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THE EASE OF DOING BUSINESS INDEX IN SELECTED COUNTRIES

DOING BUSINESS INDEX VO VYBRANÝCH KRAJINÁCH

Abstract: *The aim of the article is to analyse the competitiveness of the V4 countries. Competitiveness of the country is very important factor, because this factor enable country to be the leader in the world market. To obtain the high competitiveness level, the country might have attractive business environment. Because good business environment of the country, predict the country to be interesting for investors and those help the country to grow. To measure the quality of the business environment, we used the Ease of doing business. This index is published by World Bank every year. We analysed the performance of V4 countries in the Ease of Doing Business Index for 10 years. According to their performance, we identified the strong and weak features in business environment in V4 countries.*

Key words: Competitiveness of the Country, Doing Business Index, V4.

JEL Classification: O40

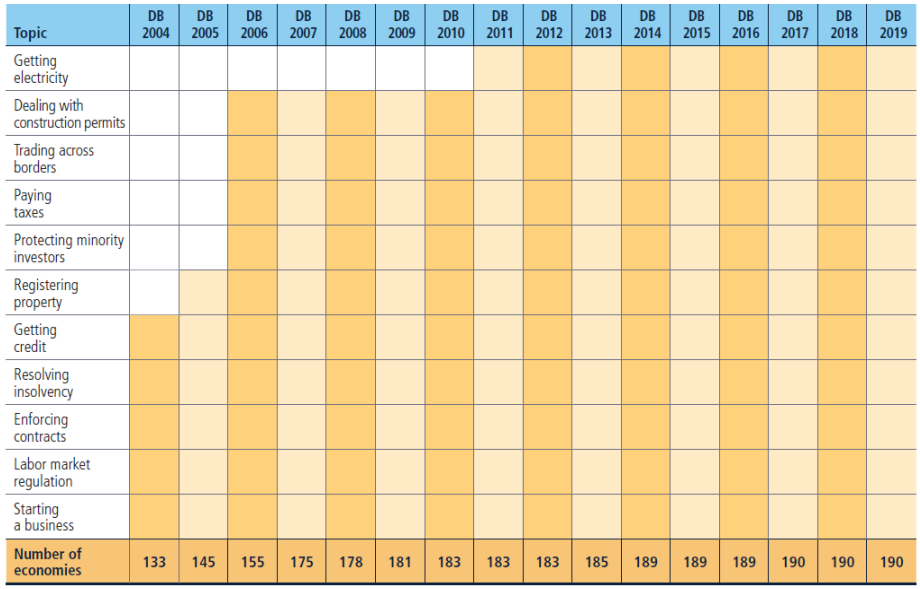
Introduction

Competitiveness is an important indicator for the countries. We can say, that the competitiveness is the ability of a country to facilitate an environment in which enterprises can generate sustainable value. Because of its relative value, the competitiveness must be constantly compared with other economies and regions (Margan 2012) Countries can create competitive advantages by improving their position through taxation (Válek and Kušnírová 2018), innovative and inventive potential. These are dynamic competitive advantages based on human capital, an educated workforce and a high level of active scientific research potential (Kollár 2013). Very important conclusions can be found in the study Mura et al (2017), where correlations between the economic freedom and economic growth were analysed.

A fundamental premise of Doing Business is that economic activity requires good rules – rules that establish and clarify property rights and reduce the cost of resolving disputes, rules that increase the predictability of economic interactions and provide contractual partners with certainty and protection against abuse. The objective is regulations designed to be efficient, accessible to all and simple in their implementation. (Corcoran and Gillanders 2015) The ease of doing business index measures the quality of the business environment and the impact of national government policymaking on the cost of doing business throughout the lifecycle of small- and medium-sized firms. (Kozovska 2014)

The first ease of doing business index was published by the World Bank in 2003. Five topics are taken into account in the early age of index Today, eleven topics are created the Ease of doing business index. The index averages the country's percentile rankings on each of the eleven topics, using an equal weighting scheme for each topic. (Kozovska 2014)

