic waste, textile, cooking oil, and more (Yellowstone National Park Lodges, 2020).

Fig. 2: Water consumption 2003-2016



Source: Xanterra Travel Collection, 2020

Fig. 3: Solid waste diversion 2014-2016



Source: Xanterra Travel Collection, 2020

Lastly, Xanterra presents data on renewable energy and sustainable cuisine that touches on improvements like locally sourced food. They provided data on previous periods for easy comparison, in one case from 2001 to 2016 (Xanterra Travel Collection, 2020). In general, Xanterra is very vocal about their sustainability efforts and include them in marketing materials. They promote the causes to the public in connection to their services and products. The corporation strives to build green when it comes to constructing new facilities and accommodations. Nine projects were certified so far in the park and Xanterra puts their focus on the globally recognized LEED (Leadership in Energy and Environmental Design) certifications represented by the new lodges, Chittenden, Hayden, Moran, and Rhyolite in the Canyon Village and Old Faithful employee housing (Yellowstone National Park Lodges, 2020).

c) People. As to corporate values, there could be numerous ones regarding employee culture and how they behave under Xanterra. Good teamwork and leadership are encouraged as well as a friendly well-mannered attitude within the staff circles and during customer service. Xanterra's sustainable report does not include information dedicated to their employees, and so the public can have access to such information only through their job posting website. There, general information specific to working in Yellowstone National Park can be found. The type of housing, boarding, and provided company recreation may depend on location, as more minor junctions and campgrounds may not have dining rooms or recreation halls. Other perks accessible to the staff include retail, lodging, and restaurant discounts, local discounts with partners, and service awards (Xanterra Jobs, 2020). Xanterra does not give out any report on their customers' data. However, they make it clear in their marketing that guest satisfaction is on top of their list. Xanterra offers a range of services to the guests. Those include historical bus tours, wildlife watching, boat rides and rentals, horse rides, and cookouts. Even when striving for the best customer satisfaction, Xanterra tries to engage guests in their sustainability efforts. For example, by opting to forego the housekeeping, they will receive a five-dollar discount on the room rate for every night of the stay. During the COVID-19 pandemic, the company was and still is operating under the Health & Safety Guidelines put forward by the Centers for Disease Control and Prevention (Yellowstone National Park Lodges, 2020). We can state that Xanterra put out the most information on their environmental policies. In CSR, it is the most accessible bottom line to report. As theorized, companies would somewhat be challenged on their environmental policies rather than the social one, and by the proportion of Xanterra's reporting, it seems the trend does apply here.

Furthermore, we will be evaluating the practices as they are carried out in a day-to-day operation in the park. We will be utilizing data from distributed questionnaires. The information was not quantitative but qualitative. As only managerial level staff answered, we will be looking for levels of unanimity to indicate how united they are on the policies they have the obligation of enforcing. From the six major categories of initiatives authors Kotler and Lee (2005) put together, Xanterra takes part in corporate philanthropy, community volunteering, and socially responsible business practices. In Yellowstone specifically, the company makes donations to the Yellowstone Park Foundation. However, the managerial staff does not encourage employees to volunteer with the National Park Service. A poster on the bulletin board is posted about the possibility of volunteering with the Range Station. From interviewing employees, we have discovered not many who did volunteer.

1) Workplace policies. All employees must go through the check-in process at the head office in Gardiner at the north entrance to the park. Through that process, employees fill out all needed work-related documentation, including a Confidential Information Policy, receive their uniforms for the season, and report in their designated location in the park. In the case of international students, Xanterra provides a one-time bus transport from the city Bozeman on check-in days. The busses then bring those who do not have their means of transportation to their locations. No park-wide shuttles are operating in Yellowstone. It may pose as an issue to some international students and those who do not own a car in the park. These staff members usually come by plane to Bozeman, where Xanterra picks them up and transports them to the park. Once in, these employees can either make friends with those who own cars or make signs to hitchhike as it is legal in the park. National Park Service requires they register their vehicle for easier access out of the park and back in at the checking gates for those who did come with their own car.

Yellowstone National Park is not very accessible for commuting. Nearest towns outside of the protected area are always at least 45 minutes to an hour away from any operating location. Most employees cited that the park is also unpredictable as there are often occurring "bison/bear jams" with tourist slowing their cars to observe the wild animals. These jams can sometimes last up to several hours. The only village situated very close to the park entrance, allowing for commute, is Mammoth Hot Springs. It is one of the most significant locations, and residents stay there all year round, mostly the rangers and their families. There is a small church and a local school for children is in the nearby town of Gardiner.

2) Environmental policies. They are critical as the current discussion on the matter no longer concerns only individual enterprises. Over the past decades, it has evolved into a global issue that needs to be tackled. Not only could firms benefit from these policies financially by minimizing waste or energy consumption, but also in terms of their image among consumers or their compliance with regulations. Reducing negative environmental impacts can be trickier amid smaller firms, but even minor improvements can affect. The participants did not have clearly unanimous answers on this part of the questionnaires. Most agreed on positive answers in more than half the questions. The National Park Service's own sustainable report on Yellowstone mentions Xanterra numerous times regarding their conservation efforts on historic buildings, environmentally friendly improvements, and green housekeeping program (National Park Service, 2020).

As part of their employee training, Xanterra includes water conservation. It manifests during and outside the working hours, with staff being required only to use reusable water bottles. The same concepts are passed on to the visitors, mainly with encouragements in the food and beverage department. There are free of charge water refill stations available for guests to get water into their own provided bottle, as well as drinking water stations, for one-time use. Of course, not all guests would happen to have their own reusable bottle to fill. Indeed, not all guests would also fancy buying reusable bottles available at the gift shops to find a water station to fill it and have a drink. For that reason, Xanterra still offers packaged water at their food courts. However, it is not wrapped in plastic; instead, the bottles are made of tin and can be recycled after use. Additionally, these water cans can be reused with refill stations when travelers stay in the park.

The bathroom mirrors of employee housing have stickers encouraging water conservation. The guest room does not have them. However, each room is equipped with an information brochure. The hotel sector has its own set of practices used throughout the park. Each guest room contains sorting bins for recyclables. The recyclables bins are also provided in the hotel's facilities and the outdoor areas. Newly, compost bins are available in the rooms, too. The Housekeeping managers relayed that this is done to get guests used to recycling that is used outdoors around the villages. In hotels and cabins, each section has an ice machine for guests to use. Most of the environmental policies are applied in the Food & Beverage department. Xanterra provides one-time use of biodegradable cutlery and food containers to guests. Yet, they can only be composted industrially. You can find information and infographics on composting and sorting waste in delis and cafeterias as there are sorting bins available. In the restaurants, customers do not sort their own trash, and it is done in the kitchen by staff. There are designated bins for landfill and compostable waste, and employees are trained on waste sorting. However, during the hectic periods during meal times, employees do not take care to sort out plastics, and some end up in the compostable bin, or instead of sorting the waste, they throw it all into the landfill bin to save time. According to managers, this should not be happening, but employees expressed they never heard any feedback. All compostable and biodegradable waste is sent to a compost center not far from the park. A Food & Beverage manager mentioned in the Old Faithful Inn that Xanterra used crayons from the restaurant to local artists in Montana instead of throwing them out after guests used them. The same treatment goes for wine corks.

The emphasis on local sources is the most prominent in the retail department. A significant percentage of products in Xanterra's souvenir shops are made locally or within the United States. Those products are utilized for two main reasons, the first being the fewer resources needed for transport. This way, the environmental effect of shipping is lowered as the park's location, and accessibility does not eliminate it. As pointed out by interviewed American employees, the second reasoning was "people from the US like buying things labeled as made in America, because the general association is, that they are higher quality." The range of products offered includes those made from reused materials, like a set of glasses made from wine bottles cut in half, or a gag gift of Christmas ornament made from dried bison/elk fecal matter as locally handcrafted merchandise, such as soap or pottery. If any of those locally handmade products get broken, it is then sent back to the artist to be reused or recycled. For other damaged products, if they cannot be put out with a marked down price, they are thrown away to landfill. The last area Xanterra focuses its environmental efforts on is the buildings in the park. The newest addition to guest lodging is the lodges in Canyon Village that replaced the old cabins. They were built locally in Idaho using the modular building process. There was also a tiny hurdle Xanterra had to deal with regarding the National Park Service regulations. Canyon had an issue after building the new lodges and moving the front desk and registration closer to them. However, the now outdated signs created slight confusion among guests. According to the park's regulations, a manager asserted that any new signs had to be approved before being put up, as they could interfere with the visual aspect of preservation. As of 2019, new approved signs were put up.

c) Marketplace policies. The respondents were primarily unanimous with their answers in this section. As stated before, Xanterra's business partners are not disclosed to the public, but we could get general information on them regarding CSR. Xanterra does take into

consideration social or environmental criteria when choosing its partners. They do not provide any information on their CSR activities to them but do engage with them on the topic. Customers satisfaction is one of the company's main goals and is measured mainly by comment cards and online surveys. If an unruly guest, lower lever staff are encouraged to bring in a manager or supervisor to help deal with a situation. Under no circumstances is any staff member allowed to cuss in in front of customers, discuss sensitive matters, or get into an altercation. In the retail department, guests can return anything as long as they present a receipt. Employees are continuously trained to try to help, even if off duty. Being around the guest is also impossible to avoid in the park as staff lives on site. Xanterra states that employees always represent the company. Mostly employees give out information on the park, exciting sights, where the best wildlife watching spots are, and how to behave safely around animals and more practical information like closest repair shops, if they know them. Employees are never allowed to give out information about other employees to the guests. It has happened in the past that information was given out, and a guest then visited an employee uninvited.

d) Community policies. Respondents were generally unanimous in their answers regarding the community polities and company values. To support the communities, a significant portion of food locally sources. In menus, meals prepared with these ingredients are marked by a small green leaf income. Xanterra has partnered with several Native American artists to sell their products in the companies giftshops. The shop in Old Faithful Inn includes a whole section on crafts from these indigenous artists. Multiple events and small fairs of sorts are held throughout the park. These allow the guests to learn a bit more about local traditional crafts. Xanterra is also partnered with Yellowstone Forever, the Gardiner School, Little People's Learning Center, and other local businesses.

3. Discussion

"Legendary Hospitality with a Softer Footprint"? Not really. At least not entirely. Because the actual number of employees keeps changing, Xanterra must train new employees all the time. As opposed to mainly having long-term already trained staff, it leads to lower service standards, such as the previously mentioned issue with sorting waste in the kitchens. It can also be noticed with the questionnaire evaluation. The reason for this questionnaire being given only to supervisors and managers was to see how well they are united on information about the company's practices, values, and missions. They are the ones handing those practices down and making sure they are enforced to the company's set standards. The size of Xanterra really comes to play here, as it is hard to relay and implement practices when going through so many levels. Significantly, when the employees at almost all of those levels change frequently. With such changes, the training process is always started from scratch, and it takes a bit of time for the new employee to orient themselves in the new work environment and fit into the local community. It is also the case that employees who do not feel appreciated will not care about their work. In the process, they may bypass some rules and regulations. They sometimes regarded it as their rebelling against the corporation. We can see that the most conflicting answers were given in the areas where most issues seem to be.

As for the guests, Xanterra is placing much emphasis on their satisfaction. The "legendary hospitality" part is portraying on most visitors. Even if the guest is wrong, employees are

instructed not to argue back and resolve any issues. The employee doesn't reach them. They call in a manager who is trained for these types of scenarios. With the return policy in the retail department, truly everything is accepted. We have seen a wet postcard being returned on a sunny day with the words "rained on it." Ultimately, we would not state Xanterra greenwashes per se. The policies they promote are actually in place, and they only have issues implementing them on the base level. There has been a time when the CEO came to visit the parks, and at that point, all employees were told to take extra care and do everything by the book. On a typical day, that wouldn't be the so in some cases. Though, there are certainly improvements still to be made.

Conclusion

This paper evaluated the usage of CSR practices in a chosen protected landscape area, Yellowstone National Park. We have fully met the goal and state that Xanterra emphasizes the environmental policies and the sustainable image of the company, but other bottom lines are not entirely overlooked. It is obvious Xanterra is trying hard to do well with their employees during the policymaking. They provide many leisure activities and work standards according to American law. The underlying issue here seems to be in communication. The company has set values and missions, but that is not always communicated all the way to the base staff members. Following the goal, we set research questions. (1) How is Xanterra applying CSR principles and tools in their day-to-day operation? (2) Does the public image of Xanterra truly represent their day-to-day operation? Regarding the first research question, the company focuses its marketing and reports on the planet's bottom line. They do not disclose to the public about their financial audits or business partners, which fall under the profit bottom line. However, they report and tell their partners in communities and organizations under their corporate philanthropy and the third bottom line. Regarding the second research question, in our opinion, Xanterra's public image does not fully represent the companies' practices in day-to-day operation, especially concerning the baseline staff members. We concluded that Xanterra might not be outright greenwashing, but their implementation is, in some cases, far from perfect.

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Boris Seidel

Technische Universität Dresden -
International Institut (IHI) Zittau,
Chair of Ecosystem Services,
Markt 23, D-02763 Zittau
email: boris.seidel@tu-dresden.de

Biodiversity Management in Regional Agri-Food Supply Chains

Abstract

Against the background of biodiversity loss in agriculture on one hand and growing consumer awareness towards regional origin and quality on the other, managing biodiversity is becoming more and more relevant for the food sector, especially for small and medium-sized enterprises (SMEs). At a regional level, the grain-to-bread supply chain is a research subject with high spatial relevance, significant ecological impacts and substantial sustainability potentials.

So far, there is no business-friendly instrument for assessing biodiversity impacts in agri-food supply chains that takes into account the specific characteristics of this sector. The presented monographic dissertation aims to close this research gap. The goal is to work out a set of practical, meaningful and relevant indicators for the evaluation of the "corporate biodiversity performance" (CBP) of farm companies. Ultimately, management recommendations are to be derived on the basis of a point rating system focusing on downstream producers (mills, bakeries).

To reach this goal, a combination of qualitative and quantitative techniques ("mixed-methods") is considered to be reasonable. In this sense, the empirical work consists of a (1) qualitative-exploratory preliminary study (expert interviews, pretests), (2) a quantitative main investigation through partially standardized surveys of farmers and (3) qualitative-explanatory in-depth case studies based on on-site interviews with selected farmers and further manufacturers. The aim of this paper is to give an overview on the methods and main results of the quantitaive major survey in order to discuss further development poentials of the indicator set.

Key Words

biodiversity indicators, biodiversity management, agri-food supply chains

JEL Classification: C57, R11

Introduction

Against the background of biodiversity loss in agriculture on our doorstep and growing consumer awareness towards regional origin and quality, managing natural resources across the entire value chain is becoming more and more relevant for businesses especially in the food sector and even for small and medium-sized enterprises (SMEs). SMEs represent 99 % of all businesses in the EU. They are the backbone of its economy (European Commission, 2019). Regarding the entire food chain (farming - processing - distribution - consumption), agriculture is by far the stage with the greatest impact on biodiversity (Schröter-Schlaack & Heinz, 2016). The Convention on Biological Diversity defines biodiversity as "the variability among organisms from all sources including

terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; it includes diversity within species, between species and of ecosystems" (Convention on Biological Diversity (CBD), 2020). But how can this complex topic be made manageable for companies?

As many cross-industry networks (Biodiversity in Good Company, Business & Biodiversity Campaign, etc.) show, the "value" of the corporate nature is increasingly recognized as a business case and as a factor of success. According to Schaltegger & Beständig, 2010 organizations can generally influence the preservation of biodiversity in the following fields of action: (1) sites and facilities, (2) supply chains, commodities and material, (3) product design, (4) production and manufacturing processes, (5) transport and logistics and (6) personnel. The supply chain plays a decisive role here. This applies in particular to micro-enterprises which have less impact on the environment through their operations than indirectly through their value chains (Kramer et al., 2017).

On the other hand, there is a promising trend of consumer awareness regarding local food and sustainability consumption at the national as well as federal level (AMI, 2018). Geographically close localized food chains have a particular potential to impact biodiversity in a positive way, because they are more capable to enforce direct agreements on quality and production standards with their suppliers. The key point is that SMEs can only manage, improve and communicate biodiversity, if they are able to measure this complex issue by the help of practicable, meaningful and relevant indicators. However, existing indicator sets (EMAS, GRI etc.) rarely refer to the aspect of biodiversity and hardly take into account the special needs of SMEs (Schröter-Schlaack & Heinz, 2015). Therefore, the authors see special demand for research in that field.

The aim of this paper is to give an overview on the methods and main results of the quantitaive major survey in order to discuss further development poentials of the indicator set. It focusses on the following research questions:

- How is the actual state of the corporate biodiversity performance (CBP) of selected supply chains empirically expressed?
- Which patterns can be seen in terms of farm size and operation mode (conventional vs. organic)?

1. Methods of Research

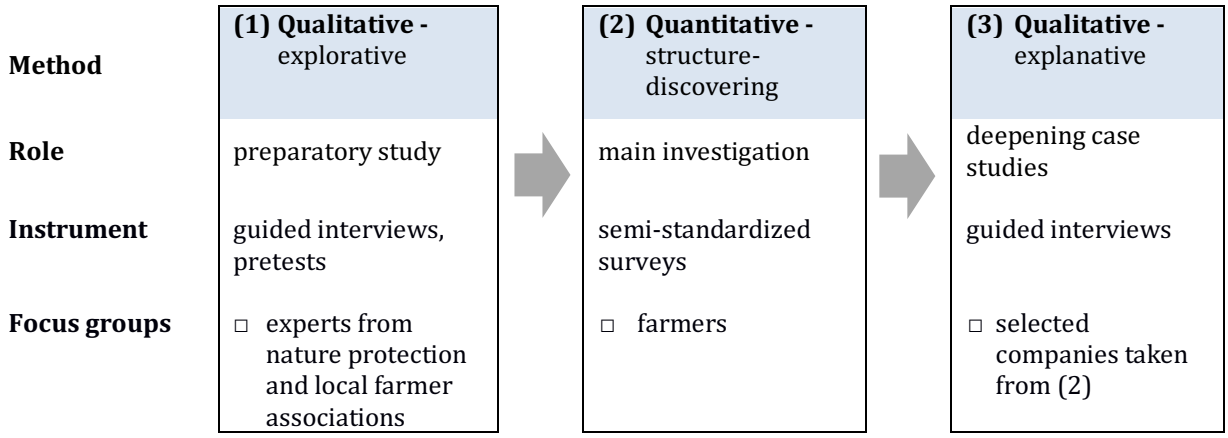
In principle, empirical social research distinguishes two paradigms: the quantitative and the qualitative methodological tradition. The goal of the first one is to collect precise, comparable and intersubjectively valid empirical information, which should have the character of "measured values", which are directly statistically evaluable (Kelle et al., 2014, p. 197). It is therefore a goal-oriented approach, which strives for objectivity of its results through the greatest possible standardization of all sub-steps (ibid). On the other hand, qualitative procedures work with non-numerical data, posit openness, authenticity and are based on the interaction and communication of researchers and research participants (Kuckartz, 2014, p. 28).

For answering the research question, a combination of qualitative and quantitative methods ("mixed methods") is considered as reasonable and promising. Relevant literature differ between two main designs for mixed methods research: exploratory and explanatory designs. Exploratory designs (QUAL→QUAN) emphasize the qualitative component, while explanatory designs (QUAN→QUAL) underline the quantitative part.

In addition to the presented two-phase models, there are also various forms of multi-link models, which are summarized as „complex design forms" (Kuckartz, 2014, p. 90). One common way is the model "qual → QUAN → qual". For instance, this is used for new fields of research, where a qualitative preliminary study with the purpose of exploration is carried out first. The purpose is to prepare the main examination and the instruments and in some cases also to clarify the research question (ibid). Following the major representative quantitative survey with a large sample, a qualitative study will again be conducted for a better understanding of the results (ibid).

The method mix in this work represents a combination of the explorative and explanative model. The following chart (Fig. 1) symbolizes the research process.

Fig. 1 Applied mixed-method design



Source: authors' illustration

The aim of the explorative study (1) is to uncover special issues and to improve the questionnaire design through guided interviews with experts and pretests in businesses. Thus, this pre-study has a preparatory role for the major quantitative investigation (2). The purpose of the second study is to use standardized questionnaires to survey the farmers in the supply chain about their impact on biodiversity. Based on a benchmark, a reasonable selection of cases for the final qualitative study (3) is to be done. The third part aims to exemplify the results from (2) and to analyze internal processes of businesses in order to derive recommendations for biodiversity management in companies.

In contrast to large enterprises, SMEs are faced with various limitations regarding the consideration of environmental aspects in decision-making processes [Johnson, Schaltegger 2016]. Facing this, three main criteria should indicators for SMEs fulfill [Schröter-Schlaack, Heinz 2015]:

1. Meaningfulness towards all relevant topics of biodiversity
2. Relevance regarding the target group and sector-specificness.

3. Practicability relating to data collection effort, implementation costs (time/personnel), simplicity and user-friendliness of the indicators.

The following figure (Tab. 1) shows the set of applied indicators. It was development by a literature-review (in particular based on Kramer et al., 2017, Haaren & Hachmann, 2008 and Braband, 2006), expert interviews and pretests with farmers. In accordance to the classification from Hülsbergen & Siebrecht, 2009, The biodiversity indicators are grouped into the fields of action "structures", "inputs" and "processes".

Tab. 1: Biodiversity management indicator set

Field of Action	Sub Issue	Indicator
1. Structures	Crop diversity	1.1 Number of parts of the crop rotation
		1.2 Share of corn [% UAA]
		1.3 share of rye [% UAA]
	Genetic Diversity	1.4 Cultivation of red-list crops {yes / no]
	Diversity of Ecosystems	1.5.a Number of different landscape elements on UAA 1.5.b Share of landscape elements [% UAA]
		1.6 Mean field size [ha]
2. Inputs	Fertilization	2.1 N-fertilization level [N kg * a-1 * ha-1]
	Plant Protection	2.2 Areas without use of PPPs [% UAA]
3. Processes	Soil cultivation	3.1 Number of landmachine passes on UAA per year
		3.2 Share of unplowed areas [% UAA]

Source: authors' illustration

The three levels of biodiversity (diversity of species, genes and ecosystems) are reflected in the first category "structures". With regard to the diversity of crops, in addition to the breadth of the crop rotation, the area proportions of with two crops with special negative positive impacts are considered. While corn tends to have a negative impact on the soil structure (risk of erosion, degradation of humus), rye scores with its undemanding for water, fertilizers and plant protection products (PPPs). The genetic diversity of crops is expressed in the cultivation of old native endangered red-list varieties. The diversity of ecosystems is measured by the number and area percentage of landscape elements (such as hedges, edge strips, solitary trees and tree rows, etc.) on the utilized arable area (UAA) as well as the average field size.

The second field of action looks at the input of substances into the agricultural production system in the form of nitrate fertilizers and pesticides. These input indicators characterize environmental impacts that act in the form of material components and influence the quality of the biotopes or niches. Potential effects are eutrophication and pollution from pesticides.

The soil is the central resource for the production of food. Soil formation is a very slow process: it takes between 100 and 300 years for the generation of one centimeter of fertile soil. At the same time, significantly more organisms live in the soil than on the ground: One gram of soil contains billions of microorganisms: bacteria, fungi, algae and protozoa. Hundreds of thousands to millions of soil animals such as roundworms, earthworms,

mites, woodlice, springtails and insect larvae live under one square meter of soil. Extrapolated to one hectare, this results in around 15 tonnes of live weight in the soil where roots can penetrate - this corresponds to the weight of around 20 cows. Against this background, the third group, "processes", relates to soil cultivation. The number of passes of landmachines over the UAA is a measure of the soil compaction. The proportion of unplowed areas is in turn an indicator of the protection against soil erosion.

In order to quantify the CBP, the indicators are connected with a point rating system according to Hofbauer et al., 2016 based on a simple constructed assessment. First of all, threshold values of the CBP in the categories "high", "medium" and "low" were definied on which the survey of farmers is based. The characteristics of the three assessment levels of the indicators are each rated with „0“ (low), „5“ (medium) and „10“ (high). With ten indicators, this results in a maximum achievable score of 100 points. With this procedure, a quantifiability of the business-related biodiversity impact is generated.

2. Results of the Research

The survey of farms was carried out in writing by post. In coordination with three flour producers in Eastern Saxony, 59 questionnaires were sent to grain suppliers and 26 of them returned. The response rate was therefore 44%. With the exception of two areas, which are in Saxon Switzerland and southern Brandenburg, most of the businesses (n = 24) are located in Upper Lusatia (districts of Bautzen and Görlitz). This part of the sample forms 3.5% of all grain-growing farm businesses in this area, which together cover at least 20.4% of the total grain-growing area. This shows that a disproportionately large number of large companies were surveyed. The range of farm sizes is very pronounced and ranges from small farms with 10 hectares to large farms with 3200 hectares. Half of the sample are in the size class of 50-500 hectares (n = 13). The median is 291 ha. The majority of the sample farms are operating conventionally (n = 20), while six are ecologically certified (n = 6). The benchmark of CBP shows that over two-thirds (70%) of the companies surveyed are in the assessment class “medium” (n = 9) and “rather low” (n = 9). Six achieved the class “rather high” and two “very high”.

Tab. 2: Results of benchmark scoring categories

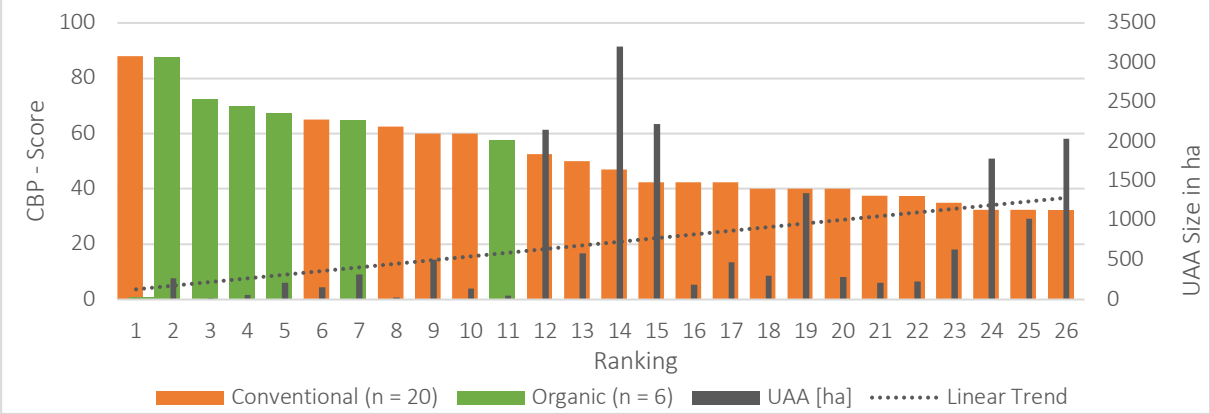
Rating Score	Evaluation of CBP	n	%
>80 to 100	“very high”	2	8%
>60 to 80	“high”	6	23%
>40 to 60	“medium”	9	35%
>20 to 40	“low”	9	35%
0 to 20	“very low”	0	0%
		26	**100%**

Source: authors’ illustration

With regard to Fig. 2, it can be seen that organic farms tend to achieve higher evaluation results, but that conventional farms also achieve very good performance in some cases. Using the trend line of the UAA sizes, it becomes obvious that the better the CBP is, the

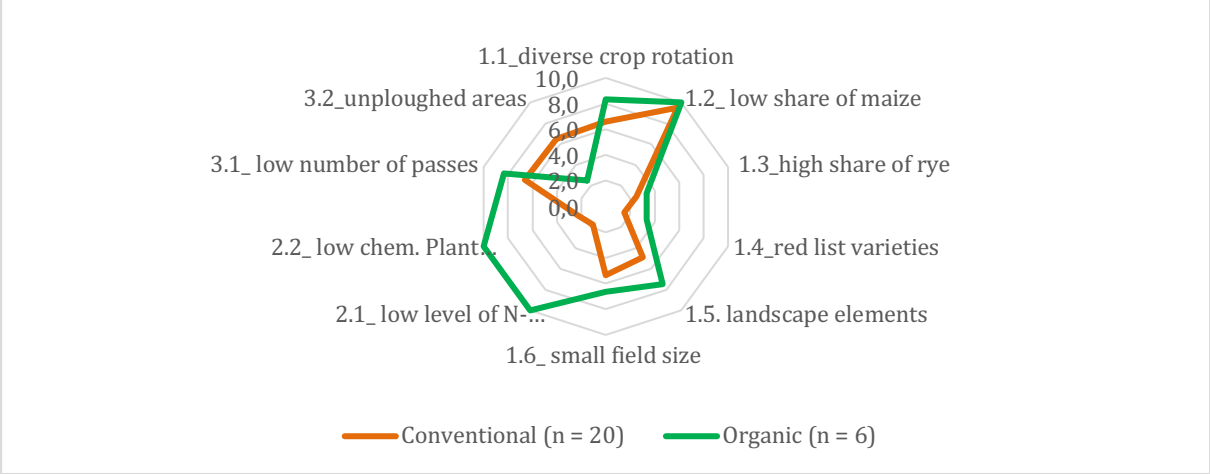
smaller the farm size tends to be. The best farm (88 CBP points) is a conventional micro-farm which extensively cultivates old grain varieties such as champagne rye or forest perennial rye on low-yielding sandy soils in a biosphere reserve.

Fig. 2: CBP Benchmark of crop suppliers (n=26)



Source: authors' illustration

Fig. 2: Indicator results from conventional (n=20) and organic farms (n=6)



Source: authors' illustration

A comparison of the mean values of the individual indicators according to the type of farming (conventional vs. organic) clearly shows that organic farms consistently achieve higher results, which is especially true for indicators 2.1. and 2.2 due to the renouncement of chemical pesticides and nitrate fertilization in organic farming. An exception is the case of plowless tillage. This is because in organic farming the soil has to be mechanically protected from weeds to a greater extent. With a medium proportion of maize and rye and the cultivation of Red List varieties, these two farming systems are closer together. All in all, the results show that there are clear patterns in regard of farm sizes and operation mode.

3. Discussion

The evaluation grid presented here provides a snapshot of the operational contribution to biodiversity potential. It is equally applicable to both ecological and conventional, small and large grain farm businesses. In order to achieve even more detailed results, differences between cultivation regions could be taken into account using weighting factors. For example, in erosion-prone, hilly and high-yield loess areas with historically grown large field sizes, the indicators 1.5 (landscape elements) and 3.2 (plowless tillage) could be weighted higher. On the other hand, on sandy, low-yielding soils in Lower Silesia, which in the future will be particularly vulnerable to increasing periods of drought, the cultivation of undemanding, more water-efficient crops such as rye but also various old varieties (indicators 1.3 and 1.4) could be given greater weight.

Basically, the rating system is quite static and deliberately simple. All indicators are queried individually and rated with the same maximum number of points. Nonetheless, there are interactions between indicators. That means that some them can have a positive or negative impact on others. Synergy effects arise, for example, when a higher proportion of undemanding crops (Ind. 1.3 and 1.4) causes a higher variety of crop rotation (Ind. 1.1), so that fewer fertilizers and PPPs are used (Ind. 2.1 and 2.2) and thus the number of crossings is reduced (Ind. 3.1). On the other hand, there is a strong trade-off between plowless tillage and the use of PPP. If the use of plows is dispensed with in conventional farming in favor of soil biodiversity and humus build-up (Ind. 3.2) and thus the number of crossings is reduced (Ind. 3.1), in most cases the pest pressure must inevitably be controlled more with chemical agents (2.2). Conversely, in organic farming, the high proportion of plowed areas can be explained as a contribution to the mechanical (hence non-chemical) weed regulation.

Overall, the research presented here provides the basis for a low-threshold management approach between companies in the grain supply chain using measure-oriented biodiversity indicators that can easily be answered by farmers and a simple point evaluation system. Without using external consultants, it makes a contribution to making the complex and difficult to grasp topic of "biodiversity" measurable and assessable with a simple tool. Future research could adapt the indicator classification to other areas such as fruit and vegetable growing or grassland or livestock farming. Another promising research field is the question how the indicator results can be communicated to the comsumers in order to raise the awareness about regional quality and biodiversity as well as to justify fair prices.

Conclusion

Agriculture as a driver of biodiversity loss in Central Europe. It is not to be considered separately, but rather linked to daily consumer behavior. Regional grain-bread supply chains were selected as a suitable subject of investigation in the dissertation due to their ecological, economic and social relevance. In order to answer the research questions, a mixed methods approach in combination of qualitative and quantitative methods was chosen. The return of the questionnaires to farms in the main quantitative survey can be rated positively at 44%. The CBP is among the 26 companies surveyed: the majority of them are rated as “medium” and “rather low” (together 70%), with organic farms tending

to achieve higher evaluation results. The higher the ranking, the smaller the company size tends to be. Synergy effects as well as trade-offs can arise between the indicators. An adapted selection of varieties and crops can be seen here as the key to resolving conflicting goals. At the same time, this has the great market potential, especially for small craft businesses, as this unique selling point stands out from the wholesale trade. The topic of sustainability communication will play an important role in this regard in the future. The system of indicators used can be refined in the future or extended to other areas of agriculture.

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Pavla Švermová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentská 1402/2, 461 17, Liberec 1, Czech Republic
email: pavla.svermova@tul.cz

CSR Reporting and its Importance

Abstract

This paper focuses on CSR reporting, as a very important activity; a company that has chosen to properly apply a CSR strategy would be difficult to do without it. This paper is not the result of a scientific research project, but an overview article. First, the topic of CSR reporting is developed. Its purpose in the company is captured here, as well as the areas covered by the report; reasons why the company should consider reporting (or not reporting); benefits if it decides to report. The following is the methodology of creating and formatting a company report in the field of CSR. Also the results and discussions on the statistical survey are included, whether reporting, resp. the number of reports, in individual EU countries depends on the economic maturity of the country. This is a very important topic, because even in the case of a positive and generous CSR strategy, which, however, will not be summarized and published towards stakeholders, the company's performance in CSR is insufficient. The aim is to approach the concepts within reporting and, above all, to state the factors that the company should consider when deciding on reporting and subsequent evaluation in the form of monitoring.

Key Words
reporting, monitoring, CSR, enterprises, sustainability

JEL Classification: M14, L26

Introduction

Corporate social responsibility (CSR) is an important aspect of a company's strategic behavior. The aspect of corporate social responsibility is even recognized at the level of the European Union. Within the concept of CSR, the company behaves responsibly in the areas of business decisions and strategies, as well as in the area of the environmental and social impacts of the company's actions. The company's customers demand from the company not only the quality of products and services provided, but also the credibility of a company with a good reputation.

According to the Czech author Kunz (2012), who deals with the concept of CSR, the basic idea of corporate social responsibility is the effort of companies to not only meet the economic goals of society, but also to take into account aspects of social and environmental nature in their activities, setting ethical and environmental standards. Furthermore, according to Kunz, they should avoid corruption, strive for employee

satisfaction and support the region in which companies are located. According to other authors Kunz and Kašparová (2013), there is no single definition of CSR, as they believe that the reason for the non-existence of a single definition is that CSR is performed voluntarily by companies and thus has no precise boundaries.

A very important part of CSR is **reporting** on the company's responsibilities. It is a periodic activity, usually in the form of an annual report, issued by companies, which sets out the company's actions and subsequent results in the area of the company's responsibility. It is therefore a document through which the company publishes all information about the actions it performs, if it contributes to the principles of sustainable business development (YouMatter, 2019). Of course, subsequent monitoring is also important, which assesses whether the required and planned goals and outputs have been achieved or not.

The question is whether there is any relationship between the economic maturity of the country and CSR reporting. Khediri (2021) claims that the effect of CSR on investment efficiency is driven by the areas Human Ressources, Business Behavior, Corporate Governance, and Human Rights; and that there is a positive association between CSR score and investment efficiency significant in countries with stronger investor protection. Rodolfo (2012) supports the need to maintain Ethical and Sustainability standards during economic crisis and concludes that more than a threat, Corporations and Society in general, should approach this as an opportunity period to improve CSR Reporting, a period in which the need for Ethic behavior and Corporate Social Responsibility is greater.

This leads to the research hypothesis „H“:
„As better a country is economically developed, as higher is the number of CSR reports."

1. CSR Reporting and Monitoring

The publication and the creation of a CSR report on a company is not mandatory, but European Union Directive No. 2014/95 nevertheless requires large companies to disclose certain non-financial information on how they operate and how they address social and environmental challenges. It follows that it is mandatory for large public-interest entities to disclose non-financial information and for large companies to disclose information on diversity. More specifically, these organizations should provide information on how they care for environmental, social and societal factors, how they respect human rights in society and how they fight against corruption and bribery works within their business and value chain.

This type of information then helps stakeholders such as customers, investors, managers and others to evaluate the non-financial performance of large companies and encourages organizations to develop sustainable business strategies that meet the expectations of all these stakeholders (YouMatter, 2019). Corporate Social Reporting communicates to various stakeholders actions surrounding Corporate Social Responsibility (Gray at al., 1995). Customers, investors and other stakeholders are interested in recognizing the effect of the business in the social setting where it develops its operation (Harrison and McKinnon, 1986). The purpose of reporting to the company on CSR actions is primarily to improve the transparency of companies' activities.

These can be two partial goals, which are:

1) On the one hand, reports on CSR activities aim to enable companies to measure the impact of their activities on the environment, on society as a whole and on the economy. In this way, companies can obtain accurate data that can help them improve their activities and thus have a more positive impact on the three basic areas, which are, as mentioned above - the environment, society and the economy.
2) On the other hand, the CSR report also allows companies to communicate externally with their stakeholders about the company's goals for sustainable business development and CSR. This then allows stakeholders to better understand what the company's short, medium and long-term goals are, allowing stakeholders to make better-informed decisions (YouMatter, 2019).

The **report** of the monitored area of CSR includes the following (ČZU, 2020):

- *Economic area* - the economic pillar of CSR includes both, the use of profit generated by the company and the behavior of companies towards their key partners. This is the area of the company's overall management, the company's behavior towards its customers, employees, investors and also suppliers. The economic area of CSR therefore includes the creation of the company's profit, but not at any cost. Companies thus make a profit while adhering to this pillar, but with regard to ecological sustainability, environmental support, and also responsibility for the community. The economic pillar includes ethical behavior towards all the above-mentioned stakeholders in society. In practice, this means that the company prioritizes long-term sustainability over short-term profits, thanks to which its management is in accordance with the ethical and moral principles of responsibility towards the whole society.
- *Employee pillar* - the employee pillar is related to legislation and ethical principles in the field of labor relations, in the care of employees and in the level of the working environment and working conditions for employees. The company supports the freedom and position of its employees within the framework of labor relations in collective bargaining and strives to prevent any discriminatory behavior and adverse situations in the workplace through formal tools. In order to prevent the problem from occurring and its subsequent solution, the company strives to create tools suitable for regularly obtaining information from employees and thus builds communication and timely detection of possible problems that may arise in the involvement of human capital in economic activities.
- *Social area* - as for the essence of CSR in the social field, it is the idea that only in a healthy society can a company prosper in the long run. In the social field, companies show affiliation with the wider society. A socially responsible company cares about consumer protection tools, such as the comprehensibility of contracts, the provision of additional product information, the creation of transparent solutions to complaint problems and the protection of customers' personal data. A socially responsible company requires its business partners and suppliers to respect human rights and labor principles. Companies in this area also support voluntary activities of employees and have developed a corporate strategy of corporate giving and philanthropy. Companies are also interested in the needs of the citizens of the region in which the companies operate and cooperate with local authorities.

- *Environmental area* - in this area, companies support preventive approaches to environmental protection. This includes activities to assess the level of risk of non-compliance with environmental, health and safety standards. Companies inform employees about preventive approaches. If companies are environmentally responsible, for example by sorting waste, they create environmentally friendly strategies to ensure that their activities do not harm the environment. Companies in this area also support the development and dissemination of technologies that are environmentally friendly and thus protect the environment.
- *Area of CSR management* - companies are beginning to be successful and efficient in creating, implementing and implementing CSR when they systematically plan, manage and organize their CSR project. Company strategies and resources for corporate social responsibility are the main starting points for CSR management. The company's control mechanism consists of CSR reporting and monitoring, as it serves to record procedures and subsequent results of the internal CSR audit. The feedback to the companies is then fulfilled by a periodic evaluation of the compliance of the internal and external environment of the companies with reality, and further suggestions for improvement are made. The reason for companies to report is the growing pressure from internal and external stakeholders. Stakeholders require information on the long-term impact of companies on society. Managers and owners of companies have come to realize that the manner, form and content of the report in the field of CSR greatly affects the long-term existence of the company (Kašparová, 2011).

Kašparová and Kunz (2013) summarize the factors that companies show as a reason **not to report**. These factors include:

- *Ignorance of problematic CSR* - where there is a complication in different understandings of a separate concept of CSR, as there are a large number of standards in this area that regulate the individual pillars of CSR at the national and supranational level. Businesses are then not sure how to create a report on CSR, etc.
- *Perceptions of data sensitivity* - companies may be afraid that when publishing information in a report, they may lead to more pressure from NGOs on the company. Furthermore, they may be worried about their image or negative legislative impacts.
- *Expectations of an increase in costs* - in this case, the company is concerned that when implementing reporting, it could incur costs associated with the acquisition of a monitoring system for these purposes.

However, one of the **main advantages for compiling a report** in the field of CSR is the *dissemination of awareness of the company's CSR activities*. Here are the main features:

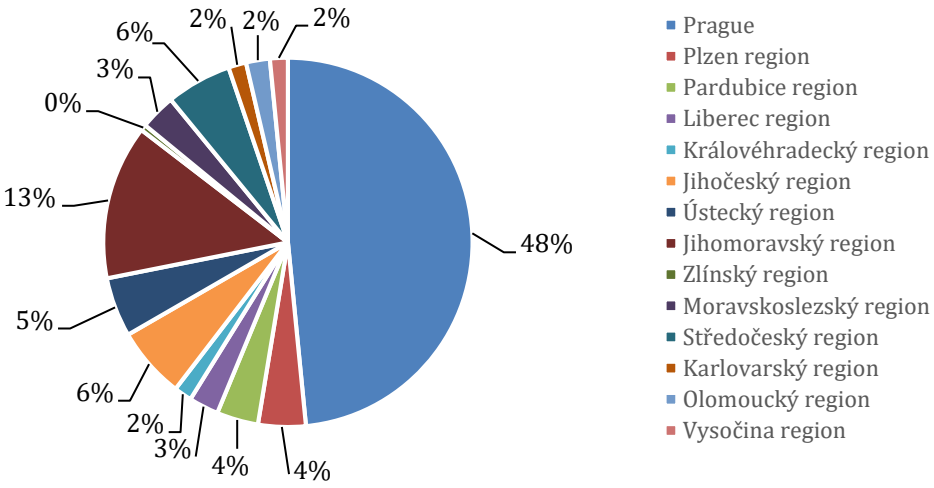
- High awareness enables the company to minimize stakeholder distrust (Du et al., 2010). Building stakeholder trust helps reduce the risks associated with a company's bad name and at the same time opens dialogues with the company's stakeholders.
- The company can then identify topics that are important to stakeholders and can focus on developing activities and improving communication with stakeholders, which can further influence the building of the company's vision and strategy (NCSR, 2020).

If a company creates a quality CSR report, it is possible to increase awareness of its CSR activities. In the Czech Republic, it is possible to participate in several competitions in the field of CSR, such as the "Top Responsible Company" competition organized by the

Business platform for the company or, for example, in the "National Award of the Czech Republic for Social Responsibility" competition.

Figure 1 shows the statistics of registrations and reports on the CSR Reporting portal in the Czech Republic. As can be seen from the graph, the most registered organizations are located in Prague, which corresponds to the number of completed and closed reports. The Zlín Region is the worst off with the number of registrations (ČZU, 2020).

Fig. 1: Number of registrations of Czech companies on the CSR Reporting portal



Source: authors' own calculations, data from (ČZU, 2020)

1.1 Creation and Format of the CSR Report

For the correct creation of a CSR report, it is important that the company formulates its goals, expectations and intentions with which it publishes the report at the beginning of the process. Furthermore, the company needs to clarify for which groups of stakeholders the report is to be intended. This occurs when defining a target group, which helps the company select specific topics to display in the report and determine the scope of those topics (Kašparová and Kunz, 2013).

Stakeholders can be divided, for example, according to how much influence they have on the operation of the company. Then there are according to Kašparová and Kunz (2013) the primary and secondary stakeholders:

a) *Primary stakeholders* – this group includes, for example, company owners, investors, employees or customers of the company or supplier. These are parties that have a great influence on the operation of the company.
b) *Secondary stakeholders* - which is a group to which interest groups belong, i.e. the government, civic associations, etc.

In order to take into account the different interests of stakeholders, it is also possible to compile different CSR reports separately for individual groups of stakeholders and to use the differentiated communication channels. Reports can be communicated in various

ways. For example, they may be presented as a separate document or may be included in other reports or statements, such as an annual report; next communication through social networks, etc. (NCSR, 2020). In order for a company to start publishing a report, it must also be decided which communication channel to choose towards its target group.

1.1.2 Communication channel selection

The report is communicated to the target group via a communication channel. The first point is to find out which communication channel seems to be the most suitable for communication with the public. The choice depends on the preference of the target group.

1.1.3 Preparation of report content

According to the authors Kašparová and Kunz (2013), it is best to first define the range of CSR activities that they will want to include in the report. It is important to be able to engage the target group with the most interesting information and to enable them to find even more detailed information in case of interest. The report should be suitably graphically modified and should also include clear navigation. Furthermore, the report should be reasonably long and, above all, comprehensible (NCSR, 2020).

In the content of CSR reports, it is generally assumed that companies include business activities and their subsequent impacts on society and the company's environment. To make the report more credible, the company should also state the *standard* it followed in compiling it, the *method* by which the data were collected and the company's business *objectives* and *policy*. Furthermore, the company can increase the credibility of the report and third-party verification, which is required by some standards.

Of course, the content of reports often results from the standard that the company chooses. For example, the GRI standard specifies the required content, a certain report quality is required. The GRI was developed by the **Global Reporting Initiative**. It is a large international organization based in Amsterdam. This company has developed guidelines for creating reporting and compiled a set of indicators to be used to measure the company's CSR activities (GRI, 2020b):

- The *first part* of the GRI standard focuses on the company and its activities. This section is marked as a company profile, where information about the company should be provided, such as company name, company owner, registered office, markets in which the company operates, etc. Another area is the company's values, principles and goals of the company.
- The *second part* of the GRI standard is called strategy. In this part, the company begins with a statement by the highest corporate representative regarding CSR and the sustainability of the company. Subsequently, the company should continue with the listed economic impacts, social and environmental impacts of the company's activities.
- The *third part* of the standard concerns the focus on ethics and integrity. This section should describe the company's values, principles and standards of business conduct, which should be described in terms of how they are used and how they are made known to the company's employees. Ethics at this point address who the stakeholders can turn to.

- In the *fourth part*, the GRI standard deals with business management. It is about the structure of the management, what bodies it is formed of, etc. This point should also indicate who is responsible for CSR.
- In the *fifth part*, the standard focuses on the involvement of stakeholders. First, the individual pages should be listed and categorized according to certain aspects. In addition, there should be information on how the parties are approached and what are the main topics discussed with the groups.
- The last *sixth part* is then devoted to the process of creating a report. Here it should be stated how the report was created, what changes have occurred in it since the last reporting, how often the reports are created and also the contact for any additional questions. Finally, there should be information on which standard the report is prepared (Fiinovation, 2018 and GRI, 2020a).

All areas covered by the GRI standard are listed in Table 1 below.

Tab. 1: Monitored areas within the GRI

Economic area	Economic results - sales, costs, wages, donations to the community, etc.
	Market presence - comparison of wages in the organization compared to wages in the area, comparison with local suppliers, etc.
	Indirect economic impacts and effects.
Environmental area	Material consumption, energy consumption, water, emissions, waste, recycling, transport.
Social area	Working conditions and procedures - relations between employees and employer, health and safety, training, equal opportunities.
	Human rights - non-discrimination, freedom of association, child labor, forced labor.
	Social influences - community, corruption, compliance with standards.
	Product responsibility - health and safety of customers, labeling of products and services, compliance with legislation.

Source: authors' own elaboration according to (GRI, 2020b)

2 Methodology

The aim of this part was a statistical survey, whether reporting, resp. the number of reports in individual EU countries depends on the economic maturity of the country. GPD per capita was chosen as a measure of monitoring the country's economic development. Data were obtained from the World Bank in 2019 (given in dollars).

The method of regression analysis was chosen. It is a form of predictive modelling technique which investigates the relationship between a dependent (number of CSR reports) and independent variable (GDP per capita in $). This technique is used for forecasting, time series modelling and finding the causal effect relationship between the variables. First, outliers were identified that were unusually distant from other observed values. These values were excluded from the calculation.

To determine dependencies between two variables (X and Y), Pearson's correlation coefficient *corr(X,Y)* was calculated.

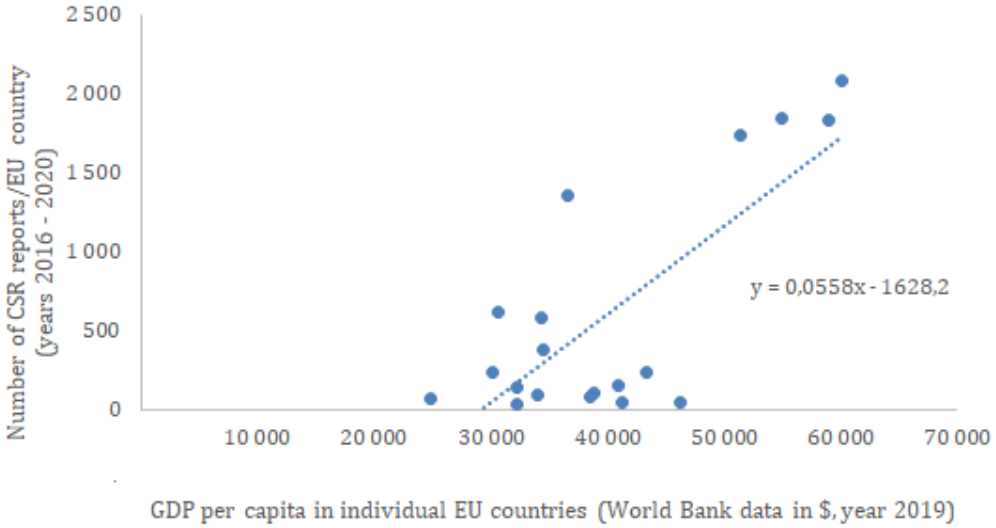
$$corr(X,Y) = \frac{cov(X,Y)}{\sigma_X \sigma_Y} \quad (1)$$

where *x* is GDP per capita in $ (World Bank data from year 2019), and *y* is number of CSR reports submitted in the individual EU countries (within years 2016 – 2020).

3 Results and Discussion

Resulting Pearson's correlation coefficient reached the value 0,569. Thus, a linear dependence was found between the quantities *x* and *y*, which can be described by the linear regression function y = 0.0558x - 1628.2 (see Figure 2). In other words, we can state that the more economically developed a country is, the more companies report their CSR activities there. So we can accept the "H" hypothesis: "As better a country is economically developed, as higher is the number of CSR reports."

Fig. 2: Number of CSR reports in EU countries depending on their economic maturity



Source: authors' own calculations, data from (Corporate Register, 2020)

But companies need to realize that **monitoring** is very closely linked to reporting. In order for the CSR strategy to be fulfilled, it is important for the company to establish mechanisms that will help it to continuously monitor, measure and subsequently evaluate the situation in various areas of CSR (Kunz, 2012).

The effectiveness of CSR activities can be assessed through a two-stage monitoring mechanism involving both external and internal agencies. Companies may appoint a Corporate Social Responsibility Committee or a Social Audit Committee to properly monitor CSR activities. The evaluation of the performance of CSR projects can also be consulted with an independent external agency (CASI, 2020).

For the evaluation of monitoring, for example, the criteria recorded in the following Table 2 can be set.

Tab. 2: Monitoring evaluation

Effectiveness of CSR activities	Do the activities achieve their predetermined goals?
Relevance of the project	Are CSR activities properly targeted at stakeholders?
Cohesion	Are CSR activities properly coordinated?
Resource efficiency	Are the resources allocated to CSR activities used efficiently?
Impacts	Do project efforts contribute to predetermined goals?
Sustainability	Will CSR initiatives continue for longer?

Source: author's own elaboration according to (CASI, 2020)

Conclusion

The aim of this paper was to introduce the topic of CSR reporting. The issue of companies deciding whether or not to report may seem relatively extensive and difficult for many firms, especially for small and medium-sized companies. However, the basic knowledge of these activities should definitely be inherent in each owner or top management of the company, as these activities can have a very large impact on the continued existence of the firm. As part of reporting on establishing dialogues with stakeholders, improving reputation and the associated improvement of relations with the environment, and as part of monitoring on the possibilities of evaluating the company's activities and compiling an overview of how successful the company is in these areas. Many companies are only beginning to grasp what customers expect them to assess, monitor and account for the full range of social and environmental effects of their operations. Expanding the overlap between corporate interests and the interests of society and the world, is the best way to ensure sustainability in the future. In addition to a strong working relationship with stakeholders, openness and accountability will develop the company, serve the interests of shareholders and create a better world. The increasing dedication to working with staff, business associates, government agencies, environmental and community stakeholders must therefore be expressed in this form of report. In conclusion it is necessary to state that the number and quality of social and environmental reports released by companies from various countries has improved and increased over the past few years; and that there is a statistical dependance between the number of CSR reports and the country's economic maturity.

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Jiří Vaníček

University of Economics and Business, Faculty of International Relations, Department of Tourism
W. Churchill Sq. 1938/4, 130 67 Prague 3 – Žižkov, Czech Republic
email: jiri.vanicek@vse.cz

Tourism in a Selected Protected Landscape Area

Abstract
The article focuses on sustainable tourism in the protected landscape area of the Moravian Karst. Participants to the research included municipalities, stakeholders in the field of tourism, local residents and visitors. The awareness of the concept of sustainable tourism has been insufficient, and there is a lot of space for education and information sharing in this field. In general, respondents believe that the region is not in danger of overtourism yet.

Key Words
protected landscape area, sustainable tourism, Moravian Karst, visitor, resident (

JEL Classification: Z30; Z32; Z33; Z38

Introduction

The international community recognized the urgency of environmental protection at the UN Conference on the Environment in Stockholm in 1972. Participants to the conference pointed out that the Earth is endangered by people themselves. The conference significantly influenced the formation of the worldwide environmental protection policy. (MOLDAN, 2009).

In 1983 the World Committee for the Environment and Development was established. The committee was the first one to offer a definition of sustainable development in a paper called "Our Shared Future" in 1987. Sustainable development is defined as follows: "Sustainable development is such that fulfills the needs of the present generation without endangering the ability of future generations to fulfill their needs"

One of the key factors for success of the tourism industry in all areas, including rural and protected areas, is the support of a local community (DAVIS, MORAIS 2004). Changes in residents' attitudes are important since they provided a way that planners and tourism practitioners should follow in order to achieve adequate level of community tourism development and planning. This adequate level was connected with satisfied quality of life, increased opportunities for new jobs, reduced costs of living (NUNKOO, RAMKISSOON 2010). A few studies underlined that residents' sense of well-being and their sustenance for tourism development were connected with how the outcomes of tourism were evaluated by the members of a community (ANDERECK 2005). This means that if residents perceive a positive benefit-cost ratio, it is more likely that they will support tourism and take active roles in tourism activities (SCAGLIONE, MENDOLA 2017).. Economic benefits from tourism, like employment and economic gain, were used

as indicators to examine community attachment, residents' quality of and satisfaction with life, and attitudes towards tourism (LEE 2013). Although economic benefits were a significant predictor, a combination of factors, such as social, emotional, and economic, performed better in analysing how residents' perceived values influence quality of life, their satisfaction with life, and support for further tourism development (WOO, KIM, UYSAL 2015, RAMSEOOK-MUNHURRUN, NAIDOO 2015)). According to Sweenev and Soutar (2001), important aspects of tourism development were also those intangible values that can be derived from place attachment or personal benefits. Since communities may have different traditions, cultures and natural resources, residents' level of support and attitudes towards tourism development and perceived quality of life may depend on the nature of a destination. The term 'sustainable development' has been used from the 1960s.

The industrialization era which started in Czechoslovakia after WWII influenced the environment significantly. A formerly rural country became an industrial one. This change resulted in a significant increase of pollution due to the construction of power plants, chemical factories and raw material mines. After the Velvet Revolution in 1989 the Ministry of the Environment and the Czech Environmental Inspection were established. Soon after that, the parliament passed significant laws to protect various aspects of the environment. (ZÁVODNÁ, 2015)

To maintain sustainability it is crucial to harmonize economic interests and environmental needs and to balance the technological progress and environmental limits. It means that sustainable development rests on three basic pillars: the economic, the social and the environmental ones (POLÁŠKOVÁ, 2011).

Tourism in protected landscape areas is a specific problem. A protected landscape area is a general term referring to a territory which is unique or very significant due to its natural, esthetic and cultural value where the scope of qualitative or quantitative restrictions of anthropogenic activities differs.

A protected landscape area (hereinafter the CHKO) is the second highest level of environmental protection, preceded only by the status of national parks. Large areas with harmonically shaped landscape, specific relief, a significant share of natural eco-systems of forest and permanent grass vegetation, with plentiful woody plants and sometimes also with extant traces of historic settlements can be declared protected landscape areas. These areas are economically used in harmony with rules applicable on the specific protection zone with the aim to maintain and improve their natural state and to retain and create the best ecological functions of the territory. The utilization of such areas for recreational purposes is admissible if it does not damage the natural values of the protected landscape areas. A CHKO, its role and specific protection terms and conditions are declared by means of a government decree.

Nowadays, there are 25 CHKOs in the Czech Republic (the Beskydy Mountains, the Bílé Karpaty Mountains, Blaník Hill, the Blanský Les Region, the Broumov Region, the České Středohoří Highlands, the Bohemian Karst, the Český Les Mountains, the Český Ráj Region, the Jeseníky Mountains, the Jizerské Mountains, the Kokořín Region, the Křivoklát Region, the Elbe Sandstone Rocks, the Litovelské Pomoraví Region, the Lužické Mountains, the Moravian Karst, the Orlické Mountains, the Pálava Region, the Odra River

Region, the Slavkovský Les Mountains, the Šumava Mountains, the Třeboň Region, the Žďárské Highlands, the Železné Mountains)

Ecotourism is considered an important sustainable development tool because it is "responsible travel to natural areas that conserves the environment and improves the well-being of local people" (definition of ecotourism by The International Ecotourism Society in 1990 – United Nations Environment Program, 2002). In fact, ecotourism not only brings economic benefits to local communities such as increasing local employment and income, but also makes tourists "more aware of nature and more supportive of its conservation via changes in their personal behavior, greater political support and larger financial contributions for such conservation" (TISDELL WILSON, 2002; TISDELL, 2003). Thus, many countries have promoted ecotourism to national parks and protected areas.

From the point of view of tourism, the adherence to the following bans and rules is important in protected landscape areas: no camping and making fire outside locations approved by an environmental protection body, no arrival and stay of motor vehicles and caravans outside roads and local streets and sites approved by an environmental protection body, no biking competitions outside roads, local streets and sites approved by competent bodies.

1. Methods of Research

The survey took place in October and November 2019 and in March 2020. The survey was partly performed by students of tourism at the University of Economics and Business as a part of their bachelor thesis polls. The objective of the survey was to identify the extent of awareness of sustainable tourism, the positives and/or negatives the CHKO status brings to a region, and to discover the opinion on the quality of the environment and the scope of participation in its protection. Representatives of municipalities showed the lowest willingness to participate in the survey; only 6 out of 26 municipalities participated in the survey. As regards stakeholders, their participation was more extensive when 46 entities took part. The highest number of respondents came from owners of catering and accommodation facilities (41 and 37%); in addition to the aforementioned, there were 18% of operators of tourist sights, 10% of producers of regional products and 9% of respondents were employees of information centers. As for people residing on the territory of the CHKO, we managed to address 150 respondents. This group included all age categories, and an equal share of men and women. Tourists arriving to the area were interviewed in person. They were intentionally addressed at various locations of the CHKO and on various days of a week. A total of 166 respondents participated in the survey.

2. Results and discussion

The existence of the Moravian Karst CHKO is perceived positively by 5 out of 6 municipalities. In their opinion, tourism contributes to the economic development of the region. It creates jobs for local people. However, on the other hand tourism adversely influences the environment and local people. There is heavy traffic in the region which

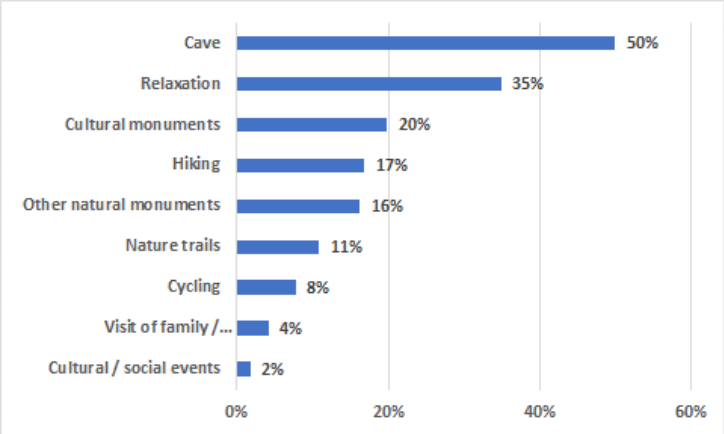
deteriorates the local roads and requires more money for their maintenance. Residents might consider the high number of tourists disturbing rather than useful. Municipalities appreciate the helpful cooperation under the Association for the Development of Rural Areas in the Moravian Karst, and activities of local action groups. Municipalities understand sustainable tourism as tourism with maximum reduction of adverse features, respect to the environment and balanced development that takes the environmental protection, benefits for the society and stable economic growth into consideration without emphasizing profit maximization.

56% of respondents operating in business know the term sustainable tourism. Businessmen usually think that sustainable tourism shall be gentle to the local landscape, ensure the distribution of visitors to various places within the region and retain sources for future generations. It is tourism which is sustainable on a long-term basis (which means non-destructive) as regards the impact on the landscape, local economy and community. Other tourist sights should be promoted to prevent concentration of tourist in 2 or 3 places within the Moravian Karst. It should be based on local sources in harmony with nature. The services should be sufficiently attractive but at the same time, their utilization should not interfere with the nature much. Not all businesses participate in the process of environmental protection. However, most of them protect the environment in a certain way, most frequently by minimizing waste, recycling it and repeatedly using various things, such as dishes. They also educate their employees and participate in voluntary events during which the Moravian Karst is cleaned.

As for the survey among Moravian Karst citizens, the majority of respondents (73%) are interested in the issue of environmental protection of the Moravian Karst CHKO. Only 19% of residents are interested in the development of tourism in the CHKO. 71% of respondents directly meet tourists and their attitude towards them is mostly positive (89%). 80% of residents think that the existence of the Moravian Karst CHKO positively influences the development of tourism in the destination. Significant sights in the territory are more carefully protected due to tourism, which results in a higher extent of environmental protection. Moreover, local people can improve their economic situation since tourism is a field, which provides and creates new jobs where local people are employed. However, tourism has a negative impact as well. Negative features include heavy traffic and related air pollution. Tourism might also disturb lives of local people and bring about additional costs. Most citizens participate in environmental protection, mostly by minimizing and recycling waste. Residents also retain rainwater and use it to take care of their gardens.

Reasons to visits to the Moravian Karst CHKO are listed in figure 1 when addressed visitors were allowed to give 3 reasons at the most. Fifty percent of respondents visited one of the caves; one third of respondents (who usually stay for several days) expect their stay to give them an opportunity to relax. One fifth of tourists visited cultural sights and one quarter of them hiked or rode bikes.

Fig. 1: Reasons to visit the Moravian Karst CHKO



Source: authors' own calculations

The sources of information before visiting the Moravian Karst included most frequently: tourists´ own experience (33%), recommendation from family members or friends (28%), and internet and media (28%). Every tenth tourist visited a tourist information centre. Three quarters of visitors came by car. In visitor's opinion, the CHKO is not overfilled with tourists. The environment is preserved well (72%). Only one third of visitors is familiar with the term sustainable tourism and can define it. 80% of respondents were satisfied with their visit to the CHKO. 20% of them were satisfied partly.

Conclusion

The Moravian Karst CHKO is an example of a preserved landscape area that managed to combine environmental protection and tourism. Visits to caves prevail; however, visitors do not limit their activities to this type of tourist attraction. They also visit other natural as well as cultural sights. This area is not in danger of overtourism yet.

One of the objectives of the questionnaire survey was to find out from all groups of respondents what sustainable tourism is in their understanding. Sustainable tourism is highly important in protected landscape areas. Most representatives of municipal governments knew this term. 56% of businessmen and only 37% of local citizens and 34% of visitors were familiar with sustainable tourism. It is apparent that there is lots of space for education and information sharing in this field.

Most municipalities think that the existence of the Moravian Karst CHKO positively influences the development of tourism. They appreciate new jobs and the inflow of finance from the regional budget. The resent the heavy traffic which results from tourism.

Stakeholders, especially owners of accommodation facilities, consider tourism very good. Most facilities are ready to accommodate handicapped visitors as well. The respondents think that they contribute to sustainable tourism by their effort to minimize waste and to strictly sort out refuse that can be recycled subsequently. Stakeholders would appreciate greater support of tourism by regional authorities and municipalities and better promotion of other tourist sights so that tourism is not concentrated on several most famous sights only.

Two thirds of local citizens addressed during the survey showed interest in environmental protection. The respondents think that the CHKO as a whole is not promoted sufficiently and attention should be focused on other places as well, not just caves. Their opinion is identical with businessmen's opinion in this aspect. Almost one-half of the addressed residents would not welcome further development of tourism. They think that further development would adversely affect the quality of their lives. They show positive attitude to tourists and consider the creation of new job vacancies and reduction of unemployment the greatest benefit of tourism in their region. Heavy traffic is a feature that they resent.

The questionnaire survey showed that the territory attracts new visitors, but people also like to return to the region. The number of visitors is not perceived to be high, and the environment in the region is considered of good quality. The survey performed among visitors showed that 86% of visitors spent one day in the region. Almost all of them were satisfied with the quality of services. Some of them would appreciate improvement in the field of catering and parking.

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Section VI

Finances and Insurance

Karina Benetti

Technical University fo Liberec, Faculty of Economics, Department of Economic Statistics
Studentska 1402/2, 461 17, Liberec, Czech Republic
email: karina.benetti@tul.cz

The Comparison of the Results of Credibility Modelling and the Regression Models with Real Data for Extreme Losses of Natural Hazards in the Czech Republic

Abstract

Credibility theory is an actuarial approach that is used to calculate insurance premiums. The aim of this article is: compare the results of the calculation of the credibility premium based on real data collected from the non-life Czech insurance industry with the results of the prediction of premium development using the regression model and the actual results for the insurance market in non-life insurance in the Czech Republic. The Czech insurance market is affected badly by the natural hazards, which in many cases have high losses. This research compares the results of an empirical study for calculating the credibility of premiums during the period from 2006 to 2018 with the results of predicting the development of premiums using a regression model and with the actual results for the insurance market in non-life insurance in the Czech Republic. The past data are collected from the Czech non-life insurance market considering the amount of the three highest risks areas and the number of extreme losses in each area. Considering the number of extreme losses, the results of this paper can be a good guide to the Czech insurance industry in the case of occurring extreme losses in natural hazards, which of the methods is suitable for estimating the development of premiums.

Key Words

Bühlmann and Bühlmann-Straub credibility, credibility premium, credibility theory, extreme losses, regression models

JEL Classification: C13, C52, C58

Introduction

This paper builds on previous research from 2019 (Benetti *et al.* 2019), which focused on calculating the premium credibility based on real data collected by the non-life Czech insurance industry. This research used a modified model based on the Bühlmann and Bühlmann-Straub models to project the premiums based on the past /posterior data of extreme losses by natural hazards collected from the Czech insurance market from 2006 to 2018.

Bayes first developed the credibility theory in 1763. Many researchers have been working to develop the theories and the models used to reach a more accurate method

of calculating the risk premium that should be collected by the insurers based on conditional probability.

Later, Bühlmann and Bühlmann-Straub credibility approaches are considered the recent development of the Bayesian credibility theory; these models apply the greatest accuracy theory. Bühlmann introduced his model in 1967. This work was followed by Bühlmann-Straub (1970), who continued the earlier work of Bühlmann and introduced a multivariate generalization of the credibility model for claim reserving.

The Czech Republic faces high losses caused by natural storms and floods over recent years; the Czech insurance market has experienced extreme losses of natural hazards that would affect the calculation of premiums to cover the expected liabilities in the occurrence of such risks. At present, thanks to changing climatic conditions, we can expect that the Czech insurance market will have to cope with the occurrence of other climate changes and thus the more frequent implementation of risks such as storms, drought and other risks already mentioned. Therefore, it is the prediction of the development of written premiums that is crucial for maintaining the financial health of non-life insurance companies, which cover natural hazards. Since credibility theory provides an actuarial approach to deal with these extreme losses, it will be important to explore the effectiveness of credibility models in such risks. Both Bühlmann and Bühlmann-Straub models introduced the credibility models that can help calculate the premiums required to cover such losses. Another option for predicting the development of premiums is to use regression models. The paper compares the results of premiums prediction using credibility models with the results of premiums prediction using regression modls with real data.

1. Methods of Research

Review of the Literature

Linda and Kubanová (2012) used actual data from five insurance companies to calculate premiums for motor third-party liability insurance based on Bühlmann-Straub credibility as a methodology to improve the quality of net premium estimation.

Loisel and Trufin (2013) considered the discrete-time ruin model to determine the characteristics of the ruin probability in the heavy-tailed claim amounts. Then apply the Bühlmann credibility to estimate net premiums.

Pacáková (2013) applied Bayesian credibility analysis to estimate parameters for several statistical distributions given prior distribution. Furthermore, estimate the credibility premium or credibility number of claims in insurance.

Happ et al., (2014), applied Bühlmann-Straub credibility to claim to reserve non-life chain-ladder. They used multivariate credibility of N correlated portfolios to estimate the conditional mean square error of the ultimate claims and compared the estimated results with the multivariate additive method.

Jindrová (2014), demonstrated a classical Bayesian approach to estimate the probability of realizing the risk of death and permanent disability due to an accident for different age groups of men and women within the Slovak insurance market.

Seinerová (2015) illustrated and applied of Bühlmann Straub model to estimate the credibility costs by combining individual and collective experience throughout the credibility factor as a confidence level. This model is used for health care insurance.

Jindrová and Seinerová (2015), applied the Bühlmann Straub model to measure the cost of healthcare insurance and the corresponding credibility factor and concluded the for large companies, the estimation of the healthcare cost is reliable while for small-sized companies it's meaningless without the referral to data from the whole market. In addition, Bayesian analysis is considered a useful technique for healthcare insurance.

Gao (2016) illustrated modelling claim reserving using Bayesian analysis, this study classified into two sessions. The first session introduced Bayesian methodology for claim reserving. The second session proposed a compound model as a probabilistic approach and the Bayesian expansion models by applying Monte Carlo simulation for claim reserving.

Jindrová and Kopeck (2017), considered Bühlmann and Bühlmann-Straub empirical credibility to estimate the credibility premiums and net premiums for catastrophic claim amounts and economic losses for different regions. They applied Bühlmann and Bühlmann-Straub credibility for short-term insurance considering two types of data i.e. past data from risk itself and collateral data from other sources deemed relevant.

Hendrych and Cipra (2017) demonstrated the dynamic linear system of simultaneous equations for the non-life insurance market in Czech; they used these equations to estimate the desired variables i.e. (outstanding claims, unearned premiums, other technical provision and loadings). This approach might motivate the development of internal models applicable in the Solvency II framework.

In 2019 ElSayed and Soliman (2019) applying the Bühlmann and Bühlmann-Straub credibility models in six branches of non-life insurance in Egypt from 2006 to 2015. They adopted the model of allocating the number of claims and the number of observed extreme losses in order to predict net credible premiums for the coming year and use a common model in the six non-life insurance sectors in Egypt between 2006 and 2015. demonstrated by extreme events, use the modified Bühlmann and Bühlmann-Straub credibility models, where the tail behaviour of receivables is considered in order to predict credible premiums.

The ElSayed and Soliman model (2019) was then used to model the estimation of premiums in non-life insurance in the Czech insurance market (Benetti et al., 2019).

Data and Methodology

Data for the Czech insurance market used in this paper are incurred claims from three most important areas: damages caused by the weight of snow, damages caused by floods and damages caused by gales and hail storms and the number of extreme losses from

each area for the period from 2006 to 2018. These data are reported by Czech Insurance Association.

In this research we compare the results of previous research from 2019 (crediblity theory) with the results of regression models and real data from the Czech Insurance Association from the year 2019.

The application of the models that will be used in this paper are carried out by using the R Package which is an open source environment for mathematical and statistical computations and Statgraphics Centurion. The actuar package is also used to apply the modified Bühlmann and Bühlmann-Straub credibility models. This section will present the data used in this research and will illustrate the results that are reached by applying the modified credibility models in a different type of risks: such as the natural hazards and the expected net premium that should be collected to cover the extreme losses resulting from occurring of these risks.

The data of natural hazards is collected as mentioned before from the Czech insurance market and published by the Czech Insurance Association from 2006 to 2018. Table 1 illustrates the number of claims for three main types, they are: damage caused by the weight of snow; damage caused by the floods; damage caused by gales and hail storms.

Tab. 1: The Amount of Extreme Claims (in thousands CZK)

Damages	2006	2007	2008	2009	2010	2011	2012
Damages caused by weight of snow	2 564 492	20 603	2 403	309 790	1 212 759	271 774	148 399
Damages caused by floods	1 340 848	386 892	5 070	1 508 902	3 994 437	336 827	353 794
Damages caused by gales and hail storms	685 606	3 134 566	1 250 653	1 936 736	2 706 853	1 045 302	1 740 007
Sum	4 590 946	3 542 061	1 258 126	3 755 428	7 914 049	1 653 903	2 242 200
Damages	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	
Damages caused by weight of snow	124 402	22 070	20 704	19 976	105 474	13 591	
Damages caused by floods	7 457 780	1 013 006	68 245	355 609	170 619	186 373	
Damages caused by gales and hail storms	1 733 727	931 355	1 181 358	1 535 267	2 511 817	1 056 526	
Sum	9 315 909	1 966 431	1 270 307	1 910 852	2 787 910	1 256 490	

Source: own elaboration from (CIA, 2019)

Table 1 shows the amount of claims in the Czech insurance market. From this table, it is clear that during the period under review, the greatest damage happened in 2013 and it is caused by floods. The Table 2 shows the number of extreme losses for each risk type.

Tab. 2: Number of Extreme Losses

	2006	2007	2008	2009	2010	2011	2012
Damages caused by weight of snow	0	0	0	0	1	0	0
Damages caused by floods	0	0	0	1	1	0	0

Damages caused by gales and hail storms	0	1	1	0	1	0	0
Sum	0	1	1	1	3	0	0

Tab. 2: Number of Extreme Losses (continued)

	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Damages caused by weight of snow	0	0	0	0	0	0
Damages caused by floods	1	0	0	0	0	0
Damages caused by gales and hail storms	2	0	0	0	0	1
Sum	3	0	0	0	0	1

Source: authors' own elaboration, data from (CIA, 2019)

2. Results of the Research

Descriptive Statistical Analysis

First, a descriptive statistical analysis is conducted to understand the different statistical characteristics of each type of risk that will be analyzed. Table 3 summarizes the statistical characteristics of each risk type.

Tab. 3 summarize the statistical characteristics of each insurance area.

Tab. 3: Descriptive Analysis for Claim Amounts per Risk Area

Risk Area	Mean	Median	St. dev.[1]	Skewness	Kurtosis
Damages caused by weight of snow	372034000	105474000	734193000	3.96215	5.39114
Damages caused by floods	1321420000	355609000	2132260000	3.57881	1.12532
Damages caused by gales and hail storm	1649980000	1535270000	748197000	4.38144	-0.25874

Source: (Benetti et al., 2019)

Tab. 3 displays the results of amount of claims for the following risk areas: damages caused by wight of snow, damages cased by floods and last risk area was damages caused by gales and hail storms. For damages caused by weight of snow is mean in the amount of 372 034 000 CZK, for damages caused by floods is mean 1 321 420 000 CZK and for damages caused by gales and hail sotrm is the mean 1 649 980 000 CZK.

Credibility Models

As mentioned above, this article does not deal with the actual modelling of premium values using credibility models but is based on already published results (Benetti *et al.*,

[1] St. dev. is standard deviation.

2019). For this reason, only the resulting values of the net premium estimate will be given here, see the tab. 4.

Table 4 shows the projected net premiums for each risk type that should be collected in each type by the insurance market in order to be able to cover any extreme events that may occur in 2019. The estimates for net insurance premiums for damages were calculated for the Czech insurance market are: 1 486 558 000 CZK for damages caused by weight of the snow, 4 178 870 000 CZK for damage caused by floods, and finally, 1 961 127 000 CZK for damages caused by gales and hail storm.

Tab. 4: Credibility Factors and Estimates of Net Insurance Premiums per risk area in 2019 (in thousands CZK)

Risk area	Credibility factor (Z_i)	Net Insurance Premium
Damages caused by weight of snow	0.7940475	1 486 558
Damages caused by floods	0.9204231	4 178 870
Damages caused by gales and hail storm	0.9585628	1 961 127

Source: Authors' calculations based on result from R Package

Regression Models

Statgraphics Centurion software – the Automatic Model Selection – was used to predict data development, with the selection of suitable models according to the nature of the data, from which the software finally selected the most suitable model according to the criteria. With regard to the nature of the data, the following models were selected: Mean, Linear Trend, Quadratic Trend, Exponential Trend, S-Curve, Moving Average, Simple Exponential Smoothing, Browns Linear Exponential Smoothing, Holts Linear Exponential Smoothing and Quadratic Exponential Smoothing - all with Optimize Parameters. Than was selected the method selection criterion – in this case was selected Akaike Information Criterion (AIC). Forecasting was performed with 95% reliability.

Tab. 5: Estimates of Net Insurance Premiums per Risk Area in 2019 by Selected Regression Model I (in Thousands CZK)

Risk Area	Forecast Model Selected	Net Insurance Premium – Forecast for Year 2019
Damages caused by weight of snow	Simple moving average of 2 terms	59 532.5
Damages caused by floods	Constant mean[1]	1 321 420
Damages caused by gales and hail storm	Constant mean	1 649 980

Source: Authors' calculations based on result from Statgraphics Centurion

If we allow the software to select from all models - including Random Walk and ARIMA models, then the results are as follows – see tab. 6.

[1] This model assumes that the best forecast for future data is given by the average of all previous data.

Tab. 6: Estimates of Net Insurance Premiums per Risk Area in 2019 by Selected Regression Model II (in Thousands CZK)

Risk Area	Forecast Model Selected	Net Insurance Premium – Forecast for Year 2019
Damages caused by weight of snow	ARIMA(0,2,1)	-54 220.9
Damages caused by floods	Constant mean	1 321 420
Damages caused by gales and hail storm	ARIMA(2,1,0)	1 882 330

Source: Authors' calculations based on result from Statgraphics Centurion

From the results in tab. 6 it is clear that the ARIMA (0,2,1) model is not suitable for predicting the development of premiums within the risk area damages casued by weight of snow, as the prediction is based on negative values. The same model was selected for risk area damages caused by floods. The ARIMA model (2,1,0) was selected for risk area damages caused by gales and hail storm. Time sequence plots from the selected models for forecasting of premium for each risk area sees in the appendix.

Data are now available on the Czech insurance market as to whether these modified credibility models or regression models are suitable for estimating net insurance premium. According to the results of the Czech Insurance Association, the results for 2019 (CIA, 2021) were as follows: damages caused by the weight of snow was for 192 305 000 CZK, damages caused by floods was in the amount of 288 816 000 and damages caused by gales and hail storm was in the amount of 2 292 976 000 CZK.

We will now compare the results of the models – credibility models and regression models with real values – see tab. 7.

Tab. 7: Comparison of Predicted Values Using Credibility Modelling and Regression Models with Real Values.

Risk Area	Credibility Modelling (%)	Regression Modles I / II (%)
Damages caused by weight of snow	773	31 / .
Damages caused by floods	1 446	457.5 / 457.5
Damages caused by gales and hail storm	85.5	71 / 82.1

From the results given in the table above, it is clear that if the model values compared to real values are above 100%, then the insurance company would use the model to create sufficient reserves in premiums, but what these values are higher than 100%, then it is considering whether it does not create too large reserves and does not have large

amounts of funds stored in them unnecessarily. To maintain the financial health of insurance companies, it is not at all appropriate for them to keep reserves below 100% - this is contrary to legal regulations. Insurance companies must make such estimates of the future development of insurance benefits that they meet their obligations. From this point of view, estimates of the development of premiums using credibility modelling seem a little more accurate than regression models.

3. Discussion

The future development of net premium can be modelled using various statistical modelling tools. Net insurance premiums were estimated using the Bühlmann-Straub Credibility Model and the regression models. These results were then compared with real values.

It is evident that if the insurers used the Bühlmann-Strabu Credibility Model, unlike regression models, for estimation of net premium, they would be able – except risk area damages caused by gales and hail storm – to create sufficient reserves to cover the risks. But, of course, by law, they must make compulsory reserves, which are calculated based on well-defined procedures, whereby insurance companies have to count on maximum damage. Therefore, this model does not calculate as much damage as possible. Still, the expected net premium is estimated to cover the insurance company's costs with the appropriate type of risk - except risk area damages caused by gales and hail storm. Therefore, the Bühlmann-Straub Credibility Model can serve insurance companies as a complementary model to estimate the net premium.

Conclusion

The Bühlmann and Bühlmann-Straub approaches represent the recent development of the Bayesian theory of trust; these models use the highest accuracy theory. This study compared the results of the improved Bühlmann and Bühlmann-Straub confidence models and the classical regression models with real values.

This research focused on three risk areas in the Czech non-life insurance market from 2006 to 2018. Furthermore, these sectors include extreme events predicting the plausibility of net premiums for the coming year 2019 for each risk area in the Czech insurance market. In addition, this process shows how much money each branch will need to cover extreme events to manage risks.

Based on economic changes in the Czech insurance market, future research may consider fluctuations in the number of insurance claims due to extreme losses or falls in insurance contracts.

Acknowledgment

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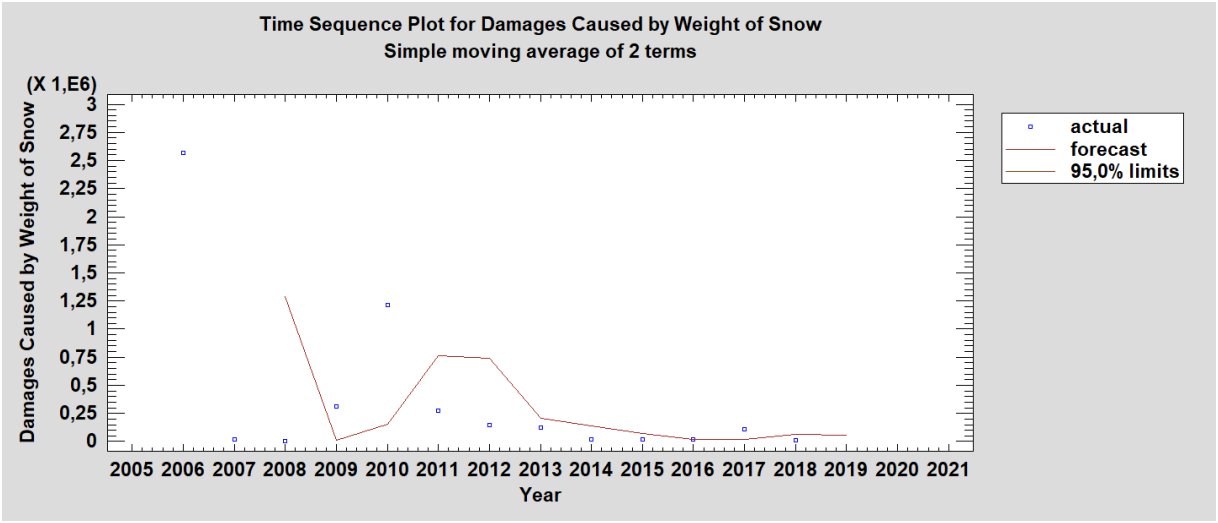
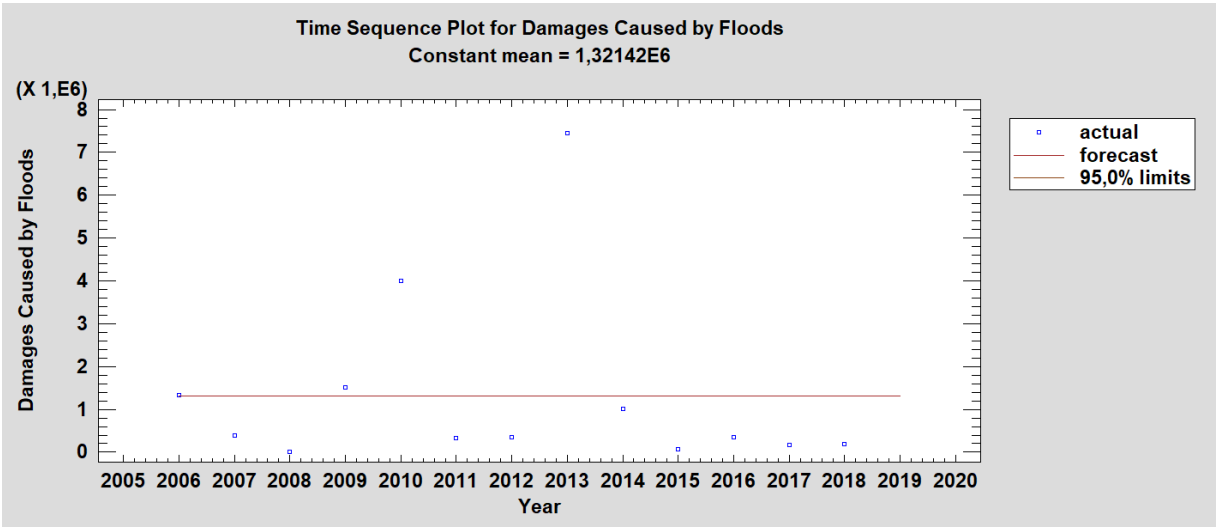
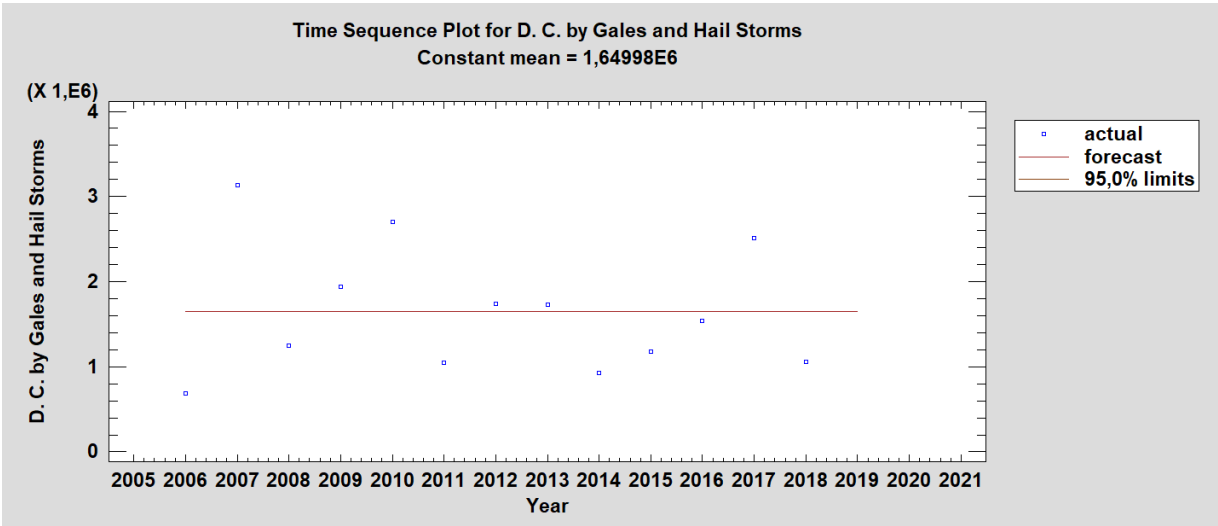
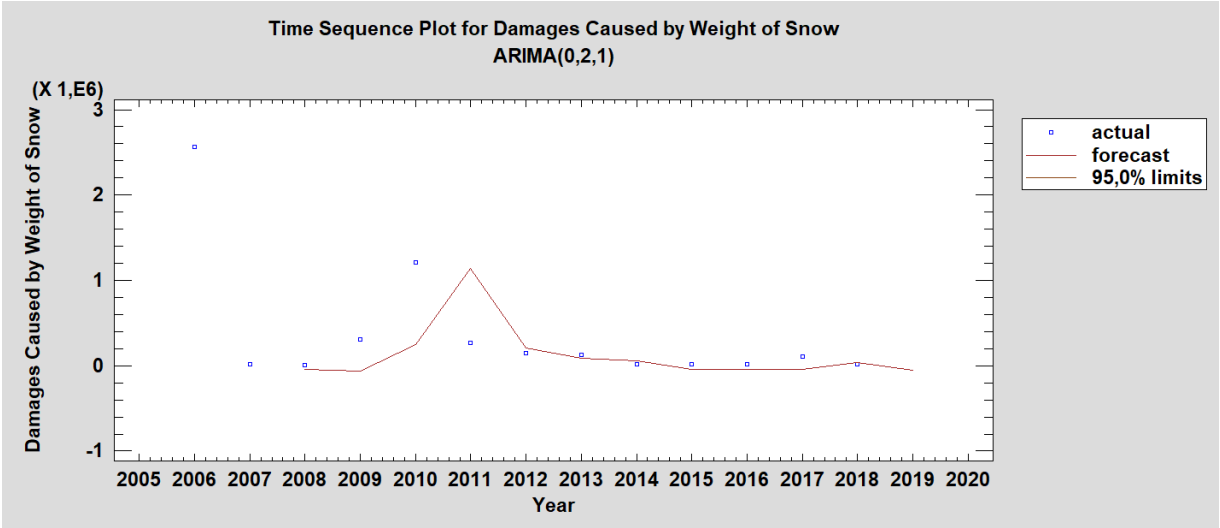
Appendix

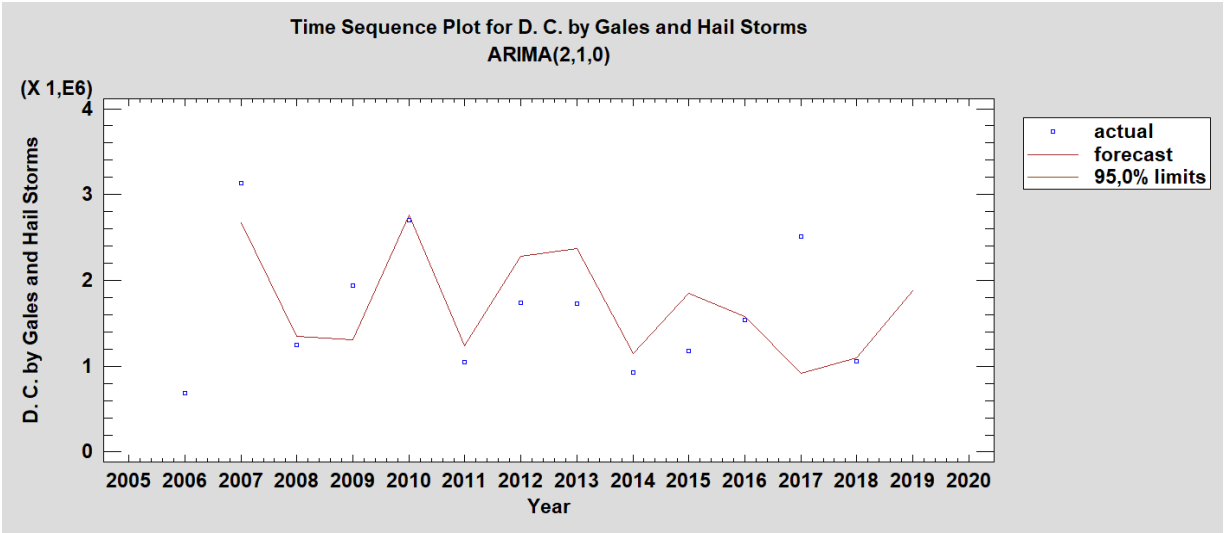
Time sequence plots from the selected models for forecasting of premium for each risk area.








Time Sequence Plot for Damages Caused by Weight of Snow
ARIMA(0,2,1)
(X 1,E6)
Damages Caused by Weight of Snow
3
2
1
0
-1
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
actual
forecast
95,0% limits


Time Sequence Plot for D. C. by Gales and Hail Storms
ARIMA(2,1,0)
(X 1,E6)
D. C. by Gales and Hail Storms
4
3
2
1
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020
Year
actual
forecast
95,0% limits

Roman Blažek

University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics
Univerzitna 8215/1, 010 26 Zilina, Slovak Republic
email: roman.blazek@stud.uniza.sk

Is the Tax System of the Slovak Republic Competitive with the Visegrad Four Countries?

Abstract
The tax system plays a central role in shaping a just society and a strong economy. It can help inequalities, not only by promoting social mobility but also by reducing inequalities in market income. The general opinion is that a good tax system should have five characteristics, namely economic efficiency, fairness, administrative side, flexibility, and political clarity of the tax system. A tax is a financial category that expresses the financial relationship between a taxpayer and the state. A tax is a payment by natural or legal persons that is enforceable, non-refundable, usually non-purpose, legally determined, and, as a rule, a recurring payment collected by the state or local authorities. It is the most important revenue item of the public budget, which has a forced character. The purpose of the article is to compare the quality of value-added tax collection in the V4 countries and subsequently to determine the tax gap. In the article, the reader reads about the tax system, the subjects of the tax system, which is VAT, read about VAT in the V4 countries, and also about the various rates that apply to value-added tax in these countries. The tax revenues of the V4 countries are compared and the problem of the difference between the actual and possible volume of tax revenues resulting from this type of taxes is also addressed. The results showed that the Slovak Republic collected approximately 30% less in value-added tax than it potentially had.

Key Words
tax revenue, tax gap, value added tax, Visegrad four

JEL Classification: E60, H25

Introduction

The tax system is a broader and more complex tool than the assessment. In addition to the direct and indirect taxation system, it also includes the authorities responsible for administering and collecting taxes that would not be possible without the various technical and organizational procedures and tools applied by these bodies. (Lipkova et al., 2017)

According to Martinkov and Banociova (2016), there is no universal comprehensive model that would determine what an optimal and efficient tax system should look like, which would apply in all countries at the same time, because each country has different, typical conditions. However, many authors agree on certain general principles that must apply in any tax system to ensure its effectiveness. Miklos et al. (2005) describe the following principles of an optimal and efficient tax system: fairness, flexibility, unpretentiousness, transparency, and efficiency.

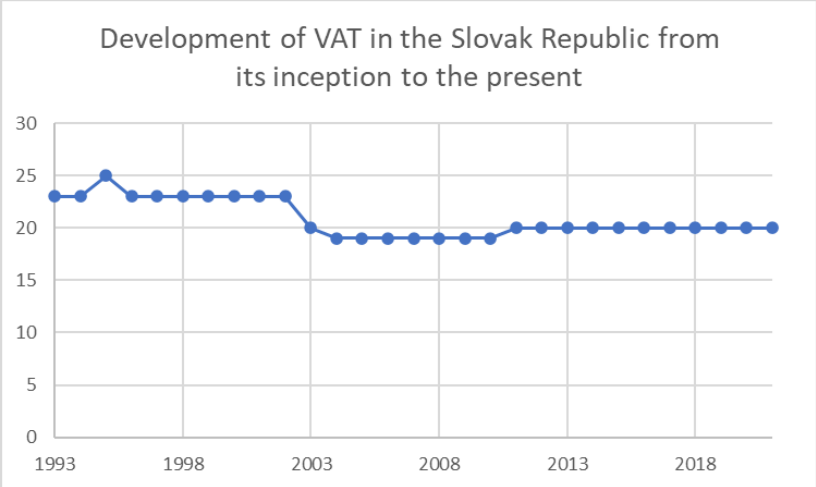
Value-added tax, abbreviated VAT, as stated by the authors Handacova and Stremy (2018), is currently the world's basic type of universal indirect tax and one of the main revenues of the state budget as stated by the authors Hajduchova et al. (2015). The general reason for the introduction of taxes is the revenue of the state budget of the country in whose territory the economic activity is carried out. VAT is taxed on consumption. According to the author Sopkova (2009), the VAT system works in such a way that the final consumer is taxed for the given product, resp. will pay for the service in the price of the product, but the state tax will ultimately be paid "for him" by all "members" of the distribution channel.

1. Methods of Research

Based on an article by Krupova and Slaboch, I decided to look at the tax gap of the V4 countries, which I analyzed before the outbreak of the covid pandemic 19. The authors Kroupova and Slaboch (2015) state in their study that their research estimates the tax capacity and tax efforts of the Visegrad Four (V4) countries and other EU members in the period 1993-2013. Based on this research, I decided to analyze the V4 countries.

In the picture below we can see how VAT has changed over the years in the Slovak Republic.

Fig. 1: Value added tax in the Slovak Republic



Source: author own research according to the Statistical Office of the Slovak Republic (2021)

The value-added tax represents one of the most important sources of state budget revenues of EU Member States, Martinková and Bánociová publish in their study (2016).

The author Rabatinova (2014) writes that since 2008 Member States have been facing increasing levels of tax evasion, especially in the area of value-added tax. There has been no significant improvement in the EU over the last few years. In 2013, VAT losses (VAT gap) amounted to € 168 billion. This represents 15.2% of the total expected VAT revenue in the EU. The paper analyzes the main trends of the VAT gap in the Visegrad Four countries in the years 2005-2013. During the crisis, VAT revenue losses increased sharply

in Poland and Slovakia, while remaining relatively stable in the Czech Republic and Hungary. In 2013, the largest improvement in VAT was recorded in Slovakia, while the VAT gap continued to increase in Poland and Hungary.

Tax enforcement may have detergent effects that extend beyond directly treated taxpayers, but evidence of such detergent effects for major sources of revenue is limited. Boning et al. (2020)

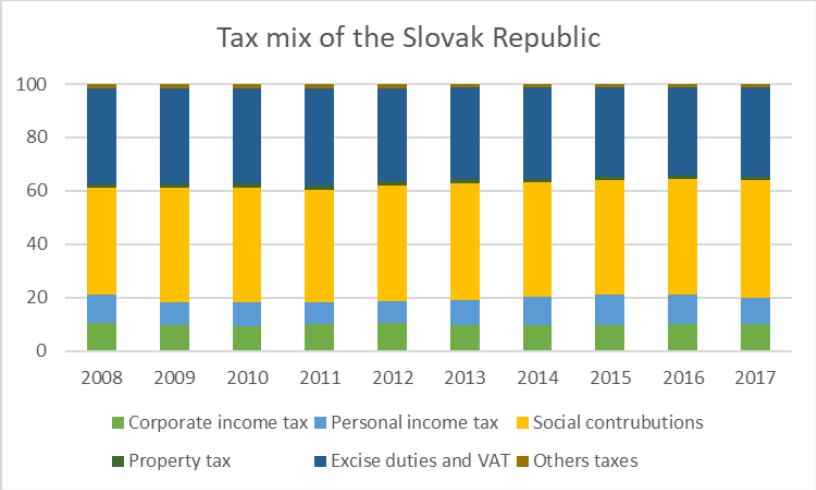
The recent financial crisis is the worst since the 1929 Great Depression. In their publications, the authors Stolicna and Cernicka (2017) tried to identify changes in the tax systems in Poland, the Czech Republic, Hungary, and Slovakia.

2. Results of the Research

Authors Olexova and Hustak (2018) state in their study that the OECD recommends countries to shift their tax combination from income taxes to excise duties, VAT and property taxes. In this article, I will follow the development of the tax mix over a period of ten years and compare which of the countries is most aimed at meeting this recommendation. The following graphs show revenues from specific taxes as a ratio of total tax revenues in the period from 2008 to 2017. I will evaluate each country individually and compare the changes achieved. As other taxes are only additional, I will not pay attention to them, even though they are included in the total taxes.

The first country is Slovakia, whose tax mix is reflected in Fig. 1. Personal and corporate income taxes together account for 18 to 21% of total tax revenues. Revenues from excise duties and VAT have ranged from 33 to 36% over the years. The smallest part consists of property taxes, the value of which is none of the monitored years exceeded the limit of two percent of the total tax revenue. The largest part of income is represented by income from social security contributions. Social contributions in the observed period showed an increasing tendency and their increase is the most significant in comparison with other taxes.

Fig. 2: Tax mix of the Slovak Republic

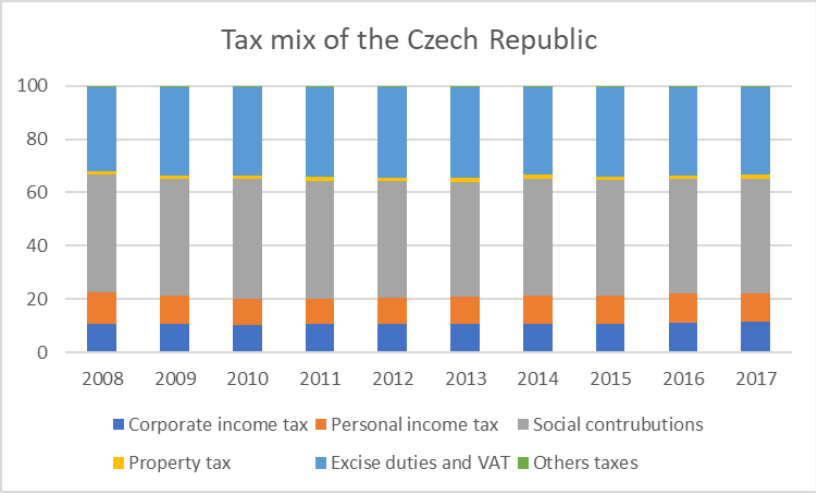


Source: author own research according to Eurostat (2020)

The second country is the Czech Republic, whose data on the tax mix is shown in Fig. 2. In the Czech Republic, as well as in Slovakia, most revenues come from social contributions. In contrast to Slovakia, in the Czech Republic we can observe a slight decrease in the ratio of income from social contributions. Income taxes individuals and legal person together represent 20 to 22 percent of the state's tax revenues over the years. Revenues from property taxes range between 1.1 and 1.5 percent of total revenues. Revenues from excise duties and VAT make up 31 to 34 percent of the share of tax revenues year-on-year and in most cases are lower than in Slovakia.

When comparing the tax mixes of Slovakia and the Czech Republic, only relatively small differences are noticeable. The distribution of tax revenues and their development over the ten years under review is similar in these countries. Both countries are achieving low year-on-year changes with a fluctuating tendency. A common feature is a decline until 2012 and the subsequent increase from 2013 on income from personal and corporate income taxes.

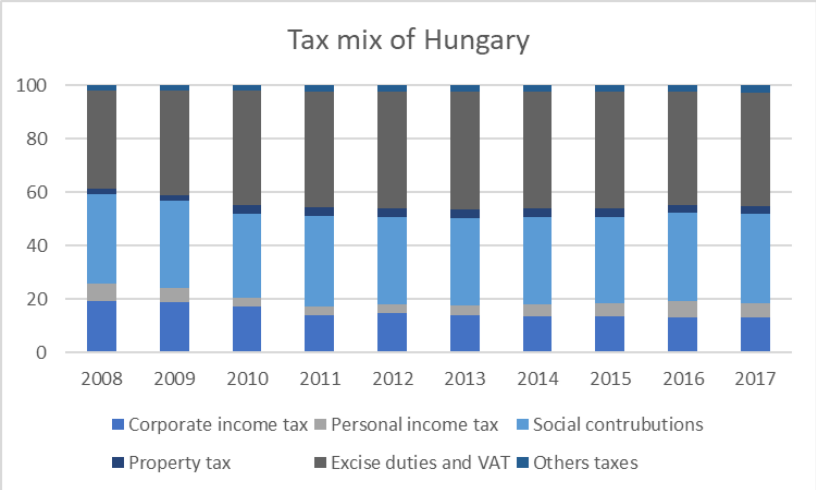
Fig. 3: Tax mix of the Czech Republic



Source: author own research according to Eurostat (2020)

The third tax mix, which is illustrated in Fig. 3, is introduced in the Republic of Hungary. The share of individual taxes in total tax revenues in Hungary is visibly different from Slovakia and the Czech Republic, which were very similar. We can observe differences in the shares of all types of taxes.

Fig. 4: Tax mix of Hungary



Source: author own research according to Eurostat (2020)

In Hungary, income from social security contributions averages around 32 to 33%. Compared to Slovakia and the Czech Republic, these revenues do not represent the largest share. In Hungary, most revenues come from excise duties and VAT. Significant differences between Hungary and the previous two countries lie in personal and corporate tax revenues. Corporate income tax is a small part of total income in Hungary and several times lower than in Slovakia and the Czech Republic. In terms of the share of total tax revenues at the beginning of the period under review, personal income taxation is significantly higher than in neighboring countries, but we can gradually observe a significant decline.

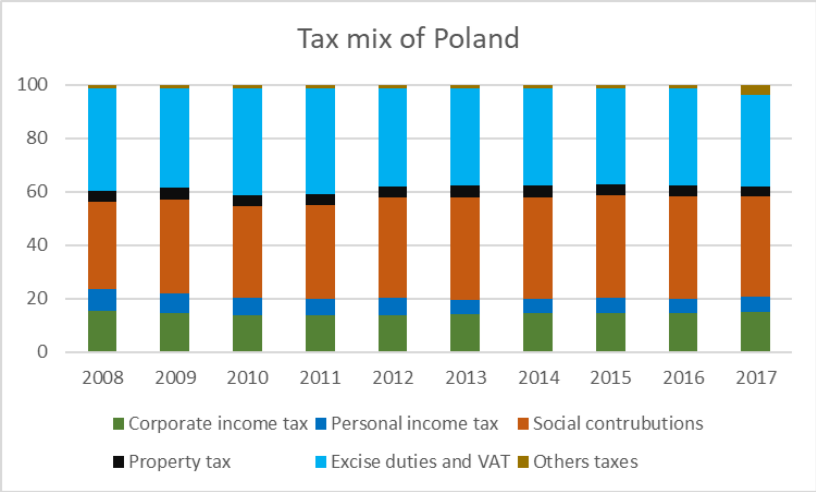
In the case of property taxes, the ratio to total income is more noticeable than in previous countries. While revenues from property taxation in Slovakia and the Czech Republic did not even reach the value of two percent of the share in the state's tax revenues, in the Republic of Hungary their value fluctuated above two percent and in some years even above three percent.

The last country in the Visegrad Group whose tax mix I analyze is Poland. The Polish tax mix shown in Fig. 4 is approaching Hungary among other V4 countries. Similarities with the Hungarian tax mix can be observed in the area of income taxes and property taxes. In the Polish tax mix, there has been a change over the years in the area of taxes, from which the state has the largest revenues. In the first half of the period under review, excise duties and VAT had the highest share in tax revenues. Since 2012, they have exceeded social contributions in relation to total revenues, and the only country from the V4 in which the highest revenues come from excise duties and VAT remains Hungary.

Poland is the leading country in terms of property taxation. The share of property tax revenues is the highest among countries in Poland and reaches a value of more than 4 percent of total tax revenues for almost the entire period. Corporate income taxes in Poland have infrequently attributed to tax revenues and their value is lower than in

Slovakia and the Czech Republic. Personal tax revenues are higher than in neighboring countries.

Fig. 5: Tax mix of Poland



Source: author own research according to Eurostat (2020)

The following Table 1 compares the development of the tax mix of individual countries and the change that has taken place in the collection of taxes over ten years. In the taxation of personal and legal income, the V4 countries have relatively succeeded in fulfilling the recommendation to reduce their burden. The share of income taxes in the total tax revenues of countries decreased in all countries, with the exception of the Czech Republic, whose revenues from personal income taxes increased year on year. The most successful country in the declining trend of income taxation was Hungary, which significantly outpaced neighboring countries.

Tab. 1: Changes in the tax mixes of the V4 countries during the years 2008-2017

	Personal income tax	Corporate income tax	Property tax	Excise duties and VAT	Social contributions
Slovak republic	- 0,24	- 0,74	+ 0,03	- 2,39	+ 4,05
Czech republic	+ 1,02	- 1,47	+ 0,23	+ 1,40	- 1,23
Hungaria	- 5,93	- 1,59	+ 0,69	+ 5,53	+ 0,44
Poland	- 0,77	- 2,12	- 0,62	- 37,78	+ 5,10

Source: author own research

In the area of the recommended increase in the tax burden on property, Poland was the least successful, with its property tax revenue ratio declining year on year. Slovakia has achieved only a negligible increase over the years. Hungary was again the most successful country, but the increase in these revenues was less than one percentage point in all countries. In addition to greater property taxation, it is also recommended to redirect the tax mix to indirect taxes, ie excise duties and VAT. The failure is visible in Poland and Slovakia, where there has also been a significant increase in income from social security contributions. Once again, the Republic of Hungary prospered the most. Compared to

other V4 countries, Slovakia is less efficient than Hungary and the Czech Republic in the efficiency of setting the tax mix.

3. Discussion

Value-added tax is the largest share of state tax revenues in relation to other taxes. Table 2 shows the amount of income from value-added taxes and their share in the total tax revenues of the state arising only from taxes, ie without social security contributions. In all V4 countries, VAT revenues are on the rise. In the case of Poland, the most volatile changes in growth and decline are among other countries. On average, over a period of ten years, it represented the largest share of VAT in tax revenues in Slovakia and the smallest in Hungary.

Tab. 2: VAT revenues and their share in state tax revenues (excluding social contributions)

	Slovak republic		Czech republic		Hungaria		Poland	
	Revenues from VAT in mil. €	% of tax revenue	Revenues from VAT in mil. €	% of tax revenue	Revenues from VAT in mil. €	% of tax revenue	Revenues from VAT in mil. €	% of tax revenue
2007	3 699,00	37,35	8 365,90	31,01	8 009,80	30,21	25 860,40	36,09
2008	4 453,50	39,04	10 437,20	35,3	8 224,10	29,27	29 007,10	34,58
2009	4 221,30	40,27	9 783,50	36,47	7 820,20	31,8	23 006,30	30,83
2010	4 182,10	38,96	10 419,90	36,72	8 442,00	33,66	27 465,60	36,81
2011	4 710,90	40,65	11 245,80	35,88	8 516,50	35,53	29 764,40	37,76
2012	4 327,70	37,56	11 376,80	36,19	9 084,10	35,91	27 783,40	35,45
2013	4 696,10	37,68	11 694,50	36,98	9 073,20	35,47	27 780,10	35,7
2014	5 021,10	37,52	11 602,40	38,33	9 754,00	36,5	21 317,10	36,1
2015	5 420,20	37,58	12 217,20	36,91	10 668,70	37,3	30 074,80	35,06
2016	5 419,70	36,87	13 091,50	36,98	10 586,80	36,09	30 838,40	34,69

Source: author own research based on Eurostat data (2020)

The tax gap represents the difference between the actual and the expected revenue from value-added tax. Based on an examination of the tax gap, VAT revenues could be higher than they actually are. The tax gap and its change are used as an indicator of the effectiveness of preventing tax evasion. The tax system of each state has various measures in place, the result of which should affect the reduction of the tax gap, which is caused by intentional and unintentional behavior of tax subjects.

Tab. 3: VAT tax gap in mil. EUR and as a percentage of potential VAT

	Slovak republic		Czech republic		Hungaria		Poland	
	mil. €	%	mil. €	%	mil. €	%	mil. €	%
2007	1 856	31	2 023	19	2 567	24	511	2
2008	1 964	30	3 165	23	2 944	26	2 743	9
2009	2 393	36	3 234	25	2 770	26	3 985	15
2010	2 613	38	4 315	29	3 351	28	3 765	12
2011	2 773	37	4 241	28	3 700	30	5 410	15
2012	2 508	37	2 916	20	2 569	22	10 308	27

	Slovak republic		Czech republic		Hungaria		Poland	
	mil. €	%	mil. €	%	mil. €	%	mil. €	%
2013	2 147	31	2 796	19	2 481	21	10 071	27
2014	2 214	31	2 345	17	2 199	18	9 485	24
2015	2 243	29	2 521	17	1 943	15	9 652	24
2016	1 872	26	2 165	14	1 629	13	8 004	21

Source: author own research based on Eurostat data (2020)

Table 3 shows the values achieved by the tax gap in VAT collection in the V4 countries in the years 2007 to 2016. The table is compiled from data published in the tax gap reports in the years 2000 - 2011 and in the years 2012 - 2016. According to the data, the table shows that countries collect several billion euros less in income tax each year than they could potentially. An incorrectly set tax system is reflected in the amount and development of the tax gap.

The data in Table 3 have been reflected separately in two graphs, the first showing the value of the tax gap in millions of euros and the second monitoring the value of the tax gap as a percentage of potential tax collection. The division is intended to approximate changes in the size of the tax gap on the basis of different perspectives and to provide better clarity.

In Chart 1, which contains the expression of the tax gap in millions of euros, we can see an increase in the tax gap in all V4 countries until 2011. Since 2012, the amount of the tax gap has also decreased in all V4 countries.

Slovakia has not achieved significant changes in increase or decrease in ten years. The most significant changes occurred in the case of the Republic of Poland, where the amount of the tax gap increased extremely during the years 2007 to 2012.