Figure 1 Topics and economies covered by Doing Business report



Topic	DB 2004	DB 2005	DB 2006	DB 2007	DB 2008	DB 2009	DB 2010	DB 2011	DB 2012	DB 2013	DB 2014	DB 2015	DB 2016	DB 2017	DB 2018	DB 2019
Getting electricity																
Dealing with construction permits																
Trading across borders																
Paying taxes																
Protecting minority investors																
Registering property																
Getting credit																
Resolving insolvency																
Enforcing contracts																
Labor market regulation																
Starting a business																
Number of economies	**133**	**145**	**155**	**175**	**178**	**181**	**183**	**183**	**183**	**185**	**189**	**189**	**189**	**190**	**190**	**190**

Source: Annual report of DB 2019

To provide different perspectives on the data, Doing Business presents data both for individual indicators and for two aggregate measures: the ease of doing business score and the ease of doing business ranking. The ease of doing business score aids in assessing the absolute level of regulatory performance and how it improves over time. (Corcoran and Gillanders 2015) The best regulatory performance is set at the highest possible value for indicators calculated as scores, such as the strength of legal rights index or the quality of land administration index. (Annual report DB 2019)

In Figure 1, we can see eleven indicators, which established the Ease of doing business index since 2011. Procedures, time, costs and minimum capital to start a company are a part of first indicator - "Starting a business". Other indicators are dedicated to construction permits, getting electricity, getting credit, registering property, protected minority investors, trading across borders and resolving insolvency. Payment, time and total tax are a part of next indicator - "Paying taxes". "Enforcing contract" contain time, cost and efforts to resolve commercial dispute. And the last indicator - "Labour market regulation" was created by flexibility in employment regulation and job quality.

Figure 2 What is measured in Doing Business?

Indicator set	What is measured
Starting a business	Procedures, time, cost and paid-in minimum capital to start a limited liability company for men and women
Dealing with construction permits	Procedures, time and cost to complete all formalities to build a warehouse and the quality control and safety mechanisms in the construction permitting system
Getting electricity	Procedures, time and cost to get connected to the electrical grid, the reliability of the electricity supply and the transparency of tariffs
Registering property	Procedures, time and cost to transfer a property and the quality of the land administration system for men and women
Getting credit	Movable collateral laws and credit information systems
Protecting minority investors	Minority shareholders' rights in related-party transactions and in corporate governance
Paying taxes	Payments, time and total tax and contribution rate for a firm to comply with all tax regulations as well as postfiling processes
Trading across borders	Time and cost to export the product of comparative advantage and import auto parts
Enforcing contracts	Time and cost to resolve a commercial dispute and the quality of judicial processes for men and women
Resolving insolvency	Time, cost, outcome and recovery rate for a commercial insolvency and the strength of the legal framework for insolvency
Labor market regulation	Flexibility in employment regulation and aspects of job quality

Source: Annual report of DB 2019

Material and Methods

The aim of the article is to analyse the entrepreneurship environment in selected countries. The business environment will be evaluate by the performance in Ease of Doing Business Index. The main goal is to choose, which country is the best for entrepreneurship. For analyses, we have chosen V4 countries. They are: the Czech Republic, Hungary, Poland and the Slovak Republic. These countries were chosen for their similar historical, economical and business environment.

We have chosen the Ease of doing business index for evaluation the competitiveness of the countries. We have chosen this index, because the Ease of doing business index measures the quality of the business environment. And good business environment is the first step for good economical environment of the country.

The analysed period was set to 10 years. According to Doing Business Report, we have analysed the annual reports Doing Business 2010 - 2019.