Conclusion

It follows that if we evaluate the average change in the tax gap in terms of its value in millions of euros and in terms of its value as a share of potential VAT, we find that the most negative development of the tax gap in the collection of value-added tax occurred in the last ten years in Poland. Hungary was most successful in reducing the VAT tax gap, and in the case of Slovakia and the Czech Republic, there were no significant changes and thus no significant decrease in the tax gap.

The issue of the tax system is very complex and demanding on human and material resources. Taxes are the most important source of government revenue and therefore their effective collection is very important. Setting up the tax system correctly and optimally is becoming increasingly difficult in the age of modernization and globalization. The tax system is influenced by many factors and at the same time, it itself influences tax subjects and their activities. The collection of taxes also has an impact on the country's economic situation, as it affects, for example, businesses and the unemployment rate. The collection of taxes is about a kind of compromise between state revenues and the tax burden. This compromise must be adapted to the requirements of both the state and the citizens at a certain time.

Acknowledgment

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Benedikt Frank

VSFS, University of Finance and Administration
Estonská 500, 101 00 Praha 10-Vršovice, Czech Republic
email: benfrank92@gmx.de

Approximation to General Economic Costs of Mental Illness

Abstract

This paper shows characteristics of mental illness and its economic impact, as well as various cost-estimating approaches and insights in missed economic opportunities. To assess the burden of economic diseases, there are three different ways: the human capital, the economic growth and the value of statistical life approach. The first focuses on indirect and direct costs. Direct costs are frequently associated with care and recovery, indirect costs apply to the "invisible costs" correlated with revenue loss due to death, injury, treatment and a fading productivity. The global financial costs of mental illness were evaluated at US$2.5 trillion, with a significantly bigger impact of indirect costs. Moreover, the effect of mental illness on economic development can only be approximated implicitly. Thus, the lack of production is primary estimated for somatic conditions compared to their corresponding quantity of disability-adjusted life years (DALYs). According to some research, the total economic productivity drop associated with mental illnesses between 2011 and 2030 is estimated to be US$16.3 trillion globally. Furthermore, the value of statistical life (VSL) method suggests that trade-offs between risks and capital should be used to assess the probability of injury or death due to psychiatric illness. Alike the economic increase effect, this calculation is equal to that of cardiovascular ailments and greater than that of chronic respiratory issues, cancer and diabetes. However, greater activism is required to better the existing condition. This involves a shift in stigmatizing mentally ill people and supports the activation of financial resources.

Key Words

economic costs, economic growth, human capital, mental illness, value of statistical life

JEL Classification: E24, H51, I15, I31

Introduction

The word burnout is often used at the moment. So it has been characterized in a variety of ways (Cherniss, 1980; Aronson, Pines & Kafry, 1983), but most scholars prefer a multifaceted concept. While there is often an association with burnout and other mental health problems, such as solicitude or depression, evidence further reinforces the fact that burnout differs from several mental ailments (Maslach & Schaufeli, 2001). Nevertheless, the relationship and proximity to related research areas is given and partly blurred. Due to the lack of explicit literature on distinct macroeconomic consequences of burnout and also mental illness, the following paper gives a general insight in the economic and social consequences of mental illness.

The main aim of the paper is to approach the economic impact of mental illness and to provide an overview of common methods of capturing economic consequences due to mental illness. Moreover, this paper starts with an outline of previous figures and characteristics of mental illness and its economic impact. Further, different methods for determining and estimating the economic costs of mental illness are presented. In addition, the paper addresses missed economic opportunities, the lack of current activity and improvement in the field of mental illness. Additionally, it comes to an evaluation of factors to be changed as well as a necessary paradigm shift in the attitude towards mentally ill people. It concludes with possible suggestions for improving the current situation.

1. Mental illnesses – an underestimated problem

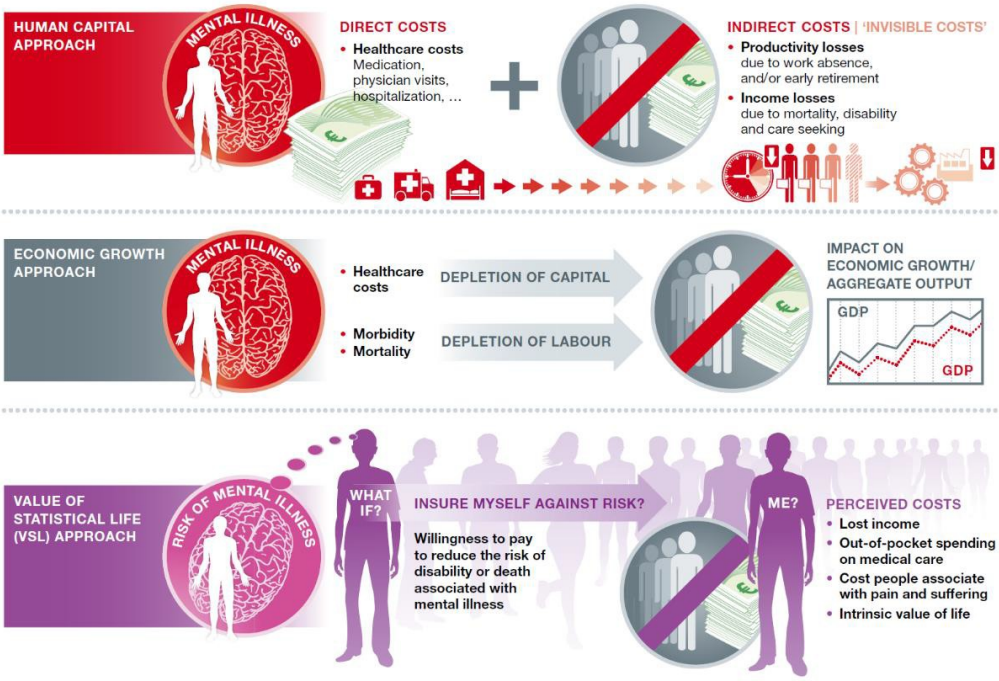
Every year about 165 million people in the European Union are affected by mental illnesses, mainly anxiety, mood and drug use disorders (Kessler et al., 2012; Wittchen et al., 2011). Altogether, 50 percent or more of people living in mid- and upper-income nations trouble with not less than one psychiatric illness in their lifetime (Trautmann et al., 2016). What do mental illnesses, for example, cost a nation? Healthcare expenses are perceived to be one of the biggest obstacles, for example, in U.S. public policy (Catlin et al. 2008). In 2006, healthcare expenses amounted to 16 percent from the nation's gross domestic product and a further increase was expected in the following years (Poisal et al., 2007). In 2019 the share of the health spending accounted for 17.7 percent of nation gross domestic product (Martin et al., 2021). Studies of the Organisation for Economic Co-operation and Development (OECD) also valued the entire expenses of mental ill-health with approximately EUR600 billion in total or in percentage terms more than 4.0 percent of the gross domestic product (GDP) in each of the 28 EU countries in 2018. For example, the cost of mental problems in Germany is estimated at 4.8 percent of GDP (*Mental health problems costing Europe heavily*, 2018).

Mental illnesses are also by no way restricted to a select number of predisposed people, but are a massive public health issue with important societal implications. They refer to extreme depression and functional disability, which are, in effect, mandatory medical conditions that could cause drastic effects not just for affected individuals. Even their families and their social and occupational surroundings get to feel the consequences (Patel et al., 2016). 2010, psychiatric as well as substance use disorders accounted for 10.4 percent from worldwide strains of illness and were the main source of years of disabilities in all disease categories (Wittchen et al., 2011; Whiteford et al., 2013). More recent studies suggest that mental illnesses account for one-third of global sickness (Vigo et al., 2016). Furthermore, due to population trends and rising expectancy of life, the long-run incidence from mental illness is also projected to rise (Patel et al., 2016). Patients and their social life are not limited to such consequences. They impact the whole social structure, in particular by economic costs. Appropriate calculation of these costs is complicated and difficult to render due to insufficient statistics. In addition, economic cost analyses differ substantially due to flaws in the description of diseases, demographics or tests analysed, sources of cost and use of resources, methodological framework and inadequate cost descriptions due to lack of evidence and distinctions (Hu, 2004). Even so, enhanced observational and financial approaches and patterns, along with greater detailed epidemiological evidence over the last 20 years, enable for an accumulation of

more detailed and accurate data that gives us a better understanding of the extent of the economic effects of mental disorders. Although the majority of persons believe that taking medicine, staying in a hospital or a clinical residence is a significant financial challenge of illness, in reality the hardship of illness – and especially of mental disorders – actually extends much deeper than these "direct" costs of diagnosis and care.

The World Economic Forum (WEF) identified three separate methods to assess the burden of economic diseases to understand more than just the "hidden costs" of illnesses. It is also about their effect on financial development within the macroeconomic scale (Bloom et al., 2011).

Figure 1. Various methods used to measure the economic effects of mental illness



Source: Bloom et al., 2011

2. Human capital costs and depressions

The human capital approach is by far the widely applied measure for the financial effects of mental illnesses as well as diseases in general. It varies amongst indirect and direct costs. Direct costs are often referred to as the "visible costs" of care and recovery within the public health sector: medicine, doctor appointments, psychotherapy services, hospital stays, so forth. Indirect costs apply to the "invisible costs" correlated with loss of revenue because of death, injury and treatment, which includes the loss of productivity as a result of lack of employment or premature retirement (Bloom et al., 2011; Gustavsson et al., 2011). Another form of indirect cost is attributed to the large incidence of psychiatric intricacies linked with severe mental disorders, resulting in high levels of emergency room consultations, a large predominance of lung disease, so for example do individuals suffering severe mental problems consume 44 percent of the total cigarettes in the United

States of America, and premature death, which is a reduction of 13 to 32 years of age. Furthermore, there are expenses associated with other effects, such as prison or homelessness, that are worth taking into account. (Colton & Manderscheid, 2006). Thus, unlike most psychiatric ailments, the cost of psychiatric illnesses is "indirect" rather than "direct." Although indirect expenses were difficult to measure, they are crucial to influencing public policy. When the major elements of the economic impact of psychiatric illnesses are measured, more educated debates should be undertaken about what needs to be done in the prevention and care of these diseases (Insel, 2008).

It is assumed that the indirect effects and the effects of poverty on labour and thus on national production in terms of costs are 23 times greater compared to the charges that fall on the medical sector. Which is a major “hidden” influence, nevertheless it is hypothetically underestimated. A relevant review was delimited to adults and linked solitary to individuals who had been identified with depression and excluded social care and social security expenses. Otherwise, the review uses a human capital approach for pricing the lost employment, acknowledged to create fairly high forecasts from what is believed to be tough economic effects of value. Even after these nearly obvious limits, some reports not only include specific details of the cost effects of health services, they also serve to point out that the consequences of depression are much more far-reaching (Thomas & Morris, 2003). In addition, some studies concentrated in particular on a single cause of indirect costs: expenses of reduction of income. The research is founded on National Comorbidity Replication Surveys` (NCS-R), a resident-based epidemiological investigation of psychiatric illnesses. In this study, results from approximately 5,000 persons had been utilized to measure the lost income by matching earnings in the prior twelve months of individuals with mental illnesses with twelve-month incomes of people with no mental issues. The research centred on people suffering extreme mental disorders. The findings from Kessler et al. (2008), built on a universalized linear model examination, show a medium decrease in income of $16,306 for people suffering extreme psychiatric ailments, mutually without and with incomes, and also that around 75 percent from the overall decrease in earnings originated from people with any earnings the previous year relative to persons who had no incomes at all. In trying to extrapolate these distinct outcomes to the wider populace, the writers reported that severe psychiatric disorder is interrelated with a yearly harm in incomes amounting to $193.2 billion (Kessler et al., 2008).

Basing on figures by 2010, the worldwide indirect and direct financial costs of mental illness were evaluated at US$2.5 trillion. Relevantly, the indirect costs of US$1.7 trillion are far greater than the direct costs of US$0.8 trillion, which contrasts with other primary illness classes, such as cardiovascular disease and cancer. The direct and indirect expenses have been calculated at EUR798 billion for the European Union, an area with highly advanced healthcare systems (Gustavsson et al., 2011). The direct and indirect expenses of psychiatric illness are anticipated to geminate by the year of 2030 (Bloom et al., 2011). Mentioned should be that these computations do not contain expenses allied with mental illnesses detached from the public health service, like legal expenses due to illegal substance exploitation (Trautmann et al., 2016).

3. Missed chance in economic expansion

From a macro-economic viewpoint, the expense of mental illnesses in a given society can be enumerated as a reduction of economic production by calculating the potential effect of psychiatric conditions on the GDP (Trautmann et al., 2016). The core concept behind this policy is that economic development relies on labour and financial resources, all of which may be adversely impacted by sickness. Capital is being decimated by health care spending and labour is being depleted by injury and death. Capital depreciation is measured on the basis of savings rate data, care costs and the ratio of therapy expenses financed from personal savings. The effect on labour is calculated by contrasting the GDP to a counter-actual setup that implies no disease demises in contradiction of the predicted deaths´ sickness. These rates of reduction of economic production are often estimated for corporal conditions and seldom for psychiatric disorders. Nevertheless, the effect of mental illness on economic development can only be approximated implicitly. Thus, the lack of economic production is primary estimated for somatic conditions compared to their corresponding quantity of disability-adjusted life years (DALYs). In the subsequent phase, the reduction of economic production for psychiatric illnesses is calculated based on the relative scale of the related DALYs for other illnesses (Bloom et al., 2011). There are studies which estimate the total economic production decline connected with mental conditions between 2011 and the year 2030 to be US$16.3 trillion globally. This relates the economic productivity damage assimilable with psychiatric disorders equal to those of cardiovascular issues and greater than that of cancer, diabetes and chronic respiratory diseases (Trautmann et al., 2016).

4. Evaluation by value of statistical life

The value of statistical life (VSL) method is the widest technique used to measure the economic effects of mental illness. This approach suggests that trade-offs between risks and capital should be used to assess the probability of injury or death due to psychiatric illness. This quantification study reveals trade-offs or theoretical expectations, such as results from polls, which questioned people what they'll be willing to spend to escape a specific hazard, as well as how much funding they would actually require taking on that threat (Bloom et al., 2011). The VSL is then determined on the basis of these arbitrary risk-value ratios. Suppose, for instance, that the overall lifetime chance of deceasing from depressive illness is 15 in 1,000. Assume, however, that there are steps that might decrease that chance to 5 in 1,000.

If citizens of a particular demographic are able to pay a mean of US$50,000 on these steps, the estimated VLS will be US$5 million for that population to be reproduced with the following calculation:

(US$50,000/ [(15–5)/1,000])

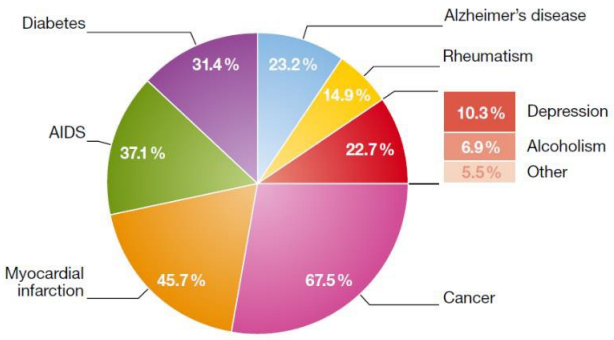
A similar reasoning can likewise be used by considering the ability to sacrifice monetarily to no longer struggle with a particular illness. As a consequence, the VSL strategy not just accounts for missed revenue and expenditure on information, prescriptions and treatment, but also for the expenses associated with injury and suffering. Applying the

VSL method, the worldwide financial cost of mental illness was calculated to be US$8.5 trillion in 2010. Alike the economic increase effect, this calculation is equal to that of cardiovascular ailments and greater than that of chronic respiratory issues, cancer and diabetes. The economic pressure is also projected to nearly duplicate by 2030 (Bloom et al., 2011). In brief, mental illnesses inflict immense monetary costs, directly through comparatively low treatment costs, and indirectly through proportionately high productivity reductions and commercial growth impacts. This sample of comparatively little direct against considerably large indirect costs varies from nearly all other disability classes, although the entire spectrum of psychiatric illnesses has rarely been taken into consideration. As this estimated scale of economic losses relies on the analytical method, available figures from year 2010 suggest that the burden of psychiatric illnesses can be calculated at US$2.5 trillion by means of the conventional human capital method, or US$8.5 trillion using a willingness to pay approach, recognizing that global health investment in 2009 was around US$5 trillion (Bloom et al., 2011; Trautmann et al., 2016). Mental illnesses therefore cost more than chronic somatic conditions, such as diabetes and cancer, and the expenses are predicted to rise exponentially by 2030 (Trautmann et al., 2016).

5. Missing activity, required improvement and changes

The advancement and application of reliable and successful diagnosis and recovery strategies for mental wellbeing is only at a comparatively early level, and so numerous evidence-based therapies and treatments have just been accessible in the last 30 years. Capacity building regarding manpower, facilities and other services is also well behind other illness fields. Above all, there might be a speculation that stigmatization and misbelief about both psychiatric and addiction problems continue to be a significant part. This is not just non-professionals whom tend to think that mental and drug use conditions are not actual illnesses, that they cannot be cured adequately, and that those suffering are at any rate partially liable. As a result, cultures are likely to invest far more on somatic ailments than on psychiatric illnesses, even if the mortality and economic effects are in minimum as high as those incurred by somatic problems (Trautmann et al., 2016). For instance, research reveals the existing public opinion on the distribution of capital. Relying on a survey from the general population of Germany, adolescents were allowed to pick three out of nine medical problems for which they would choose services not to be decreased if broad reductions in the health budget were required. Around two-thirds of participants listed cancer as a medical disorder that have to be protected from decreases, accompanied by AIDS, diabetes and myocardial infarction. Just a limited number of participants related to psychiatric illnesses, such as depression and schizophrenia (Schomerus et al., 2006). Beyond the influence of public sentiment, financing policies in certain cultures remain centred on lethality and life expectancy, and although psychiatric illnesses not directly lead to a high degree of fatalities, they seldom feature on mortality data. In the end, it does not appear to be widely understood that mental illnesses are overwhelmingly contributing to so-called high-cost consumers of our medical scheme (Trautmann et al., 2016).

Figure 2. In the event of general cutbacks within the healthcare budget, medical problems on which services should not be cut



Results in percent, multiple responses were allowed

Source: Schomerus et al., 2006

Owing to the aforementioned factors, the lack of funding in mental health services is likely to continue without reconsidering the expense of mental illness, the cost savings of medication and prevention treatments, and the necessity for a substantive improvement of stigmatization (Trautmann et al., 2016). While signs of large-scale interventions to change this condition have begun to appear (Haro et al., 2014), culture, policymakers and stakeholders must be repeatedly educated about the actual rate of mental illness and the full spectrum of future economic consequences (Trautmann et al., 2016).

Conclusion

On the basis that every year a large number of people suffer from mental illness, the preceding semester paper shows, that these diseases are a heavily public health issue that has significant societal implications. Three different ways were described to assess the economic impact of mental illness on society: the human capital approach, the economic growth approach and the value of statistical life approach use different ways of estimating economic consequences. The first deals with the direct and indirect costs of mental illness, while the second takes a closer look at the depletion of capital and the depletion of labour. Finally, the latter tries to analyse the willingness to pay, which deals with the perceived investment that people would be willing to make in order to avoid, for example, a mental illness. To improve the current situation, however, increased activism is needed. A mindset away from the stigmatization of the mentally sufferers must become established. After all, it is not only lay people who condemn mental disease. So this is one reason why the resources for dealing with mental problems are still severely limited. Due to the fact that studies have recognized the still insufficient awareness of the urgency in the broader society for psychiatric issues, it is in conclusion important to note that changes must also be initiated and supported by governments in particular in order to achieve sustainable and effective improvements. For it is likely that mental health services will continue to be underfunded without deeper consideration of cost savings in medications, the cost of mental illness in general, and preventive treatments. Because always it should be the main aim to preventively counteract mental illnesses, to minimize the suffering of individuals with psychiatric disorders and even to be able to cure them – with possibly even positive consequences for further economic growth.

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Frank Gerwald
University of Economics in Bratislava, Faculty of Business Management, Department of Business Finance
Dolnozemská cesta 1/b, 852 35 Bratislava, Slovakia
email: frank.gerwald@euba.sk
Peter Dorčák
University of Economics in Bratislava, Faculty of Business Management, Department of Business Finance
Dolnozemská cesta 1/b, 852 35 Bratislava, Slovakia
email: peter.dorcak@euba.sk
Peter Markovič
University of Economics in Bratislava, Faculty of Business Management, Department of Business Finance
Dolnozemská cesta 1/b, 852 35 Bratislava, Slovakia
email: peter.markovic@euba.sk

The Influence of InsurTechs on Traditional Insurance Operations

Abstract
The aim of this paper is to provide an overview of the impact of the growing number of InsurTechs on traditional insurance operations. Increasing investments of insurance groups in startups prove the relevance of this question for the insurance industry. The study was conducted qualitatively descriptive, using a systematic literature review. Scientific articles, studies and conference papers served as a basis. The research revealed that the traditionally conservative insurance industry has recognized the danger of losing market share to new market entrants. It is countering this danger by founding new, digitally oriented subsidiaries on the one hand, but also by investing considerable financial resources in shareholdings in startups from this sector on the other. InsurTechs occupy the interfaces to the customer and are changing insurance sales in particular through their digital solutions. The conclusion of an insurance contract is seen by customers as less attractive and the time required for this is considered too high. InsurTechs solve this customer problem through online insurance comparisons. Despite the new technologies, no InsurTech has yet managed to revolutionize the entire value chain. Different companies are attacking at different points in the chain and the strategy of the insurance groups is to cooperate rather than confront the startups. The corporate investments are therefore also seen more in the long term than in the short term, because the groups want to profit permanently from the innovations of the new companies.

Key Words
digitalization, insurance, insurtech, sales, startup

JEL Classification: D82, G22, M13

Introduction

As early as 2001, Orlikowski and Barley described the opportunities for companies arising from the mutual learning effects between new information technologies and existing companies. A fusion of the traditionally conservative finance and insurance industry with the new digital technologies has set in motion the structural change that is due in this industry. The convergence of these two sectors explains the techno-social phenomena that increasingly permeate our lives (Orlikowski, Barley, 2001).

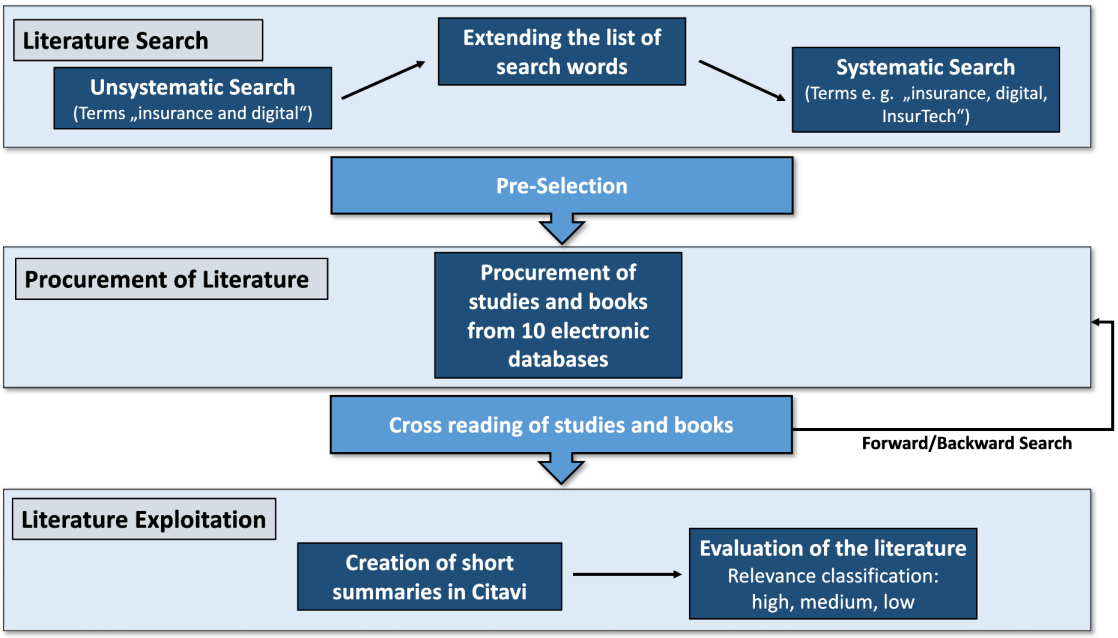
The fact that InsurTechs are an innovative and expanding field is shown by the rapidly increasing number of deals with which insurers are becoming involved in tech startups worldwide. While in Q3 2016 there were still financings of InsurTechs amounting to USD 233 million, in Q3 2020 the figure was already more than USD 2.5 billion (statista, 2021). This proves that insurers and sales organizations have recognized the danger of innovative startups establishing themselves and redistributing market share. As an attractive mass market, the insurance industry offers many attack surfaces, which the newcomers use for themselves with their new digital solutions to better serve customer needs.

In addition to their flexibility, the advantages of InsurTechs over established insurance companies lie particularly in the fact that they do not carry the high salary costs and material costs. Structures that have evolved over decades severely limit the flexibility of insurers with regard to upcoming changes. Another major obstacle is the often outdated IT landscape of insurance groups. As a result of acquisitions by other companies, several incompatible IT systems often exist in parallel. As a result, even minor modernizations become complex tasks. The reaction times to changes in the market are significantly longer compared to InsurTechs (Maurya, 2017). At the same time, insurance groups suffer from the fact that their traditional value proposition is increasingly viewed critically by the public. The groups are faced with the task of finding their way in the lifeworld of digital customers, for whom the use of online services and smartphones is a matter of course, and offering them adequate solutions.

1. Methods of Research

The study was conducted with the help of a literature search, which is one of the qualitative research methods. The approach aims to filter out the expert knowledge that is of particular interest in terms of practical relevance. This special knowledge results from the information advantage that the authors have due to their professional positions.

Fig. 1: Systematic Literature Review



Source: authors´ own figure, based on (Okoli, Schabram, 2010)

By using different types of literature, such as scientific articles, studies or conference papers, the research question is examined from different perspectives. In the context of a systematic literature search, the three phases literature search, literature acquisition and literature utilization were run through (Okoli, Schabram, 2010). The first phase consisted of an unsystematic search on the terms insurance and digital (see Fig. 1). The result led to an overview of the topic area. In order to proceed systematically, a search word list was created based on the available results. The systematic search according to vom Brocke et al. (2009) was performed with German and English terms. Further, it was determined which databases should be used for the search. The following search engines were accessed for the literature search:

1. ACM Digital Library
2. Bielefeld Academic Search Engine (BASE)
3. Google Scholar
4. IEEE Xplore
5. SAGE Journals
6. Science Direct
7. Springer Link
8. Taylor & Francis
9. Web Of Science
10. Wiley Online Library

The pre-selection of the literature was based on the keywords of the sources, the titles and the abstracts. The search queries had their own specifications for each of the portals used, as the number of hits was very high for some search engines. The date of publication or restriction to journals or books (-ISBN or +doi) were used to narrow the search.

The data was retrieved from the University and State Library of the Heinrich-Heine-University Düsseldorf. The aim of the literature search was to identify both scientific texts and practical literature, such as current studies, in order to include not only the scientific

perspective but also the practical view of companies on digitization in the insurance industry.

2. Results of the Research

In their article in Financial Innovation, Zavolokina et al. (2016) use an example from the pharmaceutical industry to describe how established companies have consolidated and expanded their market positions through cooperation and collaboration with biotech companies. Their approach to solving the new competitive situations is collaboration instead of competition and they transfer this to the finance and insurance industry. The article goes on to describe how the power of algorithms is significantly influencing and changing consumers' lives. The new technological capabilities not only affect businesses, but also have far-reaching implications for social systems (Orlikowski, Barley, 2001). If the established insurance companies interact with the new market participants, there are opportunities for both sides to learn from each other and develop further as a result.

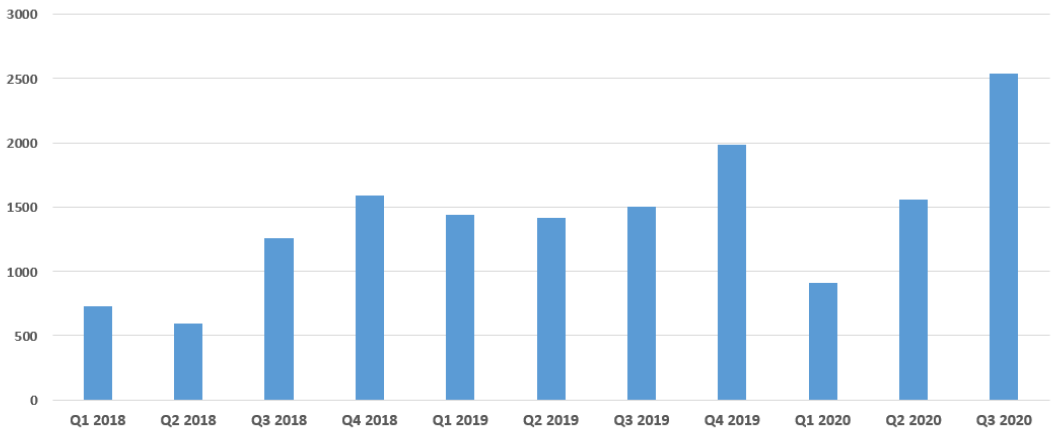
Using the example of the digitalization of the insurance industry in India, Maurya (2017) explains in his article in the International Journal of Engineering and Applications that digitalization is not only a threat to corporations, but can be an important source of growth. The insurance industry needs to rethink its model because of the technology-driven changes. The digital revolution is changing the way customers work, their shopping habits and their socialization. New technologies mean that even segments of the population in remote areas now have equal access to products and services. Accordingly, the disruptive changes have an impact on the development on the social fabric (Maurya, 2017).

Gowanit et al. (2016) find that external social factors, such as face-to-face service, influence customer trust in insurance companies. Mobile technology for claim management influences consumer decision-making. To become the price leader in low-cost insurance, the operating model must be digitized and automated to the greatest extent possible. The advantage of startups is to be able to react faster than established groups to changes in the competitive environment. As a result changes in pricing can be implemented in real time. This is happening with the support of new technologies such as the Internet of Things. Internet-connected objects such as cars send data such as annual kilometers driven directly to the insurer. However, the customer expects discounts in return for the disclosure of his data and pays the insurance premium only in the amount of kilometers actually driven (Steiner, Maas, 2018). The use of these new technologies is embedded in the DNA of startups, but the biggest hurdle for low-cost insurers is access to the market. The insurance market in Europe is highly regulated and there are high requirements to be licensed as an insurance company.

The insurance groups are countering this development by founding subsidiaries that are located in the low-wage sector and therefore do not have the disadvantage of the salary structure that has evolved over decades. At the same time, however, these subsidiaries can draw on the expertise of the parent companies without being tied into their bureaucratic structures and inefficient decision-making cultures.

Another way to face the digital changes is the investment of insurance companies in the InsurTech sector. The increasing investments in this area indicate that the insurance industry has recognized that it can no longer ignore the new competitors (see Fig. 2). The hybrid customer expects both analog and digital access options from his insurer. Customer proximity along the entire information and decision-making process is a key competitive factor. The new providers on the insurance market are defining new rules for customer proximity. Whereas in the past it was geographical or temporal proximity to the customer that was important, today it is more a matter of emotional proximity that is essential in determining with whom the customer signs his insurance contract (Floreddu, Cabiddu, 2016). The insurance agent who scores points with the customer through his personal competence and eloquent appearance will not be able to do without digital aids in the future. The question will not be whether he needs tools, but which ones and how they are used (Crittenden, 2014).

Fig. 2: Volume of InsurTech financings worldwide in millions of dollars



Source: authors´ own figure, based on (statista, 2021)

From the initiation of a deal to the conclusion of a contract to customer care, digitization has given rise to new channels that have changed communication with customers. When it comes to building customer trust, digital comparison calculators have an edge over traditional sales because they position themselves as a neutral authority that compares the offers of insurance groups. These platforms are popular because they allow the customer to have their voice and users to co-create and share content (Malthouse et al., 2013). Recommendations from customers to prospective customers are important tools for companies to use to promote themselves on other digital platforms (Charoensukmonkol, Sasatanun, 2017). Opportunity and risk for companies are equally in the fact that user-generated content appears particularly credible there. The posts published there have a strong influence on customers' potential purchasing decisions (Trainor et al., 2014). From the customer's point of view, the topic of insurance coverage is seen as unattractive and the time required for research and comparison of offers is perceived as too high. Digital natives are put off by unclear rates, unclear price structures and long contract terms. These are precisely the points that comparison portals address and are therefore perceived as attractive by the young target group.

3. Discussion

Although online comparison calculators are increasingly influencing customers' purchasing decisions, it is noticeable that the InsurTechs that have established themselves on the market so far only cover partial areas of the value chain for insurance (Eling, Lehmann, 2018). Although the new companies are attacking all areas of the value chain, there is not yet a startup that covers the entire range. This is mainly due to regulatory requirements, such as the capital needed to meet Solvency II requirements. This makes it difficult for InsurTechs to establish themselves in the market as providers of their own insurance. Instead, a group of InsurTechs are reinventing the distribution model for insurance, which often still operates according to the traditional broker model. The confusing insurance market is consequently made clearer for the consumer and information asymmetries in terms of market overview can be eliminated. The influence of comparison portals on the Internet will continue to increase, and the growing number of digital natives will accelerate this development even further, as this target group feels it can get independent advice there (Pilik et al., 2017). At the same time, this reduces customer loyalty and makes insurance customers much more willing to switch than they were a few years ago. Since comparison platforms and marketplace solutions focus on sales, they are not subject to the strict regulations to which traditional insurers are subject.

However, it must be critically questioned whether the offers of the comparison calculators really provide a neutral market overview for the customer, because the online platforms are also subject to economic interests and can only use price and performance information to the extent that this is made available to them by the insurers. No comparison calculator maps the entire market portfolio, so that information asymmetries towards the consumer must be assumed here as well, analogous to traditional insurance sales.

On the other hand, digital assistance systems are becoming increasingly intelligent, which will lead to new challenges for insurance sales. At the latest when digital voice assistants such as Alexa or Siri will be able to answer complex questions. Big Data analyses will show these devices what their owner's thought pattern is and what conscious and unconscious needs result from this. Based on situational data, voice assistants will be able to predict which changes in customer needs will dominate in the future. The technical development of the devices is moving in the direction of bundling data from different devices in order to derive intelligent conclusions. The purchase recommendations made will therefore not only be individual, but will also vary according to the situation. It can be assumed that the insurance products and additional services will adapt to this development in order to respond in the best possible way to the respective customer situation.

The increasing mechanization of insurance operations is growing the importance of insurers' IT departments. Only with the help of modern solutions can the rapidly growing volumes of data be processed and customers' expectations of a cross-channel, uniform offering be met. Companies must exploit the opportunities arising from the digitization of the value chain. This requires closer collaboration between the individual sales channels and IT departments (Román, Rodríguez, 2015).

Conclusion

InsurTechs are accelerating change in the insurance industry by establishing new technical systems that are accompanied by completely new business models. Traditional insurers have recognized the risk of disruptive changes in the insurance industry and are participating in or acquiring startups in order to benefit from their innovations. Due to novel technologies, the new companies have an information advantage based on their technical capabilities. Whereas in many other industries the aim is to conclude a temporary commitment in the future with the most lucrative possible sale of the shares, insurers take a more strategic view of their investments in the young companies. The main goal is to secure long-term access to new technologies in order to be well positioned for the future. The advantage for InsurTechs is that they gain access to the insurance groups' customer databases, which have grown over decades, through their shareholdings and can thus solve one of their biggest problems.

Acknowledgment

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Dagmar Kalová and Karel Brychta

University of Technology, Faculty of Business and Management, Department of Finance
Kolejní 2906/2, 612 00 Brno, Czech Republic
email: xphalabrinova@vutbr.cz

Productivity and Profitability in the Construction Industry – a Case of the Czech Republic

Abstract

The lack of housing availability and the growth of real estate prices are a global problem. The severity and relevance of this problem is evidenced from the fact that not only individual states but also the EU or OECD are addressing this problem. They are looking for measures how to make the housing more affordable and how to avoid further growth of real estate prices. The rate of growth of real estate prices in the Czech Republic is one of the fastest ones within the EU. This article's aim is to identify the hypothetical "winners" operating in the real estate market in the area of construction by considering the criteria of productivity and profitability of companies. The results achieved clearly demonstrate that it is the developer companies that reach profits several times higher than companies engaged in the construction itself. The analyses performed also indicate that the above-standard advantages are connected, in particular, with the ownership of production factors: land and capital. It should be noted that as a consequence of the COVID-19 pandemic, a deterioration in the real estate market can be expected due to further expected growth of prices. The foregoing is likely to lead to a change in the perception of existing standards (strengthening of rental housing) and probably to a high level in the area of cooperative construction, too.

Key Words
building, construction, house price index, real estate, real estate price

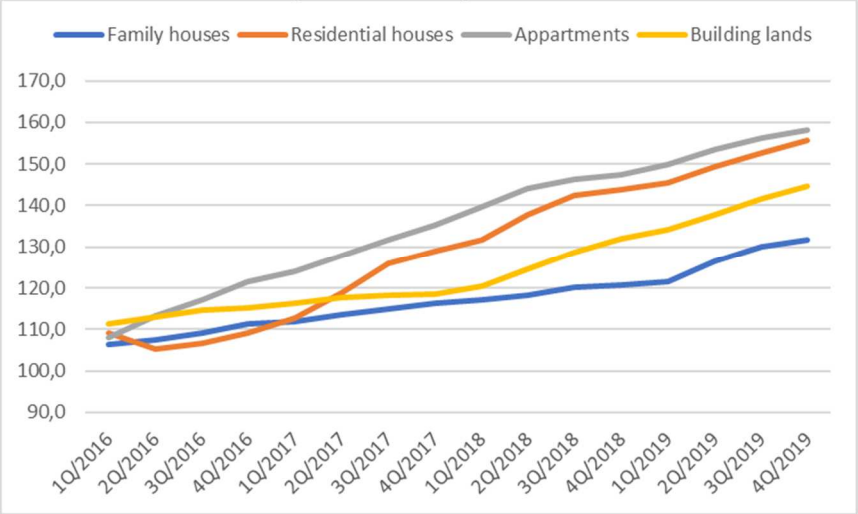
JEL Classification: L74, P12

Introduction

The growth of housing prices in the Czech Republic in 2017 showed the highest dynamics in EU countries, loans for housing financing reach high values and household indebtedness is increasing (OECD, 2018). However, there is a still a huge problem: an access to affordable housing in Czech Republic due to high construction costs, lengthy/costly administrative process, access to quality of infrastructure, social cohesion in urban neighbourhoods (OECD, 2019). At the same time, it is true that a real estate market is facing significant risks: it can be distorted by the public sector, inadequate investments and real estate prices by investors and then by buyers themselves, by which demand can be artificially and often hectically increased (Holcman & Buňat, 2019). As suggested by recent development, the quality of real estate and permit construction do not have a major impact on the overall market behavior (Holcman & Buňat, 2019). The coronavirus disease (COVID-19) pandemic has caused many changes thanks to which there were a continuous growth in sales prices, decrease in mortgage interest rates and

lack of alternative investment for capital appreciation (Hromada, 2021). New construction output will emerge more slowly, because lack of labour, more expensive construction´s work, slowdown ongoing construction and delayed approval processes (Hromada, 2021). With rising prices on the real estate market, it is possible to observe an increase in demand for alternative housing, for example rental housing or cooperative housing (Poláček et al., 2020). It can be expected that developers want to keep part of their production for renting and they prefer to sell large part of their production directly as whole apartment buildings to funds and corporations (Hromada, 2021). In this respect, the OECD recommends (generally speaking) to create a stable environment in the field of finance, legislation and institutions for all involved in the housing market, reduce the housing investment debt, including improving the quality of the outside environment of residential areas (OECD, 2019). It seems, however, that monetary policy tools along with the increase in housing construction do not have effect on halting the growth of prices (Votava et al., 2021). As shown by Fig. 1, the lowest trend in price growth can be seen in family houses (from 106.4 to 131.7), while the highest growth rate has been recorded in apartments (from 108.0 to 158.3).

Fig. 1: House Price Index Development in the Czech Republic, Index Levels (2010 = 100)



Source: authors' processing according to (CZSO, 2021)

1. Aim and Methods of Research

On the basis of secondary research, the purpose and aim of this paper is to contribute to the discussion on the topic and to evaluate the production, productivity and profitability of companies operating within the segment defined by NACE code F41 Construction of buildings (hereinafter "F41"). The initial indicators used for the selection to carry out the respective analysis were as follows: growth indicators, components of gross investment and indicators of structural business statistics (for more details see Tab. 1 below). Key indicators which were selected for the particular analysis made were set as follows:

$$\text{Per capita productivity} = \frac{\text{value added at factor cost}}{\text{number of persons employed}} \quad (1)$$

$$\text{Share of personnel costs in value added} = \frac{\text{personnel costs}}{\text{value added at factor cost}} \quad (2)$$

$$\text{Investment rate} = \frac{\text{investment}}{\text{value added at factor cost}} \quad (3)$$

$$\text{Gross margin} = \frac{\text{gross operating surplus}}{\text{value added at factor cost}} \quad (4)$$

Tab. 1: Structural business statistics

Item	Term	Specification
Growth indicators	Turnover	Market sales of goods or services.
	Sales of tangible investment goods	Sales of tangible goods.
Components of gross investment	Tangible goods	All tangible goods, new and existing tangible capital goods, including land.
	Land	Land, underground deposits, forests and inland waters.
	Existing buildings and structures	The investment includes the cost of the existing buildings and structures.
	Construction and alteration of buildings	The expenditure on the construction or conversion of buildings. Purchases of new buildings that have never been used are included.
	Machinery and equipment	This variable covers machinery, vehicles, equipment, etc.
Indicators of structural business statistics	Value added at factor cost	The gross income from operating activities after adjusting for operating subsidies and indirect taxes.
	Personnel costs	The total remuneration, payable by an employer to an employee in return for work done by the latter. Personnel costs also include taxes and employees' social security contributions.
	Number of employees	A count of the number of employees converted into full time equivalents.
	Number of persons employed	The total number of persons who work in the unit, as well as persons who work outside the unit.
	Investment	Purchase of capital equipment, e.g., machines and computers, and the construction of fixed capital, e.g., factories and housing.
	Gross operating surplus	The surplus generated by operating activities after the labour factor input has been recompensed.

Source: (Eurostat, 2021[A])

The data collection technique included the study of written documents (in particular, technical articles), information published on the websites of Eurostat (EUROSTAT, 2021[B]) and the Czech Statistical Office (CZSO, 2021).

2. Results of the Research

It is worth mentioning that the sector F41 had the highest total assets of the whole Sector F Construction (Ministry of Industry and Trade, 2019). This sector includes a subsector F41.1 Development of building projects (hereinafter „F411“) and F41.2 Construction of residential and non-residential buildings (hereinafter „F412“). The F411´s characteristics

are: a small number of companies (2,6 % of F41), high value of total assets (46% of F41), high average monthly labour cost (2,4x higher than F412) and very attractive value added per worker (3,7x higher than F412). The F412 created the most of turnover (88 %) of F41. For more details, see Tab. 2 and Tab. 3.

Tab. 2: Production characteristics (year 2018)

NACE code	F41	F411	F412
Total assets (CZK million)	301,345	138,194	163,151
Value added per worker (CZK)	1,045,244	3,622,461	973,985
Average monthly labour cost (CZK)	26,235	60,404	25,290

Source: authors' processing according to (Ministry of Industry and Trade, 2019)

Tab. 3: Production characteristics (year 2018)

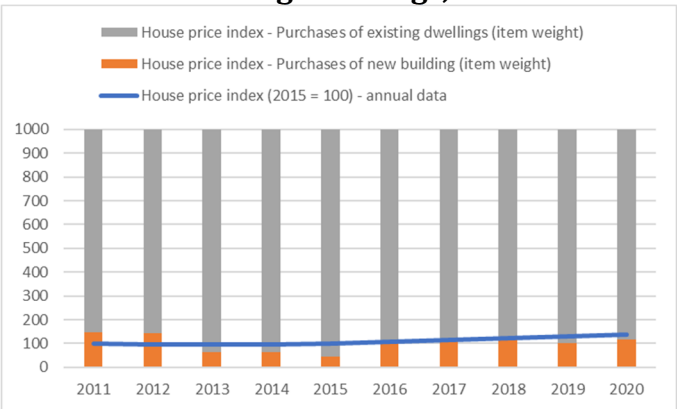
NACE code	F41	F411	F412
Number of enterprises	31,238	808	30,430
Turnover (EUR million)	11,474.9	1,377.7	10,097.2

Source: authors' processing according to (Eurostat, 2021[D])

2.1 Impact of real estate prices on the subsectors of F41

The house price index (hereinafter "HPI") reflects the price of the existing and new real estate. Fig. 2 clearly shows that the growth of prices is influenced, in particular, by the new real estate. The growth of HPI copies the development of the indicator purchases of new buildings from the total amount of the real estate sold. Companies dealing with the construction of new real estate are the main actors determining the pace of the growth in prices. According to Fig. 1, the highest price growth is manifested in the sales of apartments which may suggest that the construction of new apartments is the type of construction required the most. Item weight of house prices index is measured by per thousand weights of the HPI for new and existing dwellings (Eurostat, 2021[E]).

Fig. 2: Weights of the new and existing dwellings, Index index levels (2015 = 100)



Source: authors' processing according to (EUROSTAT, 2021[E])

For F411 is typical very high Sales of tangible investment goods (total amount 578,9 million EUR), 82 % of the whole sector F41, see Fig. 3. In 2018 turnover was 1 377,7 million EUR and it was formed by 808 enterprises. In sector F412 turnover was 10 097,2

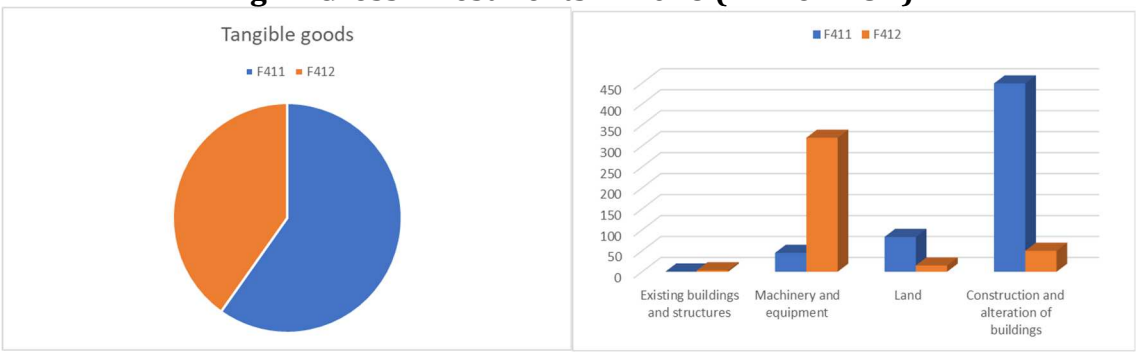
million EUR, 88 % of the whole sector F41, and it was formed by 30 430 enterprises. Very interesting is Turnover per person employed. In 2018 in F411 was 631,4 thousand euro and in F412 was only 115,7 thousand euro. Turnover per person employed in sector F411 is 5.46 times higher. 1,903 employees were employed in sector F411 (3.1% of persons from F41), and 59,690 employees were employed in sector F412 (96.9% of persons from F41).

Fig. 3: Growth indicators in 2018 (%)

Source: authors' processing according to (EUROSTAT,2021[B])

After evaluating made for the gross investments, see Fig. 4, it is clear that although only a very small number of companies and only employs with a tiny fraction of employees make up subsector F411, they spend large sums of money to acquire tangible goods. The most interesting component of F411´s tangible goods were expenditure on construction and alteration of buildings (ratio of whole sectore 90 %) and on land (85 %). Gross investment in machinery and equipment (ratio of whole sectore 88 %) is typical for sector F412.

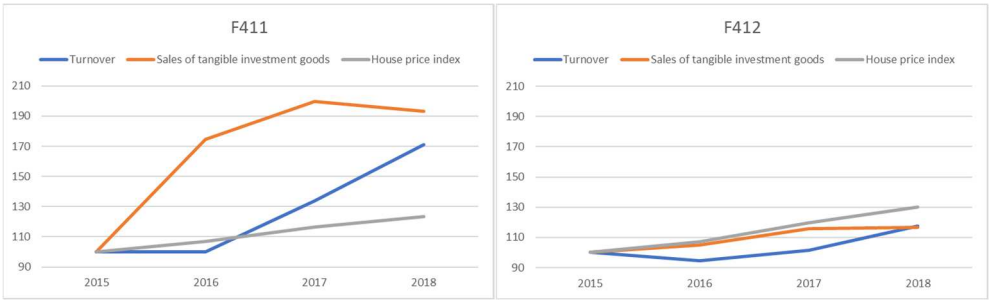
Fig. 4: Gross investments in 2018 (million EUR)



Source: authors' processing according to (EUROSTAT,2021[B])

It is obvious from the Fig. 5, that the growth of sales of tangible investment goods between 2015 and 2018 in F411 was many times higher than the HPI. Likewise the turnover had more favourable development than the HPI. On the contrary, the index of turnover and sales of tangible investment goods in F412 did not exceed the values of HPI. Obviously, subsector F411 benefits very significantly from the growth of real estate prices due to investments in strategic assets, such as land, construction and alteration of building.

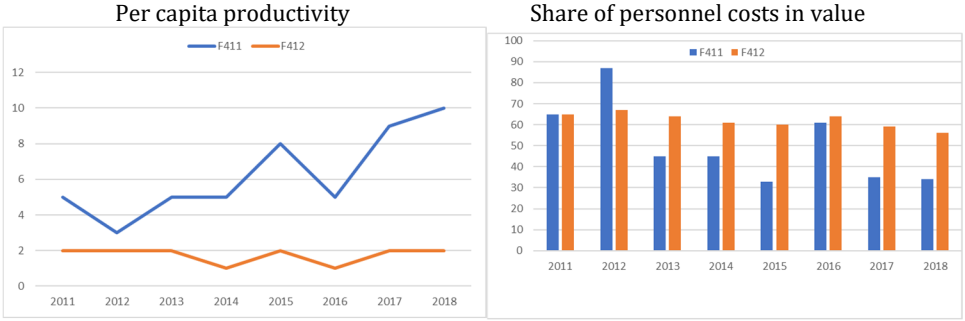
Fig. 5: Indexes of turnover, sales and House price index, Index levels (2015 = 100)



Source: authors' processing according to (EUROSTAT,2021[B])

Productivity is the output produced from each unit of input (EUROSTAT, 2021[C]). In statistical analysis, productivity may refer to capital productivity or labour productivity (EUROSTAT, 2021[C]). F411 reaches very high and increasing per capita productivity over time compared to F412, see Fig. 6. Given the small number of employees, the main production factor in F411 is capital and land. Highly professional work is also important. The main production factor in F412 is labour; the amount of capital and land is minimal. It is shown from the share of personnel costs in value that F411 employees are very well remunerated for their professional work. In 2018, wage costs in F411 amounted to EUR 71 million, employing 1,903 employees (an average EUR 37.3 thousand). In F412 totally 59,690 employees were employed and the wage costs amounted to EUR 1,022 million (an average EUR 17.1 thousand).

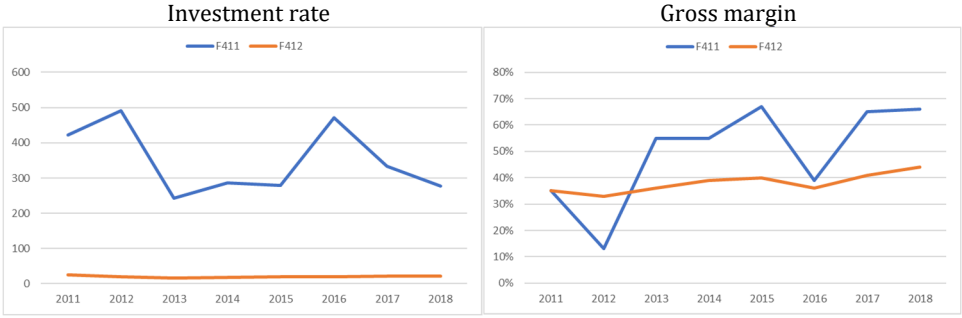
Fig. 6: Indicators of the productivity – year 2011 to 2018 (%)



Source: authors' processing according to (EUROSTAT,2021[B])

Profitability refers to the degree to which an enterprise makes a financial gain from bringing goods and services to market, it may be defined as the proportion between revenues obtained from output and expenses associated with the consumption of inputs (EUROSTAT, 2021[C]). As can be seen in Fig. 7, segment F411 has an extremely high investment rate (the highest value was in 2012 and reached 491.7%). The investment rate, however, fluctuates significantly in individual years. On the contrary, the investment rate in F412 is low in all periods under review, without major fluctuations. The highest value was reached in 2011, with the investment rate being only 25.1%. The gross margin value in F411 also highly fluctuates, significantly higher compared to F412. The gross margin in F412 is more stable and shows only a slightly increasing trend. The high profitability in F411 results from the ownership of production factors, such as capital and land. In F412, lower profitability, reached mainly by the labour factor, prevails.

Fig. 7: Indicators of the profitability – year 2011 to 2018 (%)



Source: authors' processing according to (EUROSTAT,2021[B])

3. Discussion and conclusion

The construction of buildings sector is, quite suprisingly, one of the smallest sector (in 2017 accounted for 2.3 % of the total employment and 3.6 % of the total number of enterprises in the EU) of non-financial business economy in the 27 European Union countries (hereinafter „EU") and its enterprise-size structure is composed mainly by micro enterprises (Eurostat, 2020). This can certainly be seen as surprising considering the volume and outputs (results) of production. To a certain extent, the results may also be surprising in terms of the existing and very significant differences in indicators for sector F411 and sector F412. They clearly indicate a significantly better position of the entities operating in sector F411. The question remains as to what extent the results are justified by the complexity of the operations done and the risk borne (however, there is no doubt that developer activities are significantly risky). The results show that subsector F411 reaches high profitability, due to the ownership of production factors, such as capital and land in particular. The influence of highly professional work also appears to be significant. On the contrary, the main production factor in F411 is labour. The relevance of this analysis and the associated ones is obvious. In conditions of the Czech Republic, certain disproportions occur in the real estate (or housing) market – generally, the state is imbalanced, thus leading to the continuous growth of real estate prices. It is necessary to develop a relevant strategy; in particular, to identify possible solutions for improving the affordability of housing in the Czech Republic (including the need to eliminate barriers in the sphere of public law, making the construction process lengthy and, thus, also more risky for all parties involved).

The development of the real estate market during the last year has shown that one of the impacts of COVID-19 is its contribution to further growth of real estate prices, and it can be expected that most real estate purchases will be made by financially stronger market players, including foreign ones (Hromada, 2021). Investments in realties have been proven to be good ones. A study by (Kalová & Brychta, 2018) points out that developer activity in the Czech Republic is mainly carried out by multinational companies. Profits of such companies, which buy land in the Czech Republic, will probably flow abroad. Votava et al. (2021) initiate further research, specifically, whether the price development can be corrected effectively at the regional level using other tools, not used yet, e.g., tax or regulatory ones. The authors of the paper believe that in order to increase housing affordability, it could be very effective if the current land owners (state, municipalities)

prefer housing cooperatives as bidders when selling land (plots), which, on the other hand, could create an unacceptable form of discrimination if this obligation is laid down. However, it is true that companies in subsector F411 achieve very high profit values resulting from the ownership of production factors, such as capital and land. The sale of land (plots) to cooperatives could reduce substantially the costs of acquiring new housing for the final owners. State support for cooperative housing could also lead to better availability of mortgages intended for Czech citizens.

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Dušan Karpáč, Viera Bartošová, Anna Kubjatková, Veronika Juríčková

University of Zilina, Faculty of operation and economics of transport and communications, Department of economics
Univerzitna 1/8215, 010 26 Zilina, Slovak Republic
email: anna.kubjatkova@fpedas.uniza.sk

NOPAT as a Determinant of Economic Profit Break-Even Point

Abstract
The modern goal of enterprises, value creation, is achieved through the concept of economic profit. Profit, as part of profit or loss, is one of the most important flows, pointing to how efficiently corporate capital is used in an entity (Siekelova et al., 2019; Valaskova et al., 2020). The article deals with the difference between accounting and economic profit, the selected form of economic profit - the EVA indicator. The economic value added (EVA) indicator is one of the best-known modern indicators of a company's performance. It shows whether the given entity increases its value or only earns for its economic survival. The benefit of this indicator is the valuation of equity and taking into account the risk It is difficult to express the economic profit itself, therefore the article also addresses the issue of its calculation. The company needs to know its financial status and the direction it is heading, so we decided to calculate a selected form of economic profit. However, it is also important for the company to know the point at which it begins to generate this form to know what it must achieve to demonstrate a positive state of economic profit. The article also deals with how it is possible to express the zero point of economic profit through the selected method and points out how it is possible to determine this critical point through the NOPAT indicator.

Key Words
NOPAT, EVA, economic profit, profit

JEL Classification: D46, L26, M41,

Introduction

Naturally, every business unit wants to grow in the market economy, increase its profits and expand its field of activity to grow its wealth from time immemorial (Durmanov et al., 2019; Fialova, Folvarcna, 2020). The development of considering what is a priority for an entrepreneur in a business environment has gradually changed over the centuries and flexibly adapted to current market conditions and opportunities. Initially, the subjects considered the most important to be the increase in profit, which was reported in the accounting records of the entity, later in economic theory, the idea of increasing the value of the company developed. Over time, businesses have realized that increasing accounting profits is not enough to sustain and grow in a market economy, and so the concept of economic profit has been added to business economics. Today, the concept of economic profit is very wide, especially abroad, and deals with the so-called superior form of profit, which is more important for the corporate sector than the explicitly recorded accounting

profit (Salaga et al., 2015). If a market economy firm wants to succeed and keep pace with the dynamically increasing competitiveness of other companies in the market, it must be able to dispose of its resources efficiently, while also taking into account whether its resources are sufficiently valued. The company can achieve this primarily by monitoring the growth of value and knowing what it generates under what circumstances.

It is, therefore, possible to say about economic profit that it is determined by what profit it achieves after abstracting from opportunistic, resp. alternative costs of capital, which we also know as opportunity costs. In economics, they are basic, but only abstract, resp. an illusory concept, the principle of which is very easy to understand - when making investment decisions, it is important to take into account all relevant costs. However, what is not easy with alternative costs is the expression of these "all relevant costs" and how they are measured. Opportunity costs are often also known as lost revenue, and these are a loss to the business because it deprives a certain amount of revenue of not making another at the expense of one alternative. The main barrier in connection with the calculation of alternative costs is that they are not included in the accounting records. In the USA, a model was created through which the value of a company is to be determined, and it is known and used to this day, it is the EVA (from the English "Economic Value Added") model - economic added value. This indicator began to be discussed as early as 1980 by authors from Stern Stewart & Co. The model was later developed by other authors - e.g. Stewart (2009). The economic value added (EVA) indicator is one of the best-known modern indicators of a company's performance, which takes into account the concept of economic profit. It shows whether the given entity increases its value or only earns for its economic survival. The benefit of this indicator is the valuation of equity and taking into account risk. The construction of economic added value consists of the so-called economic model, which is based on an accounting model. It is based on data and values reported in the balance sheet and profit and loss account, but these values, within the economic model, must be adjusted for the needs of business owners and the need to emphasize the compactness of data important for measuring business performance.

As the assessment of the actual economic situation based on accounting data alone does not appear to be sufficient, it is desirable to adjust that data to better assess the economic reality. The transformation of the accounting model into an economic model is an important and necessary step. The economic reality is then portrayed more credibly (Mařík, Maříková, 2005).

Net operating profit after taxes, ie NOPAT, represents operating profit generated from operating assets. It depicts the economic result of the principal business activity, which is adjusted for the effects of specific items in such a way as to reflect the real economic return of the enterprise. The calculation of adjusted taxes is characterized by the fact that it does not include the impact of costs and revenues that are not related to the main operating activity of the entity. The narrowing of business activities to operations is important in order to eliminate such effects of the company's activities on NOPAT, which do not represent the basic purpose of the company.

Given that NOPAT is an important part of the selected form of economic profit, in this study we will point out how this parameter could determine the zero point of economic profit generation.

1. Methods of Research

The basis for this study was the use of domestic and foreign professional literature, which was available in the form of scientific articles published in professional journals and conferences. Professional book publications and information from relevant websites were also used. The database necessary for the calculations related to the subject matter was based on data from balance sheets, profit and loss statements, and annexes to the financial statements of the selected company for the analyzed period 2015 - 2019. We chose a joint-stock company that records its accounting according to accounting procedures in Slovak legislation. Based on the criteria, we chose a company whose data is transparent and publicly available. We will try to estimate the data that is not published by the company through a subjective perception based on a study of the available information about the company.

To be able to determine the critical point of economic profit, we chose the form of economic profit in the form of EVA. Subsequently, we calculated all the necessary indicators on the data of the selected subject and came to the development of the economic value-added indicator as a selected form of economic profit. In its modification, EVA zero also points to the possibility of determining the critical point of economic profit. By modifying the algorithm of the EVA zero formula, we pointed out the critical point of generating economic profit determined by the NOPAT indicator.

2. Results of the Research

There is several indicators by which a company can measure its value (Bartosova, Kral, 2016; Coatney, Poliak, 2020). If the value of the EVA indicator reaches the level of zero, the business entity does not create or destroy value for the company's shareholders. In such an understanding, we can consider the EVA indicator as a certain turning point, which determines the success, respectively. business entity failure. We find the EVA zero point using a relationship that indicates at what level of the cost of equity the company acquires this critical point. The indicator, designed and calculated for this purpose, is referred to as "EVA Zero" and its explanatory power is quite obvious. If the level of the cost of equity is below the calculated EVA zero indicator, it is possible to demonstrate that the business entity creates value and effectively disposes of its capital. If the values of equity are higher, the company does not create value (Šrenkel and Smorada, 2014). Thus, if the EVA indicator is equal to zero in the given equation, the only unknown variable in the algorithm will be the quantity re, which will acquire a specific meaning after this transformation. After expressing this relationship, the company is allowed to quantify the amount of cost of equity at which the entity would acquire the aforementioned zero value of the EVA indicator (Šrenkel, Smorada, 2014):

$$r_e\,(EVA\ Zero) = (NOPAT - r_d)/Equity \quad (1)$$

The explanatory power of the indicator clearly expresses the point at which it is possible to demonstrate that the business entity uses its capital effectively. If the cost of equity is lower than the calculated EVA zero, the entity can cover all its costs with its level of profit

and create economic added value. The development of individual variables involved in the expression of EVA zero and the development of EVA zero itself is in the following table.

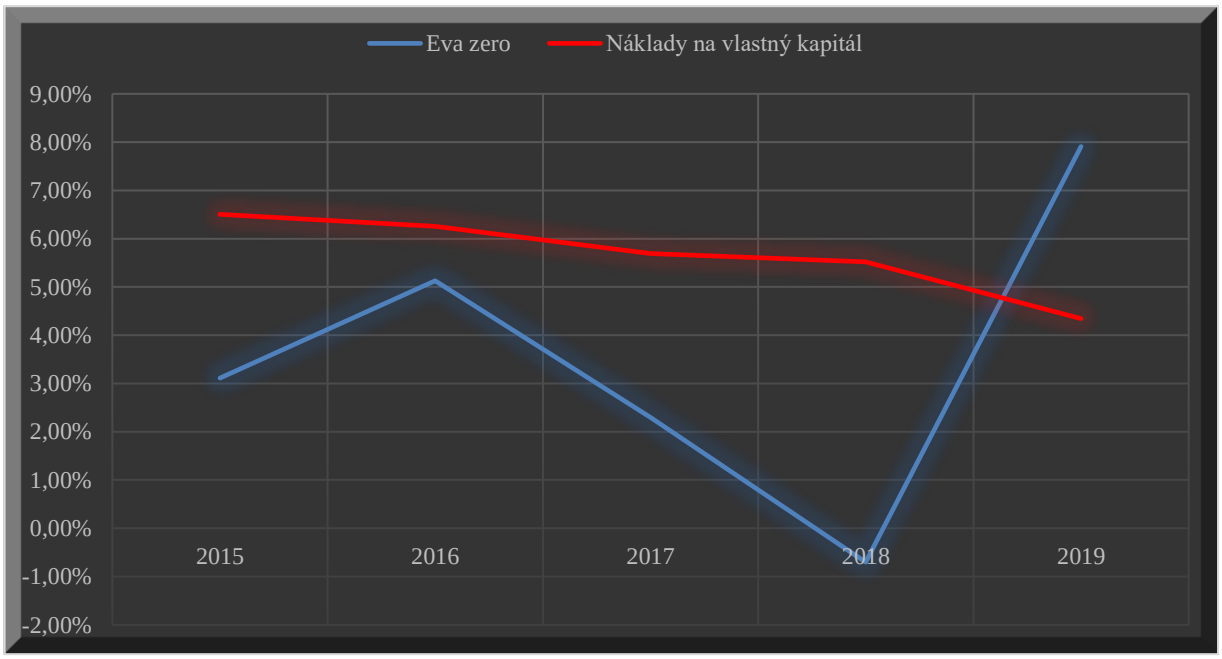
Table 1: Parameters generating EVA zero

Year	2015	2016	2017	2018	2019
NOPAT	1 200 363	1 788 532	965 485	66 247	2 954 735
Rd	412 145	354 390	340 022	358 298	298 679
Equity	28 235 736	29 502 677	30 341 693	30 879 589	34 374 653
Re	6.50%	6.25%	5.69%	5.52%	4.34%
EVA zero	3.11%	5.13%	2.30%	-0.70%	7.91%
marginal NOPAT	2 157 784	2 121 132	1 995 415	1 987 705	1 729 096
NOPAT deviation	44.7%	15.68%	51.61%	96.67%	-70.88%

Source: author´s own processing

As can be seen in the table, several indicators participate in the expression of EVA zero, which are also used in the calculation of the EVA entity or EVA equity. According to the EVA zero relationship, the net operating profit ratio is found in the numerator of the formula construction, where interest expense is deducted from it and is subsequently divided by equity. We also chose the NOPAT indicator as a reference parameter, the value of which can express at what point the subject begins to generate economic added value. The development of EVA zero, compared to the cost of equity, is graphically illustrated as follows.

Fig. 1: development of EVA zero

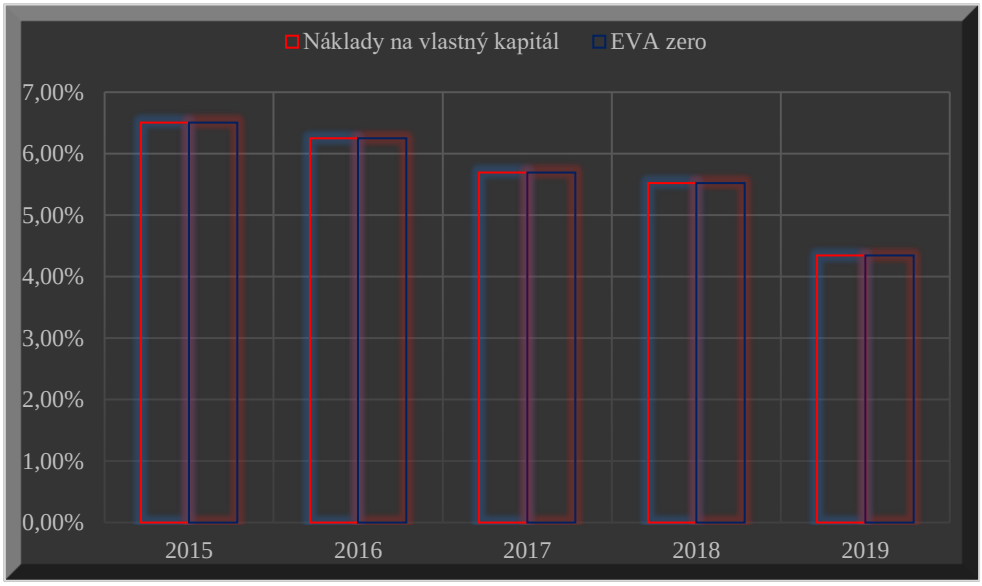


Source: authors' own processing

The graphic clearly shows that the cost of equity was below the calculated EVA zero values only once during the period under review, which means that according to the EVA zero indicator, the company generated economic value-added only in 2019, and in 2016 it was closest to the value EVAzero, however, was still more than 1% above its point. As can be seen in the relevant table, the graph shows that in 2015, 2016, 2017, and 2018, the EVA zero indicator showed lower values than the cost of equity, with the largest drop in 2018,

when the EVA zero fell below zero, which would mean that the cost of equity would have to be negative for the entity to create economic added value. This deep decrease was caused by the NOPAT indicator, which in 2018 acquired only the value of € 66,247, which is a very low level compared to other years of the period under review. The net operating profit after tax that a company would have to make in 2018 to start generating economic added value in that period would have to be worth almost € 2 million, exactly € 1,987,705, which means that the NOPAT achieved is only 3. 33% of the desired condition. In the table describing the parameters generating EVA zero, we also present the threshold values of net operating profit after tax, at which the cost of equity would reach a lower level than EVA zero, with which we could demonstrate that at given projected levels of NOPAT in individual years, the business would start to generate economic added value.

FIG. 2: Development of EVA zero after NOPAT adjustment



Source: authors' own processing

The graphical representation of the development of EVA zero after the adjustment of NOPAT clearly shows that in the case of the above changes in the achieved net operating profit after tax, the values of EVA zero in individual years of the analyzed period would reach the same level as the values of the cost of equity. In such a case, the business entity would start to generate economic added value after exceeding a set point.

We obtained the NOPAT adjusted in this way using of a mathematical correction of the formula based on the relation for the calculation of EVA zero, and we got an algorithm

$$NOPAT_{EVA\ zero} = r_{vk\ (EVAzero)} \cdot VK + (interest\ expense \cdot (1\text{-}t)) \quad (2)$$

The indicator of net operating profit after tax would thus be, in the context of EVA zero, a marginal reference point for the generation of the economic added value of a business entity.

3. Discussion

The assessment of the financial performance status of business entities has shown a relatively dynamic development in the past (Khan et al., 2020). For this trend, there have always been and still are requirements for information base on performance that changes in economic conditions (Valaskova et al., 2019). The benefit of examining the financial status of entities is the generation of information about what individual companies tend to do in the financial direction in the future. The basis for analyzes of a financial nature is primarily financial statements, which are a tool used by the company's management to obtain relevant information.

Based on the financial statements, business entities arrive at information on the achieved accounting profit, but in our article, we dealt with economic profit, which is different from accounting. The key difference between these forms of corporate profit is that in the concept of economic profit, the company also deals with implicit costs in the calculations, which are not normally recorded in the accounting records. An important part of the calculations is also the alternative cost of equity, which is an important determinant of the difference compared to accounting profit in the concept of economic profit.

The article, therefore, deals with the economic profit and the calculation of its selected form. Economic value added as the chosen form of economic profit was expressed based on profit based on data from the selected company. Furthermore, the article discussed the critical point of economic profit, which was expressed by a modified form of EVA in the form of EVA zero, while we determined the zero point of economic profit through the mathematical modification of the equation algorithm using the NOPAT indicator.

However, given the huge number of necessary adjustments in the multi-level calculation of economic value-added, it should be mentioned that so far any form of financial-economic indicator EVA is in principle always only approximate, whether on a broader or narrower scale. The level of approximation of calculations also depends on the availability of data.

Conclusion

The concept of economic profit is nowadays a well-known concept in business economics, but not so often implemented apparatus in business practice. The EVA indicator, economic added value, represents a certain form of economic profit, the calculation of which is quite demanding, but the use in the business economy is multifaceted. In the calculation, it was necessary to individually incorporate corrections and modifications of the schemes of indicators involved in the generation of EVA value, which is a quantification of net operating assets and net operating profit after tax. The calculation also includes the weighted average cost of capital, for which it was necessary to calculate the cost of equity and the cost of debt. Because economic added value has a multipurpose use, we were able to find the zero point of economic profit through a modified version, EVA zero. In the form of EVA zero, the usability of the EVA indicator was pointed out in expressing the zero point of generating economic value-added, while EVA zero primarily points to the line of cost of equity, but in the dissertation, after mathematical adjustment

of the equation, we expressed the limit value of net operating profit after tax. , which must be achieved for the business entity to cover all its capital costs and be able to start creating economic added value. Given this fact, we can demonstrate that the NOPAT indicator can point to a reference value of the critical point of economic profit generation.

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Miloš Maryška, Petr Doucek, Lea Nedomová

University of Economics and Business, Prague,
Faculty of Informatics and Statistics
W. Chruchill sq. 4, 130 00, Prague, Czech Republic
email: Milos.maryska@vse.cz, doucek@vse.cz, nedomova@vse.cz

Cyber Insurance/Re-Insurance and Impact of Covid-19

Abstract
The development of a society with a growing dependence on information and communication technologies (ICT) entails the risks associated with third parties' efforts to take control over them. To eliminate these risks means to significantly increase investments in cyber security, which is a proactive solution. A reactive solution includes cyber risk insurance that helps companies in the situation where a cyber risk becomes reality. Cyber Insurance became more important after the GDPR (General Data Protection Regulation) came into effect and now also due to the ongoing Covid-19 pandemic, during which the number of cyber-attacks increased. Just after the first lockdown in 2020, the USA and the EU had an almost 30% increase in risks associated with cyberattacks in almost every security risk category, from spam to phishing to malware in general. As the Cyber Insurance market grows, so does the Cyber Reinsurance market. The size of the Cyber Insurance market reached approximately 7.8 billion USD in 2020 and is estimated to increase to over 20.5 billion USD by 2025, which represents a more than 260% increase over five years. Our article analyzes the current state of Cyber Insurance and identifies the main factors affecting not only its current, but especially future, adoption.

Key Words
Cyber, Insurance, risks, covid-19, re-insurance

JEL Classification: K24, G22, L86

Introduction

The development of society, together with the permanent integration of information and communication technologies (ICT) into everyday processes, comes with an ever-increasing dependency on these technologies. Various surveys show a significant increase of investments in IT, especially in cyber security. Experts estimate that cyber security investments will amount to about 400 billion USD by 2025, which represents a fourfold increase over the past decade. It will include the demand for insurance solutions and services (Munich RE, 2020). Cyber Insurance represents specific products provided by insurance companies to specific customers or by reinsurance companies to insurance companies. Risks associated with Cyber Insurance are usually not covered by regular insurance policies or are not included in insurance policies at all. The purpose and goal of Cyber Insurance is to protect business companies, enterprises and individuals against risks associated with the use of information technology. As an example, we can mention risks associated with the use of the Internet, IT infrastructure, information privacy, a leak or damage to clients' personal data or information governance liability and many others. Cyber Insurance typically provides coverage that reduces the impact of the aforesaid risks, such as data destruction, loss or theft, hacking, DDoS attacks (distributed denial-of-

service attacks), ransomware, etc. Cyber Insurance typically provides very important coverage of the company's liability for losses caused to others e.g. by error and omission, by failure to secure data, by defamation and by loss or damage to the company's reputation. Cyber Insurance became more important after the General Data Protection Regulation (GDPR) came into effect and when companies became more dependent on information technology in almost all areas(Sjögren and Jakobsson, 2017). It can be assumed that the demand for Cyber Insurance will also grow for many other reasons:

- Mounting aggregation risk as more devices become part of IoTs and other ecosystems.
- Increasing cyber insurance penetration and accumulation risk.
- Increased pressure of regulators and others.
- Cyber risks more and more squeezed into dedicated Cyber insurance markets (e.g. LLOYD'S, 2019).

The importance of Cyber Insurance has also been supported by basic insurance market indicators that estimate a significant increase in the total volume of underwritten premiums concerning Cyber Insurance for the years 2020–2025 (Thomson and Laux, 2020). It has been estimated that this volume will go up from around 7.8 billion USD in 2020 to 20.4 billion USD by 2025, which is an increase of more than 260% over a time period of five years (Munich RE, 2020). The main factor affecting this growth is the increase in security breaches and cyberattacks, which can cause significant economic losses in companies. The second important factor includes the requirements of government regulators, which gradually "motivate" companies to adopt Cyber Insurance policies. We would like to mention that in addition to Cyber Insurance Programs, there are also Cyber Reinsurance Programs that often copy Cyber Insurance parameters and are provided by reinsurance companies and not by insurance companies. To put it simply, reinsurance companies insure insurance companies. As a rule, an insurance company (or reinsurance company) is not able to bear all the risks associated with the underwritten insurance/reinsurance, and therefore is reinsured with another reinsurance company. Therefore, an underwritten premium flows from an insurance company, which functions as a B2C (Busienss to Customer) element, to a reinsurance company with the typical B2B (Business to Business) relationship. An insurance company has a large number of small policies, while a reinsurance company has a smaller number of policies but with much greater coverage and a larger volume of premiums.

This article analyzes the current state of Cyber Insurance and identifies the main factors affecting not only its current, but especially future, adoption. The identification of changes in the perception of potential financial impacts of the use/non-use of Cyber Insurance as compared to traditional Life and Non-Life Insurance is also an important parameter. We are taking into account very important factor, which is Covid-19 and impact of this pandemic on the insurance and reinsurance especially in the context of switch from traditional work in the office into work from home-office.

1. Methodology

The article is based on a detailed analysis of current information from a large number of conducted Cyber Insurance surveys. The main Cyber Insurance surveys are conducted by Munich Re, which is the world's largest reinsurance company, and by the CyberCube Institute, which focuses on Cyber risks and conducts a number of surveys in this domain (Thomson, Laux, and Bole, 2021; Thomson and Di Silvestro, 2021; Schetrit, Anderson and Essen, 2021).

This article analyzes in detail individual independent inputs, compares and validates them and identifies identical conclusions, which can be considered significant thanks to the fact that they have been confirmed several times.

For the purposes of this article, we analyzed more than 130 information sources, both those publicly available and those obtained based on our cooperation with e.g. Munich Re or from paid information sources concerning Insurance and Reinsurance.

The following surveys are clearly the most important:

- "Cyber Insurance: Risks and Trends 2020," which was conducted in early 2020 and published on 14 April 2020 (Munich RE, 2020). More than 5,500 companies participating in this survey were asked about their perception of risks associated with Cyber Insurance. The survey was conducted again in 2021 (Munich RE, 2021).
- "COVID-19 Has Changed How We Think about Cyber Risk" conducted by Willis Towers Watson, which is one of the world's largest brokers, and published on 23 September 2020 (Willis Towers Watson, 2020b). The survey was based on an analysis of questionnaires from more than 1,000 survey participants from 56 countries in 2020.
- "MMC Cyber Handbook 2019 Perspectives on Cyber Risk in the Digital Era," which was published by broker Marrsh 7 McLennan in 2019 and which is based on an analysis of questionnaires of 2018 World Economic Forum participants - more than 12,500 top managers around the world - who were asked about Cyber Security (Marsh & McLennan Insights, 2019).
- "Scoping a Cyber Catastrophe Loss Study: 2019 - Looking Beyond the Clouds," which was published on 8 September 2019 by Guy Carpenter and Cyber Cube. Guy Carpenter is a global broker and CyberCube is an institution specializing in the relationship between Cyber and Insurance/Reinsurance. The survey is based on an analysis of more than 6,000 Cyber Insurance policies with a combined premium of over 285 million USD, which is approximately 10% of the US Cyber market in 2019 (GuyCarpenter, 2019; Thomson, Bole and Essen, 2019).

2. Research, Results and Discussion

Based on an extensive analysis carried out regularly by major insurance institutions Munich Re, Swiss Re, March, Aon etc., (Thomson and Laux, 2020) we can say that the number of cyberattacks keeps growing also due to the Covid-19 pandemic. The global COVID-19 pandemic has created many new opportunities for hackers, while revealing

new system vulnerabilities (Thomson, Laux, and Bole, 2021). Reinsurers need to be aware of these changes and the increased uncertainty and to adapt to new standards if they are to continue to underwrite this risk at a profit. The primary reason for this increase due to Covid-19 is the significant switch of people from a traditional business relationship to a business relationship based on electronic means, i.e. various e-shops (online retail), as well as the fact that a significant percentage of companies switched to a remote work environment in the form of cloud computing (Thomson and Laux, 2020). A well-known example of a cyberattack is the attack on Garmin, whose services were not available for several days. A very interesting finding is that just after the first lockdown in 2020, the USA and the EU had an almost 30% increase in cyberattack risks in almost every security risk category, from spam to phishing to malware in general (S&P, 2020, Willis Towers Watson, 2020a). The higher number of cyberattacks resulted in an increase in insurance claims, which may not be (and usually are not) covered by older insurance policies, and insurance companies thus cannot provide full protection against risks of network shutdowns, data breach and civil and regulatory actions created by these new network vulnerabilities (JONESDAY, 2020). The companies handle this situation by changing their existing insurance policies or by signing new insurance policies that already clearly define Cyber Insurance and set coverage parameters. There are the following insurance policies:

- Insurance policies directly covering Cyber risk, so-called Stand-Alone Cyber Insurance.
- Package policies that include Cyber risks as one of the insured risks.

2.1 Cyber Insurance coverage and its importance

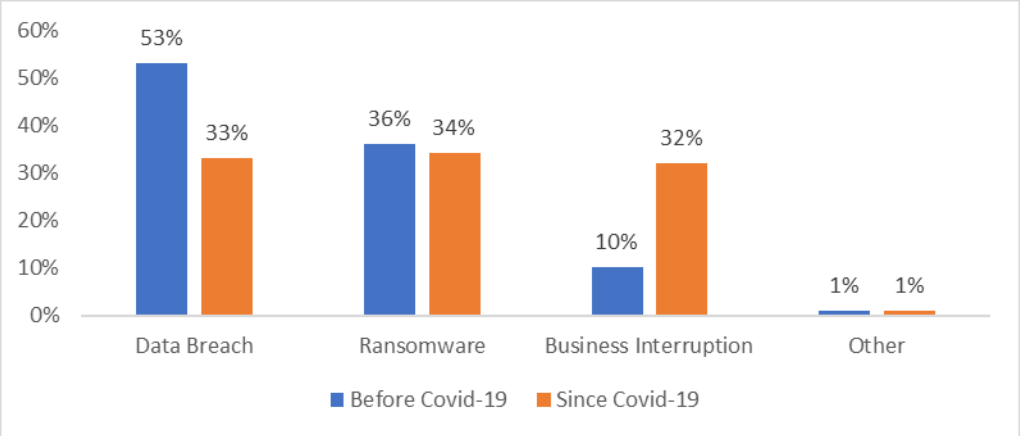
Although it may seem that Cyber Insurance will be variable and will include a large number of different types of coverage, it is not the case. In general, Cyber Insurance covers the following four basic areas (JONESDAY, 2020; (Munich RE, 2020):

- *Data Breach Expense*, which covers analysis costs and a potential impact of data breach, in particular the cost of legal protection and forensic investigators and the cost of subsequent informing of customers provided that their personal data were compromised.
- *Privacy/Network Security Liability*, which covers the cost of protection and settlement of class actions and costs incurred by third-party claims.
- *Regulatory Claims*, which cover fines and the cost of settling disputes initiated by government investigations in response to the loss/theft of personal data processed by companies.
- *Network Interruption*, which is focused purely on a company and its financing, as it covers the loss of revenues and additional expenses associated with the shutdown of corporate networks or another corporate infrastructure crucial for its primary economic activity.

The surveys that compare the situation before and during the Covid-19 pandemic show something very interesting, which is evident from the following figure. FIG. 1 compares the importance of three categories - more than half of the survey respondents (53%) considered data breaches to be the biggest driver of cyberattack losses. Now their opinion

is completely different, and they believe that the risks are evenly divided among data breaches, ransomware/extortion and business interruption. Concerns about business interruption went up, at the expense of data breaches, from 10% to 32%, making it one of the main risks of losses caused by the increased exposure of companies to the Internet. These findings were generally consistent across geographical areas. As the publicity of ransomware is growing, one would have expected that it would be now considered an increasingly major factor in cyberattack-related losses; however, business interruption was reported as the main driver of economic losses resulting from the pandemic (although not necessarily an insured loss), which could explain the perception that it will cause further cyberattack-related losses in the next 12 months.

Fig 1: What will be the biggest driver of cyber-related losses over the next 12 months?



Source: (Willis Towers Watson,(2020b)

A more detailed look at the risks is provided by the following Cyber Security Threat Radar, which combines three main aspects (Taylor, 2020):

- Main threats.
- The potential impact on a company‘s economic situation in terms of losses.
- The trend as compared to the previous time period.

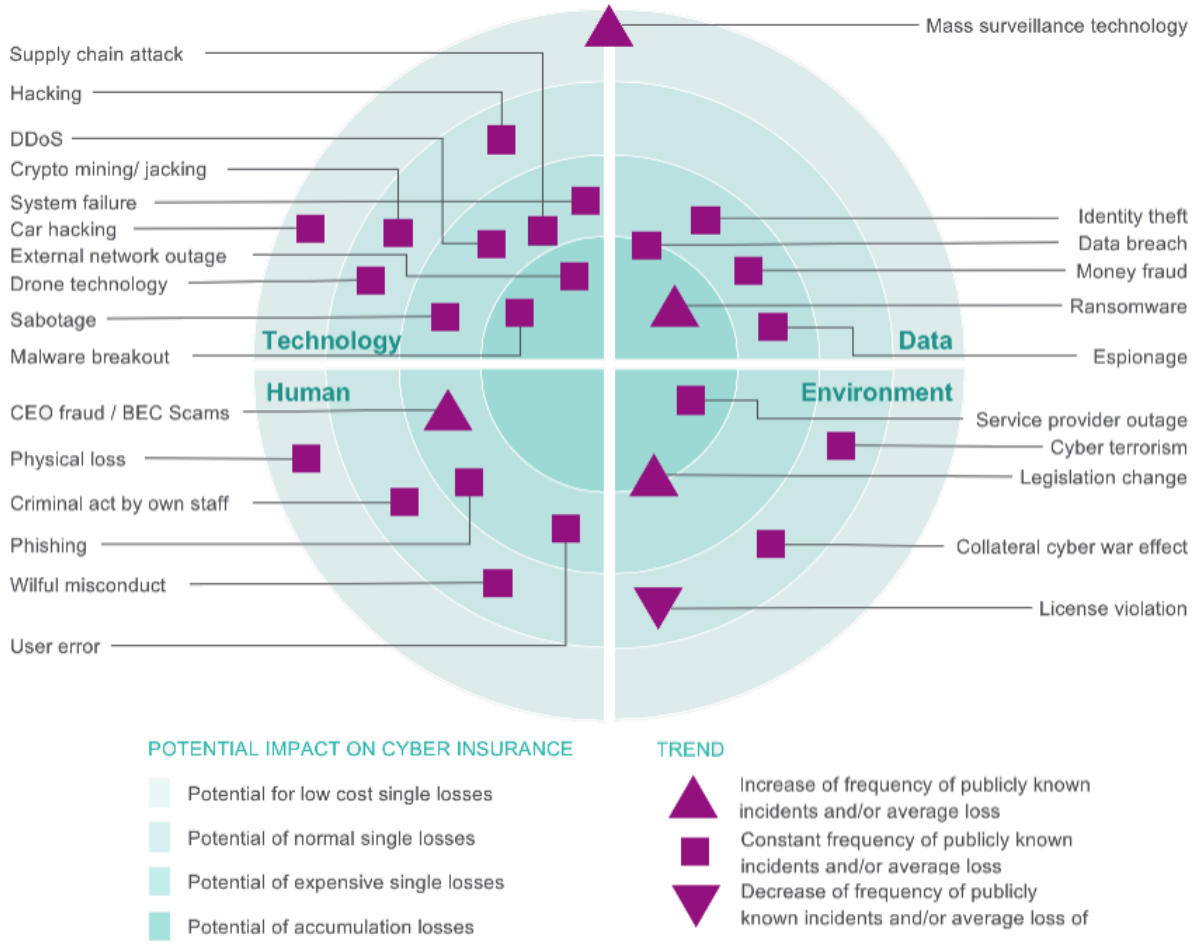
This Cyber Security Threat Radar was first introduced by Munich Re in 2018 and has been published on a yearly basis since then; it lists the risks in the given time period. Cyber Security Threat Radar is a well-arranged way of presenting Cyber Security risks, both in terms of type and significance in the context of other risks, and provides information about whether the risk increases, decreases or remains the same as compared to the previous period.

Fig. 2 shows that the following risks are the most important:

- A shutdown of external networks, i.e. the connection of a company as a whole to the Internet.
- A shutdown caused by malware.
- A data breach (an increase in the number of breaches by 1/3 as compared to the previous year).

- Ransomware (an increase in the number of attacks by 2/3 as compared to the previous year).
- A shutdown of IT service providers.
- Legislative changes (so far covered fully or partly by the legislation of about 100 countries).

Fig. 2: Cyber Security Threat Radar



Source: (MUNICH RE, 2020)

As a very interesting example, we can mention ransomware attacks. Their number is considerably growing, and they are thus becoming a very big problem (for this reason, they are listed above). Surveys show that a ransomware attack occurs every 11 seconds and affects all sectors of the economy. (Blackfog, 2020; NAIC, 2020).

2.2 Areas primarily vulnerable to cyberattacks

The most interesting targets for various groups of hackers are usually those that work with sensitive personal data. Financial institutions and healthcare facilities have been their target for some time now. Now, given IT developments, it is also companies operating with cryptocurrency (Taylor, 2020).

According to a survey (Taylor, 2020; Ungarino, 2019), the probability of a cyberattack on a financial institution is 300 times greater than on a regular IT-based manufacturing

company (e.g. a car manufacturer). An interesting conclusion of this survey is that financial institutions are often not properly prepared to fend off such attacks.

The situation is even worse in the case of healthcare, which has a significantly lower level of security compared to financial institutions that are supervised by national authorities, such as central banks, etc. Cybercriminals are well aware of this fact as well as of the value of personal data that they can obtain by breaking into the systems of healthcare institutions; for these reasons, the number of attacks on hospitals is increasing at a geometric rate every year.

Companies operating with cryptocurrencies, which are not regulated in any way and therefore the degree of their security is not clear, are a separate issue. Given the volume of funds flowing through cryptocurrencies, this is a potentially very important risk element for financial markets due to various efforts and ways to break/steal ciphers allowing to illegally transfer funds.

2.3 A response to Covid-19

Aon outlines practical steps (AON Empower Results, 2020a)that organizations can take to avoid a higher cyber risk in the midst of the Covid-19 pandemic. These steps are triggered by the fact that the COVID-19 outbreak significantly disrupted businesses and caused some panic among their employees. As an example, we can mention companies operating in Asia that activated their emergency plans and business continuity plans and allowed or ordered their employees to work from home in order to mitigate the spread of the virus. In this new reality, where millions of people work remotely, secure networks are now more important than ever. The recommended main steps in this area are as follows (AON Empower Results, 2020b):

- Defend Against the Phishing Wave.
- Test System Preparedness.
- Brace for Disruption.
- Social Engineering.
- Non-malicious disruption.

2.4 The impact of Covid-19 on Cyber Insurance

The main implications of Covid-19 in the context of Cyber Insurance and Cyber risks can be identified as risks associated with remote working and a change in cyber policy, which may not currently cover all new areas or have inaccurate wording that insurance companies can exploit to deny coverage. An example of such situations can be e.g.:

- During the COVID-19 pandemic, there was a sharp increase in two types of cyberattacks:
    - Ransomware attacks, where hackers use malware to decipher a company‘s data and then demand a cryptocurrency payment for providing deciphering keys; and

    - Fraudulent transmission schemes, where hackers send fake e-mails to targeted employees to force them to transfer funds to foreign accounts.
- These events may not be covered by standard insurance policies and often have to be added by means of a clause that may determine whether or not coverage is available.
- Many cyber policies include exclusions due to negligent network security practices - which, of course, runs counter to the very purpose of Cyber Insurance. We have seen exclusions due to delayed software repairs, the use of unenciphered portable devices and design errors that affect network traffic capacity. Such exclusions can be very problematic, especially during the COVID-19 pandemic, when network IT sources are strained.
- The California Consumer Protection Act (CCPA) came into force on 1 January 2020, coinciding with the onset of the COVID-19 pandemic in the United States. This law, which is considered the strictest consumer protection law in the country, specifies new requirements concerning data security procedures, third-party sharing and the disclosure of collection policies. In order to comply with the CCPA, many companies had to invest in new data systems and processes, which was very costly. Any violation of the CCPA can result in civil claims, statutory damages and regulatory investigations. It is important for corporate policyholders to make sure that their Cyber Insurance policies provide adequate coverage for these new regulatory exposures. This law is linked to Europe mainly through Munich Re, the world's largest reinsurance company, that sells in Europe major exposures in the USA and Europe as well as products created as a result of US legislative requirements, provided that there are commercial benefits. This conclusion also applies to other global institutions.

Conclusion

The aforesaid clearly shows that the importance of Cyber risk in the post-Covid period is increasing significantly. The question is not whether but when e.g. the systems tracking people's vaccination and traveling based on various types of electronic passports confirming completed Covid-19 vaccination will be abused.

On the other hand, companies can be fined by various national and transnational institutions for their insufficient protection of personal data. The reputation risk associated with such a fine is a separate issue.

The insurance sector and the reinsurance sector are responding to such increased risks by offering various types of insurance against cyberattacks but also by charging higher premiums for their provided insurance coverage and by modifying exclusions from their insurance indemnity.

All these factors lead to one fundamental conclusion - the demand for cyber risk insurance will grow as fast as the number of attacks on various companies and institutions. Insurance is one of the ways to eliminate the potential consequences of such attacks. On the other hand, this insurance may represent a significant capital risk for insurance companies due to accumulated exposure with respect to their capital and the need to sufficiently cover their own risks of insurance with reinsurance companies that assume part of these risks.

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Michaela Petrová, Martina Krügerová, Michal Kozieł

VSB – Technical University of Ostrava, Faculty of Economics, Department of Law
Sokolská třída 33, 702 00 Ostrava, Czech Republic
email: michaela.petrova@vsb.cz, martina.krugerova@vsb.cz,
michal.koziel@vsb.cz

INCOTERMS – History and Future Development

Abstract

INCOTERMS is now a well-established set of rules that is used in international trade. The main purpose of the INCOTERMS rules is to define the mutual roles, duties, responsibilities and transfer of risks. Their advantage is comprehensibility and uniform interpretation between the contracting parties, as well as relatively regular revisions responding to current developments. The INCOTERMS rules have been defined and are constantly being developed by practitioners associated with the International Chamber of Commerce (ICC). Each version responded to current societal demand, introduced new clauses, and specified existing ones. But their use and dissemination to the awareness of entrepreneurs also increased. In 2020, the ninth version began to be used, INCOTERMS 2020. The aim of the article is to point out the importance and core of this institute based on the historical development of INCOTERMS clauses and to identify possible future developments. We assume that future versions will respond to new types of transport associated with the expansion of unmanned drones and other modes of transport. The second essential element will be security. The transfer of some logistics operations to a virtual environment will also have an impact, as the development of payment methods. The benefit for optimizing and increasing the transparency of the distribution of INCOTERMS rules is seen in the blockchain technology.

Key Words

export, ICC, Incoterms, international trade, logistics

JEL Classification: K12, K33, F23, M16

Introduction

When concluding business transactions, the entrepreneur should not forget the issue of passing the risk of accidental destruction and destruction of goods. For this purpose, two sources have been created in the international environment, which deal with the issue of international purchase of goods. These are the United Nations Convention On Contracts For The International Sale Of Goods (CISG), also known as the Vienna Convention, which indirectly regulates these issues, and also the International Commercial Terms (INCOTERMS), rules that individual parties can incorporate into contracts in commercial transactions. Incoterms are an acronym for INternational COmmercial TERMS.

The rules of Incoterms have been defined and are constantly being developed by practitioners associated in the International Chamber of Commerce ICC, which was established in 1919 in Paris to promote greater openness of national markets for foreign trade and investment. As early as 1936, The International Chamber of Commerce (ICC)

issued the first version of the Incoterms to establish generally accepted definitions and rules for the delivery of goods between seller and buyer. Incoterms very quickly became internationally recognized delivery clauses and without whose knowledge the entrepreneur can no longer do without concluding a purchase contract. Thanks to these rules, entrepreneurs can avoid the uncertainty resulting from different interpretations of the method of delivery of goods and the transfer of risks and costs from the seller to the buyer.

The first Incoterms were valid for only 13 countries. They are now used in more than 140 countries and are translated into 31 different languages. At present, there are a total of 11 trade clauses in Incoterms 2020 divided for any mode of transport (EXW, FCA, CPT, CIP, DAP, DPU, DDP) and for sea and inland waterway transport (FAS, FOB, CFR, CIF) (Debattista, 2020). Because the Incoterms are drafted in detail in many languages and are widely available, even a layman is able to understand from these rules and their explanations what rights and obligations apply to him when choosing a particular clause. This alone can be seen as the importance of Incoterms for world trade.

Incoterms have the character of business conditions. This means that if the law allows it, they replace or supplement statutory provisions. The advantage of Incoterms is their comprehensibility and uniform interpretation between the contracting parties, which eliminates possible disputes regarding the interpretation of individual provisions of the contract, which are replaced by these international rules. The actual implementation of the terms into the contract follows a simple formula (Debattista, 2020): "[the chosen Incoterms® rule] [named port, place or point] Incoterms 2020", where the chosen Incoterms® rule represents the three-letter term of the clause, named port, place or point then place of delivery - where the risk is transferred from the seller to the buyer (for clauses C - destination to which the seller must organize and pay for the carriage of the goods, which is not, however, the place or port of delivery; for clauses D - place of delivery and also the place of destination and the seller must organize carriage to that point) and followed by the designation of a specific version of Incoterms. The advantage of Incoterms is therefore their comprehensibility and uniform interpretation between the contracting parties, which eliminates any disputes regarding the interpretation of individual provisions of the contract, which are replaced by these international rules.

International trade, like other industries, has undergone changes. Changes in transport, new modes of transport, technological progress, the process of concluding contracts must naturally be reflected in the conditions that give them barriers. Over the years, these rules have been amended, mainly due to ongoing changes in business practice. The changes in the Incoterms rules can also be used to demonstrate the development of the world economy and trade. The current version of INCOTERMS 2020 is now the eighth revision of international rules, and thus the ninth edition of the terms and conditions, came into force on 1 January 2020.

The aim of the paper is to point out the importance and essence of this institute and to identify possible future developments based on the historical development of INCOTERMS clauses. In the modern world, technological changes and modernizations are constantly taking place, and it is necessary to respond to these changes in this area as well.

Literature Review

The issue of Incoterms is given great attention in research. We can also look at the delivery conditions from different angles. Vogt and Davis (2020), for example, divided scientific articles into four areas: from the point of view of a general description of Incoterms delivery terms, comparison of individual versions of Incoterms or individual delivery clauses, the third area is the legal view, ie the inclusion of clauses in business cases. The last area (fourth) is the contributions that deal with the lack of understanding of the rules. Still, let's add more views. Incoterms can be considered in risk management as an effective tool for risk management (Bergami, 2013; Petrová et al., 2021). Stojanović and Ivetić (2020), in turn, see delivery rules as a kind of "channel" that connects trade and logistics.

However, from all points of view, the basic purpose of these conditions can be traced, namely, to help entities determine their mutual roles, obligations, and responsibilities in international trade. This will provide the parties with the certainty of a uniform interpretation of the clause included in the specific contract. The authors agree that the correct use of the clauses can speed up logistics and cost savings for parties (Vogt, 2018; Debattista, 2020; Suraraksa et al., 2020), and overall simplify and make available the link between logistics and trade (Stojanović and Ivetić, 2020).

However, let's go back to the beginning. The tradition of using business terms and incorporating them into contracts began in Great Britain in the nineteenth century. They were founded by experts associated in the International Chamber of Commerce (ICC), whose goal is to support the development of the world economy by developing international trade, services and investment and removing their barriers (in more detail, ICC, 2020; Kelly, 2010). Incoterms was first published in a codified edition in 1923 (Bergami, 2012) and contained six terms. This standardization has fostered international trade, but there have been significant differences in the interpretation of trade conditions across countries and sectors (Malfliet, 2011). That is why the ICC proposed in 1936 to publish a publication of the International Commercial Terms with the aim of a uniform interpretation of the terms and conditions. As Maltfliet (2011) points out, traders could thus rely on a uniform interpretation of the condition included in the purchase contract. Incoterms have gradually become internationally recognized delivery clauses, which are almost a matter of course when concluding an international purchase agreement. The reason is also their comprehensibility (Suraraksa et al., 2020). The ICC's Incoterms rules are reviewed and revised at regular intervals; in the last forty years, they have been updated every ten years. The updates mainly reflect changes in international trade and supply rules. When referring to a specific clause, it is important to indicate the version of the Incoterms to avoid ambiguity in the version of the condition used. Bergami (2012) states that it is important especially during the transitional period, when a new revision is issued. The latest revision, the Incoterms edition, is from 2020 and lists eleven clauses. When choosing a specific clause, several aspects need to be considered (Piltz, 2020), such as transport security requirements, insurance, import/export permits and more.

1. Methods of Research

For the purposes of this article, it was necessary to get acquainted with the individual versions of Incoterms. The source of data needed to compile an overview of historical developments was information from primary sources, namely information published by the International Chamber of Commerce and individual versions of the Incoterms. The methods of scientific work based on the evaluation of primary and secondary data, induction and deduction, analysis and synthesis are used. We examine the period from the first conditions in 1923 to the now latest version of Incoterms 2020.

At the beginning of the whole process of creating Incoterms rules stood the entrepreneurs themselves - such as industrialists, financiers, and traders, who decided to create an industry standard after the World War I because of the absence of a global system of rules for business management. The first common terms and conditions were issued by the International Chamber of Commerce (ICC, 2020) in 1923, but the first official version of Incoterms is from 1936.

PRE-INCOTERMS EDITION 1923 | Shortly after World War I, it was clear to the founders of the ICC that international trade should not be regulated by governments, but by private industry through uniform global standards (Vogt and Davis, 2020). Therefore, as early as 1920, the first negotiations for the creation of common business conditions began. It was an ICC study (2020) of six commonly used terms in thirteen countries. A summary of the findings, and especially of the differences in interpretation, was published in 1923.

PRE-INCOTERMS EDITION 1928 | The version of the terms and conditions from 1928 underwent changes concerning the elimination of errors and clarification of the original version from 1923. The first survey identified several shortcomings, but the second study succeeded in remedying them and introducing common commercial terms into more than 30 countries. (ICC, 2020)

INCOTERMS 1936 | We can talk about the version from 1936 as the first official version of Incoterms. It consisted of six terms - FAS (Free Alongside Ship), FOB (Free on Board), C&F (Cost & Freight), CIF (Cost Insurance and Freight), Ex Ship (Delivered Ex Ship) and Ex Quay (Delivered ex Quay). (ICC, 2020). For the first time, there has been a uniform regulation of procedures in international trade.

INCOTERMS 1953 | The further development of Incoterms was influenced by the World War II, due to which additional revisions of the rules were suspended. Therefore, the Incoterms were first changed in 1953, mainly due to the increase in rail traffic. In addition to the original six rules, three more rules have been added for non-maritime transport - DCP (Delivered Costs Paid), FOR (Free on Rail) and FOT (Free on Truck). (ICC, 2020)

INCOTERMS 1967 | Version of the Incoterms 1967 corrected misinterpretations of the previous 1953 version. This revision was the third in a row and added two new terms - DAF (Delivery at Frontier) and DDP (Delivery at Destination). (ICC, 2020)

INCOTERMS 1976 | In the group of Incoterms business conditions in 1976, air transport was included, specifically the FOB Airport (Free on Board Airport) condition. The FOB

condition itself appeared in the first official version of Incoterms, where it was typical for maritime transport. (ICC, 2020)

INCOTERMS 1980 | The version of Incoterms 1980 was related to the expansion of container traffic and new documentation processes, which required further revision, which resulted in a new condition FRC (Free Carrier… Named at Point). (ICC, 2020)

INCOTERMS 1990 | The main reason for creating the new version of Incoterms 1990 was the need to adapt the clauses to the increasing use of electronic data interchange (EDI) and adaptation to intermodal transport. In the new version, the FCA clause has been modified to suit all modes of transport, even in various combinations. Consequently, clauses have been omitted which only concerned certain types of transport, namely FOR, FOT and FOB Airport. In connection with the revision work, Incoterms were organized into four groups and 13 clauses:

a) group E - departure clause (EXW),
b) group F – main carriage unpaid (FCA, FAS, FOB),
c) group C – main carriage paid (CFR, CIF, CPT, CIP),
d) group D – arrival clauses (DAF, DES, DEQ, DDU, DDP). (ICC, 2018)

INCOTERMS 2000 | The revision process for the new edition of Incoterms 2000 took approximately two years. The International Chamber of Commerce in Paris sought to find out reactions, opinions, or suggestions for improvement from a wide range of world traders. At the same time, it also sought to ensure that the wording of the Incoterms 2000 terms and conditions reflected business practice. Another reason was the changes in transport techniques, especially in connection with the development of containerization, combined transport, and the introduction of new technologies in transport. The changes were made in the area of customs, specifically in the area of customs clearance and payments of customs obligations under the FAS and DEQ, and then in the area of loading and unloading obligations under the FCA. Compared to Incoterms 1990, the individual conditions did not change, nor did their arrangement into four groups. Thus, changes can only be understood as the above-mentioned specification of formulations. (UN, 2000)

INCOTERMS 2010 | The Incoterms 2010 version consolidated the Group D clauses. The DAF, DES, DEQ and DDU conditions have been replaced by the new DAT (Delivered at Terminal) and DAP (Delivered at Place) rules compared to the Incoterms 2000, which can be used regardless of the agreed mode of transport. The number of conditions was reduced from thirteen to eleven. Furthermore, the Incoterms 2010 rules were newly divided into two classes, namely rules for all modes of transport and rules for maritime and inland waterway transport. The first group includes EXW, FCA, CPT, CIP, DAT, DAP, DDP conditions and the second group FAS, FOB, CFR and CIF. (ICC, 2010). Transport safety was also addressed here. A formulation facilitating the use of electronic means of communication has also been included.

INCOTERMS 2020 | Currently, the most current version is Incoterms 2020. The impulse for the changes was, on the one hand, the effort to link the rules as much as possible with practice, but also to facilitate the correct choice of the clause. For the new version, it was important to focus on improving the presentation so that users would be directed to the right rule for their contract. Therefore, cosmetic changes have been made which should

lead to smoother export/import transactions. This is a clearer explanation of the definition and connection between the purchase contract and the supplementary contracts, with explanations for each rule and the possibility of re-ordering in accordance with the rules. In Incoterms 2020, there is a change in the name of the DAT (Delivered at Terminal) condition to DPU (Delivered at Place Unloaded). Also new is that the FCA condition will allow the issuance of a consignment note with on-board registration. The conditions of CIF and CIP were also changed, which sets new insurance standards. Incoterms 2020 also offers explanations for users to make working with clauses as simple as possible and to use these business conditions in practice as user-friendly as possible. (Debattista, 2020) The result is 11 commercial clauses divided for any mode of transport (EXW, FCA, CPT, CIP, DAP, DPU, DDP) and for sea and inland waterway transport (FAS, FOB, CFR, CIF).

2. Results of the Research

The Incoterms were first introduced in 1936. The main goal was to establish and unify the rules concerning the supply of goods in international trade. The ICC reviews and revises the Incoterms at regular intervals, updating every ten years for the last forty years. The updates mainly reflect changes in international trade and supply rules. In 1953, the ICC responded to the increase in rail transport, in 1976 to the development of air transport and in 1980 to the expansion of container transport. In 1990, the rules were adapted to the information boom and flexibility – the possibility of combining transport. The year 2000 was marked by adapting the conditions to business practice and changes in the customs process. In a similar vein, further revisions were carried out to adapt the conditions to the modes of transport and to divide them into rules for all modes of transport and waterborne transport. In the last ninth edition, the ICC also adapted the presentation and design to make the rules more user-friendly. And used as much as possible, as can be seen from the latest revisions, the emphasis on the compliance of conditions with business practice is striking. The following table has been created for a better overview of the clauses in the individual versions (see Tab. 1).

Tab. 1: Historical development of INCOTERMS

1936	1953	1967	1976	1980	1990	2000	2010	2020
–	–	–	–	–	EXW	EXW	EXW	EXW
–	–	–	–	FRC	FCA	FCA	FCA	FCA
FAS	FAS	FAS	FAS	FAS	FAS	FAS	FAS	FAS
FOB	FOB/FOR /FOT	FOB/FOR /FOT	FOB/FOR /FOT/ FOB Airport	FOB/FOR /FOT/ FOB Airport	FOB	FOB	FOB	FOB
C&F	C&F	C&F	C&F	C&F	CFR	CFR	CFR	CFR
CIF	CIF	CIF	CIF	CIF	CIF	CIF	CIF	CIF
–	–	–	–	–	CIP	CIP	CIP	CIP
–	DCP	DCP	CPT	CPT	CPT	CPT	CPT	CPT
Ex Ship	Ex Ship	Ex Ship	Ex Ship	Ex Ship	DES	DES	–	–
Ex Quay	Ex Quay	Ex Quay	Ex Quay	Ex Quay	DEQ	DEQ	DAT	DPU
–	–	DAF	DAF	DAF	DAF	DAF	DAP	DAP
–	–	–	–	–	DDU	DDU	–	–
–	–	DDP	DDP	DDP	DDP	DDP	DDP	DDP

Source: authors' elaborating (Vogt, Davis, 2020; ICC, 2010; ICC, 2020)

Tab. 1 shows the changes that have taken place over the years in the individual revisions. Changes did not only occur in individual clauses. The Incoterms rules have been extended to other countries over the years, and since the first version, after the eighth revision, traders in over 140 countries have now used them and translated them into a total of 31 languages. Suraraksa et al. (2020) also state that Incoterms are the most used in companies in international trade, where they mention knowledge and understanding of individual rules as one of the main selection criteria.

Despite the recent revision of the Incoterms rules, we could already innovate some clauses. In their article, Davis and Vogt (2021) concluded after reviewing the new version of Incoterms 2020 that the rules remain ambiguous in many cases and should be simplified. They propose reducing the number of rules to three instead of eleven and improving the definition (such as packing, marking, notices and delivery documents). They also point out that it should occur to make the rules precise, and to align L/C and Incoterms so the payment aspects marry with the Incoterms as well as to ensure the clarity of trading of goods on the water.

3. Discussion

We should not forget about constant technological progress. At the time of the next review, there may be technologies that were not yet fully utilized. Technological development has a great influence on changes in production processes and logistics. It is in the field of logistics that a lot of innovations are coming now, Durdağ and Delipinar (2020) in their study point mainly to automation, robots, wearable technologies, unmanned vehicles, wearable devices, artificial intelligence, internet of things, and artificial intelligence will manage the logistics. With the development of e-commerce, automated systems will be developed that are/will be able to select the most suitable conditions for a given business case. Tan and Thoen, (2000) investigate how the INCAS system and Incoterms can be linked.

In recent years, drones have great potential for international transport. Therefore, Incoterms should also address this direction. Drones give the opportunity to get to otherwise inaccessible areas such as islands and others. The advantage of drones is less involvement of the human factor. This increases the safety of transport, because in case of an accident comes to harm the machine, not a person. Another advantage of using drones is the ability to check in multiple customers at once, as the coordinates are given to them by the headquarters and the drone itself reaches its destination - there is no need to address the classic logistics laws relating to the need for regular breaks for drivers/pilots, etc. Social responsibility is also addressed here, as most drones currently fly electric. However, it can also be a disadvantage, as so far drones and other electrical devices (cars - Tesla, Nio, etc.) are not adapted for long distances, but this could change in the future. The possibility of overcoming very long distances and at the same time in a very short period of time with the help of drones is a ground-breaking development in the field of artificial intelligence, which will not be long in coming.

There are already several companies (start-ups) that deal with drones and international transport. The most famous are Volansi or Natilus. Volansi sets himself the task of solving

the problem of getting anywhere with the world with his drones. Natilus then aims to reduce air travel costs by 50%.

Another potential can be seen in the use of blockchain. This is an opportunity to make international trade safer. Thanks to the blockchain, it would be possible to clearly identify the place of origin. There would be a transparency of the logistics chain, and thus a clear identification of the manufacturer, which could lead to the detection of counterfeits or other illegal activities. A concrete example of this practice is the Singaporean company Perlin, which built its company on a blockchain. In April 2019, Perlin even signed an agreement with the ICC, opening its doors free of charge to 45 million ICC members in more than 100 countries (ICC, 2019). Thanks to the fact that the blockchain works on an open-source basis, not only sellers and buyers, but also insurance companies, forwarding companies, banks and others have access to it. So, anyone can check if this is a legitimate transaction and if they want to get involved in the trade.

Blockchain is also accessible in the Czech Republic, but the problem so far is the inconsistency of the system. Toman (2019) states in his article that uniform rules would be appropriate to facilitate the cooperation of private technology providers and end users. The problem with the implementation of the blockchain is mainly in the area of legal and organizational-procedural, precisely due to the absence of a legal framework or uniform standards applied by the market. Blockchain technology alone could also reduce errors or misinterpretations of Incoterms.