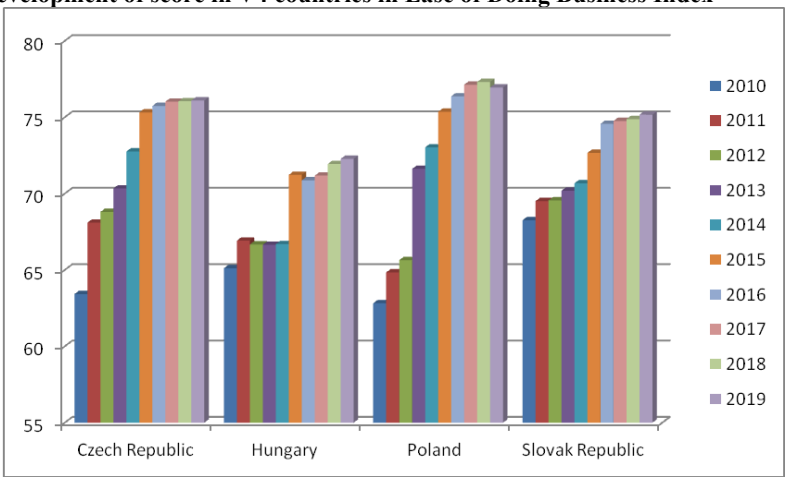
Firstly, we have focused on overall performance of the countries. Next, we have analysed the score gained in the mention index. The achieved score was in the range 0-100 points, where 100 points is the best. For better results, we have finally analysed the data and made an output in programme STATISTICA 12.

Discussion

The Ease of doing business index was formed for the years. Firstly, there were analysed only 5 indicators by the World Bank. Next year they have added one indicator. In the year 2006 there were analysed 10 indicators. From the year 2011, almost 11 indicators have been evaluated to create the whole Ease of doing business index (DBI). We can see the development of number of indicators in Graph 1.

Almost, the number of analysed countries were different by the years. In the year 2004, the 133 countries have been analysed. In the last year 2019, almost 190 countries were analysed by the World Bank. The World bank evaluate through this index countries from all the world, not only the European countries.

Graph 1 Development of score in V4 countries in Ease of Doing Business Index



Source: own processing

In the V4 countries we can see an increase in scores over the 10-year period, from Graph 1. The sharpest increase was seen in Poland. The score grew from the original 62.82 points to 76.95 points in the last published DBI. Another country with the most significant growth, was the Czech Republic. In cases of Slovakia and Hungary, the increase in score were recorded, but it was more moderate. Thus, we can say, that the business environment improves in the analysed countries from year to year and creates a pleasant environment for running business in the countries.

The biggest move in the score was in Poland. From the lowest score in 2010, this country reached the highest score in 2019 among the V4 countries. This fact can also be seen on the boxplot graph of Poland. The modest change of score were seen in the case of Hungary and Slovakia. The size of both boxplot charts was similar. In the case of Slovakia, the obtained score was significantly higher than in Hungary.

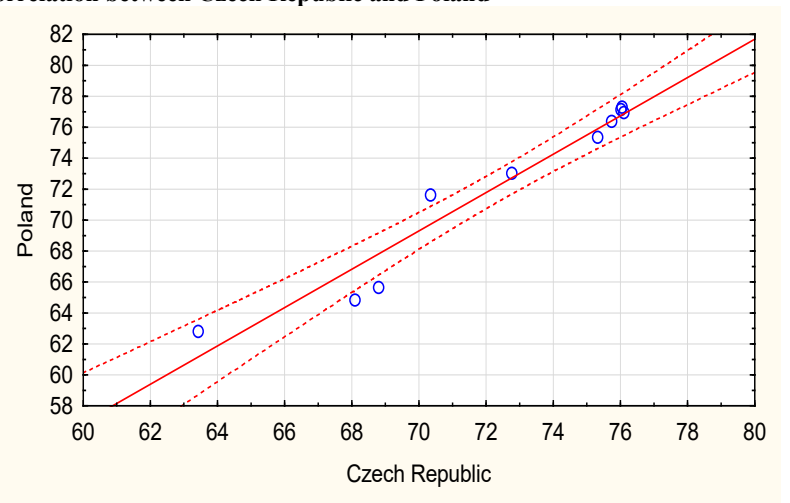
As we can see from the Figure 1 and Graph 2, the biggest positive correlation among V4 countries are between the Czech Republic and Poland. In this case, the Pearson's r was 0,971042 at the significant level £=0,05.