Conclusion

As in every area, in the case of Incoterms, the situation is such that the new revision of these rules from 2020 already has its critics who would make further changes now. The fact that the changes compared to 2010 are not drastic also helps. Davis and Vogt (2021), for example, suggest simplifying the rules after reviewing the new version of Incoterms 2020. At a time of technological boom, when in a few months a whole new technology may be introduced in the world that no one had heard of a few years ago, it would also be suggested that revisions of the Incoterms rules be adopted more frequently. It will certainly be desirable to consider the timing of the revisions. Whether the ten-year revisions are satisfactory in today's technologically advanced world with so many development possibilities, and it will not be necessary to proceed to shorter intervals. Durdağ and Delipinar (2020) point to the incorporation of technological innovations, such as automation, robots, wearable technologies, unmanned vehicles, wearable devices, artificial intelligence, internet of things, and artificial intelligence. On the other hand, new revisions cannot be hastily accepted. The main benefit of Incoterms rules is their stability, general awareness of them, as well as their simplicity and specificity. In the event that more frequent revisions are introduced, eg every 5 years, the question is whether this would not lead to confusion and opacity. Durdağ and Delipinar (2020) anticipate ten-year revisions, even believing that there will be no dramatic changes in the revision of the conditions in 2030 compared to the current version of Incoterms 2020. However, this does not claim another revision. In 2040, they anticipate significant changes in the number and content of commercial conditions. This can be agreed, as the conditions will have to be adapted to new modes of transport, such as drones, or to the virtual environment and new payment methods. To assess whether the changes in individual revisions have the desired effect, the authors conduct and will conduct research and

comparisons both for individual sectors and within geographical areas. Bergami (2012) favours a time lag of two to three years, when the new conditions are used so that the changes can take effect at all.

Developments in logistics and supply chain management can also be traced from the historical development of Incoterms. As logistics activities transform and become more important in international trade (Durdağ and Delipinar, 2020), the relationship between the two main players in international trade (exporter and importer) will continue to change. The transfer of some logistics operations to a virtual environment will also have an impact, as will the development of payment methods. The benefit for optimizing and increasing the transparency of the distribution of Incoterms rules is seen in the blockchain technology.

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Alena Pozdílková

Department of Mathematics and Physics, University of Pardubice
Studentská 95, 532 10 Pardubice, Czech Republic
email: alena.pozdilkova@uhk.cz

Martina Hedvičáková

Department of Economics, Univerzity of Hradec Kralove
Rokitanského 62, 500 03 Hradec Králové III, Czech Republic
email: martina.hedvicakova@uhk.cz

Analysis Using Multi-Criteria Decision Making of Term Deposits in the Czech Republic

Abstract
The current situation in the banking market is affected by the ongoing coronavirus pandemic. Banks strive to minimize risks while responding to declining interest rates and strong competition in the market for savings and future products. Banks responded quickly by raising the interest rates on savings and time deposits with respect to the increase in the interest rates by the Czech National Bank (CNB) in February 2020. However, due to the Covid-19 pandemic, CNB cut interest rates three times between March and May 2020 to support the economy. These interest rates remained unchanged until June 2021. At the same time, the yield on these products is negatively influenced by the rising inflation rate, which reached 3.2% in 2020. The aim of the article is to analyze the advantage of individual term deposits offered by the large banks. Different periods of term deposits (short-term and medium-term), as well as different deposit amounts, are selected as model examples. The multi-criteria analysis is employed to compare 11 major banks, which offer term deposits, eventually helping the client to make a decision based on the yield, stability, and availability of the bank.

Key Words
term deposit, interest rate, multi-criteria decision making, inflation rate, bank

JEL Classification: E43, G21, G11

Introduction

The banking market, like other markets, has been hit by the coronavirus pandemic, which has a global impact. Central banks are trying to stimulate the economy and lower their interest rates. Banks were cautious in March, waiting for further government action to minimize risks. Czech banks are still waiting for a reduction in inter-est rates on mortgage loans. On the contrary, interest rates on time deposits reacted quickly with their reduction and are almost at minimum values. So far, this reduction has not yet had such a significant effect on sav-ings accounts, however, a downward correction is also expected during April.

(J. A. Bikker & Gerritsen, 2018) results show that interest rates have become more sensitive to bank risk since the onset of the global financial crisis. More generally, we showthat

time deposits reflect more closely the eco-nomic environment than bank interest rates on savings accounts do. They find that maturity - increasing condi-tions (i.e., withdrawal fees for savings accounts and product maturity for time deposits) positively influence a product's interest rate.

In general, bank risk and the deposit rate are positively related (Beyhaghi et al., 2013; Demirguc-Kunt & Huizinga, 2004; Imai, 2006; Martinez Peria & Schmukler, 2001; Mondschean & Opiela, 1999; Murata & Hori, 2006; Park & Peristiani, 1998) or (J. Bikker et al., 2016; J. A. Bikker & Gerritsen, 2018). The results from (Raza et al., 2017) show that deposit rate is positively affected by interest rate where-as savings is adversely influenced by interest rate but comparatively interest rate is strongly significant for savings.

These topics with using multi-criteria decision making were also studied by (Borovička, 2017) with a focus on building savings, by (Kuncová & Lízalová, 2015) with a focus on current accounts or (Hedvicakova, 2017; Hedvičáková & Pozdílková, 2015) with a focus on accounts for young people.

Interest rates have been low since the beginning of the financial and subsequent economic crisis. (Claessens et al., 2018) found that a one percentage point decrease in interest rates means a lower net interest margin of 8 basis points, with this effect being higher (20 basis points) at low rates. Low rates also adversely affect the bank's profitability, but with greater variability.

It will now depend above all on how long the virus pandemic will last and how long the government's emer-gency measures will last. The second wave, which is due to come in the autumn, is currently being discussed. The bank has time to prepare for the second wave of the pandemic and also the Central Bank will get a proctor for a possible stimulation of the economy. If the economy were to enter a long-term economic crisis, it would be possible for central banks to set negative interest rates.

1. Methodology

The savings account is opened for a current account, maintained free of charge and bears interest at a higher interest rate than a current account. It is usually maintained either without a notice period or with a notice period (in similar lengths as term deposits). The term deposit bears interest at a more favorable current account interest rate. The only difference is that if you want to withdraw money before the due date is set on a term deposit, this withdrawal will be charged a contractual penalty (Adamčíková, 2021).

Inflation rate as an increase in average annual CPI indicates percentage change in last 12-month average over preceding 12-month average. Current situation in the mortgage market. This inflation rate is appropriate for making adjustments or considerations of average quantities. It is taken into account particularly when real wages, pensions, etc., are calculated. Average year-on-year inflation rate in 2019 was 2.8 % and 3.2% in 2020. Inflation rate as an increase in CPI compared with the corresponding month of preceding year indicates per-centage change in price level between the reference month of a given year and the corresponding month of preceding year. This figure excludes seasonal variations; as always corresponding months are compared (CZSO, 2021).

Multi-criteria decision-making and evaluation of variants will be based on the calculation of the weights of individual criteria, their standardization and then the determination of the utility function.

The importance of each individual criterion will be used in a standardized form:

$$v_j \geq 0, \sum_{j=1}^{n} v_j = 1.$$

The overall evaluation of variants is determined by using utility function as follows:

$$u(x) = \sum_{j=1}^{n} v_j u_j(x),$$

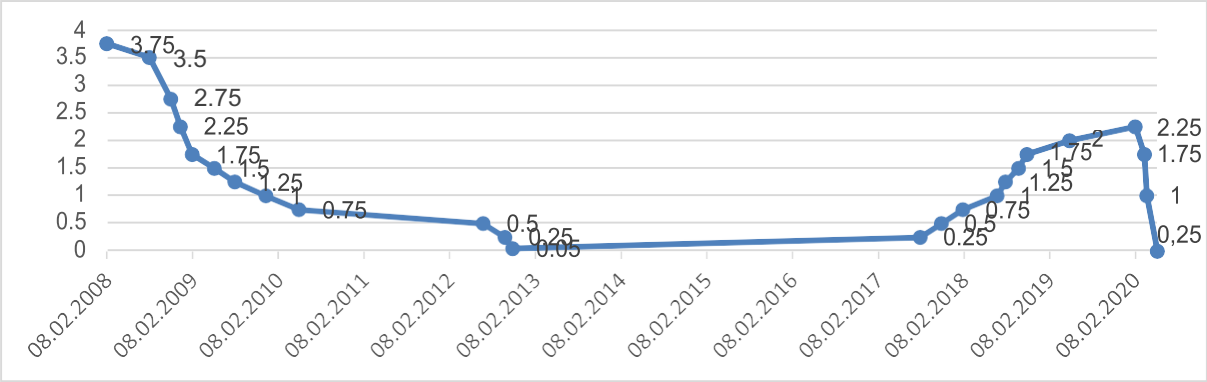
in which v_j represents standardised importance of individual criteria and $u_j(x)$ represents theevaluation of each variant.

Multi-criteria analysis will help the client make a decision which term deposit to choose,based on yield, stability and availability of all compared banks.

Analysis of the current situation in the banking market

Commercial banks responded to the February 2020 increase in interest rates by the Czech National Bank by raising interest rates on savings and term deposits. In March 2020, the government of the Czech Republic declared a state of emergency in connection with the Coronavirus pandemic. The Czech National Bank sought to revive the economy despite a twofold decline in interest rates in April 2020. However, banks did not react to this declinein interest rates or reduced their interest rates on savings accounts only minimally. As interest rates fall, banks are waiting and waiting for the situation with the pandemic to develop further. They are also waiting for the costs of government orders. A higher declinein interest rates was recorded in April 2020 in term ac-counts. However, in May 2020, the central bank lowered its interest rates again. The current 2W repo rate is 0.25%. This rate was valid for the entire following year (until May 2021). No significant reaction was recorded for commercial banks, except for lower interest rates on mortgages and consumer loans. In the third quarter of 2021, a slow recovery of the economy is expected,and thus a possible increase in interest rates (CNB, 2021).

Fig. 1: 2W Repo rate in % in the Czech Republic



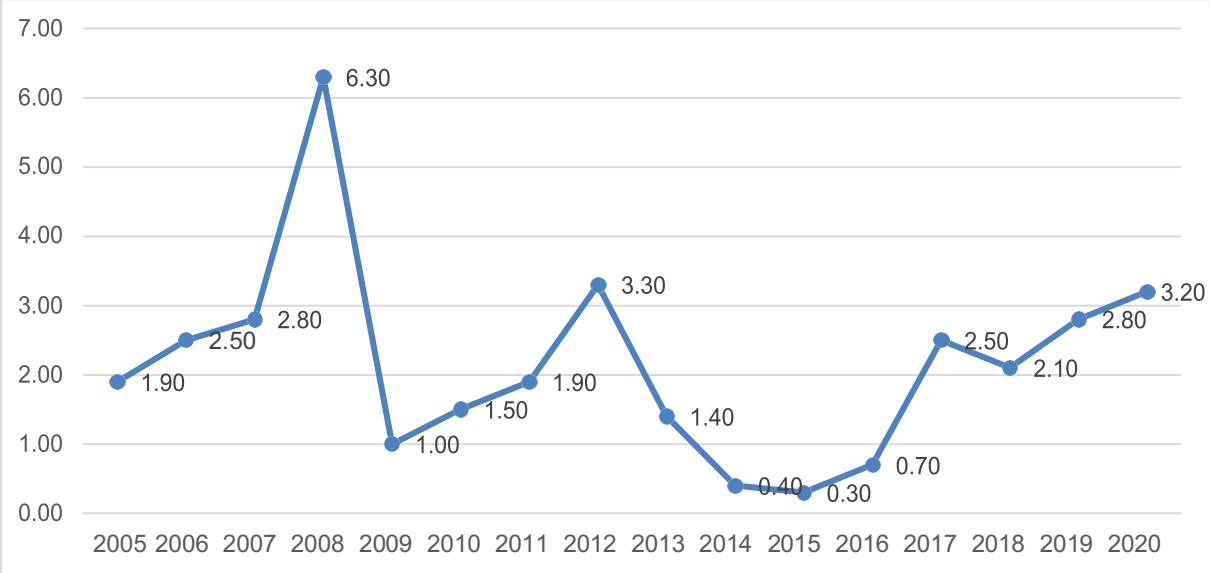
Source: own processing, data from (CNB, 2021)

According to the analysis of the bank's banking market, the interest rates on their products are waiting for government measures and they are stockpiling funds to defer client repayments on mortgage loans. However, there is a lot of competition on the Czech banking market and banks will try to gain a competitive advantage from the current situation. This will be an opportunity especially for smaller or "low-cost" banks, which will try to keep the current interest rate on savings and term accounts and, conversely, try to reduce interest rates on mortgage loans to retain or acquire new clients and thus have larger part of market share. Traditionally, large banks will try to prevent the outflow of clients and try to prevent the refinancing of older loan agreements by maintaining existing interest rates on mortgage loans and savings accounts.

Inflation rate

The rate of inflation significantly affects the amount of final savings in savings and term accounts. The infla-tion rate rose until the beginning of the financial and subsequently the economic crisis. It peaked at 6.3% in 2008, when the crisis began. The following year, it dropped sharply to one percent. Then there was an increase in the inflation rate and in 2013 and 2014, when most European countries were in deflation or at very low val-ues, the inflation rate in the Czech Republic was 0.4% and 0.3%. There has been a slight increase since next year, and since 2017 inflation has been slightly higher than the Czech National Bank's inflation target. Inflation has been rising again in the last two years. The inflation rate reached 3.2% and is thus slightly above the CNB's inflation target in 2020 (see Fig. 2) (Hovorka, 2021). Inflation is expected to rise this year due to the effects of the Covid 19 pandemic.

Fig. 2: Inflation rate in % in the Czech Republic



Source: own processing, data from (CZSO, 2021)

Multi criteria decision making in the Czech banking market

For our analysis, we selected the 14 largest banks, taken according to the number of clients. All these banks have over 100,000 clients (Hovorka, 2021). But only 11 of these banks offer term deposits, both short-term and medium-term. This includes Česká spořitelna, ČSOB, Komerční banka, Moneta Money bank, Fio banka, Reiffeis-enbank, Unicredit bank, Equabank, Wüstenrot, Sberbank and bank Creditas.

Deposits are divided into short-term (7 days to 12 months), medium-term (2 to 4 years) and long-term (deposit period 5 and more years). We chose 1 short-term and 1 medium-term case for our analysis, because in the current uncertain times, long-term deposits are not offered by many banks. Concretely 1 year and 2 years were chosen.

However, in addition to the length of the term deposit, interest rates tend to also depend on the amount of the deposit. For this reason, we chose 2 different amounts, the first 200 thousand, representing deposits of lower volume, and the second 600 thousand, representing deposits higher than half a million CZK.

For each of the selected banks, a term deposit was selected that meets the given criteria (allows a given amount and length of the deposit). If the bank offers more such options, the most advantageous one has been selected. Selected data of these banks are in following Table 1:

Tab. 1: Interest rates for selected banks and number of clients

Bank	No. of clients	IR - 200000, 1 year	IR - 200000, 2 year	IR - 600000, 1 year	IR - 600000, 2 year
Česká spořitelna	2700000	0.9	1	0.9	1
ČSOB	2800000	0.01	0.05	0.01	0.05
Komerční banka	1664000	0.01	0.01	0.01	0.01
Moneta money bank	1000000	0.4	0.4	0.4	0.4
Fio banka	980000	0.22	0.25	0.22	0.25
Raiffeisenbank	700000	0.01	0.01	0.01	0.01
Unicredit bank	450000	0.01	0.01	0.01	0.01
Equa bank	415000	0.8	0.9	0.8	0.9
Wüstenrot	414000	0.8	0.85	0.8	0.85
Sberbank	114000	1.2	1.25	1.2	1.25
Creditas	100000	0.4	0.6	0.4	0.6

Source: own processing, data from (Hovorka, 2021)

We will use the method of multi-criteria decision-making and evaluation of variants, where the criteria will be the yield for short-term and long-term term deposit, always taken for the amount of the deposit of 200 thousand and 600 thousand.

As main criteria, we will consider yield per 100,000. Other criteria will be the stability of the bank, given by three indicators - the number of clients, the balance sheet total at the end of 2019 and the net profit for the entire bank (also for 2019). The last criterion will be the availability of the bank, which will be determined by the number of branches and

the number of ATMs in the Czech Republic. The above criteria will be used in multi-criteria decision-making and evaluation of the alternatives.

All non-anonymous deposits of natural and legal persons held in Czech crowns and in foreign currency are insured in the Czech Republic. The amount of compensation is provided in the amount of 100% of this volume, but up to a maximum equivalent of EUR 100,000 for one depositor at one bank or credit union. For this reason, insurance in a multi-criteria analysis was not considered.

At first, average yield for 100 thousand will be calculated. Then other five criterions will be standardized and evaluated by the same weight 0.2. These criterions are number of clients in thousands of CZK, the balance sheet in billions of CZK, the net profit of the selected bank in billions of CZK, number of ATMs and number of branches in in the Czech Republic. Yield per 100,000 for all selected banks and stability and availability criterions after standardization are in following table:

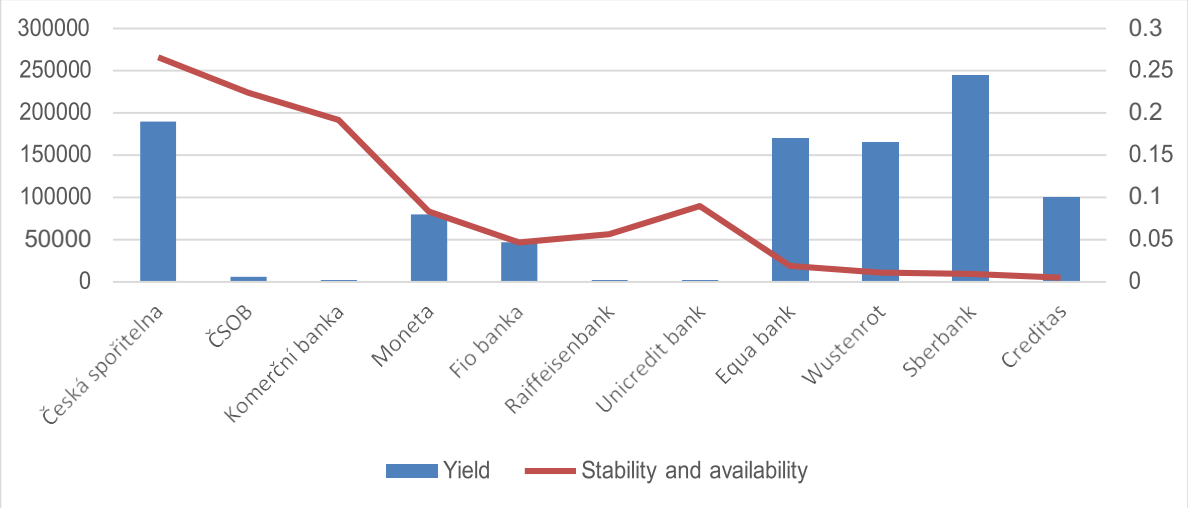
Tab. 2: Results for all selected banks

Bank	Yield per 100,000	No.of clients	Ballance sheet	Net bank profit	No.of ATMs	No.of branches	Total
Česká spořitelna	190000	0.223695112	0.240442	0.238512	0.327887	0.299065	0.26592
ČSOB	6000	0.231980116	0.268787	0.265463	0.217835	0.135514	0.223916
Komerční banka	2000	0.198840099	0.177488	0.200782	0.177899	0.20227	0.191456
Moneta money bank	80000	0.082850041	0.036256	0.053901	0.133878	0.108812	0.083139
Fio banka	47000	0.081193041	0.024225	0.024255	0.046063	0.056742	0.046496
Raiffeisenbank	2000	0.057995029	0.06114	0.056596	0.035852	0.070093	0.056335
Unicredit bank	2000	0.037282519	0.144529	0.133405	0.051282	0.081442	0.089588
Equa bank	170000	0.034797017	0.009888	0.008759	0.003631	0.036716	0.018758
Wüstenrot	165000	0.033968517	0.011042	0.007681	0	0	0.010538
Sberbank	245000	0.009113505	0.013843	0.007277	0.005673	0.009346	0.00905
Creditas	100000	0.008285004	0.01236	0.003369	0	0	0.004803

Source: own processing, based on (Hovorka, 2021)

From this table you can see, that the highest returns have Sberbank, but evaluation of stability and availability is for Sberbank only 0.009. The second highest returns have Česká Spořitelna, which have the highest number of evaluation of stability and availability. Thus, it depends on the client whether he prefers higher returns or how much he will take into account other criteria. The only two other banks worth mentioning are Wüstenrot and Equabank, term deposits of all other banks are disadvantageous.

Fig. 3: Results for all 11 banks, yield per 100,000 CZK and total results of stabilityand availability in 2019



Source: own processing, data from (Hovorka, 2021)

Conclusions and discussion

Inflation is currently rising. Its value in 2020 was 3.2% and is still growing slowly. The CNB predicts further developments for the second and third quarters of 2022 with inflation of 2.4 and 2.2% (CNB, 2021). However, the further development of the pandemicand the measures of the Czech government will be important. However, if we analyze the development of the previous economic crisis, there was first an increase in the rate of inflation and then a sharp decline almost to the level of deflation.

Interest rates on savings products vary not only across banks, but also across the accounts of individual banks. (J. Bikker et al., 2016) results show that time deposit rates reflect more closely the economic environment than bank interest rates on savings accounts do. The model from (Athanasakou & Hussainey, 2014) predicts demand for LTDs (long-term deposits) as a function of advertising, prices of own and competing financial assets, and income.

By analysis was shown, that although many banks offer term deposits, but their yield is very different. Taking into account the size of the bank, we obtained the following results through multi-criteria decision-making. Using the first criterion - average yield for 100 thousand, Sberbank, Česká spořitelna, Equabank and Wüstenrot have returns much higher than all the others. On the other hand, ČSOB, Komerční banka, Reiffeisenbank and Unicredit bank have very low, completely negligible yields. If we consider all the mentioned criteria the highest returns have Sberbank, but evaluation of stability and availability is for Sberbank only 0.009. However, this is mainly due to the very small number of branches, which may not bother some clients. The highest number of evaluation of stability and availability has Česká Spořitelna, which has the second highest returns. It therefore depends on the client whether he prefers higher returns or how much he takes into account other criteria. The only two other banks worth mentioning are Wüstenrot and Equabank, term deposits of all other banks are disadvantageous.

It will also depend on the next steps of the Czech National Bank and whether it will further reduce interest rates. Banks are likely to respond by lowering interest rates on savings

and time deposits to minimum levels. Given the current inflation rate, real savings from savings and futures will be negative.

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Iveta Sedláková

University of Žilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics
Univerzitná 8215/1, 010 26 Žilina, Slovakia
email: iveta.sedlakova@fpedas.uniza.sk

Specifics of the Liquidation Method in the Determing the Value of the Company in the Conditions of the Slovak republic

Abstract

Every company, regardless of industry and business activity, goes through individual phases of its life cycle. The dreaded phase is a crisis, which in the case of a pessimistic scenario may lead to the termination of the company's activities through liquidation or bankruptcy proceedings. Both of these processes have a different course. It is these differences that are the essence of the difference between the two models of the liquidation method used in the conditions of the Slovak Republic. In the article we point out the procedures of evaluation by the liquidation method used in the conditions of the Slovak Republic with a focus on evaluation by expert evidence. In the article we present an example of the structure of an expert opinion with a proposal of its content in the evaluation of a company in liquidation. We have come to the conclusion that the liquidation method as a part of the property principle differs from the property method, we point out the specifics in the process of valuing a company in liquidation. The author of the article participated in the creation of legal regulations concerning evaluation in expert opinions and is also based on the knowledge of their application in her experts activities.

Key Words
valuation process, liquidation value of the company,expert opinion, expert evidence, assets, commintments

JEL Classification: G32,G33

Introduction

In this article, we decided to address the issue of determining the value of the company by the liquidation method, name the problematic areas in the evaluation process and define the specifics of this method. The reason for our research is the topicality of this topic on a global scale. The ambition is to focus attention on the application of this method in the conditions of the Slovak Republic. Because we have several years of experience, especially in the field of evaluation in expert evidence, we see an opportunity to summarize the findings and initiate a broader discussion. Expert evidence in the Slovak Republic is regulated by a comprehensive legal framework, which defines the position and competencies of the expert as well as the methods to be used when evaluating the company in the form of an expert opinion. Regardless of the method, we draw attention to the meaning of §2 of the Decree of the Ministry of Justice of the Slovak Republic, No. 492/2004 of. from. on the determination of the general value of property, as amended (hereinafter referred to as the valuation decree), in particular the concepts of objectification, initial value and general value. The process of objectification is an expert determination of the general value of property, in which we objectify the initial value to the

final value. In the process of objectifying all components of assets, external sources and the company as a whole, experts must take into account the technical condition, market influence, economic influences and other specific factors.

In the case of the liquidation method, specific factors have a significant weight. For the purposes of the valuation decree, the general value of an asset means the resulting objectified value of the asset, which is an expert estimate of the most probable price of the appraised asset at the valuation date at a given place and time. Sellers will act with due information and caution and with the assumption that the price is not affected by undue motive. The general value is understood in the expert assessment as a value that has a different character, depending on the method used to determine it and for what purpose. For example, in the case of liquidation, the general value has the character of the liquidation value, ie the liquidation balance that is distributed among the owners; The initial value in accordance with the valuation decree is the acquisition and re-acquisition value of the asset at the time of valuation or, for selected components of the asset, the value specified in the annexes to this decree for each type of asset.

For the economic components of an asset, the carrying amount is usually used as input to determine the general value of the enterprise's assets. We obtain the initial value of the assets from the company's accounting. Basic information is provided mainly by the financial statements. According to Kareš (2019), we can ask ourselves whether the financial statements allow us to give a true picture of the company's financial situation. This question is important because the input information significantly affects the final evaluation. Some authors deal with the issue of company evaluation in times of crisis. However, in our opinion, this topic is still not given sufficient attention. For example, the authors Hečková, Chapčáková (2011) proposed methodological recommendations for the valuation of a company in bankruptcy, which operates in the mining industry. According to Tichý (2015), the insolvency of a company affects its value. Králik (2007) writes about the influence of the value of the company on the management action in solving the crisis in the company. Kurotová (2018) analyzes the methods of determining the value of the company valid in the conditions of the Slovak Republic. It analyzes their advantages and disadvantages. He says these are methods that can provide a comprehensive view of the company. Poborský (2015) deals in more detail with the liquidation method and talks about problematic areas. According to him, it is not possible to make evaluations without knowing the legal context and individual asset valuation for liquidation valuation use should have some different features compared to standard valuation.

1. Methods of Research

In order to talk about the method of evaluation, we believe that we must understand the reason, the purpose of evaluation. There may be more reasons than we state, but the basic reason is the liquidation or bankruptcy of the company. The course of liquidation in the sense of the Commercial Code is in the competence of the liquidator, who is appointed by the company or is determined by a court. The company enters into liquidation by registering the liquidator in the Commercial Register. The liquidator is obliged to repeatedly announce the liquidation to everyone, especially creditors, because he is obliged to satisfy all of them. The liquidator will create a list of assets, a list of receivables and also extraordinary financial statements. These extraordinary financial statements serve, among other things, to enable the liquidator to determine whether the company has higher external sources than assets. If he finds out, he must file for bankruptcy. If the assets are higher than the external sources , it can take all steps that

will lead to the termination of business activities, sale of assets and satisfaction of all creditors. The liquidator therefore performs only such acts on behalf of the company, which are aimed at terminating all activities of the company. It fulfills the company's obligations, claims and accepts benefits. He must not conclude new contracts. In addition to the payment of creditors, they must quantify and cover the costs associated with the liquidation process. He is obliged to submit a report on the course of liquidation and a proposal for the distribution of the liquidation balance. He will prepare a report with the proposal on the day of the end of the liquidation, when he is also obliged to prepare financial statements. Subsequently, he submits a proposal to delete the company from the Commercial Register. An interesting connection between the liquidator and the expert is that all documents that the liquidator is obliged to prepare serve as documents for the expert and, conversely, the expert opinion is the basis for the liquidator. The essence of the expert opinion is actually the quantification of the liquidation balance. The proposal for the distribution of the liquidation balance is also related to the legal form of the evaluated company. During the liquidation is the obligation to use the business name of the company with the addition - in liquidation. Finally, the expert opinion may contain such facts and values of the components of the assets as to provide a different view of the company as to whether the company should be in liquidation or, on the contrary, should be declared bankrupt. The results of the expert opinion take precedence over the results only from the financial statements. This is because the financial statements and the accounting as a whole are only the basis for an expert opinion.

As far as the legal act of bankruptcy is concerned, the first step is a proposal for bankruptcy, either by the debtor himself or by creditors. The proposal must be accompanied by a list of assets, a list of liabilities and the latest regular financial statements. With regard to the expert activity, the expert may also encounter the task of examining the merits of the creditor's filing for bankruptcy. If this was not justified, the creditor is liable for the damage caused, which may also be subsequently subject to expert examination. The next step is the commencement of bankruptcy proceedings, where the debtor performs only ordinary legal acts, ensures the operation of the company. At this stage, bankruptcy may be averted if it is proven that all claims of the participants in the bankruptcy proceedings have expired. If these receivables do not expire, bankruptcy is declared and the court appoints a trustee in bankruptcy. The view of the position of the creditor is different in the assessment in terms of whether it is an unsecured creditor or a secured creditor, if it is a secured creditor, then this may be preferred or later. In each case, the secured creditors are in a special solution regime. The trustee in bankruptcy is liable to the creditors of the registered claim for damage caused by unintentional, uneconomical or unreasonably incurred costs. The Bankruptcy and Restructuring Act, as amended, also addresses the possibility of the so-called small bankruptcy, which concerns those companies that have liabilities or assets of up to EUR 1 million. From the economic and expert point of view, it is interesting to decide whether to proceed with restructuring or bankruptcy in a crisis situation. Restructuring can be interesting in such cases if the company has significant, respectively. very specific components of property - it has e.g. licenses, patents, interesting unfinished investments, etc.

As can be seen, the basic difference between bankruptcy and liquidation is that in liquidation all creditors must be satisfied in full and in bankruptcy it is a relative satisfaction of these creditors, so that their claims are satisfied in proportion to their mutual amount. This fundamental difference between liquidation and bankruptcy also results in a difference between the two models of the liquidation method.

Liquidation method for determining the general value of the company and parts of the company in accordance with Annex no. 1 to the evaluation decree shall be determined:

$$V\check{S}H_L = \sum_{i=1}^{n} V\check{S}H_{ZMi} - V\check{S}H_{CZ} - V\check{S}H_{NL}$$

$$V\check{S}H_{LK} = k_S \,.\sum_{i=1}^{n} V\check{S}H_{ZMi} + V\check{S}H_{F\acute{U}}$$

Where: VŠHL - general value of the company and parts of the company determined by the liquidation method at the end of business activity by liquidation [€], VŠHLK - general value of the company and parts of the company determined by the liquidation method at the end of business activity by bankruptcy, $\sum_{i=1}^{n} V\check{S}H_{ZMi}$ - total value of individual general values of asset components [€], VŠHCZ - general value of external sources [€], VŠHNL - general value of costs related to liquidation (eg liquidator's fee, fees for expert opinions, liquidation of damages, disposal of fixed assets , employees' right to severance pay, etc.) [€].

The liquidation method can be applied in the following cases:

- liquidation
- bankruptcy
- restructuring
- managerial decision-making on the possible termination of business activities
- as part of the income principle in the evaluation of companies with a limited time limit of business, when the expected net income from the monetization of assets after the termination of its activities is calculated.
- criminal proceedings for various reasons, the impact of which is bankruptcy or liquidation
- commercial disputes for various reasons, such as the determination of financial loss
- the reason may be such an action or such a dispute that will cause the liquidation or bankruptcy of the company

We need an expert opinion in connection with the legal act of bankruptcy and restructuring:

- when determining whether the company, resp. business company extended
- to register a non-monetary receivable because the application requires an expert opinion to determine the value of such non-monetary receivable
- if the creditors' committee wants to know the value of the business
- if the secured creditor requests the determination of the value of the assets securing his claim
- an expert opinion on the encumbered property in order to determine whether it is subject to bankruptcy
- expert opinion to determine the value of compensation for encumbered property
- if the authorized person, which is e.g. the relative wants to exercise the right to purchase the assets from the bankruptcy estate on the basis of the value in the expert opinion
- determining the value of the bankruptcy estate in connection with a possible mistake of the administrator
- examining the relative satisfaction of creditors to see if any of them have been favored

- at this point it is necessary to emphasize that in the case of valuation of property on which there is a security right and another burden, this expert opinion must also contain the specified value of this burden

Problematic areas of determining the value of the company by the liquidation method

In the liquidation method, the basic areas of problems that need to be solved during the evaluation process are important. An important and primary range of problems is the definition and obtaining the necessary documents from the contracting authorities, which in the case of liquidation is the liquidator, in the case of bankruptcy is the administrator of the bankruptcy estate. As part of obtaining documents, it is necessary to organize and complete physical inspections of all assets that are being valued, as well as consultations with the contracting authorities, resp. with designated contact persons. They should provide all information about the property, its use, care, costs associated with its maintenance. Another problem is, according to the submitted inventory of assets, to identify experts who are competent to assess the assets of the company. In the conditions of the Slovak Republic, individual components of property according to their technical and economic purpose and their nature are evaluated by experts of the relevant expert departments. For example, buildings, structures and land are valued by an expert in the field of construction, production technologies by experts in the fields of engineering, electrical engineering, office equipment, expert in the field of home furnishings, fleet expert in the field of transport, intangible assets expert in the field of industrial property and economic components coverage expert in the field of economics and management. The economic components of assets in an expert appraisal are mainly receivables, inventories, securities, financial assets and unfinished investments. All these mentioned experts from various fields solve in the process of evaluation of individual components a very specific issue, which is precisely the setting of individual coefficients, which determine, respectively. they objectify the initial value to the final value of the property, ie the general value. The determination of the value of external sources as another important range of problems, together with the costs of liquidation, is also solved by an expert in the field of economics and management. External resources as well as liquidation costs are very significant in value and have an absolute impact on the overall result, as they reduce the entire value of the assessed assets. If the value of external resources is greater than the value of the entire valued property, it is not possible to proceed to the liquidation process and the liquidator has criminal liability and the obligation to file for bankruptcy. In such a case, another significant set of problems enters the calculation of the liquidation method, and that is the determination of the monetization coefficient. The final area of activity is the determination of the value of the company as a whole in the form of an expert opinion, which has its exact requirements set by law. In the conditions of the Slovak Republic, an expert opinion in which the task is to determine the value of the company as a whole or part of the company must be in accordance with Act no. 382/2004 Coll. on Experts, Interpreters and Translators and on Amendments to Certain Acts, as amended, prepared only by an expert organization or expert institute who are entered in the list of experts in the field of expertise in Economics and Business Management. Experts from various professions and disciplines work in them. The expert opinion must be drawn up properly and within a specified period of time, in an efficient, cost-effective and impartial manner. The whole structure of the expert opinion must ensure its reviewability, comprehensibility, legibility and justification. The expert opinion is an obligation to archive for 10 years, which in expert practice means that in such a time frame the expert may be asked to explain it in the form of an expert hearing, for example in court proceedings. The entire expert report is bound and provided with a blue imprint of the seal of the expert organization with the state emblem.

2. Results of the Research

The reason for our research is the topicality of this topic on a global scale, currently mainly in connection with the spread of COVID-19. It is precisely because of the pandemic situation that many businesses at risk of liquidation or bankruptcy remain at risk. The temporary protection of entrepreneurs allows to delay or reverse such a situation, according to Act no. 92/2020 Coll., Amending and supplementing Act no. 62/2020 Z.z. on certain emergency measures in connection with the dissemination of COVID-19. Among other things, this Act, pursuant to Section 17 (2), allows an entrepreneur under temporary protection not to file for bankruptcy against his property during its duration. According to §17 par. 3, the execution proceedings against the entrepreneur under temporary protection are suspended and according to par. 4, the exercise of a lien on the property of the enterprise may not be commenced against such an entrepreneur. The connection of these legal norms are specifics that the expert must be aware of before evaluating the company. He must know the answer to the question of when a company ends its activities in liquidation, when it goes bankrupt and what other legal options it has. The subject of our research is not these legal contexts, but professional specifics, which relate mainly to the economic components of property.The general value of inventories falls within the competence of the expert department of economics and management. The expert economist determines the value of stocks in accordance with Annex no. 8 to the Decree of the Ministry of Justice of the Slovak Republic no. 492/2004 Coll. on the determination of the general value of assets as of the date of processing the expert opinion as the product of the initial value of inventories and the coefficient of objectification. The expert will find out the initial value after performing the physical inventory on the day of processing the expert opinion from the value recorded in the company's accounts or from the actual state of stocks found during the physical inventory. In case of discrepancy, the value found during the inventory takes precedence. The objectification coefficient takes into account the usability of stocks, the possibility of their transformation into cash, the specific position of the stock owner on the market, the average cost of capital associated with their financing, surplus stocks, physical and moral stocks and their specific characteristics, seasonality, fashion and turnover. At this point, it must be said that the expert view of the value of inventories is different from the accounting view. It is the coefficient of objectification that defines the view of the expert. The type, nature of stocks and their usability for the evaluated company or for another company in the industry are important. Problems are unusable, either in terms of their condition, work in progress, volume or due to seasonality, fashion and other influences. With a significant amount of stocks of a specific type and taking into account their technical nature, the cooperation of experts from several expert fields is required. In such a case, the assessment is not only within the competence of the economic expert. Expert evaluation of stocks can therefore be considered an interdisciplinary issue. The specific position of the evaluated company and the specific characteristics of inventories significantly affect their final value, ie their possibility of transformation into cash. If inventories form a crucial component of a company's assets and will be monetised separately, which will occur in the event of both liquidation and bankruptcy, experts should also take into account the average cost of capital associated with their financing. Excess stocks can be a problem not only in liquidation but also in a functioning business. With a stable company, it may be a strategy to be ready to ensure large orders and completeness of the range. Prior to the valuation itself, it is necessary to break down inventories in terms of their accounting and stock records into material, work in progress and semi-finished products, finished products, goods and animals. A more detailed breakdown depends on the business activity of the evaluated company. Assuming the use of inventories in the business activities of the evaluated company, the detail of the breakdown has a significant impact on the entire evaluation process. In the case of the liquidation method, in particular in the case of liquidation, such use of stocks is not

possible because the company ends its business activity. Material, work in progress and semi-finished products can no longer be used in the evaluated company and we consider their recovery in the production process of another company to be unrealistic. In this case, their process of transformation into cash is questionable. If we evaluate the same inventories, on the same date, but for a different purpose, such as a sale, merger or inheritance, their general value may be at or above the starting value. Finished goods and goods represent inventories for which we recommend taking into account the market values of comparable products, the specific position of the stock holder on the relevant market, actual quantitative and qualitative parameters and cash flow, trade margin, seasonality, fashion and especially cash flow. . When applying the liquidation method, we will therefore consider stocks that can be used in the activities of other companies or stocks that cannot be used. In the case of their valuation, it is necessary to consider the costs associated with their sale or removal. Such costs can then be included in the general value of the liquidation costs in the context of the total liquidation value of the company.

The general value of receivables falls within the competence of the expert department of economics and management. The expert economist determines the value of receivables in accordance with Annex no. 9 to the Decree of the Ministry of Justice of the Slovak Republic no. 492/2004 Coll. on the determination of the general value of assets as of the date of processing the expert opinion as the product of the initial value of receivables and the recoverability coefficient. Baseline means its carrying amount at the date of its inception, without adjustment by the accounting officer or auditor. From the expert's point of view, we understand the recoverability coefficient as an aggregate coefficient, the calculation of which takes into account the debtor's payment discipline, his business activity, maturity date, receivable volume and security of performance. The most complex issue is especially trade receivables, because it is necessary to assess each business partner individually. Receivables will be divided into groups after an expert examination of enforceability. Unclassified receivables are problem-free, recoverable in full, the customer of which has a high payment discipline, is active, or the receivable is secured or due. Classified receivables have a more detailed division into classes, which is assigned a recoverability coefficient at various intervals from 0.0 to 1.0. This topic is very broad and it is not possible to address it in more detail in connection with the issue of this paper. The liquidation method is mainly related to overdue receivables, which are assigned a zero coefficient, we understand them as uncollectible with the resulting zero value, receivables from entities in liquidation, receivables from entities in bankruptcy and receivables enforced in court, which are active litigation and executions, whose enforceability may vary from case to case. This expert assesses it individually. We can state that the enforceability of receivables of a company that is in liquidation is difficult. Business partners abuse the fact that the company ends its activities and does not pay their obligations.

Example of an outline of an expert opinion for a legal act of liquidation:

The benefit for the readability of expert opinions is that the outline of the expert opinion and its title page are described by Act No. 382/2004 Coll., On experts, interpreters and translators, as well as Annex No. 5 and 6. Decree of MS SR no. 228/2018, which implements Act no. 382/2004 Coll., (Hereinafter referred to as the Act on Experts and the Implementing Decree). Our ambition is to expand this outline of the draft content of the expert opinion, by which the competent expert organization determines the liquidation value of the company ABC, s.r.o.- in liquidation. The introductory part of each expert opinion must contain precisely defined subchapters in accordance with the Act on Experts and the Implementing Decree. The clearly formulated role of the expert organization to determine the general value of ABC, s.r.o.-in

liquidation. The subject of the investigation is the company ABC, s.r.o., its assets, liabilities, costs associated with liquidation, with the monetization of assets, with the settlement of employment and business relations. The purpose of an expert opinion is the reason for the evaluation, it is a legal act that is defined in the relevant legal norm. In our case, it is the termination of the business activities of ABC, s.r.o. liquidation and subsequent sale of the assets of this company. The choice of method will result from the defined task and purpose, which in our case is the liquidation method. It is not possible to start the evaluation process without specifying the date on which the expert opinion is prepared. All necessary documents are required by this date. It is the decisive date on which the value of the company is determined in accordance with the purpose. For the purpose of this expert opinion, it is the date on which the company entered into liquidation. The documents for the elaboration of the expert opinion, with which the team of experts worked, are listed in the next subchapter together with the legislation which forms the legal framework of the whole issue as well as the expert activity in general. In addition to consultations with designated persons in the company, the client, physical inspections of the property, the documents for the preparation of such an expert opinion are also information from publicly available sources, but especially accounting, tax and economic documents, which the team of experts requested from the client. Before starting work on the expert opinion, a list of all assets, a list of liabilities, extraordinary financial statements as of the date of entry into liquidation, the last known regular financial statements, ownership deeds for real estate and buildings, documents for the acquisition and condition of movable property, extract from business register, all contracts, internal directives, treasury book, bank statements, account balances as of the date of entry into liquidation, various documents for individual components of assets (invoices, stock cards, asset registration cards, etc.). The most extensive chapter is the assessment part, it combines all the knowledge of experts who worked on the evaluation of the company. Its division and structure is different for each expert opinion. This section must include the choice of method, its description and also the rationale for the procedures. It also includes the characteristics of the company, a description of the company's activities, its organizational structure, history. The company's activities and its position in the industry have a significant impact on the overall value and values of assets, because, for example, isolated specialized activities require specialized employees who work with specialized technology and use specialized technological procedures. This can cause more complex sales of such a business. In the case of the possibility of bankruptcy and restructuring, the specialized activity may be the reason why the company will try to restructure instead of bankruptcy. Specialized assets, also obsolete although high-performance technologies, are more difficult to sell off in the event of business closure. Their value is diametrically different in the case of a going concern that continues to operate. The expert team should pay attention to the elaboration of the economic and financial analysis of the company by the decisive date. This analysis can, among other things, also serve to verify the fact that ABC, s.r.o.-in liquidation is not extended. It is an analysis of extraordinary financial statements as of the date of liquidation. It may be interesting if the results of the extraordinary financial statements are different from the result in the expert opinion. It is the difference between the book value and the objectified, general value. In this case, the decisive result is the expert opinion. After performing physical inspections in the company, the experts determine the general values of the components of the assets and process them into separate chapters. A summary of the values of the entire asset and the chapter, which contain the general value of external resources and the general value of liquidation costs, will be prepared by an expert in the field of economics and management. He will prepare the costs of liquidation on the basis of consultations and documents from the liquidator and on the basis of communication with all experts who worked on the expert opinion. It is essential to ensure that they are not duplicated or, conversely, that certain costs are not forgotten. In the last chapter of the assessment part, the general value of

the company is determined by the liquidation method for liquidation. It summarizes all the results and findings. It will be prepared by an expert from the Economics and Management Department after consultation with all experts who worked on the evaluation. The result is, as we have already explained above, essentially the value of the liquidation balance. The conclusion of the expert opinion should contain answers to the questions asked. The role of the expert and the subject of the investigation in this case was to determine the general value of ABC, s.r.o.-in liquidation at the relevant date. n the end, the place and date of elaboration, the expert stamp, the signature of the statutory body, the expert responsible for the performance of the expert activity are also stated. Finally, there is a list of names of all experts who worked on the expert opinion and can confirm its accuracy and provide the required explanations. The required verifiability of the expert opinion is ensured by the annexes. These are selected documents on the basis of which the final value was determined, extensive calculations, photographs, as well as expert opinions of experts whom the expert organization invited to cooperate. Attachments can be in paper or electronic form. An integral part of the expert opinion is the expert clause, which has a precisely defined wording in the law. It states, among other things, who prepared the expert opinion and, in particular, that he is aware of the consequences of a deliberately false expert opinion.

3. Discussion

Our research has shown that the liquidation method is a typical example of the influence of the purpose of valuing a company on the method of calculation, so we are talking about two models of this method. The liquidation method has its problematic areas and specifics, which distinguishes it from the property method, even though it belongs to the property valuation principle.Topics for further discussion, which we pay attention to in our research, are the coefficient of monetization in the case of the liquidation method at the end of business by bankruptcy and defining specifics in the case of using the liquidation method as the second phase of the yield method in companies with limited life. According to Hečková and Chapčáková, 2011 there is missing the methodology of exact determination of the monetization coefficient in the Decree of the Ministry of Justice of the Slovak Republic no. 492/2004 Coll. on the determination of the general value of assets. In our opinion, it is not possible to determine the methodology exactly, because the legally binding regulation does not take into account all specific cases. We also perceive the discussion on the application of the liquidation method in the valuation of functioning and profitable companies in cases where we want to compare the revenue potential from the company's activities and from the possible monetization of assets at the termination of business activities.

Conclusion

From the point of view of expert activity, a company must be understood as an open system, a living organism at a certain stage of its life cycle. In the case of the liquidation method, we can speak of a phase of pessimistic crisis. Of course, this does not apply in the case of management's decision on the possible termination of the company's activities by liquidation, this can happen at any stage. As already indicated above, the liquidation method can also be part of the income methods of a company with a limited time activity. According to Marík, the liquidation value can also be an estimate of the lower limit of the company's valuation, if its yield value is lower. Also, according to Mařík, from a certain point of view, the liquidation method can be considered as a revenue method, as the value of the company will be given by the expected income from

liquidation. However, not income from the company as a functional unit, but income from the sale or liquidation of individual items. The asset method involves determining the general value of all the components of an asset from which borrowings are deducted. It is applied, for example, to the sale of a business as a whole, where the values of the components of the assets are the values forming a functional unit. But with the liquidation method, essentially the same components of the assets will be valued with regard to the gradual sale, problematic use and costs of liquidation. Our comparison of valuation procedures for the property and liquidation method revealed fundamental differences in the valuation process, which we described as the basic areas of problems and mentioned in our proposal for the structure of the expert opinion. We named the specifics in the evaluation of inventories and receivables, which we addressed in more detail in our contribution. We have come to the conclusion that the specifics of the liquidation method are mainly in the valuation of trade receivables, work in progress, semi-finished products, materials, but also in the valuation of unfinished investments, financial investments and intangible assets. These asset components may have different general values at the same date when the asset and liquidation methods are applied. The reason is mainly the impossibility of completing the developed production and transformation processes in the company. The company has costs in connection with its liquidation that will not be incurred in the ordinary course of business.

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Vyhláška Ministerstva spravodlivosti SR č. 228/2018 Z. z., ktorou sa vykonáva zákon č. 382/2004 Z. z. o znalcoch, tlmočníkoch a prekladateľoch a o zmene a doplnení niektorých zákonov v znení neskorších predpisov

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Lenka Straková

The University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics
Univerzitna 8215/1, 01026 Zilina, Slovak Republic
email: lenka.strakova@fpedas.uniza.sk

Identification of Earnings Management Existence Using Discretionary Accrual of Modified Jones Model

Abstract

Profit is an important item in the company's financial statements is most often examined by third parties in the business environment, as for most interest groups, profit is one of the basic and essential sources of information about the company. It follows that each interest group expects different profit values to meet its objectives. Evaluation of companies based on mathematical apparatus or decomposition of indicators may not always yield an accurate result. This is where earnings management enters the process and with it the possibility of distorting accounting data and manipulating profits. This paper examines the issue of earnings management in companies operating in Slovakia, intending to identify earnings management in companies operating in Slovakia through the discretionary accrual of the Modified Jones model. To achieve the results of the research, a statistical analysis is performed, where it is necessary to perform several steps consisting of estimating discretionary accrual, identification of earnings management, and determining the direction, degree, and extent of earnings management in case of its occurrence in companies operating in Slovakia. In addition to statistical analysis, the paper uses the method of comparison and modeling. The financial information needed for calculation variables of the Modified Jones Model has been obtained from the financial database, Amadeus.

Key Words

earnings management, discretionary accrual, non-discretionary accrual, positive discretionary accrual, negative discretionary accrual

JEL Classification: M41

Introduction

The economic results of companies represent an important tool for many entities in a global business environment (Grofcikova, 2020). They are often considered as the only source of information (Siekelova and Podhorska, 2020) that informs the company's partners about the managerial activities of their company and that is why it is necessary to present these economic results using real numbers. However, companies prefer to achieve better results by applying the principles of earnings management, which leads to improved economic values being shown to be achieved during an accounting period (Blazek et al., 2020). A basic element of tests for the identification of earnings management existence is a measure of management's discretion over earnings (Kliestik et al., 2020). Within this issue, emphasis is placed on accrual earnings management, which does not influence the corporate underlying economics but involves the change in the accounting presentation of these economics (Valaskova and Durana, 2020). The literature focused on the topic of earnings management has followed several

approaches, which are different. Some authors try to identify earnings management in a set of companies by the medium of discretionary accruals (Siekelova et al., 2020). Jones (1991) focused on the detection of earnings management in a set of companies by the medium of residual from a regression of total accruals on change in sales and property, plant, and equipment. The Modified Jones model was focused on the detection of earnings management according to residual from a regression of total accruals on change in sales and on property, plant, and equipment, where revenue is adjusted for change in receivables in the event period (McNichols, 2000). Dechow and Dichew (2002) developed a model based on the accrual of working capital and operating cash flow because the authors consider these two quantities to be short-term, which may result in a change in their development over some time. The accruals amount presented on the balance sheet is a crucial component in calculating the cash flow for the company's operations. When the quality of these discretionary accruals is inferior, the amount of cash flow calculated from the report will not be able to reflect the company's current business risks (Khuong et al., 2020). Callo, Cimini, and Jarne (2016) presented a study in which they compared the significance of accounting data in individual accounting units with high discretionary accruals, in which the possibility of using earnings management appeared. The results of their study pointed to a low level of significance of returns for entities with a high intensity of discretionary accruals. Other authors are interested in the detection of earnings management according to specific accruals. McNichols and Wilson (1988) try to assess earnings management existence by the model focused on the estimation of residual from a regression of the provision for bad debts on the allowance beginning balance, and current and future write-offs. Beneish (1999) wants to detect earnings management by seven indexes which represent days in receivables index, gross margin index, asset quality index, depreciation index, selling general and administrative expense index, total accruals to total assets index. Another approach that is reflected by literature related to the measurement and detection of earnings management is to examine the statistical properties of earnings to identify behavior that influences earnings. These studies are related to the behavior of earnings around a specified benchmark, such as zero or a prior quarter's earnings, to test whether the incidence of amounts above and below the benchmark are distributed smoothly, or reflect discontinuities due to the exercise of discretion (McNichols, 2000). Based on the above approaches to the measurement and detection of earnings management accruals include all adjustments that allow a business to change from a cash basis to an accrual basis - whether this means allocations, provisions, or changes in accounting methods. Companies also try to use earnings management for the purpose to be profitable by effectively driving new business openings, reducing cost, increasing client certainty (Ayu et al., 2020), and using networked information-driven technologies (Haskins et al., 2020). Changes in working capital also form part of accruals. DuCharme et al. (2001) consider accruals models to be the most important in the detection of earnings management because this approach captures the subtle income management techniques allegedly used to avoid detection by outsiders. Accruals not only reflect the choice of accounting methods but also the effect of recognition timing for revenues and expenses, asset write-downs, and changes in accounting estimates.

This study is primarily focused on the identification of earnings management existence using discretionary parts of accruals of the Modified Jones model. The modification of the Jones model is based on the adjustment of changes in sales taking into account the change in receivables. It was the reduction of measurement errors of the discretionary

accrual created based on revenues that led the authors to modify this model. (Dechov, Sloan, Sweeney, 1995). Authors Dechow et al.(1995) find that a Modified Jones model provides the most powerful test of identification of earnings management in a set of companies in comparison to the Healy model, the DeAngelo model, and the standard Jones model. Peasnell, Pope, and Young (2000) find that the Modified Jones model represents an effective model to generate powerful testing for earnings management and is also more powerful for the revenue and bad debt manipulations than non-bad debt manipulations. Based on the findings of several authors in the literature dealing with the issue, it is possible to conclude that the modified Jones model can more significantly reveal and identify the existence of earnings management in companies, based on sales.

1. Methods of Research

Information on the financial data of the companies on which the research is carried out is obtained from the Amadeus database. The total number of enterprises in the territory of the Slovak Republic on which the research is performed represents 2,150 enterprises. The sample of enterprises is selected based on the application of financial criteria, which include the number of sales is more than € 3,000,000, the amount of total assets is more than € 5,000,000 and the amount of profit is more than € 100,000. These companies are monitored for three years 2015-2017. To achieve the results of research aimed at identifying earnings management according to the Modified Jones model, it is necessary to estimate the discretionary parts of its accruals using statistical analysis. After estimating the discretionary parts of the accruals of the given model, the identification of earnings management is assessed by comparing the values of the discretionary parts of the accruals of the examined sample of Slovak companies with the discretionary parts of the accruals of the fictitious group using the Mann-Whitney test. Through this test, it is possible to identify the presence of earnings management, but it is not possible to determine in which direction earnings management is moving. For this reason, it is necessary to determine its direction, degree, and extent by comparing the percentage and average values of discretionary accruals.

2. Results of the Research

The analysis was primarily focused on the identification of earnings management using discretionary parts of accruals of the Modified Jones model. At first was needed to calculate descriptive characteristic of discretionary accruals which consisted of standard deviation, average, and median. By the medium of descriptive characteristics was possible to interpret the prediction error of the Modified Jones model. In the following table is possible to see the value of descriptive characteristics expressed as coefficients.

Tab. 1: Descriptive characteristics of discretionary accrual of Modified Jones model

Period	Standard deviation	Average	Median
Year 1	0.310967	0.086902	0.108808
Year 2	0.157933	0.017894	0.031159
Year 3	0.158591	0.006402	0.020153

Source: authors' calculations

As we can see from table 1 the highest value of the standard deviation of discretionary accruals of the Modified Jones model was recorded in the first year at approximately 0.310967. The second highest value of the standard deviation of discretionary accruals of the Modified Jones model was recorded in the third year at approximately 0.158591. In the second year, the value of the standard deviation of discretionary accruals was 0.157933 which represents a lower value in comparison to the value of the standard deviation of discretionary accruals in the third year. In this year the value of standard deviation was the lowest. The second descriptive characteristic which was analyzed was average. The value of average was different in all years. The highest value of it was recorded in the first year at the level of 0.086902. The second highest value of average was at the level of 0.017894. In the third year was recorded the value of average at the level of 0.006402, which represents the lowest value in comparison to other years in the analyzed period. The third analyzed descriptive characteristic was median. Particular values of it were differences from year to year. The highest value was recorded in the first year at the level of 0.108808. In the second year, the value of the median was at the level of 0.031159. The lowest value of the median was recorded in the third year at the level of 0.020153.

Tab. 2: Verification of earnings management existence using Mann-Whitney test

Indicators	Year 1	Year 2	Year 3
Significance level	0.05	0.05	0.05
P-value	<0.0001	<0.0001	<0.0001
Accepted hypothesis	H1	H1	H1
Statement	Existence of EM	Existence of EM	Existence of EM

Source: authors' calculations

From table 2 is possible to see that in the analyzed period of three years the significance level represents equal values in all years. In the comparison to p-values, the values of significance level were higher what it means that in the analyzed set of companies was recorded the existence of earnings management.

Tab. 3: Direction of earnings management

Period	Positive discretionary accrual	Negative discretionary accrual
Year 1	76.10%	23.90%
Year 2	61.44%	38.56%
Year 3	58.28%	41.72%
Average	65.27%	34.73%

Source: authors' calculations

From table 3 it is possible to see percentage values of positive and negative discretionary accruals of the Modified Jones Model. The percentage values of positive discretionary accruals were different from year to year. The highest percentage value was recorded in the first year at the level of 76.10%. The lowest percentage value of positive discretionary accruals was recorded in the third year at the level of 58.28%. In comparison to negative discretionary accrual is possible to see that the percentage value of negative discretionary accrual were also differences in all analyzed years. The highest percentage value was recorded in the third year at the level of 41.47%. The lowest percentage value of negative discretionary accrual was recorded in the first year at the level of 23.90%.

Tab. 4: Degree of earnings management

Period	Positive DA (average value)	Negative DA (average value)	Difference values
Year 1	0.087010	0.086914	0.086914
Year 2	0.017994	0.017902	-0.000008
Year 3	0.006766	0.006402	0.000364
Average	0.037223	0.037072	0.029090

Source: authors' calculations

From table 4 is possible to see average values of positive and negative accruals of the Modified Jones model and their different values in the analyzed three years. In the first year, the average value of positive discretionary accrual was higher than the average values of negative accrual. The equal situation was recorded in the second year when the average value of positive accrual was higher in comparison to the average value of negative accrual. In the last year, the movement of the average values of positive and negative accruals was not changed.

Tab. 5: Extent of earnings management

Period	Scope of positive discretionary accrual	Scope of negative discretionary accrual
Year 1	0.066216	0.020771
Year 2	0.010994	0.006903
Year 3	0.003943	0.002671
Average	0.027051	0.010115

Source: authors' calculations

From table 5 is possible to see the particular values of the scope of both types of accruals. The scope of positive discretionary accrual achieved a higher level of values in all analyzed years in comparison to the scope of negative discretionary accrual.

3. Discussion

The analysis was primarily focused on the identification of earnings management using discretionary parts of accruals of the Modified Jones model. For assessment of identification of earnings, management was calculated descriptive characteristics of discretionary accruals of Modified Jones model. Is possible to see that the value of average achieved positive values in all three years which means that companies try to manage their earnings by raising it. For assessment of identification of earnings,

management was created a fictive set of companies based on the assumption of absence of earnings management existence for evaluating differentiation of values of fictitious and real sets of companies. Based on it in the analyze was use the Mann-Whitney test. At first, the null and alternative hypotheses were stated. The null hypothesis was based on the non-manipulation of earnings in the companies and the alternative hypothesis was based on manipulation of earnings in the companies. Then in the analysis was compared p-value with the significance level of 0.05. Based on calculation there was admit alternative hypothesis which represented manipulation of earnings in the set of companies. By using the Mann-Whitney test is only possible to identify the existence of earnings management in a set of companies, but it is not known in which direction earnings management is moving. For assessment of direction was calculated the percentage of discretionary accruals. From the results of table 3 is possible to say that companies try to manipulate their earnings by its raising because the percentage of positive discretionary accrual was higher than the percentage of negative discretionary accruals. Based on the degree of earnings management is possible to say that the manipulation of earnings by companies is realized rather by increasing the profit than by decreasing it. Within the extent of earnings management based on calculation values in table 5 is possible to point out the manipulation of profit by increasing it because the range of positive discretionary accruals was higher than the range of negative discretionary accrual.

Conclusion

The paper aimed to identify the occurrence of earnings management in companies performing business activities in Slovakia using the discretionary accrual of the Modified Jones model. To achieve the results of the research, a statistical analysis was performed, where it was necessary to perform several steps consisting of estimating discretionary accrual, identification of earnings management, and determining the direction, degree, and extent of earnings management in case of its occurrence in companies operating in Slovakia. Based on the performed analysis, results were achieved that identify earnings management in companies in Slovakia. In examining the direction, degree, and extent of earnings management, a positive discretionary accrual reaches a higher value than a non-discretionary accrual, which means that companies focus on manipulating profit by increasing it. This research result may be due to contractual motives, which are based on contractual terms between the company and stakeholders, limited rationality, which implies market inefficiencies, thus exploiting capital market motifs affecting the status and value of companies or external motives based on entities with current or future interests, thereby interfering to some extent in the way information is provided to stakeholders. The issue of earnings management is a current topic in the world of business, and therefore the subject of future development will be a deeper focus on identifying specific motives encouraging the manipulation of profit by increasing it, as well as focusing on identifying earnings management in a particular industry in the Slovak Republic.

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Section VII

Impacts of COVID-19 and Resilience Actions

Petra Doleželová, Lenka Fojtíková

VSB -Technical University of Ostrava, Faculty of Economics, Department of International Economic Relations
Sokolská třída 33, 702 00 Ostrava 1
e-mail:petra.dolezelova@vsb.cz,lenka.fojtikova@vsb.cz

Trade Policy Measures in the Time of Covid-19 Pandemic: the Case of the EU Trade

Abstract
The paper deals with non-tariff trade measures (NTMs) introduced in response to the Covid-19 pandemic in the case of the European Union (EU) and its biggest trading partners. The aim of the paper is to identify non-tariff measures that might have affected trade flows of the EU in time of the pandemic. The NTMs are examined in terms of their quantity, type, and product focus. The analysis shows that applied NTMs were focused only on the narrow product groups related to Covid-19 and thus had little space to significantly influence the trade of the EU. Moreover, the considerable part of the NTMs was made up of Trade Facilitating Measures for which the negative impact on trade is unlikely.

Key Words
Covid-19, European Union, international trade, non-tariff measures

JEL Classification: F10, F13, H50

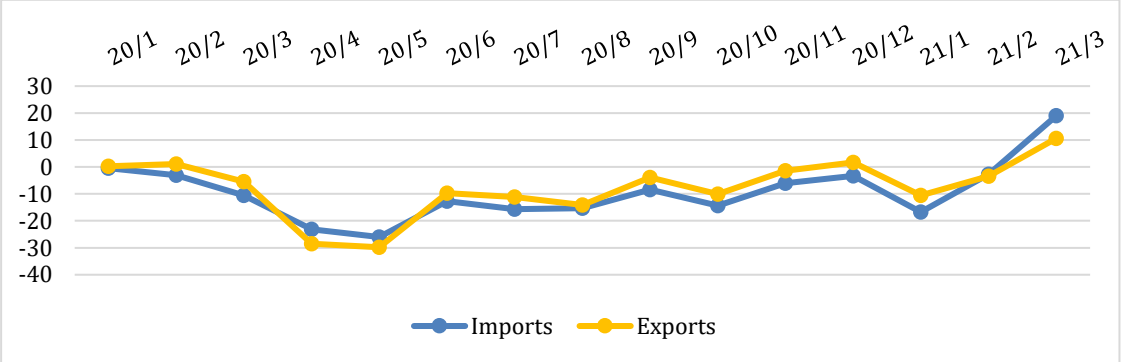
Introduction

The Covid-19 pandemic that erupted in early 2020 affected the lives of all people around the world. It also had serious repercussions on countries' economies. Not only has Covid-19 led to a reduction in economic activity in most countries, but it also has had a significant impact on international trade. The pandemic exposed the unpreparedness of countries for crisis situations and highlighted the insufficient equipment of the countries with materials and products necessary for dealing with a health crisis. Efforts of countries to provide their own citizens with a sufficient supply of medical devices, medicines, and other essential products, the consumption of which was increased due to the pandemic, led to a new wave of trade protectionism. The wave of protectionism caused by Covid-19 was quite different from the protectionism that had been present in recent years, for example, in the case of the US-China trade war. While most pre-pandemic protectionist measures were aimed at restricting imports into the country, pandemic NTMs were aimed mainly at restricting exports of essential goods from the country. Some of the measures were also aimed at tightening the sanitary and safety conditions of imported products or facilitating exports.

The slowdown in economic activity, has significantly affected the international trade flows of most countries. Inevitably, it also had an impact on the European Union as one of the world's largest trading powers. Both imports and exports of the European Union were negatively affected by the pandemic. The monthly development of export and import

flows of the European Union expressed as a percentage change compared to the same period 12 months earlier is shown in Figure 1. As can be seen, in all months of 2020 with few exceptions in exports, both European Union exports and imports were lower than during 2019.

Fig. 1: Year-on-Year Growth of the EU´s Exports and Imports (in %)



Source: author´s creation, data from (Eurostat, 2021)

The aim of the paper is to identify the NTMs applied by the EU and its biggest trade partners which eventually may have contributed to the decline in the European Union trade during the pandemic. The paper maps the development of bilateral trade flows between the European Union and its largest trading partners during the pandemic and examines the protectionist measures that might have affected these flows. Non-tariff measures introduced by both the European Union and its trading partners are characterized in terms of their number, type, and product focus.

1. Methods of Research

We examine measures applied by the EU and its ten largest trading partners. We consider this number of trading partners to be sufficient for research, as their total share in exports and imports of the European Union is almost 70%. Moreover, the shares of other individual trading partners in EU trade are below 2%. The shares of countries in EU trade are shown in Table 1.

Tab. 1: Shares of the EU´s Biggest Trade Partners in the EU Exports and Imports in 2020 (in %)

Exports	%
USA	18.3
United Kingdom	14.4
China	10.5
Switzerland	7.4
Russia	4.1
Turkey	3.6
Japan	2.8
Norway	2.5
South Korea	2.3
Canada	2.1

Imports	%
China	22.4
USA	11.8
United Kingdom	9.8
Switzerland	6.3
Russia	5.6
Turkey	3.6
Japan	3.2
South Korea	2.6
Norway	2.5
Vietnam	2

Source: author´s creation, data from (Eurostat, 2021)

UNCTAD (2021) defines non-tariff measures as policy measures other than normal tariffs that can have a potential economic impact on international trade in goods, changes in traded quantities or prices, or both. Non-tariff measures can take several forms. Following the International Classification of NTMs, we divide NTMs into two main groups: Trade Facilitating Measures and Trade Restricting Measures. Within these groups, the measures are divided into several chapters depending on their nature and further subdivided into groups. The most common double-digit groups that are relevant to our paper are shown in Table 2.

Tab. 2: Main NTMs Groups

Code	**Trade Facilitating Measures**
B 14	Authorization requirements for importing certain products TBT (realxed)
E 32	Prohibition for non-economic reasons
G 4	Regulations concerning terms of payment for imports
L 41	Tax and duty exemptions, reductions, other fiscal incentives reducing burden of taxes otherwise due
	Trade Restricting Measures
A 11	Prohibitions for sanitary and phytosanitary reasons
C 9	Other pre-shipment inspection formalities not elsewhere specified
P 16	Conformity assessments
P 22	Export monitoring and surveillance requirements
P 31	Export prohibition
P 32	Export quotas
P 33	Licensing, permit or registration requirements to export

Source: UNCTAD, 2020

Non-tariff measures are not comprehensive but rather specifically targeted. This means that individual NTMs are always targeted on specific products or groups of products. Non-tariff measures applied by the European Union and its trading partners are further examined in terms of their product focus. For this purpose, the international nomenclature for the classification of products - Harmonized System - is used. Two-digit product chapters are used to identify the product groups affected by the non-tariff measures.

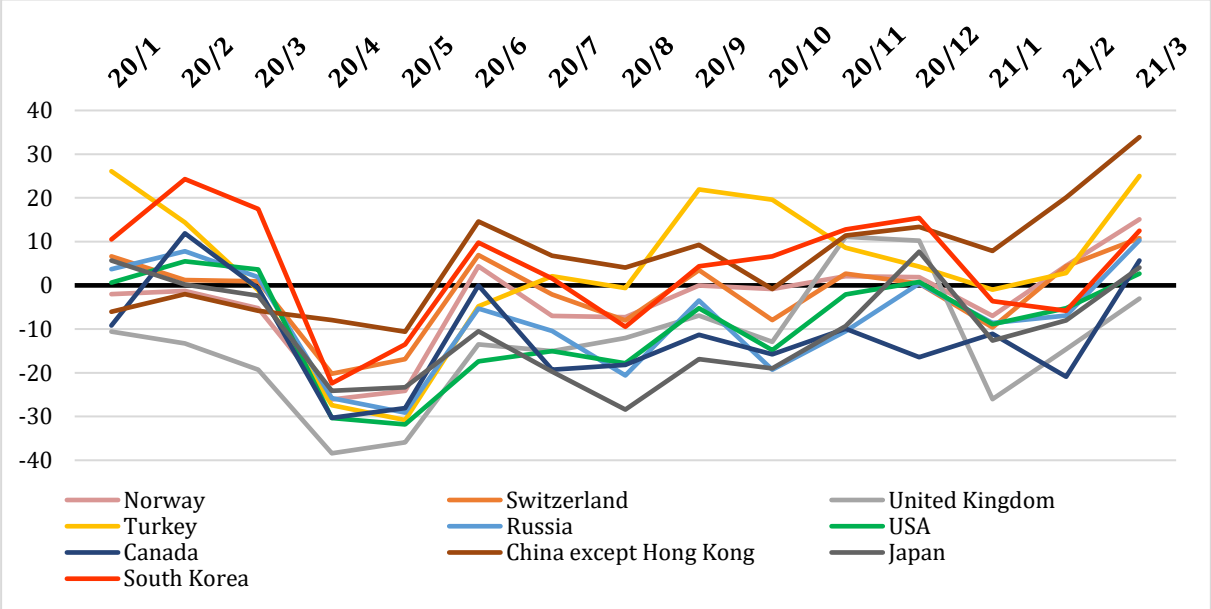
Data on the European Union's bilateral trade flows and its trading partners were obtained from the Eurostat. Data on non-tariff trade measures were drawn from the UNCTAD database. Non-tariff measures were classified based on information contained in the publication the International Classification of Non-Tariff Measures published by the Multi-Agency Support Team of the UNCTAD.

2. Results of the Research

In the first step, we examined the development of export and import flows of the European Union with its ten most important trading partners. Figures 2 and 3 show the year-on-year growth of EU´s exports and imports as the percentage change in exports and imports compared to the same period 12 months earlier. The year-on-year growth was

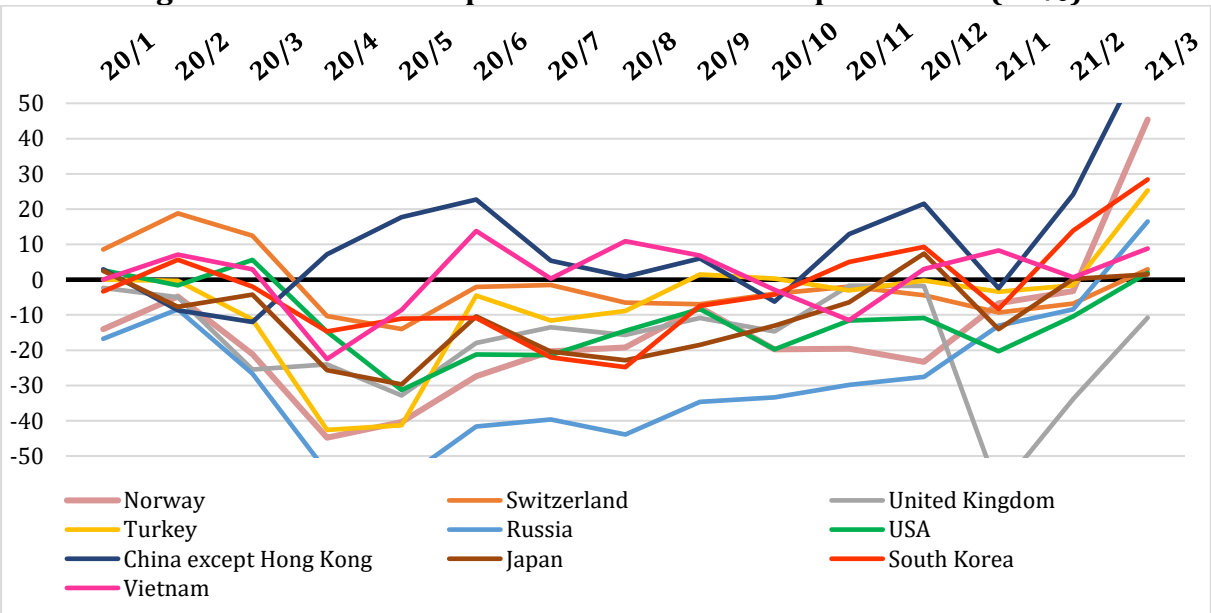
chosen as the most suitable measure as it allows us to compare the value and monthly development of trade flows in the time of the pandemic compared to the same months before the pandemic. This way, the effects of seasons are removed and long-term trends are discerned. As can be seen, the largest decline in EU exports compared to 2019 was recorded in all countries in April and May 2020 when the pandemic broke out in full force around the world. At that time, the most stringent measures restricting economic activity were introduced in most countries, including the EU member states. The most significant decrease compared to 2019 was recorded in the EU exports to the United Kingdom, Canada, and Japan. The EU exports to South Korea were the only ones to be higher on average than in the previous year. In March 2021, a recovery in the EU exports can be observed for all economies.

Fig. 2: Year-on-Year Export Growth of the European Union (in %)



Source: author´s creation, data from (Eurostat, 2021)

Fig. 3: Year-on-Year Import Growth of the European Union (in %)



Source: author´s creation, data from (Eurostat, 2021)

The EU imports recorded much sharper declines in growth than exports. The largest decline was recorded for the EU imports from Russia, where year-to-year differences reached up to 30% in some months. The decline was mainly due to the fact that most Russian imports are mineral fuels, the consumption of which was reduced due to lower production during the lockdown. Other countries whose exports to the EU fell sharply during the pandemic were Norway, the United Kingdom, and the USA. However, there were also countries whose exports to the EU, despite the pandemic, were for most months higher than in the previous year, namely China and Viet Nam. This increase was caused mainly by higher exports of medical devices during the pandemic from these countries.

Regarding the non-tariff measures, a total of 65 NTMs were introduced by the EU's largest trading partners during the period under review. The European Union itself has implemented a total of 25 measures. The number of measures implemented by individual economies is shown in Table 3.

Tab. 3: Number of applied NTMs from January 2020 to March 2021

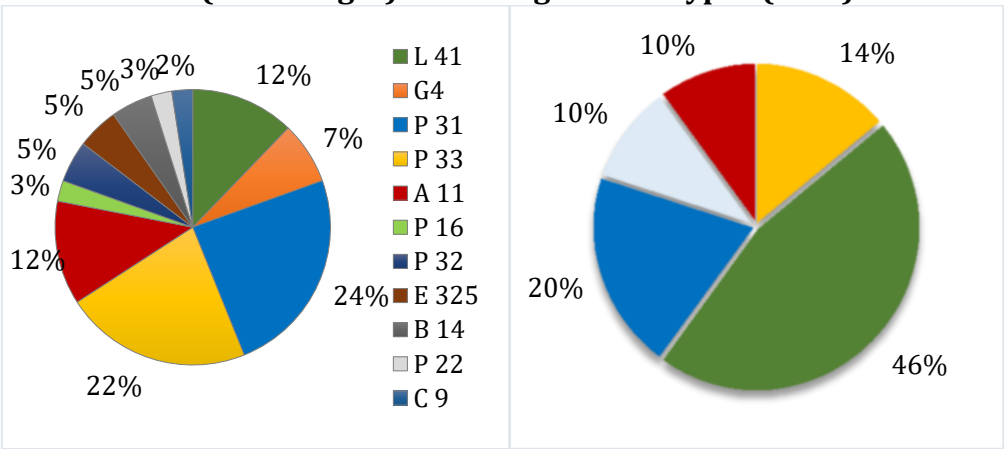
Country*	CN	JP	NO	RU	KR	CH	TR	UK	USA	VN	CA	EU
NTMs	4	2	2	5	14	8	1	1	22	3	3	25

* CN – China; JP – Japan; NO – Norway; RU – Russia; KR – South Korea; CH – Switzerland; TR – Turkey; UK – United Kingdom; USA – United states of Amrica; VN - Vietn-Nam; CA – Canada; EU – European Union

Souce: Author´s creation, data from (UNCTAD, 2021)

Based on the information in the NTMs notifications, the individual measures were classified into two-digit groups with the help of the International Classification Of Non-Tariff Measures according to their characteristics. Figure 4 shows the percentage distribution of each type of the NTMs applied by the EU trade partners. Almost 70% of these NTMs were Trade Restricting Measures. The largest share of NTMs introduced by the EU's trading partners consisted of export-related measures, more precisely Export prohibition and Licensing, permit or registration requirements to export, Export quotas, and Export monitoring and surveillance requirements. Within the Trade Facilitating Measures, the biggest share had Tax and duty exemptions, reductions, other fiscal incentives reduced the largest share of taxes otherwise due.

Figs. 4 and 5: Distribution of NTMs of the EU´s trade partners (on the left) and the EU (on the right) according to their types (in %)



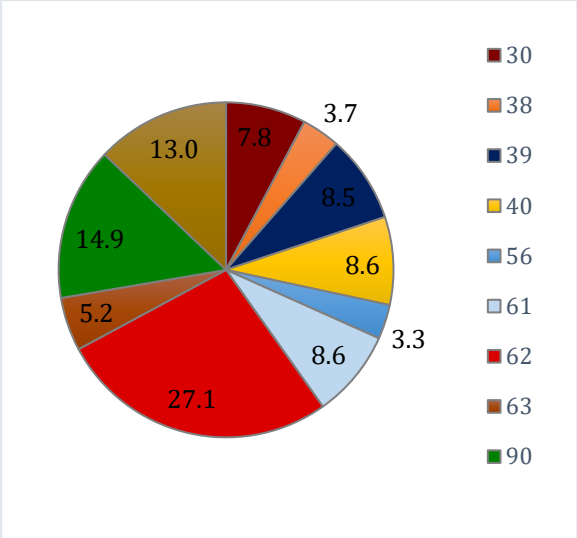
Source: author´s creation, data from (UNCTAD, 2021)

Figure 5 shows the percentages of each type of NTMs applied by the European Union at the time of the pandemic. As we can see, the measures applied by the European Union are made up of five main types of NTMs. Almost half of the EU´s NTMs are Trade Facilitating Measures, namely Tax and duty exemptions, reductions, other fiscal incentives reducing the burden of taxes otherwise due. This means that the EU has largely sought to promote the trade of its member states.

Figure 6 shows the percentage share of the main product groups that have been the subject of NTMs. The largest share of NTMs applied by EU´s trade partners was directed to product Chapter 62, which among others includes, for example, disposable apparel designed for use in hospitals and clinics, surgical or isolation gowns and glowns, and Chapter 90 containing instruments and appliances used in medicine, spectacles and goggles, breathing appliances, etc.

As for the NTMs introduced by the European Union, their product focus is very similar to that of its trading partners. Most of the EU´s NTMs were focused on product Chapter 62 (29%) and Chapters 61 (15%) and 90 (9%).

Fig. 6: Product focus of NTMs (in %)



30	Pharmaceutical products
38	Miscellaneous chemical products
39	Plastics and articles thereof
40	Rubber and articles thereof
56	Wadding, felt and nonwovens; special yarns; twine,ropes and cables and articles thereof
61	Articles of apparel and clothing accessories, knitted or crocheted
62	Articles of apparel and clothing accessories, not knitted or crocheted
63	Other made up textile articles; worn clothing and worn textile articles; rags
90	Optical, photographic, measuring, medical or surgical instruments

Source: author´s creation, data from (UNCTAD, 2021)

3. Discussion

Using the example of the European Union and its biggest trading partners, we examined NTMs introduced during the Covid-19 pandemic. The NTMs applied by the EU´s trade partners consisted mainly of the Trade Restricting Measures predominantly export-related measures aimed at preventing exports of Covid-19 related goods from the country to ensure their sufficiency in response to increased domestic demand. Within the product focus, the subjects of NTMs were mainly product groups including basic medical devices or materials for their production, medicaments, and other Covid-19 related products. Besides export-related NTMs, measures ensuring the quality of imports of medical products were also applied. These measures have been introduced in most countries in

response to imports of low-quality medical devices from China (Horwitz, 2020), and as Broom (2020) points out, also mainly due to the occurrence of several cases of imports of face masks that did not meet quality standards. The export-related measures introduced by the European Union were focused mostly on the same products as in case of its trading partners.

Regarding the European Union, the considerable part of its NTMs was made up also of Trade Facilitating Measures. During the Covid-19 pandemic Trade Facilitating Measures are as important as Trade Restricting Measures. Trade Restricting Measures ensure a sufficient supply of essential products on the domestic market and ensure the quality and safety of imported products, thus protecting the domestic market and consumers. Trade Facilitating Measures seek to mitigate the effects of the pandemic on the economy by supporting economic activity, for example by fostering the export activities of domestic entities, ensuring the survival of small and medium-sized enterprises in times of trade decline, and facilitating the faster and safer movement of goods across borders. The main framework for the introduction of Trade Facilitating Measures is provided by the WTO Trade Facilitation Agreement (2017), which is one of the most important agreements in the area of facilitating cross-border trade that contributes to reducing the cost of trading across borders and allows WTO members to better control trade flows (Eliason, 2015).

In recent years, trade has been a key driver of economic prosperity in the EU, and the European Union is fully aware of this. At the same time, the EU is one of the most important promoters of trade liberalization and one of the most open economies in the world. The high share of Trade Facilitating Measures reflects the European Union's intensive efforts to support and facilitate international trade in times of pandemic, and to prevent a downturn. However, it is important to keep in mind that although NTMs are being implemented for legitimate policy objectives, they may also have negative implications. Fugazza et al., (2017) state that NTMs have disproportionate effects mainly on small traders. Lee and Prabhakar (2021) then examined the effects of NTMs introduced during a pandemic on the sustainable growth of countries. As Lee and Prabhakar conclude that most countries used NTMs in the time of pandemic cautiously and collaboratively which corresponds also with our findings. Prudent and well-considered introduction of non-tariff barriers is one of the important prerequisites for achieving the desired goals and minimizing negative impacts.

Conclusion

The analysis showed that of all countries, the European Union has introduced the highest number of non-tariff trade measures. However, the high number of the NTMs does not mean that the European Union has shown the greatest tendency towards protectionism during the Covid-19 pandemic. A large part of the EU's NTMs were Trade Facilitating Measures for which a negative impact on international trade is unlikely.

Trade Restricting Measures of the EU and its trading partners were specifically focused on product groups related to the pandemic. Due to their narrow product focus, these measures had little opportunity to significantly affect EU foreign trade. Introduced NTMs may have affected mainly trade of products whose world demand was increased due to

the pandemic. This means that if the NTMs hindered international trade, it was mainly pandemic-induced trade.

It is therefore unlikely that NTMs related to the Covid-19 pandemic would have a significant negative effect on the total European Union's foreign trade. Therefore, the decline in European Union trade can be attributed to a global decline in economic activity and other factors rather than to non-tariff measures.

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Helena Fialová, Jan Fiala, Alžběta Zíková

Metropolitan University Prague
Department of International Trade
Dubečská 900/10, 110 00, Praha 10 - Strašnice, Czech Republic
email: helena.fialova@mup.cz, jan.fiala@mup.cz,
alzbeta.zikova@mup.cz

Impact of COVID-19 on Economy of Czech Republic presented by Magic Quadrangle

Abstract

The success of government macroeconomic policy assessed by a special indicator known as a "Magic Quadrangle" is measured by the size of the area reflecting values of four macroeconomic indicators – the growth of real GDP, the rate of unemployment, the rate of inflation and the trade balance. The assessment of the success of government macroeconomic policy is influenced by the choice and construction of four indicators and should be interpreted carefully. The quadrangle of the Czech Republic in years 2019, 2020 and 2021 shows a critical decline in the size of the quadrangle caused by the COVID-19 in the year 2020 reflecting thus the negative impact of the crisis. The forecast for the year 2021 is optimistic, nevertheless, it uncovers the main weakness of the Magic Quadrangle. When ignoring the government finance, namely the general government balance and the general government debt, the Magic Quadrangle is biasing the assessment of the economic situation of a country and the forecasted values. The numbers forecasted for public finance in 2021 and the following years in the Czech Republic are shocking. A huge deficit in the government balance and high public debt will, without doubt, influence the values of all four indicators in the Magic Quadrangle.

Key Words

magic quadrangle, macroeconomic indicators, Czech Republic, COVID-19

JEL Classification: B22, E01, E60

Introduction

The performance of the government of a country known as the macroeconomic policy may be assessed by a special indicator known as "Magic Quadrangle" (Wealth and finance, 2015). It is a geometric structure depicting four main macroeconomic indicators, namely economic growth as the growth of real GDP, the situation in the labour market represented by the rate of unemployment, changes in the price level measured by the rate of inflation and the foreign trade activity taken as the relation of the trade balance surplus or deficit to GDP. Four indicators are depicted on axes and create the quadrangle. They are constructed with respect to the positive or negative assessment of each indicator. The government macroeconomic policy is considered positively with a higher rate of growth of GDP, lower inflation and lower unemployment and a higher percentage of exports over imports related to GDP (Mankiw, 2015). In its macroeconomic policy, the government is supposed to perform the policy in each field (fiscal and monetary policy, exchange rate policy, income policy etc.) with regard to the best results reflected in the size of the area

of the quadrangle. A larger quadrangle should demonstrate a more successful macroeconomic policy.

This article shows the results of the government macroeconomic policy in the Czech Republic demonstrated by the magic quadrangle in the latest strong epoch-making crisis. The article shows the disaster in the economic development of the country on one hand but also limited and untruthful facts resulting from the assessment by the magic quadrangle on the other hand.

1. Czech Economy Assessed by Magic Quadrangle

1.1 Years of recessions

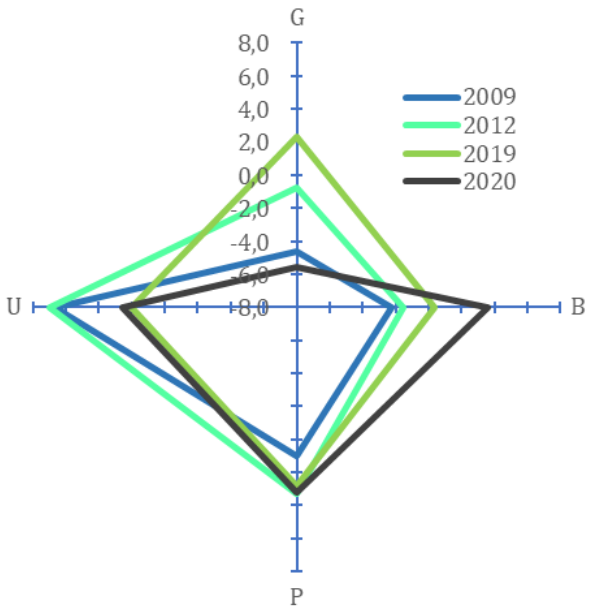
The crucial years (periods) in the performance of the Economy of the Czech Republic in the first two decades of the 21st century are the following ones:

- 2008-2009
- 2011-2012
- 2019-2020

The period 2008-2009 is called the Great Recession and affected most countries in the world. In 2011-2012 there was a slowdown in the European Union countries including the Czech economy, which copied the drop in the output of Germany through the interaction in the foreign trade. The period 2019-2020 brought a horrible slump in economies of all countries and became a new phenomenon without any experience or manual for treatment. The disaster in most countries has not yet been overcome. The Magic Quadrangles for the years: 2009, 2012, 2019 and 2020[1] are shown in Figure 1.

[1]Quadrangles for 2009 and 2012 both represent years with worst situation in the respective recessions. Quadranles for 2019 and 2020 show both, the last year of prosperity (2019) and the following year of recession (2020). More lines would cause confusion in the quadrangle.

Fig. 1: Magic Quadrangle of the Czech economy, years 2009, 2012, 2019 and 2020



Where:
G: GDP growth
B: Current account
P: Inflation
U: Unemployment[2]

Area of quadrangles calculated as the equality: 1 PP = 1 cm:

2009 = 126,
2012 = 199,
2019 = 194,
2020 = 151, all in cm^2

Source: authors' own work, data from (CZSO, 2021).

When considering the total area covered by quadrangles, the situation seems to be the worst in the year 2009. The lowest growth of GDP in the year 2020 was balanced by positive results in the trade balance. In the year 2009, the trade balance showed higher imports than exports but in the year 2020 exports exceeded imports significantly. The area of the quadrangle in the year 2020 in comparison to the year 2019 was larger because of the lower growth in prices but smaller by the higher level of unemployment. The area of the quadrangle in the year 2012 does not raise a negative assessment. The year 2019 is considered to be the year of economic prosperity but the area is not larger than the area of the year 2012.

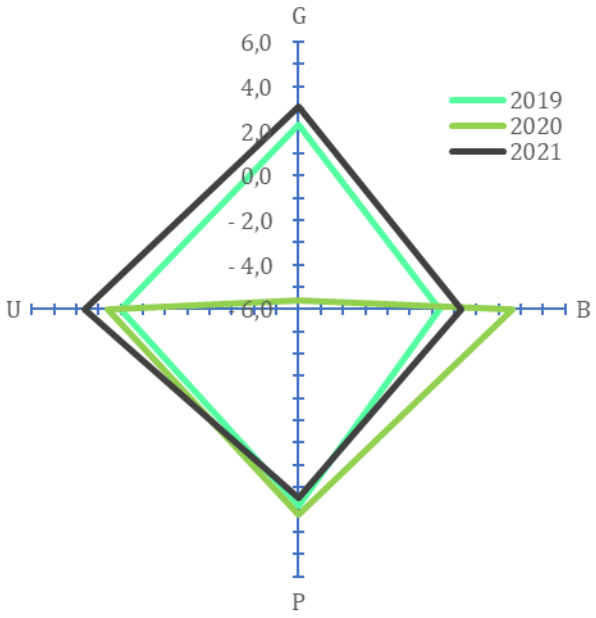
1.2 Year 2020 - year with the outbreak of COVID-19

Figure 2 shows the Magic Quadrangle for years 2019 (the year of prosperity), 2020 (the crisis caused by the COVID-19) and 2021 (the year of the expected recovery[3]).

[2]Indicators are constructed as follows: G – Gross domestic product in constant prices (YOY change in percent); B – Current account balance as percentage of GDP; P – YOY change in CPI in percent; U – unemployment rate in percent.

[3] Generally, the recovery in the year 2021 is expected. Numbers estimated by numerous institutions differ and change permanently. For this article numbers of the recovery in the year 2021 is expected. Numbers estimated by numerous institutions differ and change permanently. For this article forecasts for years 2021 and 2022 of the Ministry of Finance (2021) were used.

Figure 2 Magic Quadrangle of the Czech economy, years 2019, 2020 and 2021



Where:
G: GDP growth
B: Current account
P: Inflation
U: Unemployment

Area of quadrangles calculated as the equality: 1 PP = 1 cm:

2019 = 194,
2020 = 151,
2021 = 226, all in cm^2

Source: authors' own work, data from (CZSO, 2021) and (Ministry of Finance, 2021).

Economists and research institutes all over the world expect the year 2021 to be the year of recovery when most countries reach even better results in comparison to the year 2019 (the year before COVID-19). The same is true for the Czech Statistical Office. The area of both quadrangles corresponds to this expectation (226 in comparison to 194).[4]

2. Critical comments

The four main macroeconomic indicators depicted in the magic quadrangle do not cover all macroeconomic indicators and do not represent the government field of activities fully (Fialová & Fiala, 2008). Necessarily two indicators from public finance should be considered, namely the general government budget balance and the general government debt. Tools of monetary policy, first of all, interest rates changes and the exchange rate of currency play also a significant role.

On the other hand, the indicator of the foreign trade (current account balance as a percentage of GDP) that shows the different aspect of success or failure of government than the other three indicators, should better not be included in the magic quadrangle.

[4] It seems to be useful to remind the reader of this article that numbers in comparisons of rates of growth of indicators should be interpreted carefully. Percent ups and downs cannot be simply compared as they result from different bases. The decrease of the indicator in one year by 20% needs the increase of 25% in the next year to reach the original value. It is clear and simple but very often we meet same percent used by politicians and speakers.

2.1 Assessment of indicators values

One of the fundamental differences between microeconomics and macroeconomics is the declared target of indicators. The microeconomic indicators usually are aiming at maximal and minimal values (highest profit, lowest cost). The macroeconomy prefers optimal values (Mankiw, 2017). When assessing the economic growth not only recessions or even depressions are the threat but the opposite situation called "overheating of the economy" brings problems and trade-offs in cooling the economy down.

Moderate inflation is the dream of economists and politicians and is incorporated in the inflation target of most central banks (usually the growth of prices about 2%) (Fialová & Fiala, 2014). The galloping inflation has a destructive impact and hyperinflation destroys economies completely. The reverse development of prices – the deflation leads to stagnation and recession, and – what is the main evil – is hard to be solved (Frank, Bernanke, Antonovics & Heffetz, 2019).

The slowing down of unemployment is the aim of governments when it exceeds the "natural rate of unemployment" but the lower unemployment has a negative impact on the labour market and the economy of the country as a whole (Fialová & Fiala, 2014).

2.2 Different or controversial aims of macroeconomic policy

The aims of macroeconomic policy in individual countries are not identical. They change over time with respect to the actual situation in the country and with respect to the world economy. The same level of each of the indicators need not be assessed in different countries and different periods equally.

Indicators do not change on a regular basis. Improving one of the indicators may cost the worsening of another one. When supporting the growth of GDP, the government may face inflation and vice versa – slowing down inflation results in slowing down the economic growth and increasing unemployment (McConnel, Brue & Flynn, 2018).

In the quadrangle itself, these trade-offs may lead to shifting the quadrangle up or down (lower growth and lower inflation or vice versa) or in any other direction. The same area of the quadrangle may show a very different actual situation in the country.

3. The Standard Analysis of the Czech Economy in the Period 2000 – 2022

Based on the data of the CZSO (2021) the following Table 1 includes two more main indicators from the field of government finance, namely the General government balance[5] and the General government debt[6].

Tab. 1: Macroeconomic indicators of the Czech economy, 2000 – 2022

short name	G	B	P	U	Government finance	
long name	GDP	Current account (CA) of balance of payments/GDP	CPI	General unemployment rate	General government balance/GDP	General government debt/GDP
year/units	%, y/y, real terms	%	%, y/y, avrg.	%, avrg.	%	%
2000	4,0	-4,4	3,9	8,8	-3,6	17,0
2001	3,0	-4,8	4,7	8,1	-5,8	22,7
2002	1,6	-5,1	1,8	7,3	-6,4	25,8
2003	3,6	-5,7	0,1	7,8	-6,9	28,2
2004	4,8	-3,7	2,8	8,3	-2,4	28,4
2005	6,6	-2,1	1,9	7,9	-3,0	27,7
2006	6,8	-2,5	2,5	7,1	-2,2	27,6
2007	5,6	-4,6	2,8	5,3	-0,6	27,3
2008	2,7	-1,9	6,3	4,4	-2,0	28,1
2009	-4,7	-2,3	1,0	6,7	-5,4	33,4
2010	2,4	-3,6	1,5	7,3	-4,2	37,1
2011	1,8	-2,1	1,9	6,7	-2,7	39,7
2012	-0,8	-1,5	3,3	7,0	-3,9	44,2
2013	0,0	-0,5	1,4	7,0	-1,3	44,4
2014	2,3	0,2	0,4	6,1	-2,1	41,9
2015	5,4	0,4	0,3	5,1	-0,6	39,7
2016	2,5	1,8	0,7	4,0	0,7	36,6
2017	5,2	1,5	2,5	2,9	1,5	34,2
2018	3,2	0,4	2,1	2,2	0,9	32,1
2019	2,3	0,3	2,8	2,0	0,3	30,3
2020	-5,6	3,6	3,2	2,6	-6,2	38,1
2021	*3,1*	*1,3*	*2,5*	*3,6*	*-8,8*	*44,8*
2022	*3,7*	*0,5*	*2,3*	*3,7*	*-5,9*	*48,2*

Source: authors' own work, data from (CZSO, 2021) and (Ministry of Finance, 2021).

[5] General government balance/GDP = the share of the deficit (surplus) on the volume of GDP in current prices (in %). According to Maastricht's´ criteria, the level of deficit should not exceed 3 % of GDP.

[6] General government debt as a percentage of GDP = is the share of general government debt on the volume of GDP in current prices (in %). According to Maastricht's´ criteria, the level of deficit should not exceed 60 % of GDP.

When including data concerning general government balance and debt in the assessment of the economy of the Czech Republic for the years 2020 and 2021, we get a different picture. The year 2020 shows worse numbers in comparison to the previous year 2019, which seems to be logical and corresponds to the bad macroeconomic conditions caused by COVID-19. But numbers forecasted for the year 2021 are shocking. In the year with expected sufficient growth, inflation slightly exceeding Central Bank target and moderate unemployment, the government is planning[7] a huge deficit in government balance, which exceeds not only the respective Maastricht criterion but exceeds all deficits since the year 2000. Logically, a huge deficit will increase general government debt forecasted for 2021 to nearly 45% of GDP, which will be the highest level since the year 2000, too.

The failure of the local government(s) to use their fiscal policy as a counter-cyclical tool, rapidly expanding the public debt, will potentially increase the marginal rate of taxation (and therefore the marginal rate of withdrawal), and rise the interest on government-issued bonds furthering the crowding-out effect, suffocating the economic growth instead of utilizing it´s potential.

Conclusion

The magic quadrangle should be used and understood critically (Fialová & Fiala, 2008). It has its rationale and needs sophisticated and cautious application. It can be useful for quick and simple information about complex indicators changes. It may be used successfully in comparing indicators of one country in different years. Comparison of countries, namely countries with different economic structure and level may not be rational.

Each number in statistics and economics should be applied and explained carefully because each number might be misused and interpreted wrongly. The magic quadrangle is a useful tool in teaching economics as it can check the knowledge of students of several indicators and principles in one test. It can be recommended to complete an analysis of the macroeconomic policy of a country based on the magic quadrangle by other indicators, i.e., GDP per capita, an indicator of economic misery, demographic data etc. (Blinder & Baumol, 2016).

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[7] Government budget approved by the parliament for next year is in fact the plan, which may but need not be realized.

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David Křížek and Kamila Veselá

Czech University of Life Sciences, Faculty of Economics and Management, Department of Economic Theories
Kamycka 129, 165 00 Prague, Czech Republic
email: krizekd@pef.czu.cz; veselakamila@pef.czu.cz

Evaluation of the Impact of Government Interventions During the Covid-19 Pandemic on Czech Households

Abstract
As the Covid-19 pandemic spreads with unprecedented force, governments around the world implemented emergency measures. In the Czech Republic the second wave has already meant a dramatic rise in the number of infections. The aim of the presented text is to analyse the effects of government measures implemented in response to the growth in the number of infections on the citizens of the Czech Republic. To this end, primary data was collected using a questionnaire survey involving 948 respondents. Using the Contingency table and $\chi 2$ test and calculating Cramer V, it was found that roughly 48 % of the population was negatively affected by the pandemic, regardless of gender, age, highest educational attainment, size of residence, income level or their social status. But this is no longer the case in the event of job losses or an assessment of the appropriateness of government action.

Key Words

Covid-19; expectations; government intervention; unemployment

JEL Classification: C12, D12, D84, E62

Introduction

At the end of 2019, a virus began to spread from China's Wu-Chan, already sweeping the world in 2020. Covid-19 is a viral disease caused by the coronavirus SARS-CoV-2. In response to the outbreak of the pandemic, which struck with unprecedented force and at a very rapid pace, governments around the world implemented emergency measures, the most common of which were: travel bans, restrictions on free trade, the closure of restaurants and shops, blanket testing, quarantine and various economic packages to support economic operators. In particular, the main purpose of these measures was to protect the health of their citizens by reducing the risk of infection and thus the risk of death, but also economic support for those affected by the pandemic as well as by government measures. In an effort to create a systematic tool to combat pandemics, governments developed indicators to reduce citizens' uncertainty about future events, as often in response to pandemic 'waves', measures were tightened, released and tightened in various ways. The lack of consistency of government measures has been the most

frequent target of criticism from citizens, who have often been confused about which measures apply today and which will apply tomorrow.

One of the first indicators to guide government action in the Czech Republic was the daily increase in the number of infections alone, along with the proportion of infections among the total number tested. The R number was then monitored. The R number is a basic reproduction number that helps to estimate how the virus will spread. The higher the R number, the faster the disease spreads, in contrast, if the R number is below one, the number of infections in the population declines. An anti-epidemic PES system was later developed. In particular, it aimed to increase the clarity of the current epidemiological situation and to make it possible to predict future government actions that would be based on the PES grade. The PES-level risk index is the scale on which the Covid-19 epidemic threat level is assessed. This index is monitored for both the whole Czech Republic and the counties. The index is 0-100 %, where 0 % is zero risk, 100 % is the highest risk. The index itself aggregates the scores of 4 risk indicators, namely: (a) how many people have been infected recently; (b) how many seniors have been infected recently; (c) the number of infections is increasing, or the virus is spreading in the population; (d) are the infected effectively intercepted? Depending on the results, the country and counties are then placed on a colour risk scale, with clear anti-epidemiological measures associated with each level.

In countries where governments have implemented strict policies on quarantine and social isolation, people have a better chance of reducing the risk of infection and subsequent death caused by the virus (Hussain, 2020). The benefits of this social distancing, quarantine and lockdown are thus evident in the medium to long term, when it becomes clear how these measures have helped to reduce the number of new infections and thus deaths. Correia et al. (2020) similarly concluded that the severe interventions used in the US during the 1918 flu pandemic led to better economic outcomes in the medium term. The contrary conclusion that government action is counterproductive is favoured, for example, by Heyden and Heyden (2020), Shanaey et al. (2020), or Zaremba et al. (2020). Ashraf (2020) adds that there is also an indirect positive economic impact through reducing Covid-19 outbreaks. Goodell (2020) and Yarovaya et al. (2020) concluded that the Covid-19 pandemic would also have a significant impact on the functioning of the financial sector. Corbet et al. (2020) examined the impact of the word "corona" on stock returns and found that companies with the word "corona" in their names experienced strong negative returns and experienced an increase in hourly volatility as the Covid-19 pandemic erupted. This confirms the magnitude of the impact of the Covid-19 pandemic on people's psyches.

Research shows, among other things, that the frequent confusion of government measures that have been criticized, that governments are not yet ready to respond quickly to similar situations. This is even though modern history clearly shows that there is an increase in the frequency of pandemics, including infectious diseases (Ross et al., 2015). This implies a clear recommendation to all governments that a quality system for fighting pandemics must be developed for the future.

The aim of the submitted text is to carry out an assessment of the effect of the Covid-19 pandemic and the government measures implemented to mitigate the spread of the virus, on Czech households. The Covid-19 pandemic was a major factor influencing world

affairs, the global economy and the household economy in 2020. Government interventions to mitigate the spread of the virus have often been criticized. Many economic agents were mildly affected by the economy's lockdown, some more so and some to the point of bankruptcy. The research is carried out on primary data obtained from a questionnaire survey to assess the effects of the Covid-19 pandemic and government interventions on specific households in the Czech Republic and their incomes.

1. Methods of Research

The theoretical basis of the article has been developed through analysis and subsequent synthesis of secondary sources, the basic method used is research in particular on scientific articles and expert publications. The primary data underlying the research were obtained from a questionnaire survey conducted in 2020 in October aimed at assessing the impact of the covid-19 pandemic and the recurring economy lockdown on Czech households. A total of 952 respondents participated in the questionnaire, of which 4 responses were discarded as incomplete. The respondents included both students (in this case exclusively distance learners) and non-students. The criterion for selecting respondents was that they were economically active.

The gender composition of respondents was 421 (44.4 %) male and 527 (55.6 %) females. The age mix of respondents was divided into groups of 0-20 years, 21-25 years, 26-30 years, 31-40 years, 41-50 years, 51-60 years and 61 or more. The dominant groups are 0-20 years and 21-25 years, which together make up 85.9 % of all respondents. The structure of respondents' responses was further examined by highest educational attainment, size of residence of respondents and income level. At the outset of the response testing, a relative frequency test was conducted to verify whether the responses obtained to the research questions were statistically significant. The calculation of the test criterion is based on the formula:

$$U = \frac{P - \pi_0}{\sqrt{\frac{\pi_0 * (1 - \pi_0)}{n}}} \qquad (1)$$

where P is the probability value; π_0 is the predicted probability given by the number of sample variants; n is the sample size. The observed U-values are compared with a critical value of a normal standard distribution at a probability level of 5%.

In descriptive statistics, absolute and relative frequencies were used and pivot tables and $\chi 2$ test were used to analyse the data obtained. The pivot table contains the observed frequencies from the questionnaire investigation of individual character combinations. From the differences (residues) observed in the frequencies and frequencies obtained from the hypothesis of zero, the total standardised residue is calculated. If its value is less than the critical value of the $\chi 2$ distribution at a level of significance of 0,95 for the appropriate degree of freedom, the zero hypothesis cannot be rejected at the 95 per cent level of significance. In the case of rejection of the null hypothesis and proof of addiction, Cramer's V is determined to verify the strength of that addiction.

The following research questions were tested as part of the evaluation of the results of the questionnaire:

Research question 1: Government intervention at the time of Covid-19 felt negative about myself. Negative impacts were specified as: loss of employment, loss of income, reduced consumer options and change in sentiment caused by strict covid measures.

Research question 2: Because of the measures taken at the time of Covid-19, I have lost/lost my job.

Research question 3: How do you assess government action at the time of Covid-19?

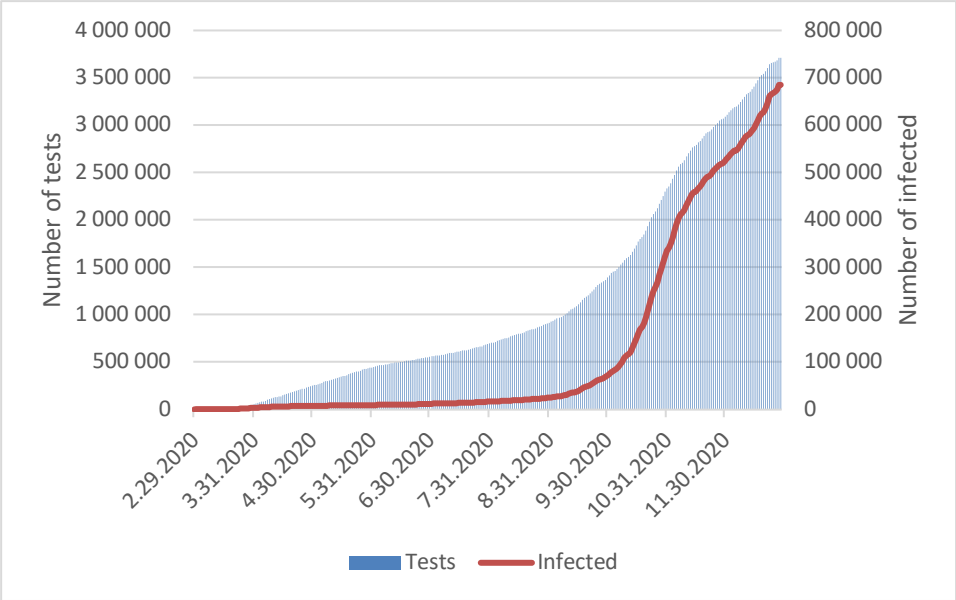
The answers to the research questions were tested according to the criteria of gender, age, highest educational attainment, size of residence, income level and social status (for these purposes, the answers of students, employees, self-employed workers and parents were separately assessed). The starting point for this breakdown was an interest in affecting respondents' different underlying financial conditions, at the same time it can be assumed that covid-19 or lockdown may have a different impact on employees than, for example, the self-employed.

2. Results of the Research

What happens in the Czech Republic regarding the development of Covid-19 can be broken down into 2 waves. The first wave began in March 2020, when the first infections occurred in the Czech Republic. This first wave lasted until around the beginning of July. During this wave, the highest daily increase was 377 infected. By June 30, 2020, there were 11,987 infections in the Czech Republic. The government measures received mainly positive feedback and the Czech Republic was seen as a country that was fighting Covid-19 with considerable success.

The second wave was much worse for the Czech Republic, with the maximum daily increase in the second half of the year climbing to 16.329 infections, and by 30.12.2020 the Czech Republic had registered a total of 701.622 infections. In response to rising numbers of infections, as well as rising deaths, the government responded by closing schools, restricting or banning curfews, and closing shops and restaurants. At this time, the government also introduced an anti-epidemic PES system. In the second wave, government intervention was also widely disputed.

Fig. 1: Evolution of the number of test and the number of positive persons in the Czech Republic from 1.3.2020 to 29.12.2020



Source: own processing, based on data Czech Statistical Office

Research Question 1 examined how people felt government interference on each other at the time of Covid-19. There were two answers to the choice: I did not feel government interference on me; I felt government interference on me negatively. The following zero hypotheses have been established in relation to this research question:

- H01: There is no relationship between perceptions of the negative impact of government intervention and Covid-19 on the living situation of respondents and the gender of respondents.

- H02: There is no relationship between the perception of the negative impact of government intervention and Covid-19 on the living situation of respondents and the age of respondents.

- H03: There is no relationship between perceptions of the negative impact of government intervention and Covid-19 on the living situation of respondents and the highest educational attainment of respondents.

- H04: There is no relationship between the perception of the negative impact of government intervention and Covid-19 on the living situation of respondents and the size of the respondents' residence.

- H05: There is no relationship between perceptions of the negative impact of government intervention and Covid-19 on the living situation of respondents and the level of income of respondents.

- H06: There is no relationship between perceptions of the negative impact of government intervention and Covid-19 on the living situation of respondents and the social status of respondents.

Of the total respondents (948), 462 (49 %) said they were negatively affected by government intervention and the economy's lockdown. The relative frequencies test showed that the results were not sufficiently statistically significant, with the test criterion at 0.7795 being below the critical value of the normal standard distribution (1.9599). Results of Chi-square test hypothesis testing are shown in Table 1. In the case of rejection of the null hypothesis, Cramer's V is calculated to determine the dependency.

Tab. 1: Results of the research question hypotheses tested: 'Government intervention at the time of Covid-19 was felt (not) negatively by me'

Hypothesis	Degrees of freedom	Criterion	χ2	Critical Value	Cramer V	Result
H01	1	Gender	0.45728188	3.84145882	-	H0 confirmed
H02	5	Age	5.35656327	11.0704977	-	H0 confirmed
H03	2	Education	1.07671097	5.99146455	-	H0 confirmed
H04	4	Residence size	3.60157024	9.48772904	-	H0 confirmed
H05	5	Income	7.98646208	11.0704977	-	H0 confirmed
H06	3	Social status	3.6618674	7.8147279	-	H0 confirmed

Source: own processing

None of the criteria tested (sex, age, highest educational attainment, residence size, income level and social status) proved relevant. Research has confirmed that there is no relationship between feeling the negative impact of government intervention on the household economy and the above criteria. Yet the percentage of negative impact on Czech households is high at almost 50 %.

The second research question was focused on research into job loss due to the Covid-19 pandemic. The research tested the following zero hypotheses:

- H01: There is no relationship between the impact of Covid-19 on job loss and the gender of respondents.

- H02: There is no relationship between the impact of Covid-19 on job loss and the age of respondents.

- H03: There is no relationship between Covid-19's impact on job loss and respondents' highest educational achievement.

- H04: There is no relationship between Covid-19's impact on job loss and the size of respondents' residence.

- H05: There is no relationship between the impact of Covid-19 on job loss and the income level of respondents.

- H06: There is no relationship between the impact of Covid-19 on job loss and the social status of respondents.

Of the total respondents (948), 122 (13%) said they had lost their jobs as a result of Covid-19, government measures and the lockdown. The relative frequency test showed that the results were sufficiently statistically significant, with a test criterion of 22,8649 being below the critical value of the normal standard distribution (1,9599). The results of Chi-square test hypothesis testing are shown in the table below. In the case of rejection of the null hypothesis, Cramer's V is calculated to determine the dependency.

Tab. 2: Results of the research question hypotheses tested: 'Due to measures at the time of Covid-19, I have lost my job'

Hypothesis	Degrees of freedom	Criterion	$\chi 2$	Critical Value	Cramer V	Result
H01	1	Gender	0.665586785	3.841458821	-	H0 confirmed
H02	4	Age	35.07810255	9.487729037	0.192157015	H0 rejected
H03	2	Education	0.758088043	5.991464547	-	H0 confirmed
H04	4	Residence size	2.437201529	9.487729037	-	H0 confirmed
H05	5	Income	9.818836609	11.07049769	-	H0 confirmed
H06	3	Social status	12.24826216	7.814727903	0.105234871	H0 rejected

Source: own processing

Research has shown that there is a relationship between job loss due to Covid-19 and age. More groups of older people than younger groups have been hit by job losses. For those aged over 50, the percentage of those who lost their jobs as a result of Covid-19 was 27% of respondents. But the strength of addiction measured by Cramer's V indicates a low relationship rate.

The latest research question focused on the subjective assessment of respondents to government action. The research question: "How do you evaluate government action at the time of Covid-19?" offered respondents 3 variants of responses, namely: (a) I consider government action appropriate; (b) I consider government action inappropriate, action should have been more stringent; (c) I consider government action inappropriate, action should not have been so stringent. The results showed that 34% of respondents considered government measures to be appropriate, 23% of respondents considered that government measures should have been more stringent and 43% of respondents considered that government measures should not have been so stringent.

The research tested the following zero hypotheses:

- H01: There is no relationship between the Covid-19 assessment of government measures and the gender of respondents.

- H02: There is no relationship between the Covid-19 assessment of government measures and the age of respondents.

- H03: There is no relationship between the Covid-19 rating of government measures and the highest educational attainment of respondents.

- H04: There is no relationship between the assessment of government measures at the time of Covid-19 and the size of the respondents' residence.

- H05: There is no relationship between Covid-19's assessment of government measures and respondents' income levels.