Figure 1 Correlation between V4 countries

Proměnná	Czech Republic	Hungary	Poland	Slovak Republic
Czech Republic	1,000000	0,909062	0,971042	0,932642
Hungary	0,909062	1,000000	0,876720	0,965016
Poland	0,971042	0,876720	1,000000	0,926414
Slovak Republic	0,932642	0,965016	0,926414	1,000000

Source: own processing

Graph 2 Correlation between Czech Republic and Poland



Source: own processing

The performance of DBI 2019 in V4 countries

When we have analysed the DBI 2019 through their subindexes, we can identify the strengths and weaknesses of the analysed country. In case of the **Czech Republic**, the strongest indicators were "Trading across border" and "Getting electricity". In these indicators were obtained score more than 95 points. The weakest indicators were "Dealing with construction permits" and "Enforcing contracts". But in both mentioned cases, there were still obtained favourable score more than 50 points. The country was overall ranked at 35th place in DBI 2019.

The strongest indicators in **Hungary** was "Trading across border". On the other hand, the weakest indicator was "Protecting minority investors" with the score of 50 points. The country was overall ranked at 53rd place in DBI 2019 from 190 countries. In the last year, there were a reform in taxes. Hungary made paying taxes less costly by decreasing the social tax rate paid by the employer and by reducing the corporate income tax rate to a flat rate.

In case of **Poland** as the best country form V4 group for doing business, the strongest indicator was "Trading across border". The lowest score was in indicator named "Protecting minority investors", the obtained value in this weakest indicator was over 60 points. Poland's overall position was 33rd place. In the last year, there were a reform in enforcing contracts. Poland made enforcing contracts easier by introducing an automated system to assign cases to judges randomly. But in the other area, in paying taxes, the situation had worsen. Poland made paying taxes more complicated by requiring the monthly reporting of value added tax returns, extending the list of goods and services subject to a reverse charge mechanism and introducing new reporting obligations for SAF-T files.

In case of the **Slovak Republic**, the strongest indicators were "Trading across border" and "Registering property". This strengths are stabile strength of the Slovak Republic for a years and are mentioned by Xhala and Nemec (2016), too. In these indicators were obtained score more than 90 points. The lowest score was in indicator named "Protecting minority investors" with the score over 53 points. Overall position of the country was 42nd place. In the last year, there were a reform in area of enforcing contracts, too. The Slovak Republic made enforcing contracts easier by implementing electronic service of process.

Conclusion

The business environment in the country is a key factor, that enable the country to be competitive. Across the Ease of doing business index, we can compare the business environment through the countries.

The strongest indicator in DBI 2019 was "Trading across border" in case of all V4 countries. The weakest indicator was "Protecting minority investors" in Hungary, Poland and in the Slovak Republic. Only the Czech Republic has the biggest problems in another indicators. All V4 countries obtained the increasing score through 10 years period. The business environment of all V4 countries was similar with the rank of DBI 2019 from 33rd to 53rd place. But only one country can became a leader of the group.

According to performance of DBI, we can set, which country from V4 group has the most suitable business environment. From the made analyses, Poland has the most attractive business environment from V4. Their score of DBI was the highest for the years.

Súhrn

Cieľom príspevku je porovnať konkurencieschopnosť krajín V4Konkurencieschopnosť krajiny môže byť skúmaná z rôznych uhlov pohľadov a prístupov, pretože je jedným z. kľúčových faktorov úspechu krajiny. K dosiahnutiu želanej úrovne konkurenčnosti výrazne prispieva atraktívne podnikateľské prostredie. Pretože len to dokáže predurčiť krajinu k úspechu, z zvýšenému záujmu investorov, čo v konečnom dôsledku napomáha krajine rásť a zveľaďovať sa. . Na meranie kvality podnikateľského prostredia sme použili Ease of doing business index. Tento index je každoročne publikovaný Svetovou bankou. V príspevku sme skúmali vývoj tohto indexu v krajinách V4 počas 10 rokov. Vzhľadom na zmeny vo vývoji jednotlivých krajín sme mohli identifikovať silné a slabé stránky pre každú zo skúmaných krajín.

Kľúčové slová: konkurencieschopnosť krajiny, Doing Business index, V4.