- H06: There is no relationship between the Covid-19 assessment of government measures and the social status of respondents.

The relative frequency test confirmed that the responses obtained are statistically significant for the overall population. The test criterion has a value of 7,9772 and is greater than the critical value of the normal standard distribution (1,9599). The results of Chi-square test hypothesis testing are shown in the table below.

Tab. 3: Results of the research question hypotheses tested: 'I consider the government's measures at the time of Covid-19 (un)appropriate '

Hypothesis	Degrees of freedom	Criterion	$\chi 2$	Critical Value	Cramer V	Result

H01	2	Gender	2.0394881	5.9914645	-	H0 confirmed
H02	10	Age	14.319894	18.307038	-	H0 confirmed
H03	4	Education	37.77412	9.487729	0.1996149	H0 rejected
H04	8	Residence size	40.904806	15.507313	0.2077222	H0 rejected
H05	10	Income	41.437074	18.307038	0.2090694	H0 rejected
H06	6	Social status	39.809798	12.591587	0.1897219	H0 rejected

Source: own processing

Research has shown that there is no dependency between the assessment of government measures and the gender and age of respondents. On the contrary, a dependency between the assessment of government measures and education has been demonstrated. As education grows, there is a growing number of views that government measures are appropriately designed. At the same time as education increases, the share of respondents who believe that government measures should have been stricter is falling.

Research has also shown the dependency of assessments of government measures and the size of residence of respondents. People who live in a place with a smaller population tend to be more inclined to think that government measures should have been less stringent. The effect of the level of income of respondents on their assessment of government measures was also confirmed. As income increases, people are more critical of government measures as inappropriate and should be stricter. The overwhelming view among students is that government measures are too stringent, with those in the parent category taking the opposite view. However, all the identified dependencies are weak, as demonstrated by Cramer's V, as shown in Table 3.

3. Discussion

Evaluating whether government measures have a positive or negative impact on the economy is very complicated. The negative impacts of government measures can be assessed on the basis of data on the number of people who have lost their jobs as a result of Covid-19, on the basis of the number of people whose monthly incomes have fallen, but also the psychological effects caused by quarantine, curfews, etc. Research has shown that in the Czech Republic around 48 % of the population have been negatively affected by the pandemic or have expressed that they feel the negative consequences of the government measures of the Covid-19 pandemic. Research has not shown that perceptions of the negative impact of government intervention depend on gender, age, highest educational

attainment, size of residence, income level or their social status. Still, the fact that nearly half of respondents view interventions on themselves negatively is of particular concern to the psyche of citizens.

Research on the impact of government measures on job loss showed that 13 % of respondents lost their jobs in relation to Covid-l9 and government measures. In addition, it has been demonstrated that more older people have been affected by the loss of their jobs, which in the medium and long term may have a negative impact on the growth of long-term unemployment due to their more difficult employability. The group of parents and the self-employed have also been hit harder by the redundancies. While the lockdown of the economy has a direct negative effect on countries' economies, job loss and GDP falls, social isolation also has a positive economic impact due to the reduction in the risk of death (Greenstone and Nigam, 2020; Thunstrom et al., 2020). Indeed, Greenstone and Nigam (2020) estimate that mild social isolation in the US over the 02/2020-10/2020 period saved 1.7 million American lives.

Research into the subjective evaluation of government measures, their (non) appropriateness has yielded interesting results. The results showed that 34 % of respondents considered government action to be appropriate, 23 % of respondents considered that government action should have been more stringent and 43 % of respondents believe that government measures should not have been so stringent. Respondents were most negative about the unsystematic nature of government measures and frequent changes in government decisions. They also pointed to the fact that due to frequent changes in government measures, they lost track of what was currently valid and what was not.

Conclusion

While opinions differ on the course of the pandemic and related government measures, many people welcome the measures in fear for their lives, while many people disagree with the measures. The fact is that only time will tell what effects the pandemic has had as a result. But we can already subscribe to the view that even if the current measures and isolation slow down the economy and negatively affect virtually all economic actors, in the long term it will show how the measures have helped to prevent the spread of the virus and save people's lives.

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Eva Nahalková Tesárová

Anna Križanová

University of Zilina, Faculty of Operation and Economics of Transport and Communications, Department of Economics,
Univerzitna 1, 010 26 Zilina, Slovakia
email: eva.tesarova@stud.uniza.sk
email: anna.krizanova@fpedas.uniza.sk

Covid-19 as an Affecting Enemy in the Field of Retail: a Case Study from the Slovak Republic

Abstract

The paper deals with the current development of retail in the conditions of the Slovak Republic. The COVID-19 pandemic has changed people's lives in many ways, including the way they buy food. While lower disposable income and overall economic uncertainty have led many to reduce their spending on fashion, services, electronics and restaurant visits, food spending increased as consumers began to be supplied with durable food and cleaning and protective equipment. With the gradual introduction of measures against the spread of the modern virus, it has been transformed into all areas of the economy. Retail was one of them. The curfew, the impossibility of traveling and the recommendation to buy food in the nearest grocery store from the consumer's residence have raised the question of whether customers have really started to prefer to buy where they live. The methods used in the paper were analysis, comparison, deduction, generalization and the last step was to determine the relationship between the variable of the place of residence (urban/rural) and the preference for retail operation. We found that the examined variables are independent and the dependence between them is weak 8.9%. The contribution of the article can be seen in the findings and the analytical background of the researched issues.

Key Words

Retail, Covid-19, e-commerce, development

JEL Classification: M30, M31, L81

Introduction

The problem of digital deprivation is already known, but the COVID-19 pandemic has highlighted its negative consequences. The global change in way of life, work, and socialization resulting from the epidemic has indicated that a basic level of digital integration is essential. During the lockout, people were forced to use ICT to adapt to a rapidly changing reality. Current experience with the coronavirus pandemic shows that the transition to these emergencies is not smooth. The inability to quickly convert to the online world (due to lack of skills or technical abilities) significantly reduces professional mobility, hindering access to public services (Kuc-Czarnecka, 2020). McKinsey's research found that even among those customers who were "very satisfied" with their online experience, some still consider shopping for food online as a temporary measure. Overall, however, McKinsey suggests that online sales will continue to grow faster than a year ago in Covid-19, mainly due to the percentage of new customers leaning towards e-commerce.

This may be especially true for older generations (who previously shopped at the store) who have realized the convenience that online shopping can bring. In the first days after the outbreak of the coronavirus, Slovaks began to look for durable food. The Slovaks mostly stocked up with products of daily consumption, especially drugstores, cleaning products and food for pets. Detergents increased sales by 1,800 percent, baby food products, whose sales increased by 1,100 percent year on year, or baby milk, which saw a 600 percent increase. However, the biggest winners of the crisis were undoubtedly sewing machines, whose sales grew by almost 5,000 percent year on year. Similarly, sales of respirators, disinfectant gels and protective equipment, and digital thermometers increased by thousands of percent. The pandemic situation associated with Covid-19 has caused interventions worldwide in all sectors of national economies. The retail area did not go unnoticed either. Retailers of essential goods such as food, groceries and healthcare are experiencing increased demand for services for consumers at home and are facing challenges in inventory, supply chain management, supply and maintaining a secure environment in their facilities. On the other hand, retailers of non-essential goods, such as clothing and footwear, are facing a significant drop in sales and need to adopt new ways to reach and engage customers who buy from home to stay. Some manufacturers and retailers are even turning and changing their product combination to meet the demands of the COVID-19 crisis (Roggeveen & Sethuraman, 2020). Many authors around the world are addressing the impact of measures against the spread of a modern pandemic and changes in
consumer behavior (McFadden et al., 2020; Laato et al., 2020) Consumer behavior in normal and crisis periods is discussed in an article by Mehta et al (2020). The study by Konishi et al. (2020) collected information from points of sale and monitored the shopping behavior of Japanese citizens during a pandemic. Appel & Hardaker (2021) addressed the issue of retailers' strategy during the pandemic. In his publication, Naeem (2020) focused on impulsive shopping behavior during the current situation. The impulses to buy panic were caused by fear of illness, empty shelves, rising prices and the social will to buy more. The COVID-19 pandemic has led to a sharp increase in online commerce (Dannenberg et al., 2020). Safara (2020) and Koch et al. also addressed e-shopping prediction. (2020). The impact of COVID-19 was addressed by many authors, in the case of the sharing economy, specifically Airbnb services, which were significantly marked by measures of national governments, revenues in this sector decreased significantly (Fialova & Vasenska, 2020). The consequences for the banking sector were addressed by the authors Korbez & Niedziolka (2020).

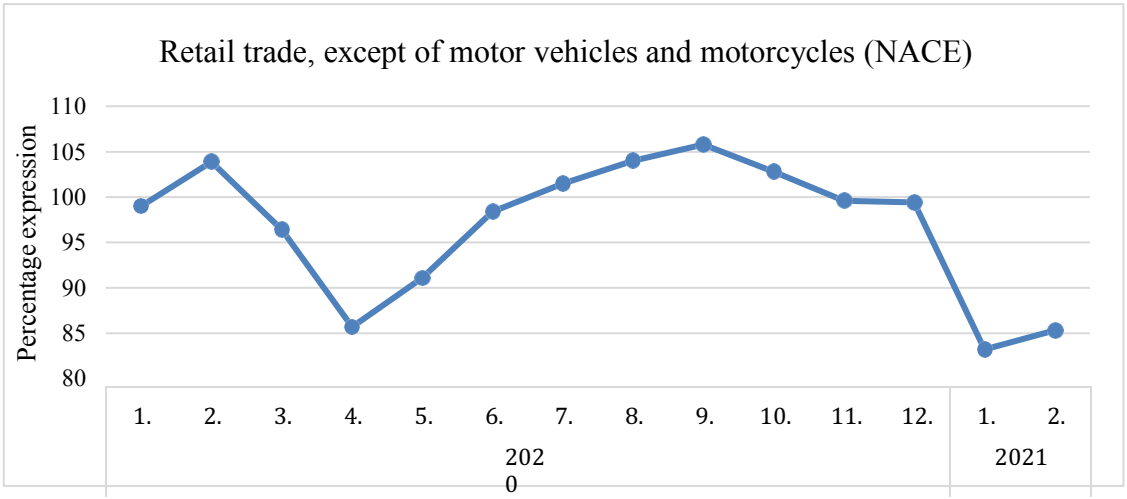
1. Methods of Research

In the first part, using analysis, partial comparison, deduction and generalization, we will describe retail in the current pandemic situation caused by the outbreak of COVID-19. In the article, we will then focus on the data obtained by conducting a questionnaire survey in January 2021, which was attended by 510 respondents. In the survey, we asked respondents which form of retail they currently prefer, what factors are most important to them when choosing food in a retail store, and in the last step we examine the relationship between residence (urban or rural) and preference for retail operation through Pearson's chi-square test of independence. and we also measure the intensity of the dependence using the Cramer's coefficient.

2. Results of the Research

The following Fig. 1 deals with the development of retail sales in the Slovak Republic. Data are obtained from the Statistical Office of the Slovak Republic. As we can see, sales began to decline from February 2020 and by April of the same year fell by 14.30%. During this period, the whole of Europe was paralyzed. Representatives of European countries issued restrictions and tried to eliminate people's mobility. The decline in revenues was also caused by measures taken by the Slovak government and a consortium of experts and scientists who created a set of rules and recommendations for stopping the spread of COVID-19. In the first place, large manufacturing companies began to close, followed by retail stores of textiles, electronics and other non-essential products. Grocery stores, pharmacies, drugstores and newsagents remained open. Another measure was the closure of state borders and the associated disruptions in the supply of food and other goods from abroad. Residents began impulsively buying basic foods, especially yeast, flour and dairy products. Preferred items purchased included cleaning products, disinfectants, toilet paper and other hygiene items. The so-called kurzarbeit, which represented a temporary reduction in normal working hours. Some companies were forced to lay off their employees, which costs they were unable to finance. Therefore, in April 2020, the unemployment rate increased by more than 1.5% (6.57%) compared to January of the same year. From the 5th month, the gradual easing of restrictions began, which also meant the opening of retail outlets and a positive trend of growth in retail sales, which lasted until the 9th month of 2020. This is the period in which the second imported wave of the COVID-19 pandemic arrived. The decline in sales in the following months (October, November, December) was not so enormous due to less stringent restrictions and the partial operation of retail operations. Much tougher measures came at the turn of 2020 and 2021, due to the unfavorable growth of diseases, which caused the re-closure of retail stores and a drop in sales of 16.80% in January. In February, we record a drop in sales of 14.70%.

Figure 1. Development of retail in Slovakia



Resource:
http://datacube.statistics.sk/

In a more detailed analysis of retail trade (Table 1) according to the NACE breakdown, we found that in non-specialized stores (supermarkets, hypermarkets) the largest increase

in sales was recorded in March 2020. A significant drop in sales did not occur until 2021 (January 12.4%; February 13.2%). The largest increase in sales was recorded in March 2020. Retail sales in specialized stores decreased throughout the period under review. We record much larger losses in retail trade realized in stalls and markets. The decrease in sales by up to more than 50% is mainly due to the imposition of restrictions against the spread of COVID-19. On the other hand, retail trade outside stores, stalls and markets (mail order sales, internet sales, vending machines, etc.) had a growing trend of sales growth since July, with the exception of January 2021, where sales fell by 7.5%. This drop may be due mainly to significant customer spending in the previous month of December 2020.

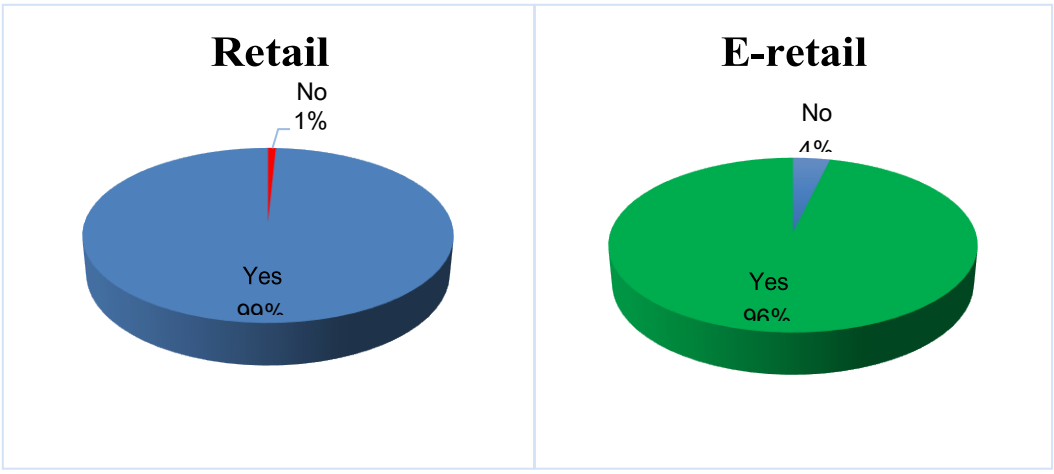
Table 1. Development of retail according to NACE

Retail (NACE)	2020												2021	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	1.	2.
47.1	-1,2	9,8	12,9	2,5	3,5	3,9	4,6	7,5	8,6	4,1	2,1	3,2	-12,4	-13,2
47.2	-1,4	0	-5,2	-7,7	-14,9	-6,2	-7,1	-3	-10,7	-13,6	-17,8	-5,4	-20,3	-16,4
47.8	-8,7	-10,3	-24,5	-23,8	-38,5	-26,9	-40,3	-15,2	-32	-26,1	-33,8	-33	-51,5	-30,3
47.9	-6,5	-9	-2	-4,5	-8,2	-3,1	3,9	9,5	18,9	16,2	9,4	6,7	-7,5	10,5

Resource:
http://datacube.statistics.sk/

There are many studies that identify and analyze differences in consumer behaviour according to the customer generations. (Gajanová et al., 2020). Members of a consumers' generation change their attitudes and behavior with age, but at the same time, people of the same age do not have the same attitudes and behavior across different generations. (Nadanyiova et al., 2020) Fig. 2 indicates the answers of respondents to the question whether they visit retail establishments and whether they also purchase products via the Internet. Only 1% of respondents do not shop in a traditional retail store, which represented 4 participants. The higher percentage of negative answers was in the case of online purchases, namely 4%, it was mainly people of the Baby Boomers generation.

Figure 2. Preferences between retail and e-commerce

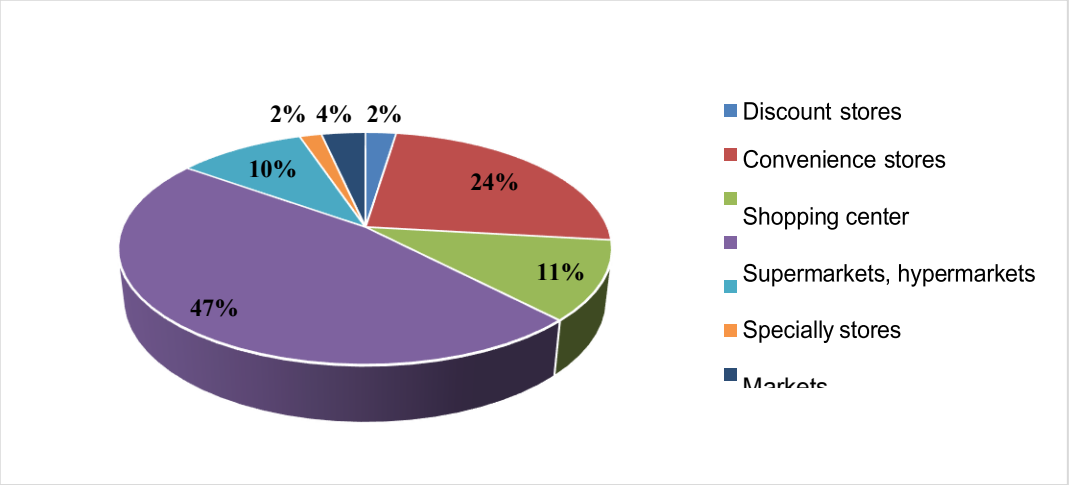


Resource: own survey

The most important factor determining the purchase of a food is its quality (27%), followed by freshness (23%), the composition of the product is the third most important factor in the purchase (14%). Country of origin is a less important factor with a 12% share. The appearance of the food and the packaging are equally 7%. Only 6% of respondents choose goods based on the brand and 1% of respondents choose food through advertising. Today, as the market environment becomes increasingly globalized, building and managing brand value is a significant challenge for managers. (Klieštiková & Janošková, 2020). The share of 3% is made up of other factors that affect the making of the purchase,we can include, for example, the price, recommendations of acquaintances and the like.

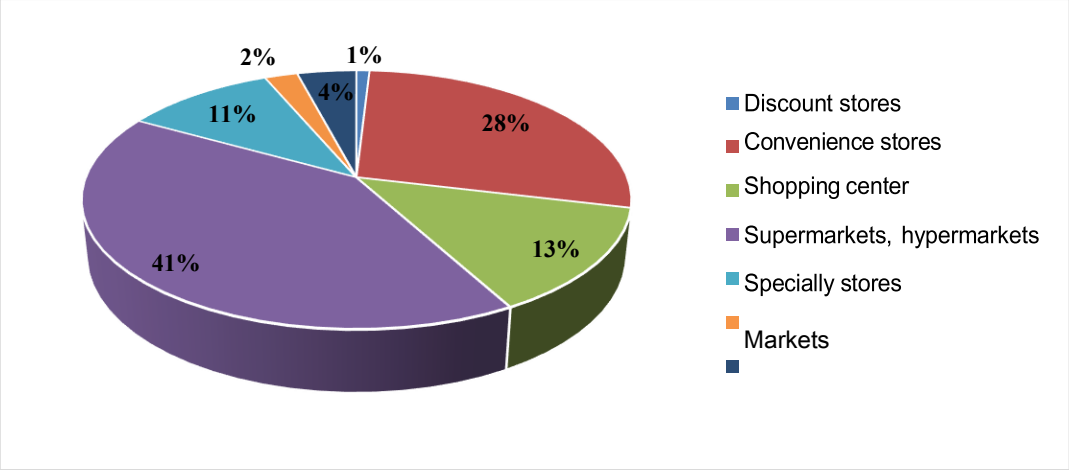
The following illustrations show the preferences of retail units depending on where customers live.

Figure 3. Consumer preferences in the city



Resource: own survey

Figure 4. Consumer preferences in the countryside



Resource: own survey

Therefore, we established a hypothesis when choosing the significance level of the test at the level of 0.05:

H0 = there is no dependence between the respondent's residence and the choiceof retail form

H1 = there is a dependence between the respondent's residence and the choice ofretail form.

To verify independence, we used Pearson's chi-square test of independence, where we found that the p-value is greater than the level of significance, so we do not reject the null hypothesis and the variables are considered independent. Even in the current pandemic situation, the participants' place of residence has no impact on the choice of retail form.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4,076[a]	6	,666
Likelihood Ratio	4,198	6	,650
Linear-by-Linear Association	,008	1	,931
N of Valid Cases	510		

a. 2 cells (14,3%) have expected count less than 5. The minimum expected count is 3,86.

Next, we measured the intensity of the dependence using the Cramer's coefficient, where we set a null hypothesis:

H0 = variables are not significant.H1

= variables are significant.

The P - value in this case was also greater than the level of significance, so we do not reject the null hypothesis. The variables are not significant. The dependence between residence and preference for a specific retail form is at the level of 8.9%. This is a weak relationship between the examined variables.

Symmetric Measures

		Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Nominal by Nominal	Phi	,089			,666
	Cramer's V	,089			,666
	Contingency Coefficient	,089			,666

3. Discussion

The coronavirus pandemic hit the Slovak economy in March 2020 and in the first wave closed business operations or limited the sale of goods in stores to three months. In most cases, the decline in retail sales was only short-lived and the temporary decline in sales was offset by stronger revenue growth in the coming months. The second wave of the pandemic had a much stronger impact on retail sales, which limited and later closed stores for 4-6 months. During 2020, retail achieved the largest sales increases compared to 2019 during the months of full operation (February, July-October). In recent months, year-on-year retail sales have declined. An even more significant decline in sales than during 2020 is recorded at the beginning of 2021. Retailers across Europe have experienced a significant shock to both supply and demand on an unprecedented scale, exacerbated by government measures restricting the movement of people and goods. Some governments have introduced unilateral export controls on specific goods to protect domestic supply, others have reduced tariffs to support trade. Stricter border controls, meanwhile, have slowed the ability of goods to cross countries smoothly. Although these measures were temporary, the impact on supply chain networks could have caused longer-term disruption. When the flow of goods was caught in countless places, many households across Europe had difficulty accessing basic consumer products right after the pandemic. In some parts of the market, the supply shock was associated with an increase in demand, especially within the food supply chain. This has forced retailers and brands to recognize the fragility of some modern supply chains. Larcom et al. (2021) in their study recorded results showing that between March and August 2020, COVID-19 restrictions represented an increase in sales to food retailers of GBP 4 billion and to retail outlets by GBP 4 billion; and a loss of GBP 20 billion from the sale of non-food stores and a loss of GBP 25 billion from turnover in food and beverage services. Liu & Rabinowitz (2021) focused on retail dairy prices and Camba (2020) on diesel prices.

Conclusion

Covid-19 also changed the shopping behavior of Slovaks. Purchases moved earlier to online space. Only time will tell whether the change in consumers' shopping behavior will be permanent or only temporary. However, one thing is certain: we will continue to see the effects of the crisis for many more months, and rapid adaptation to change is key to successfully managing the situation.

Acknowledgment

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Jana Ostárková

Vysoká škola báňská – Technical University of Ostrava, Faculty of Economics,
Department of International Relations
17. listopadu 2172/15, 708 00 Ostrava-Poruba
email: jana.ostarkov@vsb.cz

Evaluation of the Regional Resilience of the Czech Republic by Multidimensional Methods

Abstract

The study of the region's resilience in recent years has gained in importance, which has been reinforced by the current COVID-19 pandemic crisis and has affected the whole world globally. And even though there is such an interest in the concept of resilience, there is no uniform definition and understanding of the term, resilience is one of the basic criteria for evaluating and comparing the economies. The unexpected shock, in the form of COVID-19 pandemic crisis, has led to the implementation in the European Union of a new strategy for strengthening and building the resilience of the EU as a whole and its Member States, into the EU's policies. The Czech Republic, as a Member State of the EU, and its cohesion regions will face a new challenge of strengthening resilience towards green and digital transformation, which has become the main priority of renewing and strengthening the EU's resilience and is closely linked to EU Cohesion Policy as well as its instruments of support. Based on the identified resilience factors that were part of previous research, the paper aims to identify clusters (based on cluster analysis) and their factor scores for each of the five defined dimensions of the resilience of NUTS 2 cohesion regions of the Czech Republic for the period 2000-2019. Clusters and factor scores, as well as the previous identification of factors determining the resilience of the Czech NUTS 2 regions, are identified separately within the societal, economic, social, ecological, and innovative dimension of resilience.

Key Words

cluster, cluster analysis, factor, factor analysis, regional resilience

JEL Classification: C38, O18, O52, R10, R11

Introduction

In recent years, there has been a growing interest in the concept of resilience, not only at the academic level but also at the political level. Resilience as a term is usually used to describe how an entity or system responds to shocks and imbalances. The term resilience is used across all disciplines from environmental sciences, through psychology to technical sciences dealing with the study of materials. It is not surprising that the concept of resilience has come to the fore in the field of regional and economic sciences. At present, resilience is understood as an element or attribute that an entity or system should achieve and the desired state that should be supported by these entities (Martin & Sunley, 2015).

Due to the economic crisis of 2007-2009 that affected the whole world and the development of individual economies and regions, there was a greater interest in the concept of resilience, especially as part of political discussions. The main driver of the growing interest in the study of resilience, both at the level of states and at the level of lower regional units, was the economic crisis of 2007-2009. Indicators affect regional resilience. This issue has also been raised by the current pandemic crisis, which has affected all the world's economies and contributed to greater interest in supporting and building the resilience of regions (Martin, 2012; Rose, 2009; Cutter et al., 2008; Hill et al., 2008; Norris et al., 2008; Foster, 2006).

Today, the European Union (EU) is the biggest leader in building resilience, introducing a new concept of strengthening Europe's resilience towards a more resilient green and digital Europe and linking these objectives to Cohesion Policy instruments that are key to promoting regional cohesion (European Commission, 2020). Although interest in strengthening resilience is growing, there is no generally accepted definition or agreed on method of measurement, which leads to often misunderstandings and many variants of understanding this concept (Staníčková, 2017a; Staníčková, 2017b).

Based on the identified resilience factors that were part of previous research, the paper aims to identify clusters (based on cluster analysis) and their factor scores for each of the five defined dimensions of the resilience of NUTS 2 cohesion regions of the Czech Republic for the period 2000-2019. The paper is divided into three chapters. The first chapter briefly discusses the data and methods used in the research. The second chapter provides an insight into the results of factor analysis, which preceded cluster analysis. The third chapter focuses on the cluster analysis itself and more precisely on the identification of aggregated clusters within each of the five dimensions of resilience.

1. Data and Methodology of Research

The original data set composed of indicators selected on the basis of literature review and was composed of 75 candidate indicators obtained from the European Statistical Office (Eurostat). The number of 75 candidate indicators was reduced to 40 construct indicators after correlation analysis, and these indicators entered into factor and cluster analysis. These 40 indicators are divided into five dimensions, which were inspired to be created by a new concept of the EU's resilience assessment. These five dimensions of resilience include: *societal dimension, economic dimension, social dimension, ecological dimension, and innovative dimension.*

In each of these dimensions, a factor analysis was performed separately, followed by a cluster analysis. The data set was compiled for the territory of the Czech Republic, more precisely for their eight NUTS 2 (Nomenclature of Units for Territorial Statistics) cohesion regions valid as of 1.1.2021, for the reference period 2000 to 2019 (acording to data availibility), representing the EU programming periods in which the Czech Republic has already fallen. Two main applications were selected for working with the data set. Microsoft Excel for obtaining and editing data from the Eurostat database and creating own variables and their subsequent establishment. IBM SPSS Statistics analytical software 27 was used for key calculations of one-dimensional and multidimensional analysis, i.e., both for factor and cluster analysis.

Since resilience is multifactorial conditioned, it is best to use quantitative methods of multidimensional statistical methods to measure it. Factor and cluster analysis are among such best-known multivariate statistical methods suitable for measuring the resilience of regions. Factor analysis (FA) is a statistical procedure used to identify a small number of factors that can be used to represent the relationship between sets of interrelated variables. The FA is used as a method of structure detection, where all indicators are relevant (Meloun, 2011; Meloun & Militký, 2006). Cluster analysis (CA) classifies objects based on a set of selected characteristics that are very similar to others in the cluster, in the case of this paper based on indicators of resilience factors. The resulting cluster of objects should show high internal homogeneity inside the cluster and high external heterogeneity between clusters (Meloun, 2011; Meloun & Militký, 2006).

2. Results of Factor Analysis – Brief Overview

Based on the factor analysis, individual factors for partial dimensions of resilience were evaluated. Within the first dimension of the societal dimension, three factors were identified: factor 1 "Health facilities", factor 2 "Health" and factor 3 "Population", which reflect the societal dimension of the resilience of the cohesion regions of the Czech Republic. Within the second economic dimension, four factors were identified: factor 1 "Economy", factor 2 "Tourism", factor 3 "Value added growth and early school leaving" and factor 4 "Infrastructure", which speaks to the economic dimension of resilience. Under the third social dimension, two factors have been identified: factor 1 "Employment and the threat of social exclusion," and factor 2 "Youth employment", indicating the social dimension of resilience. Under the fourth ecological dimension, two factors have been identified: factor 1 "Emissions and energy" and factor 2 "Renewables", which reflect the environmental dimension of resilience. In the fifth innovative dimension, one factor was identified, factor 1 "Innovation", which speaks to the innovative dimension of resilience. Based on the FA results, the factors are subject of cluster analysis to find clusters that express an internally homogeneous, externally heterogeneous group of regions with similar or different resilience characteristics. Based on the CA results, cluster profiles are compiled based on values of factor scores, which are specific to the regions in these clusters.

3. Results of Cluster Analysis – Detailed Overview

Identification of the number of clusters in each of the five dimension was taking into account the criteria of agglomeration schedule and dedrogram. The number of clusters of evaluated regions for the 1st dimension is four clusters, for the 2nd dimension four clusters, for the 3rd dimension three clusters, for the 4th dimension four clusters and for 5 dimension two clusters.

Tables 1 to 5 show the average values of the factor scores for the individual resilience dimensions for the individual clusters of cohesion regions that have been allocated to CA. In the tables, the maximum and minimum values are always recorded for individual average factors of each dimensions. Across clusters, it is thus possible to assess which clusters, or which groups of cohesion regions, achieve the best and, conversely, the worst

results in the respective factor. CA is carried out in aggregate for the period 2000-2019, ie 20 years, with a distinction of eight cohesion regions in each year, for which the values of the relevant factor scores are available, according to which clustering occurs. Thus, eight regions enter the input clustering matrix in 20 years, ie a total of 160 regional values. For the subsequent creation of profiles of individual clusters, the values of factor scores of the respective regions in the respective years are used.

3.1 Aggregated clusters of the societal dimension of resilience

Cluster 1 contains 85 values of indicators, which are formed by indicators related to the cluster, which form the cohesion regions of Střední Morava, Severozápad, Jihozápad, Střední Čechy and Moravskoslezsko. In the case of the first factor 1 "Health facility", the cluster of regions is in negative values, similarly for the second factor 2 "Health". For factor 3 "Population", the cluster 1 reaches positive value.

Cluster 2 contains 15 values of indicators, which are formed by the cluster of the Praha cohesion region. These regions reach negative values in the case of factor 1, similarly to factor 2, where at the same time cluster 2 reaches the lowest value of the total factor score, which is a very negative phenomenon given the fact that this factor indicates the level of life expectancy and overall population change.

In cluster 3, there are 20 values of indicators, which are formed by indicators related to the cluster, which form the cohesion region of Střední Čechy. In the factor 1, they achieve the best values of the factor score, which is a very positive phenomenon, given that this factor indicates the level of security of the medical facility. Within the factor 2 and 3, the factors reach negative values, which negatively indicates the level of medical facilities and the level of average life expectancy.

Cluster 4 contains 40 values of indicators, which are formed by indicators related to the cluster, which form the cohesion regions of Severovýchod and Jihovýchod. They reach positive values within all factors, while they reach the lowest values within the factor 3.

Tab. 1: Classification of clusters according to the values of factor scores within the 1st dimension for the period 2000-2019

Cluster	FA 1	FA 2	FA 3
Cluster 1	-0,532	-0,415	**0,450**
Cluster 2	*-1,399*	0,592	*-2,106*
Cluster 3	**1,829**	*-0,970*	-1,157
Cluster 4	0,739	**1,145**	0,413
MIN	-1,399	-0,970	-2,106
MAX	1,829	1,145	0,450

Source: authors' calculations

3.2 Aggregated clusters of the economic dimension of resilience

Cluster 1 contains 60 values of indicators, which are made up of indicators related to the cluster, which consists of the cohesion regions of the Severozápad, Severní Morava, and

Moravskoslezsko. Under factor 1, "Economy" is of negative value, as is factor 2 "Tourism" and factor 4 "Infrastructure". For factor 3 "Value added growth and early school leaving", the values reach positive values, which can be considered a positive phenomenon.

Cluster 2 contains 32 values of indicators, which are formed by indicators related to the cluster, which consists of cohesion regions of Střední Čechy and Jihovýchod, which reach negative values for factors 1, 2 and 3, while factor 4 reaches positive values, which is very positive. phenomenon, given the fact that a factor of 4 indicates the level of infrastructure.

Cluster 3 contains 48 values of indicators, which are made up of indicators related to the cluster, which form the cohesion regions of Jihozápad, Severovýchod and Jihovýchod. Factors 1, 3, and 4 reach negative values, while factor 2 reaches positive values, which can be considered a positive phenomenon in the field of tourism.

Cluster 4 contains 20 values of indicators, which are formed by indicators related to the cluster, which form the cohesion region of Praha. In factor 1, they reach the highest values of the factor score and at the same time within factor 4 the lowest measured values. In factor 1, a positive value is a very positive phenomenon, given that this factor indicates the overall level of the country's economy. On the contrary, it is the case with a factor 4, the lowest value of factor score negatively indicates the level of infrastructure.

Tab. 2: Classification of clusters according to the values of factor scores within the 2nd dimension for the period 2000-2019

Cluster	FA 1	FA 2	FA 3	FA 4
Cluster 1	-0,458	*-0,685*	**0,614**	-0,438
Cluster 2	*-0,138*	-0,483	*-0,661*	**1,419**
Cluster 3	-0,251	**1,348**	-0,099	-0,008
Cluster 4	**2,196**	-0,406	-0,549	*-0,939*
MIN	-0,458	-0,685	-0,661	-0,939
MAX	2,196	1,348	0,614	1,419

Source: authors' calculations

3.3 Aggregated clusters of the social dimension of resilience

Cluster 1 contains 90 values of indicators, which are made up of indicators related to the cluster, which consists of all cohesion regions in the Czech Republic. Within factor 1 "Employment and the risk of social exclusion", they achieve the lowest overall values of the measured factor scores, which is a very negative phenomenon, given the fact that this factor indicates the level of employment and the risk of social exclusion. Under factor 2 "Youth employment", the factor scores reach negative values, but not at the same level as in the previous factor.

Cluster 2 contains 12 values of indicators, which are formed by indicators related to the cluster, which form the cohesion regions of Střední Čechy, Jihozápad, Severovýchod and Jihovýchod. For both factor 1 and factor 2, the factor score values reach positive values, while for factor 2 they reach the maximum values of all measured factor scores, which can be considered a very positive phenomenon given the fact that factor 2 indicates the level of employment of young people.

Cluster 3 contains 58 values of indicators, which are made up of indicators related to the cluster, which consists of the cohesion regions Severozápad, Severovýchod, Jihovýchod, Střední Morava and Moravskoslezsko. In the factor 1, the factor scores reach positive values, the highest measured values within the factor 1, which can be considered a very positive phenomenon given that the factor 1 indicates the level of employment and the threat of social exclusion. In the factor 2, the values of the factor scores reach negative values and at the same time the lowest values, which is a negative phenomenon regarding the level of employment of young people.

Tab. 3: Classification of clusters according to the values of factor scores within the 3rd dimension for the period 2000-2019

Cluster	FA 1	FA 2
Cluster 1	*-0,680*	-0,035
Cluster 2	0,142	**2,475**
Cluster 3	**1,026**	*-0,457*
MIN	-0,680	-0,457
MAX	1,026	2,475

Source: authors' calculations

3.4 Aggregated clusters of ecological dimension of resilience

Cluster 1 contains 78 values of indicators, which are made up of indicators related to the cluster, which consists of the cohesion regions Jihozápad, Severozápad, Severovýchod, Jihovýchod, Střední Morava and Moravskoslezsko. Within the factor 1 "Emissions and energy", the factor scores reach the lowest values, which is a very negative phenomenon regarding the poor level of pollution, which is indicated by this factor. For factor 2 "Renewable resources", the values of the factor scores reach positive values, but not at any significant level.

Cluster 2 contains 42 values of indicators, which are formed by indicators related to the cluster, which consists of the cohesion regions Jihozápad, Severozápad, Severovýchod, Jihovýchod, Střední Morava and Moravskoslezsko. Within factor 1, the values of factor scores achieve positive results, while for factor 2 they achieve the lowest results within the total measured values within the factor, which can be considered a negative phenomenon in the level of renewable sources.

Cluster 3 contains 14 values of indicators, which are made up of indicators related to the cluster, which form the cohesion regions of Praha and Střední Čechy. These regions achieve the highest measured values within the factor 1, which positively indicates the level of pollution and energy efficiency. Conversely, for a factor of 2, which indicates the level of renewable sources, the values of the factor scores reach negative values.

Cluster 4 contains 26 values of indicators, which are made up of indicators related to the cluster, which form the cohesion regions of Praha and Střední Čechy. In the factor 1 and 2, the regions achieve positive values, while with the factor 2 the highest measured values within the factor, which is a positive phenomenon regarding the level of renewable sources.

Tab. 4: Classification of clusters according to the values of factor scores within the 4th dimension for the period 2000-2019

Cluster	FA 1	FA 2
Cluster 1	*-0,787*	0,094
Cluster 2	0,144	*-1,140*
Cluster 3	**2,330**	-0,242
Cluster 4	0,873	**1,689**
MIN	-0,787	-1,140
MAX	2,330	1,689

Source: authors' calculations

3.5 Aggregated clusters of innovative dimension of resilience

Cluster 1 contains 137 values of indicators, which are made up of indicators related to the cluster, which consists of the cohesion regions of Střední Čechy, Jihozápad, Severovýchod, Jihovýchod, Střední Morava and Moravskoslezsko. Within factor 1 "Innovation", which is at the same time the only factor of the innovative dimension of resilience, the regions reach negative values, which negatively indicates the level of innovation.

Cluster 2 contains 23 values of indicators, which are made up of indicators related to the cluster, which consists of the cohesion regions of Praha and Jihovýchod, which, unlike cluster 1, achieve positive values within factor 1, which positively indicates the level of innovation in the regions.

Tab. 5: Classification of clusters according to the values of factor scores within the 5th dimension for the period 2000-2019

Cluster	FA 1
Cluster 1	*-0,335*
Cluster 2	**1,997**
MIN	-0,335
MAX	1,997

Source: authors' calculations

Conclusion

Based on the results of the factor analysis, factors within each of the five dimensions of resilience (societal, economic, social, ecological, and innovative dimension) were identified. The factors thus obtained were evaluated in a subsequent cluster analysis, which divided the evaluated regions into heterogeneous and homogeneous groups, which were characterized by similar characteristics and problems. For the groups thus classified, the factor scores of each cluster within a given resilience dimension were evaluated. The analysis shows that the Praha cohesion region and the Střední Čechy cohesion region achieve positive results in the evaluation of factor scores of individual clusters within dimensions. Especially in the innovative and ecological dimension of resilience, while the factor scores of the remaining cohesion regions reach negative values in these dimensions. Other cohesion regions achieve values that are negative about their state of the environment and their level of innovation. This is confirmed by the long-known state that Praha and Střední Čechy are the so-called growth poles of the Czech

Republic. The question is therefore whether they will cope better with the subsequent changes caused by the consequences of the pandemic and the reorientation of European Union policy than others, or whether they will face short-term growth and consequent decline, as they will not be eligible for EU's cohesion instruments, so that are focusing on support in ecological and digital area. The orientation of further research using this results of factor analysis, cluster analysis and the cluster profiles according to factor scores will be an analysis according to the EU programming periods, i.e., 2000-2006, in this case respectively 2004-2006 with regard to the accession of the Czech Republic to the EU in 2004, then 2007-2013, 2014-2020, relevant 2019 regarding data availability

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Natalie Pelloneová

Technical University of Liberec, Faculty of Economics, Department of Business Administration and Management
Studentská 2, 461 17 Liberec, Czech Republic
email: natalie.pelloneova@tul.cz

Impact of the First Wave of the COVID-19 Pandemic on Family Farms in the Czech Republic

Abstract

The COVID-19 pandemic has had unprecedented effects on all dimensions of human life. Industries of all kinds have been forced to rapidly change how they work, and agriculture is no different. The first wave of the COVID-19 pandemic, which started in the Czech Republic in March 2020, posed huge risks for agricultural production. Food demand and supply shocks caused by the COVID-19 outbreak affected agriculture negatively through COVID-19 policies. At the same time, significant reductions in income, restrictions on the movement of people and the closure of restaurants and food services induced rapid changes in food consumption patterns. Family farms are considered a very important form of Czech agriculture and it was these farmers who were particularly exposed to the effects of the COVID-19 pandemic. The first part of the paper presents the specifics of agricultural business. Then an analysis of Czech agriculture in terms of its structure is performed. The next part of the paper summarizes all the negative impacts of the COVID-19 pandemic on Czech agricultural enterprises. Based on an online survey of 26 family farms, this paper examines the impact of the first wave of the COVID-19 pandemic on family farms' production and operation in the Czech Republic. The article also discusses the possibilities of supporting and strengthening the family farming sector.

Key Words

family business, family farm, agriculture, specifics of agricultural business, COVID-19

JEL Classification: O13, L2, Q10

Introduction

Many family farms and small entrepreneurs in Central Europe are struggling with substantial challenges resulting from changes in their economic, ecological and social environment. The COVID-19 pandemic has serious consequences (e.g. lockdowns, travel restrictions and border closures) for the agricultural industry, especially small farmers (FAO, 2021).

There are over 23 000 family farms registered in the Czech Republic, and they account for a significant proportion of agricultural activity. Unfortunately, due to the outbreak of the COVID-19 pandemic, many family farms have suffered significant losses due to their inability to sell their products. The closure of markets means that market supplies have been interrupted to a significant extent. Meat-processing plants began to shut down due to outbreaks; the supply chain shuddered as restaurants and school cafeterias closed. The COVID-19 pandemic resulted in restrictions on the movement of workers, changes in demand of consumers, closure of food production facilities, restricted the food trade

policies, and financial pressures in food supply chain. This is especially worrying for small producers and family farms, whose livelihoods are now at risk. The aim of this research is to find out what effects the first wave of the COVID-19 pandemic had on Czech family farms (Fialová, 2019).

1.FLiterature review

This part of the presented paper will be devoted to the specifics of agricultural business and the definition of family farms in the Czech Republic.

1.1 Specifics of agricultural business

Agricultural business in the Czech Republic is governed by Act No. 252/1997 Coll., On Agriculture, as amended. Pursuant to Act No. 252/1997 Coll., On Agriculture, an agricultural entrepreneur is a natural person or legal person that intends to operate agricultural production as a continuous and independent activity in its own name, on its own responsibility, for the purpose of making a profit, under the conditions set out in this Act (Scholzová, 2019). It is sufficient for natural person or legal person to be registered in the Register Agribusiness of Entrepreneurs, whose administrator is the Ministry of Agriculture.

Since 2007, proof of professional competence is no longer required in the Czech Republic for the operation of agricultural business activities. The only conditions that must be met in order to obtain a certificate of registration in the above-mentioned register are reaching the age of 18, legal capacity, permanent residence in the EU and basic knowledge of the Czech language. These conditions must be met by an entrepreneur - a nature person and a responsible representative of a legal person (ČESKO, 1997).

Before registering for an agricultural business, it is necessary to choose the appropriate legal form of business. Each of the legal forms has advantages and disadvantages. Less administrative and financial demands are placed on nature persons when starting agricultural activities. On the other hand, nature persons are liable for business liabilities with all their assets. Legal persons generally have easier access to external financial resources, but the establishment of such a company is associated with greater administrative complexity.

One of the main specifics of agricultural business is clearly the strong influence of the weather. Another no less important factor is the difference in conditions, whether soil or climatic. Also, compared to industrial production companies, agricultural entrepreneurs have to deal with the strong dependence on sales prices of agricultural production and the impossibility of influencing the market price (Štefanová, 2014).

In agricultural production, there are also differences in labor needs and other working time arrangements. For example, crop production is characterized by fluctuations in labor requirements that arise during the year. In the case of livestock production, it is necessary to specifically schedule working hours during the day and week. The seasonality of

agricultural business also has a significant impact on the activities of these businesses. The seasonality of agricultural business is very often reflected, for example, in the difficult and expensive storage of products (Dvořáková, 2017).

1.2 Family farms in the Czech Republic

Family farms are the most common way of cultivating land and farming. The Association of Private Agriculture itself created the Czech definition of family farming. This way of doing business is based on the principle of the responsibility of the farmer and their family. Farmers also say that support for family farms will help to curb or stop rural displacement. Czech agriculture consists mainly of large companies. All neighboring states have a much higher percentage of family farms.

Small farmers are mainly trying to obtain more tax breaks, simplify business and anchor the definition of a family farm in law. The aim of all these efforts is to understand the family farm as the basis of Czech agriculture.

Family businesses can also be described as resilient and financially stable, especially in times of crisis. This is mainly due to business decisions that have a direct impact on their family. For a family business, it can be assumed that business owners make more sustainable and long-term business decisions than corporate businesses, where changes can occur quite often. On the other hand, emotionally influenced decisions can be a disadvantage of family businesses (Šebek and Pospíšil, 2003).

At the beginning of the 1990s, almost no agricultural land in the Czech Republic was privately owned. As can be seen from Table 1, in 2016 private farmers farmed about 30 % of the total 3.4 million ha of agricultural land. The remaining part (i.e. 70 %) of arable land in the Czech Republic was managed by large enterprises that have the status of legal persons. These large companies have only a small relationship to the location in which they operate and have a weak impact on the quality of local life. In 2016, out of 26,000 active farmers in the Czech Republic, there were approximately 23,000 nature persons, compared to 3,000 legal persons. Despite the clearly set European trends, the dual structure of Czech agriculture has an adverse effect on the support of family farms, especially from the state. The current political climate does not favor efforts to define the term "family farm", the government does not appreciate the idea and benefits of this form of farming (Gorgoňová, 2018).

Tab. 1: Agricultural entities – share of cultivated land

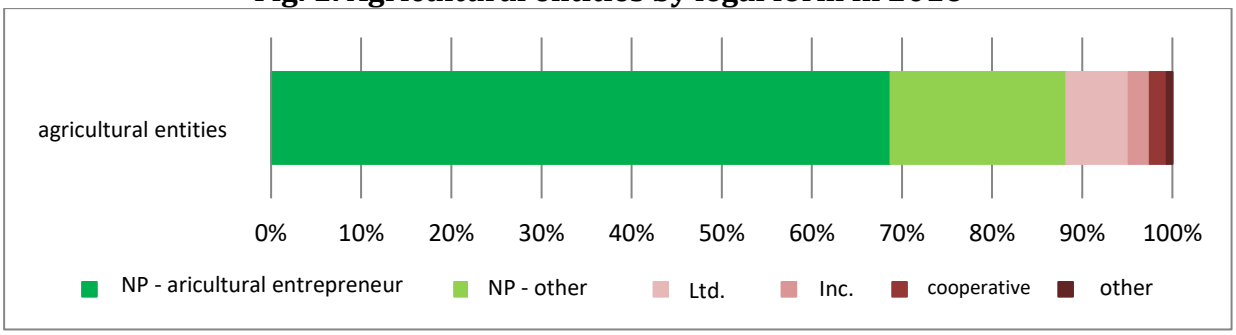
Entities	Index	2013	2016	Change (%)
Total agricultural entities	quantity cultivated land (ha)	26 246 3 491 818	26 525 3 456 645	+1,06 % -1,01 %
Nature persons	quantity cultivated land (ha)	23 345 1 063 960	23 402 1 040 124	+0,24 % -2,24 %
Legal persons	quantity cultivated land (ha)	2 901 2 427 858	3 123 2 416 521	+7,65 % -0,47 %

Source: authors' own calculations, data from (CZSO, 2017)

Table 1 also shows the changes in the number of individual business entities between 2013 and 2016. The latest data for 2019 at the time of the research have not yet been published by the Czech Statistical Office. The last column of Table 1 shows that the total number of agricultural entities has increased. Between 2013 and 2016, the number of nature persons and legal persons increased. The increase was much higher for legal persons (approximately 7%). On the contrary, there was a decrease in the cultivated land of both entities between 2013 and 2016.

In 2016, out of the total number of 26,525 agricultural entities, a total of 23,402 (approximately 88%) were in the legal form of nature persons. More than 2/3 of entrepreneurs from nature persons were in the form of agricultural entrepreneurs. In 2016, a total of 3,123 agricultural entities (i.e. 12%) were established with the legal form of a legal person. Of the total number of 3,123 legal persons, approximately 60% were entities with the legal form of Ltd., approximately 19% in the form of Inc. and about 16% in the form of a cooperative. See Figure 1.

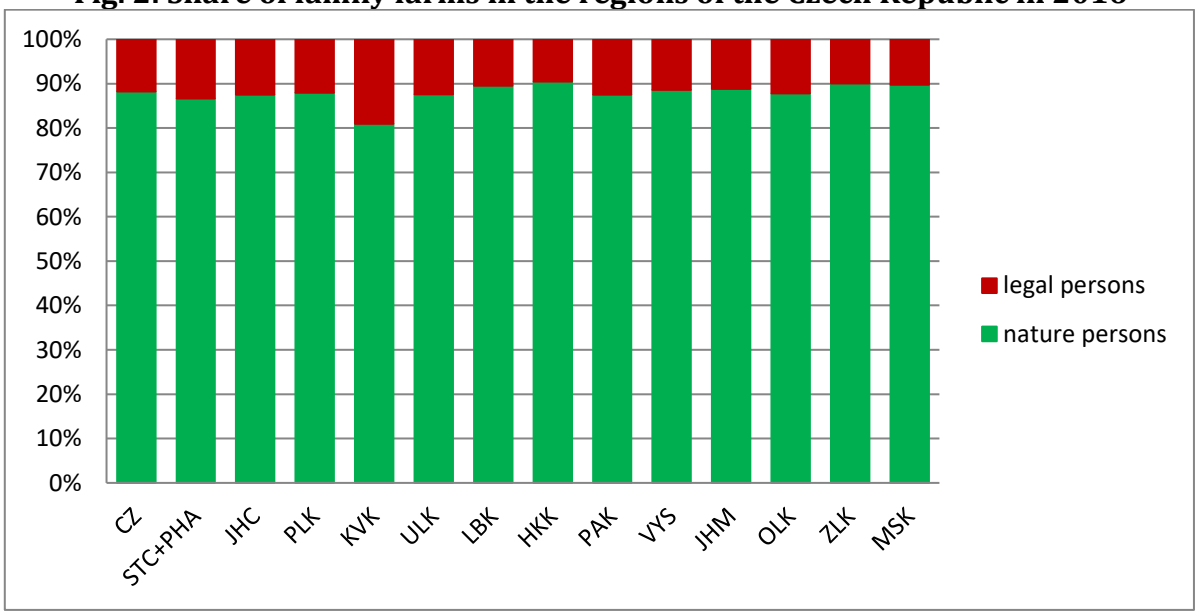
Fig. 1: Agricultural entities by legal form in 2016



Source: authors' own calculations, data from (CZSO, 2017)

Figure 2 shows that in 2016, the Czech Republic had the largest share of legal persons in the Karlovy Vary Region. On the other hand, the largest share of nature persons was in the Zlín and Hradec Králové regions.

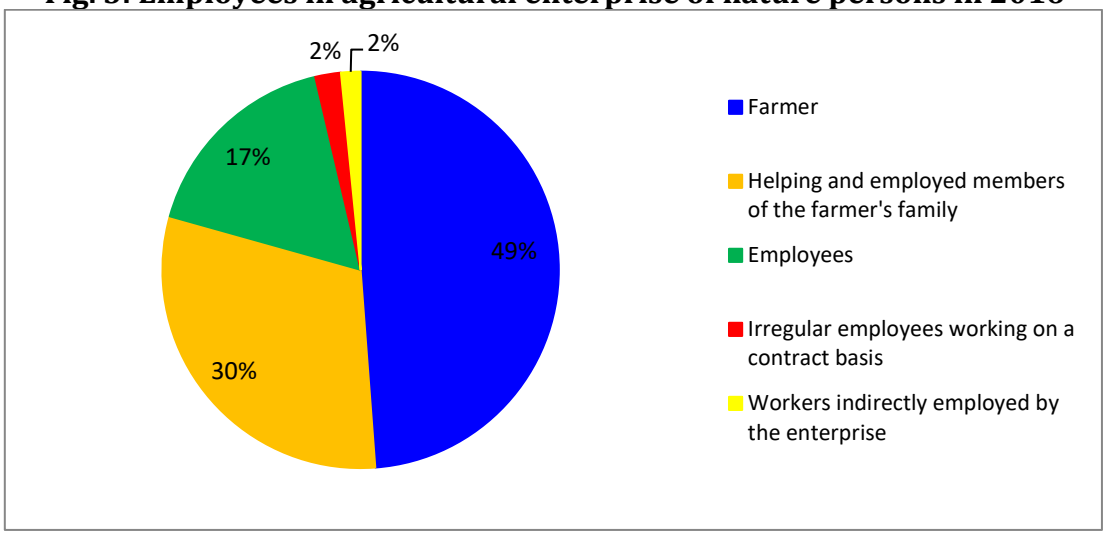
Fig. 2: Share of family farms in the regions of the Czech Republic in 2016



Source: authors' own calculations, data from (CZSO, 2017)

Figure 3 shows that the Czech Republic has a high proportion (about 79%) of family workers at the expense of employees and outsourced workers.

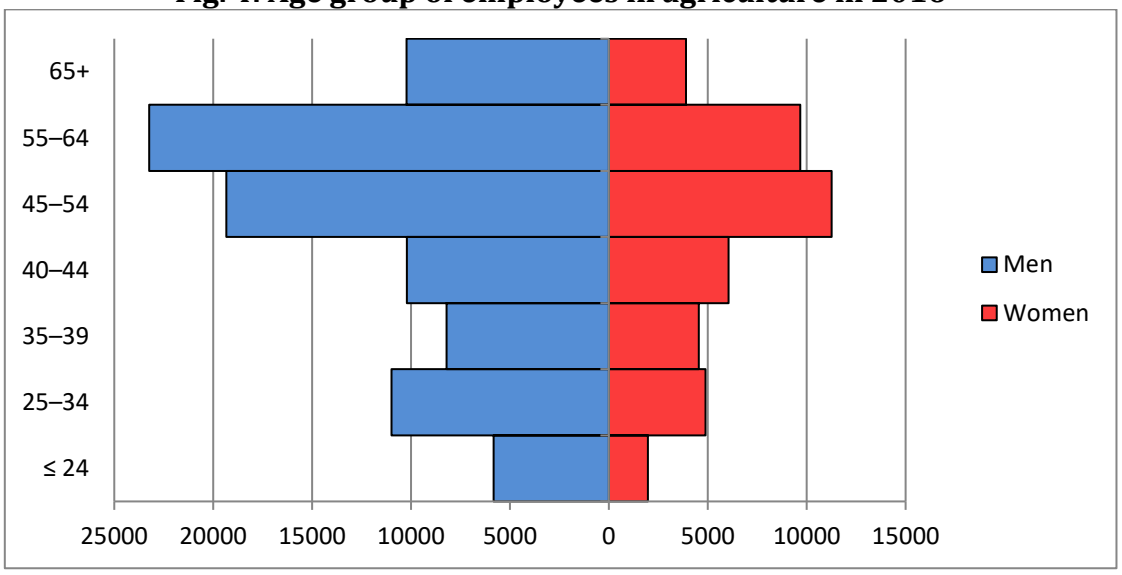
Fig. 3: Employees in agricultural enterprise of nature persons in 2016



Source: authors' own calculations, data from (CZSO, 2017)

The Zlín Region and the Vysočina Region show a high share (over 85%) of family workers at the expense of employees and externally hired workers. On the other hand, the Ústí nad Labem Region shows the highest share (30.3%) of non-family employees on family farms.