Acknowledgement

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Marek TEPLÝ

ROBOTIC PROCESS AUTOMATION AS A DISRUPTOR TO THE OFFSHORING MARKET

AKO MÔŽE ROBOTIZÁCIA ZAUTOMATIZOVANÝCH PROCESOV NARUŠIŤ OFFSHORE MARKET

Abstract: *This article discusses Robotic Process Automation (RPA) and evaluates its ability to disrupt the offshoring market. It examines the benefits of both RPA and offshoring and argues that highlighted advantages of RPA outweigh those of offshoring strategies. Hence the author suggests that RPA could be a key disruptor of the offshoring market. The evidence highlights both financial and non-financial benefits that an organisation could achieve by deploying RPA, which would also include control over the automated processes. The article assumes that taking a path towards RPA could also change economies in developing countries and their approach to the global economy market. However, the paper doesn't focus on the impact on the developing countries nor the adoption rate of RPA. These factors could be part of additional research in the future.*

Keywords: *Market, Offshoring, Process,Organisation, Relocation,*

Kľúčové slová: *Market, Offshoring, Proces, Organizácia, Premiestnenie*

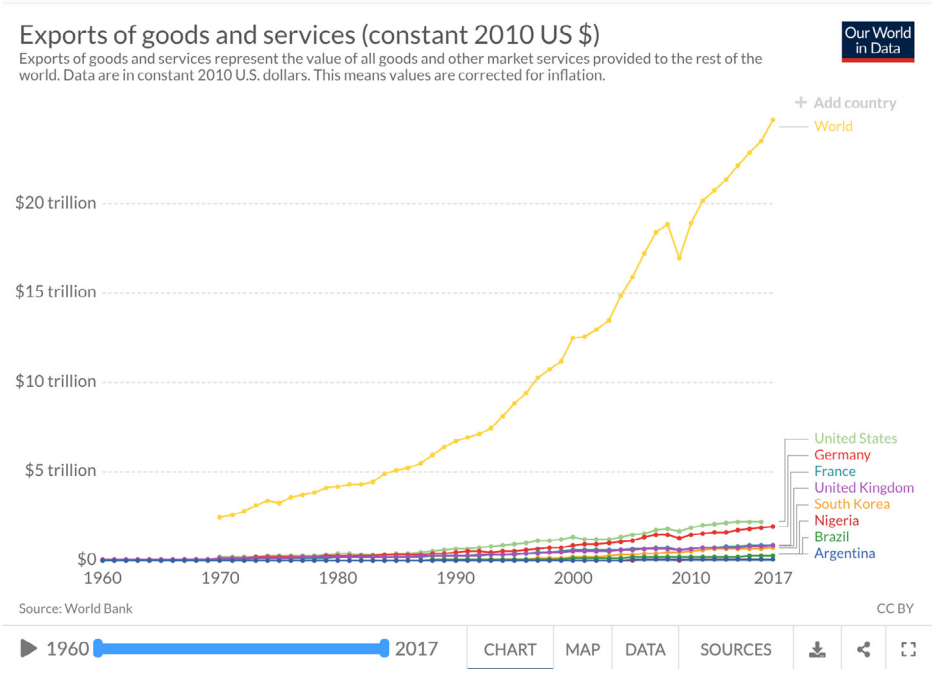
JEL: F 16, F 18, F 43, F 63, L 1, L 14.

Introduction

With approaching industry 4.0, the progress in technology opens doors to alternative advances that promise extensive improvements in operations' effectiveness and efficiencies. Concepts such as Machine Learning and Artificial Intelligence have become pivotal elements of organisations' strategy aiming to achieve a competitive advantage across industries. Due to rapid changes in the market that also includes human factors integrations, the author discusses the impact of such innovation on traditional strategic management. The article introduces the concept of Robotic Process Automation and its influence on Offshoring approaches. The paper is dedicated to broader readers and does not necessarily target IT specialists.

Taking full advantage of globalisation and other economic opportunities resulted in a steep elevation in applying offshoring strategies. The value of exporting goods and service in 2017 was estimated to be USD 24,7 trillion worldwide from which export of services held approximately 24% as organisations have developed a healthy appetite to seek cost advantage in low-income countries (Our World in Data, 2019). The increasing number also corresponds with rapid growth in exporting products and services between 1960 and 2017 (Figure 1). Offshoring has also been encouraged by developing countries through tax benefits and additional concessions so they could secure foreign investments (Berry, 2005). Hence, low wage countries such as China, India and have become hubs for relocated business operations. This trend, however, might change in the future due to a new emerging market that has the ability to replace some repetitive human tasks through robotic software for a fraction of the offshoring cost.