Fig. 4: Age group of employees in agriculture in 2016



Source: authors' own calculations, data from (CZSO, 2017)

The development of the age structure in agriculture can be documented by statistical data (CZSO,2019). Figure 4 shows that in 2016, younger age groups were less represented in agriculture. The highest share is achieved by older workers. Figure 4 shows that the age structure in agriculture is significantly tilted towards older age categories. Workers aged 45 to 64 have the largest proportion. Statistical sources show that there is no visible improvement in the age structure of employment in agriculture. One of the reasons for this phenomenon is the increasing retirement age and also the lack of interest amongst young people in working in agriculture. The physical demands of the work and low wages

discourage young people from careers in agriculture. Young people are not even attracted to life in the countryside. Life expectancy is increasing in the Czech Republic. The ageing of Europe's farmers is one of the greatest challenges that rural areas are facing. Unlike in the Czech Republic, there are many more family farms abroad, which take care of the land and landscape more responsibly than large companies. These farmers are related to the place because they work and live there and want to pass on their farms to future generations (Šebek and Pospíšil, 2003). Figure 4 further shows that in 2016, Czech farmers were predominantly men. In 2016 only 32% of people employed in the sector were women.

2. Impacts of the first wave of the COVID-19 pandemic on agricultural business

In the Czech Republic, the COVID-19 pandemic had a similar impact as in other countries in Europe. One of the significant effects of the COVID-19 pandemic was the closure of the borders between states. During the first wave of the COVID-19 pandemic, there were significant delays to the imports of raw materials and also complicated movements of animals and goods across borders. In the case of the Czech Republic, the closure of the borders had a significant impact, especially on the dairy industry and its supplies to Italy. There was also a significant problem with the export of beef and with the export of live animals, especially cattle for fattening and slaughter cattle to Turkey. To partially mitigate the negative impacts, so-called green stripes were introduced. Thanks to these, the trucks could pass more smoothly through the border controls.

Another significant problem that farmers had to deal with in the first wave of the pandemic was the acute shortage of workers. This shortcoming was caused mainly by the closure of borders and restrictions on free movement, which prevented seasonal workers from arriving on time. Thus, farmers lacked seasonal workers mainly during the planting period (March and April) and partly also during the harvest period. According to Kříž (2020), in the first wave of the pandemic, 4000 to 8000 seasonal workers were missing. The lack of seasonal workers mainly affected sectors demanding manual work (fruit, vegetables, hops). To mitigate this impact, farmers were forced to use students from agricultural schools and workers from other sectors. Farmers were very careful about employing people from other sectors.

In connection with quarantine measures, the problem of the lack of regular staff was also noted. Some entrepreneurs faced the problem of significant labor shortages caused by employees having undergo mandatory isolation or quarantine. This fact was a significant problem especially in the area of animal production, where it is essential to ensure adequate care for farmed animals. In the future, agricultural entrepreneurs should focus on creating a contingency plan in case those employees who are important to ensure the continued operation of the department, are quarantined.

In connection with the regime and quarantine measures, farmers also had to adjust the structure of any internally held staff meetings and the growing pressure on the hygiene of operations. In the first wave of the COVID-19 pandemic, farms, like other sectors, had a problem with the distribution of protective equipment (facemasks and disinfectants). The

government distributed this protective equipment to other more important areas, and farmers had to arrange for their own supply.

The COVID-19 pandemic has also changed the structure of food demand. Farmers who sold their products to restaurants and canteens ran into problems in the form of a drop in sales. Farmers also lost customers due to closed restaurants and hotels. Crop and animal production is dependent on the operation of restaurants and catering facilities, and therefore farmers have been forced to curb production, and this has affected the costs of this production. The crisis caused by the COVID-19 pandemic has temporarily contributed to rising food prices. Prices increased especially for vegetables, fruits and pork (Dostál, 2020).

Family farms also experienced a major problem with the COVID-19 pandemic. For family farms, there was a significant decline in opportunities for the sale of their production on farmers' markets, which had to be closed. Millions of losses were also reported by smaller winemakers, who were not able to present their wines due to the constant disruption of events.

Another factor that has been reported in connection with the COVID-19 pandemic is a change in consumer behavior. Some consumers now attach more importance to the nutritional value of food and obtaining it locally. Due to the COVID-19 pandemic, some consumers have also changed their eating habit. It was mainly a matter of abandoning the use of the services of gastronomic facilities in favor of home cooking. There has also been a problem with the use of beef in the Czech Republic. Some consumers preferred different types of meat and other food during the first wave of the COVID-19 pandemic (Kříž, 2020).

3. Methods of Research

The survey was focused on the impact of the first wave of the COVID-19 pandemic on family farms in the Czech Republic. The obtained data were anonymized and the results are presented only in summary form for the whole of the Czech Republic. The survey was conducted from 10 March to 15 May 2021 and was completed by 26 family farms from all over the Czech Republic.

In the first step of the research, a list of family farms in the Czech Republic was created. The list of farms was collated with the help of the MagnusWeb database, the Ares portal, the Google search engine and social networks. With the help of these portals, a list of agricultural enterprises was created, containing the name "family farm", "farm" or "agricultural farm". Contact informations for the farms were subsequently obtained from websites or social networks. Some contact information was also available in the MagnusWeb database. The survey addressed a total of 114 family farms in the Czech Republic.

Family farms were contacted via e-mail with a request to fill in an online form created on the Google platform. Some farms were also contacted via social networks (e.g. Instagram and Facebook). The snowball method was also used, where family farms were asked to subsequently distribute the survey to other farmers. The return rate of the surveys was

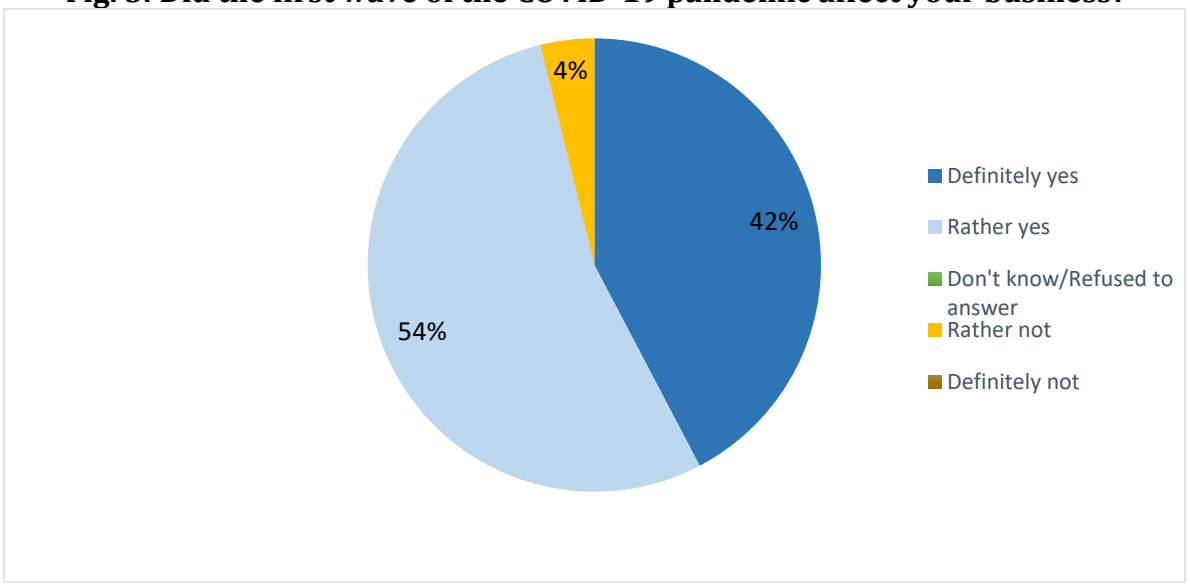
about 22%. It should be noted that such a rate of return, according to some experts, may make it impossible to generalize the findings of the survey.

In the following part, the elementary evaluation is presented in the order of the individual questions on the survey.

4. Results of the Research

Question 1 was whether the first wave of the COVID-19 pandemic had an impact on their business. The results are shown in Figure 5. The results of the survey showed that up to 96% of respondents noted the negative effects of the first wave of the pandemic on their business.

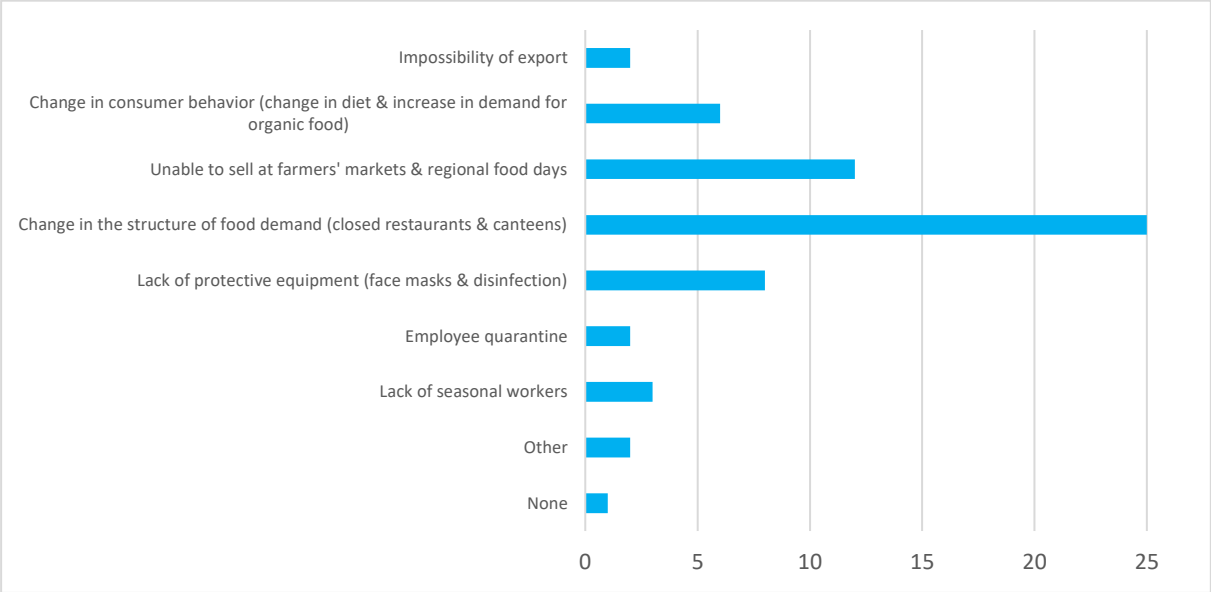
Fig. 5: Did the first wave of the COVID-19 pandemic affect your business?



Source: authors' own processing

Question 2 asked what specific effects the COVID-19 pandemic had on your business. The results are shown in Figure 6. The survey showed that businesses were most affected by closed restaurants and canteens and by the inability to sell at farmers' markets and regional food days. On the other hand, they were least affected by the impossibility of exporting and the lack of seasonal workers.

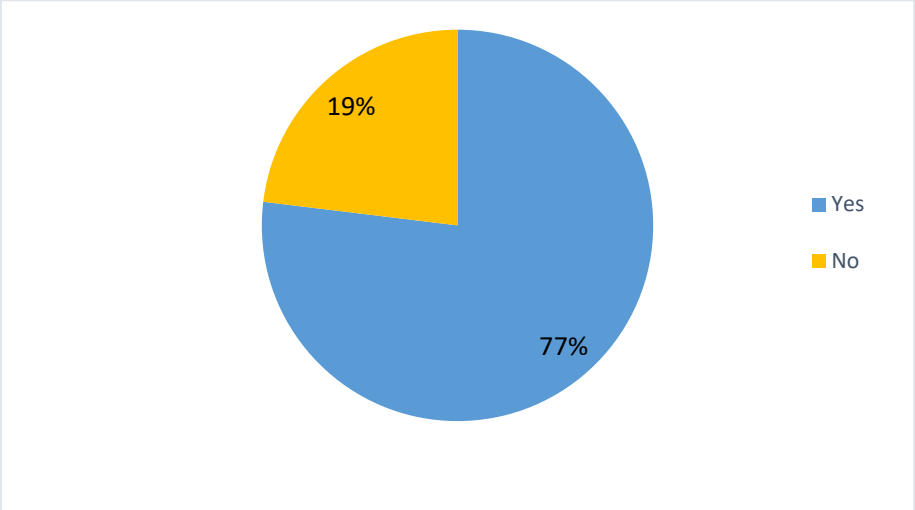
Fig. 6: What effects did the COVID-19 pandemic have on your business?



Source: authors' own processing

Question 3 focused on whether companies applied for a subsidy program to support pandemic-affected businesses. The results are shown in Figure 7. The survey showed that 20 of the interviewed businesses applied for a subsidy program.

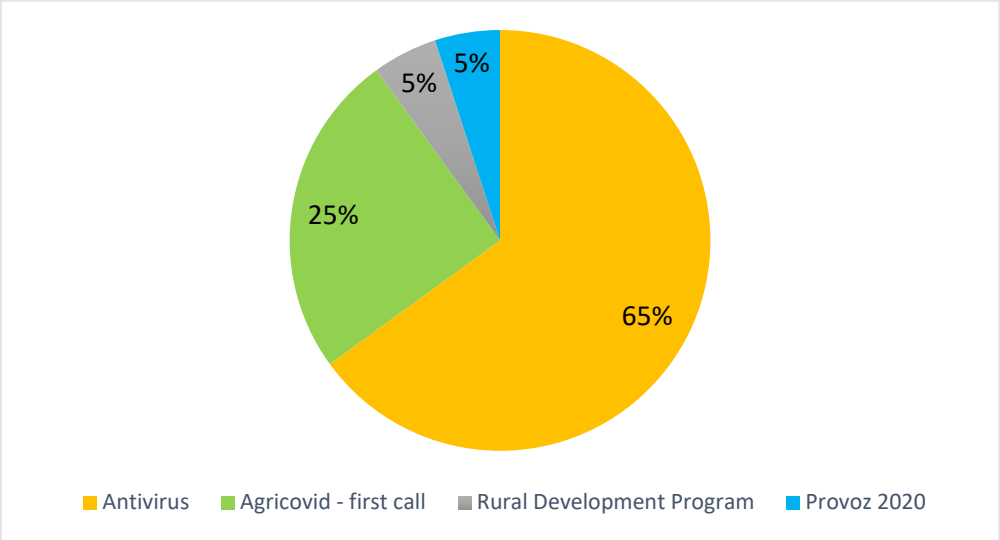
Fig. 7: Did you use any subsidy program?



Source: authors' own processing

The aim of question 4 was to find out which of the state offers they used. The results are shown in Figure 8. The survey showed that 13 interviewed businesses applied for the Antivirus program and 5 interviewed businesses applied for the Agricovid program - the first call. One business applied for the Rural Development Program and one business applied for the Provoz 2020.

Fig. 8: What support did you use?



Source: authors' own processing

Conclusion and Discussion

According to the research of the available data and information, the COVID-19 pandemic mainly affected the meat, dairy, bakeries, breweries, viticulture, fruit growing and potato growing industries. One of the ways to support food producers and also agricultural entrepreneurs was the first call of the Agricovid subsidy program. In January 2021, food producers or farmers who produce food intended for food service operators could apply for compensation under the Agricovid - food industry program. Restrictions on the operation of restaurants and school canteens due to the pandemic had a significant impact on all food industries and on agricultural entrepreneurs. According to estimates by the Ministry of Agriculture, the pandemic affected up to 10,000 entities in agriculture and food. Entitlement to the subsidy arose if total revenues decreased by at least 25% year-on-year between the beginning of March and the end of November 2020. The maximum rate that the entity could obtain was up to CZK 200,000 per company and up to CZK 20,000 per employee. The support could reach up to 75% of the total decrease in income compared to 2019, when the maximum subsidy could be up to €800,000 for food producers and €100,000 for agricultural entrepreneurs (Bílý, 2021). Out of the total number of respondents, 5 subjects applied for this subsidy. In connection with this program, the 2nd call was announced in the period from 15 March to 30 April 2021, and had a wider range of uses compared to the first call. Whether this bond will be used could be the subject of further research. Some entrepreneurs were discouraged by the conditions for submitting an application or the conditions for drawing subsidies. E.g. for the Agricovid - food support program, other government aid was deducted from the contribution.

The subsidy program Provoz 2020 - Reduction of the Loan Principal, which was announced in the summer of 2020 and terminated in September of the same year, was also aimed at supporting small and medium-sized enterprises in the area of primary agricultural production. In this program, the eligible applicant could receive up to CZK 150,000 to repay the principal of their operating loan, which they negotiated or planned to negotiate with their bank. The Ministry of Agriculture has allocated a total of CZK

500,000,000 to this program (Dostál, 2020). Out of the total number of respondents, one entity applied for this subsidy. In April 2020, the Government also decided to increase the Rural Development Programme 2014–2020 by another CZK 3.3 billion. Out of the total number of respondents, one entity applied for this subsidy.

Other forms of ad hoc aid on the part of the Czech Republic, which would help agricultural entrepreneurs in connection with their cash flow, include, for example, the acceleration of the payment of aid in connection with green diesel and a faster VAT refund. Another example of aid for agricultural business that the Ministry of Agriculture should take into account is the non-taxation of agricultural subsidies. Another proposal is the creation of an uninsurable risk fund for which there would be an obligation to exhaust within a period of up to 3 years and, in the event of non-exhaustion, its re-delivery. However, the Ministry of Finance is critical of this step.

It is also necessary to draw attention to the limits of research. The return rate of the survey was quite low and it was not possible to obtain answers from a larger number of subjects. Therefore, only a relatively small sample of businesses could be examined.

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Michaela Staníčková, Lukáš Melecký

VŠB-TU Ostrava, Faculty of Economics, Department of International Economic Relations
Sokolská třída 33, 702 00 Ostrava 1, Czech Republic
email: michaela.stanickova@vsb.cz, lukas.melecky@vsb.cz

Covid-19 Crisis and Restoring Resilience: the EU's Perspective and Approach

Abstract

The Covid-19 epidemic struck the world with exceptional speed, severity and breadth. Globalisation contributed to the rapid spread of this modern-day plague to all corners of the world. The word "resilience" has been used frequently throughout the coronavirus pandemic. At the heart of resilience is the claim that humans have the capability to recover or even grow in the face of adversity. Resilience refers to the ability to withstand and cope with challenges and transform in a sustainable, fair, and democratic manner. In the current crisis, these ideas – resilience, grit and the ability to bounce back – are understandably seductive in the face of adversity, "2020 made us stronger". The paper aims to shed a summary on the fundamental aspects of resilience, but especially pay attention to the current strategies oriented on resilience, with a specific focus on the European Union approach. Considering Covid-19 crisis and the transition-led political agenda, the European Union needs to further strengthen its resilience and bounce forward, i.e., recover but emerge stronger by intensifying these transitions. Now, national governments are struggling to absorb the shock generated by the pandemic, but in time the international community will overcome the crisis and begin the recovery phase. In the longer term, an approach that reacts to the systemic origins and impacts of major shocks is needed if policies are to be effective.

Key Words

Circular economy, Covid-19, crisis, European Union, resilience

JEL Classification: B52, E32, F62, O52, P41

Introduction

The concept of resilience has come to the fore in the last few years, not only in the academic field but also in political and public discussions. This term, used to describe how an entity or system responds to shocks and disturbances, has been explored for many years, during which an effort has been made to examine and analyse various aspects of it. Resilience thus became a link between fields, formerly distant at first glance, and pointed out the importance of monitoring all aspects of human life and society in connection with the fact that even a seemingly unimportant factor of human life may ultimately be crucial for the resilience of society. Nowadays, there are apparent changes (often exogenous in the form of economic shock or crisis – from 2020 in the form of health shock continuing in economic crisis) in modern society, social structure, territorial policy, public administration, and other fields having an impact on the functioning and efficiency of the whole society, especially in terms of resilience and vulnerability of the economy. The combined health and economic shocks of 2020 have impacted the livelihoods of millions of households, disrupted business activities, and exposed the fault lines in today's social protection and healthcare systems. The crisis has also further accelerated the effects of

the Fourth Industrial Revolution on trade, skills, digitisation, competition and employment, and highlighted the disconnect between economic systems and societal resilience. In this moment, it is crucial to reflect on how best to return to growth and how to build back better economies improving outcomes for people and planet (WEF, 2020).

The paper aims to analyse the consequences of the current crisis in the form of exogenous shock – Covid-19 – causing the economic crisis and reviving the concept of resilience. Given the topicality of the topic and, to some extent, its novelty, the key method used in the paper is a literature review mapping contemporary sources related to the issue by relevant institutions and organisations with emphasis on the European Union/European Commission. The topic is realized through the method of literature review. A literature review is a survey of scholarly sources on a specific topic. It provides an overview of current knowledge, allowing identifying relevant theories, methods, and gaps in the existing research. Literature review doesn't just summarize sources – it analyzes, and synthesizes to give a clear picture of the state of knowledge on the subject.

1. Resilience Concept

Resilience as a term is commonly used in research across all disciplines from environmental analysis to materials science and engineering, ecology, psychology, sociology and economics, making it currently used in various contexts, especially in a positive sense as an attribute of an object, entity or system and more normatively as a desired element that should be somehow promoted or supported (Martin and Sunley, 2015). The concept of resilience and its very idea comes to the fore in the fields of economic geography and regional studies, mainly due to changes in recent years caused by the global economic crisis, which affected all components of the regional economy. The economies of individual countries and their regions face the challenge of being resistant to economic fluctuations, not only about changes that are dramatic and complex in terms of the length of the crisis but also concerning their impact on the socio-economic status of all countries. After the years of the 2008 economic crisis, the concept of resilience became part of regional economic studies' conceptual and analytical goal by the continuing importance of regions as an economic entity and a subject of decision-making processes in public policies. Thus, there is an increasing interest in the resilience of regional economies and local and urban economies. The field of regional resilience research is widely researched in research studies by foreign researchers (Martin, 2012; Rose, 2009; Cutter et al., 2008; Hill et al., 2008; Norris et al., 2008; Foster, 2006). In these studies, regional resilience is generally determined by how the region or system responds to shocks or disturbances and can ensure its continuous development in these circumstances. There is a presumption that thanks to the current pandemic crisis, which is currently another case of global crisis, the concept of the region's resilience will increasingly be crucial for the formulation of individual countries' economic policies. However, this pressure to use the idea of regional and local economic resilience in political circles is probably somewhat ahead of the understanding of the concept. The concept of resilience is relatively complicated and deep in content, and relatively complex for evaluation and measurement. At present, there is no generally agreed notion of resilience in the context of regional development, nor is their considerable ambiguity as to what exactly is meant by regional economic resilience and how it should be conceived. There is still no generally accepted methodology on how regional resilience should be measured,

its determinants, and how it relates to long-term regional growth models. Consequently, this leads to some misunderstandings and various variations in the use of the concept of resilience.

2. Covid-19 Crisis and Restoring Resilience

Covid-19 crisis marked a turning point in our modern history, questioning the exposure of our economies to severe events. The first global pandemic in over 100 years, Covid-19, spread across the world at an unprecedented speed. The crisis has exposed fundamental shortcomings in pandemic preparedness, socio-economic safety nets and global cooperation. Covid-19 outbreak is the first global pandemic to be caused by a coronavirus, leading to a crisis with considerable losses in health and much of the worldwide economy, with high social costs. Governments and businesses have struggled to address compounding repercussions in workforce challenges, disruptions in essential supplies and social instability. They have had to balance health security imperatives against the economic fallout and rising societal anxieties while relying on digital infrastructure in unprecedented ways. The outbreak of Covid-19 pandemic has led to a global health crisis and deep economic recession – deeper than the downturn during the 2008–2009 financial crisis – and created a climate of profound uncertainty about the outlook. At this pivotal moment, there are growing calls for "building back better". While the immediate priority is to respond to the health crisis, this moment in time also offers a unique opportunity to reflect on the fundamental drivers of growth and productivity that have degraded since the financial crisis. It is also a moment to determine how we may shape our economic systems in the future so that they are productive and lead to environmental sustainability and shared prosperity. This moment calls for innovative and much-needed shifts in policy.

Therefore, resilience can be understood as a competitive advantage in times of crisis. Being resilient means adapting to problems, rebuilding and even emerging from the experience more robust, and learning something new. Suppose resilience is defined as the positive transformation that an economy undergoes in resisting and overcoming any adversity that arises. In that case, it seems evident that, in times of crisis such as the current Covid-19 situation, it is a competitive advantage that the economies need to get. WEF published its Global Competitiveness Report as the first edition (The Global Competitiveness Report – Special Edition 2020 – How Countries are Performing on the Road to Recovery) to prompt policymakers beyond short-term growth and aim for long-run prosperity. This special edition analyses historical trends on competitiveness and the latest thinking on future priorities. It provides recommendations against three timelines: a) those priorities that emerge from the historical analysis before the health crisis; b) those priorities needed to restart the economy, beyond immediate responses to the Covid-19 crisis, while embedding people and the planet into economic policies (revival over the next 1-2 years); and c) those priorities and policies needed to reboot economic systems, in the long run, to achieve sustainable and inclusive prosperity in the future (transformation over the next 3-5 years) (WEF, 2020).

Black Swan events and major humanitarian crises do occur and they can durably affect both advanced and developing economies. One of the policy questions we have to think about is if and what amount of our resources we want to devote to achieving more resilient and agile economic systems better able to withstand rare but potentially

catastrophic events. There is no easy answer to this question because we do not know the probability of such events or, in some cases, their nature and potential for destruction. Covid-19 crisis is showing us, it is time to move to a longer-term perspective and to better integrate risk factors in our economic analysis and policy decisions (OECD, 2020).

3. EU's Perspective and Approach to Covid-19

The European Union faces at once a pandemic and planetary emergency – as does the whole world. Covid-19 crisis has exposed several vulnerabilities in the EU and its Member States. An analysis of the impacts of the crisis, beyond its terrible human toll, reveals severe disruptions across Europe's economy and society. Preparedness and prevention, early warning systems and coordination structures were clearly under strain, thus underlining the need for more ambitious crisis management for large-scale emergencies at EU level. In the first months of the pandemic, many hospitals were overwhelmed, free movement of people and goods was severely restrained, and essential medicines and equipment were in short supply. The need to treat Covid-19 patients affected the capacity of the system to deal with non-Covid-19 patients. Simultaneously, residential care facilities and essential support services for older people and persons with disabilities were particularly challenged. Schools and universities were forced to close, many ill-prepared to offer digital learning alternatives to classrooms, particularly children from disadvantaged backgrounds or those with a disability. Overall, confinement measures have had a much more severe effect on the economy than the 2008 financial crisis.

Ensuring effective recovery spending is a high-stakes challenge for the European Union, with the potential for derailment because of fuzzy objectives and overloaded procedures. The EU should work with member countries to identify limited policies that will maximise the impact of EU investment while accounting for spillovers. European Commission's President von der Leyen's political guidelines set a long-term strategic direction to achieve the transition towards a green, digital and fair Europe, which goes hand in hand with the current strategy. The recovery plan for Europe shows the way forward: Next Generation EU aims to build a more resilient, sustainable, and fair Europe through large-scale financial support for investment and reforms. Strategic foresight will play a key role in helping future-proof EU policymaking by ensuring that short-term initiatives are grounded in a longer-term perspective. To make the most of its potential, this Commission has a solid mandate for strategic foresight at the heart of EU policymaking (EC, 2020a). The central theme of this first report, of the Strategic foresight 2020, is resilience, which has become a new compass for EU policies with the Covid-19 crisis. Resilience is necessary in all policy areas to undergo the green and digital changes while maintaining the EU's core purpose and integrity in a dynamic and, at times, turbulent environment. A more resilient Europe will recover faster, emerge stronger from current and future crises. Forward-looking policies supported by foresight will strengthen the EU's resilience. Foresight can help anticipate developments likely to have adverse impacts to enhance resilience through structural changes.

The first annual Strategic Foresight Report outlines how foresight will inform policies to strengthen the EU's resilience in four interrelated dimensions: social and economic, geopolitical, green, and digital. It analyses the EU's resilience in response to the COVID-19 crisis in the context of the acceleration or deceleration of relevant megatrends. These

long-term driving forces will likely have a large influence on the future. An analysis of the impacts of the crisis, beyond its terrible human toll, reveals severe disruptions across Europe's economy and society. The EU's vulnerabilities and resilience capacities are analysed in the light of relevant megatrends, long-term driving forces that will most likely have a significant influence on the future. Fourteen global megatrends have been identified by the Commission's Megatrends Hub (EC, 2020a):

a) seven accelerating trends: diversifying inequalities, shifting health challenges, accelerating technological challenge and hyperconnectivity, changing nature of work, diversification of education and learning, increasing demographic imbalances, and changing security paradigm;
b) seven neutral or decelerating trends: expanding influence of the east and south, increasing significance of migration, increasing influence of new governing systems, aggravating resource scarcity, climate change and environmental degradation, continuing urbanism, and growing consumptcoion.

Systematic analysis of the vulnerabilities and capacities revealed by the crisis in the EU and its Member States, considering the possible acceleration or slowing down of these megatrends due to the crisis, is depicted by a four-dimensional analysis of resilience, i.e. societal and economic, geopolitical, green and digital dimension (EC, 2020a).

The EU must ensure that, together with the scientific and expert community, the EU direct investment towards enhanced protection from the adverse impacts of social, economic and environmental shocks; better preparation to face emerging large-scale risks, and deep transformation to be able to reconcile sustainability with resilience in the future. This "protect-prepare-transform" approach ultimately implies optimising innovation in an integrated fashion, focusing on a transition that is just and embodies new social, green, and digital pathways altogether. With its collaborative and inclusive approach to innovation, Europe is well equipped to respond to this emergency but will have to do it coherently and ambitiously (EC, 2020b). But is it enough? Will there be no need for anything more, given the acceleration of time and the change of orientation or prioritization of society and the awareness of the principle of scarcity and limited / insufficient resources?

The dramatic events of the first quarter of 2020 lead us to reconsider some of the implicit assumptions underlying the design of our economic systems and to think about some of the dilemmas and trade-offs that we are facing during this stressful period. The lessons learned could help us better anticipate or deal with future Black Swans. Black Swans can be understood as Covid-19, and the circular economy may seem to be a new possibility. The Covid-19 pandemic has exposed the vulnerability of the global economy, including the EU's, and made resilience a more salient priority for governments: the EU Member States, for example, now need to integrate resilience into their national recovery plans in order to be eligible for recovery support. To build resilience to future crises and to support the response to the current COVID-19 crisis, leading institutions such as the World Economic Forum and the World Bank are increasingly calling on governments to look to the circular economy. A new analysis by impact organisation Circle Economy confirms the mutually reinforcing nature of the two concepts (resilience and circular economy) but advises caution around some of the circular economy practices, trends, and

prerequisites that – if not managed properly –could weaken a system's resilience. The new Circular Economy Action Plan (CEAP) paves a promising road towards circular value chains and the mainstreaming of renewable, regenerative and cyclable resources. The CEAP, published on the same day the World Health Organisation officially declared Covid-19 a global pandemic, makes no explicit mention of resilience, and as such, overlooks the systems and policies needed to effectively manage the trade-offs and opportunities that circularity presents for resilience.

The EU needs to urgently embed resilience across its circular economy plans. Making the CEAP fit for resilience – in designing upcoming legislation and initiatives, the EU should:

a) promote decentralisation – in utilities first – and inclusive governance processes to manage common-pool resources. By continuing to engage citizens, social partners and industry in the transition in meaningful ways – through, for example, binding commitments to citizens and the development of citizen-led and citizen-owned circular economy solutions – the EU can pave the way for more resilient forms of ownership;
b) promote a skills-based labour market and promote skills transferability in the context of the circular or green transition. With the instruments and network around the Skills Agenda in place, a stronger focus on developing transferable skills can promote both resilience and the circular economy. These should take equal importance in both curricula and assessment, and can be embedded in European Skills, Competences, Qualifications and Occupations frameworks as well as the Skills Agenda;
c) build monitoring and governance systems around slow variables such as culture, values and institutional change. To do so, the EU should first research the social impact of the circular economy with a focus on slow variables. This research agenda should be strongly embedded in the social sciences and political economy and not shun potential controversy or risks. Based on this research, the EU should develop circular economy governance systems that can respond to slow variables as well as the fast variable indicators currently used such as greenhouse gas emissions or job creation.

Conclusion

COVID-19 epidemic struck the world with exceptional speed, severity and breadth. Globalisation contributed to the rapid spread of this modern-day "plague" to all corners of the world. Economies have always been sensitive to certain types of shocks in the past. Today, thanks to the COVID-19 crisis, the concept of resilience is gaining prominence and the importance of the concept of resilience is growing, both in research and in economic policymaking. COVID-19 crisis shows how it has reduced the resilience of key systems to shocks and allowed failures to cascade from one system to others.

The EU Member States need to integrate resilience into their national recovery plans in order to be eligible for recovery support. As well as, the EU as a whole, needs to draw lessons from the pandemic, anticipate future developments, and strike the right balance between the wellbeing of current and future generations. Creating greater resilience by design, not by disaster, should be at the core of a coordinated EU recovery response to the Covid-19 outbreak. During a global health emergency and imminent economic recession,

an integrated "people, planet and prosperity" recovery model and a concerted investment in research and innovation-led transformation will enable us to emerge from this pandemic more resilient as a region, as countries and as localities. The EU must ensure that, together with the scientific and expert community, we direct investment towards enhanced protection from the adverse impacts of social, economic, and environmental shocks; better preparation to face emerging large-scale risks; and deep transformation to be able to reconcile sustainability with resilience in the future. Investing in resilience will be crucial to ensure that the EU is never again devastated by a disaster.

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Kamila Veselá, David Křížek, Lucie Severová

Czech University of Life Sciences, Faculty of Economics and Management, Department of Economic Theories
Kamycka 129, 165 00Prague, Czech Republic
email: veselakamila@pef.czu.cz; krizekd@pef.czu.cz; severova@pef.czu.cz

The Impact of the Covid-19 Pandemic on the Indebtedness of Czech Households

Abstract
Covid-19 is a disease that spread dramatically throughout 2020, affecting all of the world's economies. Government measures to stop the spread of the virus have curtailed economic growth and have affected the economic situation of governments and individuals and their ability to consume, as well as their ability to repay their liabilities. On one hand, there is an effort to increase household consumption, as consumption is what leads to GDP growth. Debt, on the other hand, which helps increase current consumption, becomes a risk factor in times of economic recession and can deepen the economic recession even further. From 2005 to 2019, debt increased more than threefold to CZK 1.9 trillion. The goal of the presented text is to analyze the effects of the Covid-19 pandemic and the resulting economic recession on Czech households, their income and their ability to meet their obligations. The conclusions from the research showed that 8.7% of respondents had a decreased ability to repay their liabilities and the economic situation deteriorated for 42% of respondents. The greatest negative impact on the repayment of liabilities was shown for self-employed people and parents.

Key Words
Covid-19, households, pandemic, ability to repay liabilities, indebtedness

JEL Classification: C12, D12, D84, E62

Introduction

The Covid-19 coronavirus pandemic is a viral disease caused by the SARS-CoV-2 coronavirus. The pandemic began in Wuhan, China in December 2019, but quickly spread around the world. In the Czech Republic, the Czech government began addressing the coronavirus pandemic in mid-February 2020 in response to the deteriorating epidemiological situation in Italy. In response to the pandemic, the growing number of infected people and the growing number of deaths, governments around the world have introduced measures in the form of trade restrictions and even complete economic lockdowns. Such measures, of course, have a very negative impact on the economy, its growth, public debt, as well as the economy and debt of households.

The goal of the presented text is to evaluate the impact of the Covid-19 pandemic, which was a significant factor influencing world events and the global economy in 2020, and

had major effects on the debt structure of Czech households and the ability of Czech households to meet their financial obligations. The goals will be fulfilled through two partial goals. In the first stage of the research, an analysis of time series of the debt development of Czech households will be conducted on a monthly basis in order to reveal whether and to what extent the economic recession associated with the Covid-19 pandemic affected the volume of loans to Czech households. In the second stage of the research, an evaluation of primary data obtained from a questionnaire survey will be conducted, whose purpose is to assess the impacts of the Covid-19 pandemic on specific households in the Czech Republic, their income and their ability to meet their obligations.

"Living on credit" has been a trend of the last 20 years. The housing debts of households, as well as consumer loans, are growing steadily. Atalay (2020) concluded in his research that households have been increasing their housing debt in recent years, but not their unsecured credit card debt. Household indebtedness is growing for both banking and non-banking institutions (Rajakumar et al., 2019). Debt allows households to increase their current consumption, which is very important for economic growth. Households' final consumption expenditure in the Czech Republic has long represented about half of GDP (Sixta, 2014). Household consumption is, therefore, described as the engine of GDP growth (Singer, 2007). However, over-indebtedness can be a risk, both for households and for the economy as a whole. High household indebtedness can be dangerous not only for households, but also for the economy as a whole (Chotewattanakul, 2019). Moreover, the trend of indebtedness does not only concern households, but also, for example, public budgets, such as those of municipalities or cities (Lajtkepová, 2017) and state budgets (Karpová, 2011).

In addition to the financial liability of households, household indebtedness also has psychological consequences. These consequences worsen significantly during a pandemic and bring growing uncertainty about future income. It is also necessary to point out that the implemented monetary interventions of the central bank can have an impact on people's psyche through household debt. According to Boyce (2018), if interest rates are high, there is an increased risk of psychological stress in people with a high debt burden. Boyce infers from this that changes in central bank interest rates implemented in order to meet economic objectives even pose a threat to the mental health of some borrowers.

Kukk (2016) addressed debt in times of crisis using the example of the economic recession in 2008-2009, and he points out that high household indebtedness intensifies economic recession. In addition, estimates have shown that debt as measured by the debt-to-income ratio and the debt service coverage ratio hampers consumption for the whole economic cycle. In addition, economic recession is more easily reflected in the economic situation of low-income groups who are also indebted. This is also pointed out by Singer (2007), who points to the risk caused by the indebtedness of low-income households and single-person households. This also corresponds to the findings of Ottawani (2011), who showed that, in real life, debt decisions are related to the impulsivity of individuals. Impulsivity is often higher in less educated people with lower incomes.

Economic recessions always have a very negative impact on both individuals and the economy as a whole. This was shown both in 2008-2009 during the financial mortgage crisis and in the current Covid-19 pandemic, which also brings with it a significant downturn in the global economy. This economic recession carries with it the risk of losing employment, a drop in the activities of self-employed people and problems with the repayment of financial liabilities. Petrov et al. (2020) point out the increased importance during the Covid-19 pandemic of analyzing the structural characteristics of household indebtedness as a necessity for the financial sustainability of households.

1. Methods of Research

The theoretical basis of the article was processed through the analysis and subsequent synthesis of secondary sources, and the basic method used was the examination of, in particular, scientific articles and professional publications. Statistical data and some additional information were obtained from current official Internet sources, in particular from data from the Czech National Bank (ARAD system). The methods used in this article can be divided into two stages: the first stage of research is based on secondary sources, namely the time series of the Czech National Bank for the period from December 2005 to October 2020, broken down by monthly periods. The research will focus on an analysis of the development of the total indebtedness of Czech households and the development of their consumption and housing expenditures. The methods used for the time series analysis include an analysis of the trend of absolute indicators, relative growth rate and regression. Special attention is paid to comparing the growth rate of debt before and during the Covid-19 pandemic.

The results of the time series analysis are confronted with the results of a questionnaire survey, which was conducted in October 2020 and focused on assessing the impact of the Covid-19 pandemic and repeated economic lockdown on Czech household debt and the ability of households to repay their liabilities. A total of 952 respondents took part in the questionnaire survey, and 4 answers were excluded for being incomplete.

The gender composition of the respondents was 421 (44.4%) men and 527 (55.6%) women. The age distribution of the respondents was divided into groups of 0-20 years, 21-25 years, 26-30 years, 31-40 years, 41-50 years, 51-60 years and 61 and more years. The dominant groups are 0-20 years and 21-25 years, and together they form 85.9% of all respondents. The structure of the respondents' answers was further examined according to the highest level of educational attainment, the size of the respondents' residence and income level. At the beginning of testing the answers, a test of relative frequencies was carried out in order to verify whether the obtained answers to the research questions are statistically significant. The calculation of the tested criterion is according to the formula:

$$U = \frac{P - \pi_0}{\sqrt{\frac{\pi_0 * (1 - \pi_0)}{n}}} \quad (1)$$

where P is the probability value; π_0 is the assumed probability given by the number of selection variants; n is the sample size. The obtained U-values are compared with the critical value of the standard normal distribution at the 5% probability level.

Absolute and relative frequencies were used in the descriptive statistics, and the data obtained was analysed using contingency tables and the χ2 test. The contingency table contains the observed frequencies from the questionnaire survey of individual combinations of variables. The total normalized residue is calculated from the differences (residues) of the observed frequencies and the frequencies obtained from the assumption of the null hypothesis. If its value is less than the critical value of distribution χ2 at the significance level 0.95 for the appropriate degree of freedom, the null hypothesis cannot be rejected at a significance level of 95%. If the null hypothesis is rejected and a dependence is proven, Cramér's V is determined to verify the strength of this dependence.

As part of the evaluation of the results of the questionnaire survey, the following research questions were tested:

Research question 1: Due to the measures at the time of Covid-19, my economic situation worsened.

Research question 2: At the time of Covid-19, my monthly expenses increased/decreased.

Research question 3: Due to measures at the time of Covid-19, I had difficulty repaying my liabilities.

Research question 4: Due to measures at the time of Covid-19, I saved money and could not shop as much in stores.

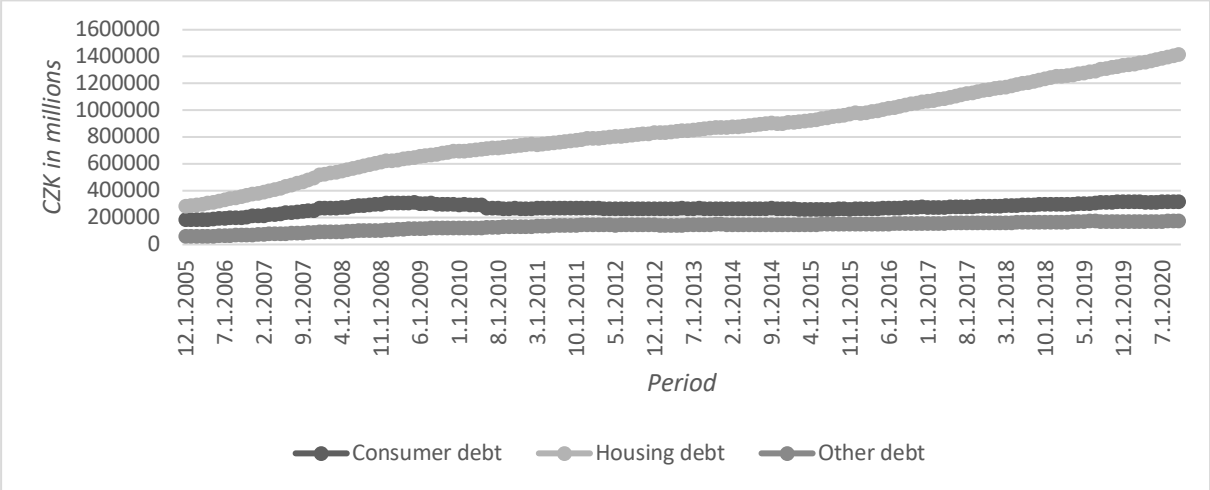
The answers to the research questions were tested according to the criteria of gender, age, highest educational attainment, size of residence, income and social status (for these purposes, the answers of students, employees, self-employed persons and parents were evaluated separately). The starting point for this breakdown was the interest in portraying the different initial financial conditions of the respondents and, at the same time, it can be assumed that Covid-19, or lockdown, may have a different impact on employees than on self-employed people, for example.

2. Results of the Research

From a long-term perspective, the total indebtedness of Czech households is growing steadily, both in the area of housing expenditures and indebtedness from consumer expenditures. In 2019, the total indebtedness of Czech households as of 31 December 2019 was CZK 1.9 billion, while on 31 December 2005, the total indebtedness of households amounted to CZK 0.5 billion. This corresponds to an increase of 364% over the last 14 years. The average growth rate for indebtedness was higher in the first half of the monitored period and averaged 20% per year, while in the second half of the

monitored period, it fell to an average of 5% per year. The following chart shows the development of absolute indicators of indebtedness for Czech households broken down into indebtedness for housing, consumption and others (including any debts from overdrafts or credit cards). The growing indebtedness of households is mainly due to the growth of housing expenditures, which averaged 23% per year in the first half of the monitored period and 7% per year in the second half of the monitored period. As regards development stability, housing expenditures show a stable trend without significant oscillations. The development of indebtedness for consumer expenditures shows higher volatility.

Fig. 1: Development of Czech household indebtedness in 2005–2020



Source: our own data processing based on data from the Czech National Bank from the ARAD time series database

The development of indebtedness from housing debt and consumer spending were further subjected to a regression analysis to investigate the trend of indebtedness over time. The development of housing debt can be described by a linear function:

$$y = 350{,}475.4 + 5{,}594.2x \tag{2}$$

where y is the amount of household debt from housing and x is time. The linear function was able to explain 97.9% of the dependent variable.

Table 1: Characteristics of the regression function - housing debt

Reliability value R	SS Residuals	F test ("P")	parameter a	parameter b
0.979189	3.17885E + 11	8.9237E-151	350475.428	5594.243

Source: our own data processing

As already mentioned, the established function describes a clearly growing trend of housing debt. At the same time, the data did not show the Covid-19 pandemic to have a

statistically significant impact on the development of housing debt for households. Despite the growth in the number of people infected in the Czech Republic and the lockdown of the economy, housing debt for Czech households continued to grow in 2020, at a rate of 6% from January to October.

In the case of the consumer debt of households, it is not possible to describe the development of debt using a linear or quadratic function. The development of this debt shows more frequent oscillations, which make it impossible to accurately estimate and predict the behaviour of the indicator. The nature of consumer spending (i.e. the fact that consumption expenditures may take the form of unnecessary expenses unlike housing expenditures) causes the growth rate of consumer debt to slow down in response to Covid-19. Since February 2020, consumption debt has even fallen in a few months compared to previous months.

The second part of the research concerned an examination of the impact of Covid-19 on the economic situation of Czech households on the basis of primary data obtained from a questionnaire survey. The first research question asked was: "The government measures employed during the Covid-19 pandemic have worsened my economic situation." In relation to this research question, the following null hypotheses were established:

H01: There is no relationship between the gender of the respondents and the impact of Covid-19 on the economic situation of the respondents.

H02: There is no relationship between the age of the respondents and the impact of Covid-19 on the economic situation of the respondents.

H03: There is no relationship between the highest educational attainment of the respondents and the impact of Covid-19 on the economic situation of the respondents.

H04: There is no relationship between the residence size of the respondents and the impact of Covid-19 on the economic situation of the respondents.

H05: There is no relationship between the level of income of the respondents and the impact of Covid-19 on the economic situation of the respondents.

H06: There is no relationship between the social status of the respondents and the impact of Covid-19 on the economic situation of the respondents.

Of the total number of respondents (948), 397 answered in the affirmative (i.e. that the Covid-19 pandemic worsened their economic situation), and 551 respondents (58%) stated that the pandemic did not have a negative impact on their economic situation. The relative frequency test confirmed that the responses obtained are statistically significant for the entire population. The tested criterion has a value of 5.0017 and is greater than the critical value of the standard normal distribution (1.9599).

The results of the hypothesis testing using the chi-square test method are shown in the following table (Tab. 2). If the null hypothesis is rejected, Cramér's V is calculated to determine the dependence.

Table 2: Results of tested hypotheses for the research question: "The government measures employed during the Covid-19 pandemic have worsened my economic situation"

Hypothesis	Degree of freedom	criterion	$\chi 2$	Critical value	Cramér's V	Result
H01	1	gender	2.243468531	3.841458821	-	H0 confirmed
H02	5	age	9.161383333	11.07049769	-	H0 confirmed
H03	2	education	5.659567142	5.991464547	-	H0 confirmed
H04	4	residence size	9.985610663	9.487729037	0.10263208	H0 rejected
H05	5	income	16.20166742	11.07049769	0.13073013	H0 rejected
H06	3	social status	8.261868754	7.814727903	0.08642942	H0 rejected

Source: our own data processing

The research has demonstrated that there is no correlation between the impact of Covid-19 on the economic situation of households and gender, age or the highest educational attainment of respondents. On the other hand, a correlation has been confirmed between the size of the respondents' residence and the impact of the Covid-19 pandemic on the economic situation of households. The Covid-19 pandemic had a smaller negative impact on the economic situation of Czech citizens living in municipalities with a smaller population. However, the strength of this dependence measured by Cramér's V is very low (0.1026).

Furthermore, a dependence has been proven between the respondents' level of income and the impact of the Covid-19 pandemic on the respondents' economic situation. The negative impact is higher for people with lower incomes than for people with higher incomes. However, the strength of this dependence is also very low (Cramér's V 0.1307). The dependence between social status and the impact of the Covid-19 pandemic on the economic situation of the respondents has also been demonstrated. The pandemic had the greatest impact on the economic situation of students and parents and the smallest impact on self-employed people. However, the strength of dependence measured by Cramér's V with the value 0.086 is very low.

The impact of the Covid-19 pandemic on the respondents' monthly expenditures was the subject of a second research question. The research tested the following null hypotheses:

H01: There is no relationship between the gender of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

H02: There is no relationship between the age of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

H03: There is no relationship between the highest educational attainment of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

H04: There is no relationship between the residence size of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

H05: There is no relationship between the income level of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

H06: There is no relationship between the social status of the respondents and the impact of Covid-19 on the monthly expenditures of the respondents.

Out of the total number of respondents (948), 256 of them stated that their monthly expenses increased, while 692 respondents stated that their monthly expenses decreased. Thus, 27% of respondents saw a negative impact on their monthly income.

The relative frequency test confirmed that the responses obtained are statistically significant for the entire population. The tested criterion has a value of 14.1606 and is greater than the critical value of the standard normal distribution (1.9599). The results of the hypothesis testing using the chi-square test method are shown in the following table (Tab. 3).

Table 3: Results of tested hypotheses for the research question: "My monthly expenses increased/decreased during the Covid-19 pandemic"

Hypothesis	Degree of	criterion	$\chi 2$	Critical value	Cramér's V	Result

	freedom					
H01	1	gender	2.305112	3.841459	-	H0 confirmed
H02	5	age	9.310294	11.0705	-	H0 confirmed
H03	2	education	0.412666	9.487729	-	H0 confirmed
H04	4	residence size	1.645337	9.487729	-	H0 confirmed
H05	5	income	8.371674	11.0705	-	H0 confirmed
H06	3	social status	0.016679	7.814728	-	H0 confirmed

Source: our own data processing

The hypothesis testing did not show a correlation between the impact of the Covid-19 pandemic on the respondents' monthly expenditures and the gender, age, highest educational attainment, size of residence, income or social status of the respondents.

The third research question focused on the impact of Covid-19 on the ability of Czech citizens to repay their liabilities. The tested null hypotheses are as follows:

H01: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the gender of the respondents.

H02: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the age of the respondents.

H03: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the highest educational attainment of the respondents.

H04: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the size of the respondents' residence.

H05: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the income level of the respondents.

H06: There is no relationship between the impact of Covid-19 on the ability to repay liabilities and the social status of the respondents.

Out of the total number of respondents (948), 82 of them stated that the Covid-19 pandemic had a negative impact on their ability to repay liabilities, while 866 respondents had no difficulty in repaying their liabilities. Therefore, 8.7% of respondents experienced a negative impact on their ability to repay liabilities.

The relative frequency test confirmed that the responses obtained are statistically significant. The tested criterion has a value of 25.4631 and is greater than the critical value of the standard normal distribution (1.9599). The results of the hypothesis testing using the chi-square test method are shown in the following table (Tab. 4).

Table 4: Results of tested hypotheses for the research question: "Due to measures employed during the Covid-19 pandemic, I had difficulties repaying my liabilities"

Hypothesis	Degree of freedom	criterion	$\chi 2$	Critical value	Cramér's V	Result
H01	1	gender	1.054344	3.841459	-	H0 confirmed
H02	4	age	4.061573	9.487729	-	H0 confirmed
H03	2	education	2.296912	5.991465	-	H0 confirmed
H04	4	residence size	2.955863	9.487729	-	H0 confirmed
H05	3	income	107.137	7.814728	0.336175	H0 rejected
H06	3	social status	27.49805	7.814728	0.157679	H0 rejected

Source: our own data processing

The research has shown a relationship between the impact of Covid-19 on the ability to repay liabilities and the respondents' social status and income level. The greatest negative impact on the repayment of liabilities was shown for self-employed people and parents. The biggest difficulties with the repayment of liabilities are also recorded for people in the highest income category (over CZK 50,000 / month). This corresponds to the fact that citizens with higher incomes usually also have higher liabilities and therefore higher monthly payments. The strength of dependence measured by Cramér's V reaches 0.3362, i.e. a moderate strength of dependence.

The last research question was focused on research into the development of citizens' savings during the Covid-19 pandemic. The tested null hypotheses are as follows:

H01: There is no relationship between the gender of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

H02: There is no relationship between the age of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

H03: There is no relationship between the highest educational attainment of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

H04: There is no relationship between the residence size of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

H05: There is no relationship between the income level of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

H06: There is no relationship between the social status of the respondents and the impact of Covid-19 on the amount of the respondents' savings.

Of the total number of respondents (948), 502 stated that they had saved more during the Covid-19 pandemic because they could not shop in stores, while 446 respondents did not save more than usual during the Covid-19 pandemic.

However, the relative frequency test showed that the responses obtained were not statistically significant. The tested criterion has a value of 1.8188 and is smaller than the critical value of the standard normal distribution (1.9599). The results of the hypothesis testing using the chi-square test method are shown in the following table (Tab. 5).

An analysis of the chi-square test showed dependence on gender, age, income level and social status. In all cases, the strength of dependence was low, with the value of Cramér's V reaching a maximum of 0.1159. Only in the case of residence size and educational attainment, dependence has not been confirmed. As regards the correlation between savings and gender, the research showed that 59% of men and 48% of women saved more money. This can be explained, for example, by the fact that women are more active in online e-shops, so they shopped more through this channel when they could not shop in brick-and-mortar stores. The research also showed that respondents in higher age groups saved more as a result of shopping less. It can be deduced that with older age, people are more careful and have a tendency to save in uncertain times such as pandemics. More savings were also recorded for people in higher income categories. Lastly, self-employed people and employees saved more as a result of the pandemic, and students saved the least.

Table 5: Results of tested hypotheses for the research question: "Due to measures employed during the Covid-19 pandemic, I saved more money because I could not shop as much in stores."

Hypothesis	Degree of freedom	criterion	χ2	Critical value	Cramér's V	Result
H01	1	gender	11.65259202	3.841458821	0.110868227	H0 rejected
H02	5	age	12.7243249	11.07049769	0.11585458	H0 rejected
H03	2	education	3.155644757	5.991464547	-	H0 confirmed
H04	4	residence size	7.038012261	9.487729037	-	H0 confirmed
H05	5	income	11.52922737	11.07049769	0.110279791	H0 rejected
H06	3	social status	11.37697468	7.814727903	0.101422855	H0 rejected

Source: our own data processing

3. Discussion

Household indebtedness has shown a long-term growing trend. From 2005 to 2019, debt increased more than threefold to CZK 1.9 trillion. Debt allows current consumption to be increased and supports economic growth, but over-indebtedness can undermine economic stability and exacerbate economic recession. It is periods of recession that will test a country's economic stability and the responsiveness of its government. Thus, similarities can be found, for example, between the recession of 2008-2009, which was based on the US mortgage market, and the Covid-19 crisis (Spatt, 2020). It was the Covid-19 crisis that caused a great global panic and a slowdown in the world economy (Ali et al., 2020). The results of the presented research showed that 42% of respondents were negatively impacted by the Covid pandemic and their economic situation worsened. This means a high degree of stress for mortgage holders (Biddle, 2020). The research also confirmed the negative impact of Covid-19 and related government interventions on monthly household expenditures. A total of 27% of respondents stated that their monthly expenses increased during the Covid-19 pandemic. A key question addressing the impact of Covid-19 on households' ability to meet their obligations

showed that 8.7% of respondents found themselves in a difficult situation in repaying their liabilities as a result of the pandemic and related government measures. The greatest negative impact on the repayment of liabilities was shown for self-employed people and parents. The biggest difficulties with the repayment of liabilities are also recorded for people in the highest income category (over CZK 50,000 / month). This corresponds to the fact that citizens with higher incomes usually also have higher liabilities and therefore higher monthly payments. On the other hand, 53% of respondents stated that as a result of lockdown and mandatory quarantine, their consumption decreased and savings increased. Similarly, Liu (2020) demonstrated the negative impact of the pandemic on household consumption in China, in particular in urban households.

Conclusion

A number of studies have shown that higher indebtedness of economic entities (whether they be households, municipalities, or even states) can be a risk factor for the economy. The level of risk always increases in times of economic recession. The current Covid-19 pandemic is revealing, among other things, whether or not entities in the Czech Republic are over-indebted, because the higher the indebtedness of entities, the more susceptible they are to external shocks such as a pandemic recession. It is clear that the Covid-19 pandemic has had a negative impact on the whole world, but only time will tell what the overall impact will be.

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