Figure 1: Exports of good and services from the global perspective



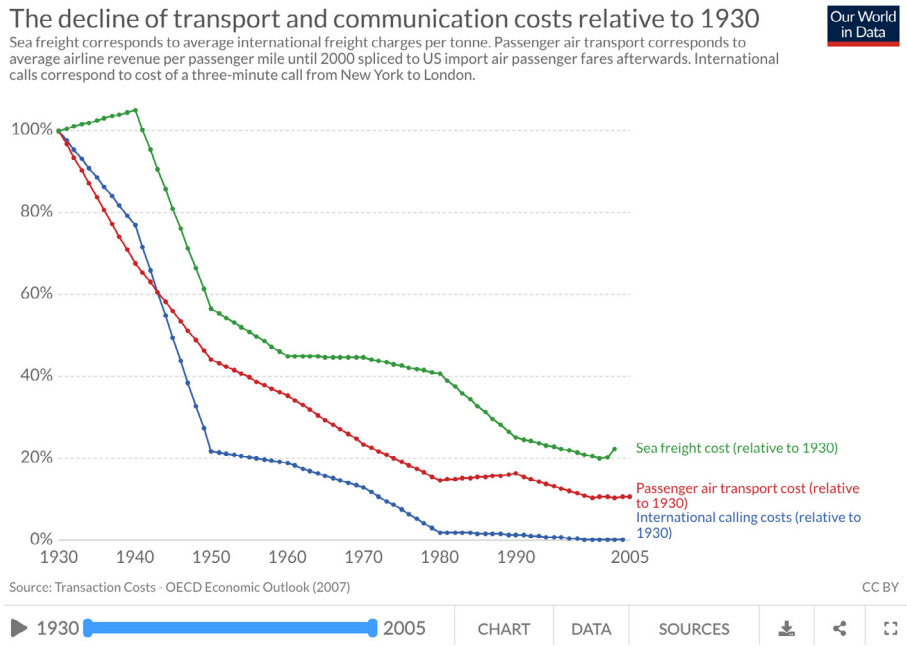
Source: Our World in Data, 2019. Available at: https://ourworldindata.org/trade-and-globalisation#what-do-countries-trade. [Accessed 07 September 2019].

Offshoring strategy and the offshoring market

The offshoring strategy has been widely practised since 1960, mostly with the critical objectives to reduce cost by relocating standardised work to low wage countries (Mykhaylenko, 2015). Although the literature suggests that offshoring benefits shall reach far beyond the cost reduction (Bonasia, 2005 & Ebrahimi, 2009), the profit margin is still very often the key decision factor. The emphasis on cutting expenses is also apparent from the number of researches that elaborate on offshoring with reference to a transactional theory. Understandably, ignoring the fact that the business has the ability to increase shareholders' value, would, in reality, be in conflict with the established organisational mission and the triple bottom line (Moran, 2011).

From the modern perspective, the offshoring market has rapidly evolved in the past sixty years, mostly due to globalisation and technology. Those two factors have drastically shaped the market by accelerating its growth at the beginning of its life cycle, as well as causing its disruption in later stages. In the first instance, technology and globalisation have triggered exponential growth as their progress has dramatically reduced prices within the Information and Communication industry. For instance, "the cost of transferring a trillion bits of data plummet from $150,000 in 1970 to 12 cents by 1999" (Khan & Bashar 2016). Similarly, the cost of an international phone call fell from $300 per minute from New York to London to a few cents (Khan & Bashar, 2016) (Figure 2). From the operational perspective, the progress in technology has enhanced offshoring growth through digitalisation. This enabled separating processes and relocating those functions that had to be performed internally in the past due to security or quality assurance (Palugod, 2011).

Figure 2: Transport and communication costs between 1930 and 2005



Source: Our World in Data, 2019. Available at: https://ourworldindata.org/trade-and-globalisation#what-do-countries-trade. [Accessed 07 September 2019].

In the second instance, technology and globalisation have dramatically increased turbulence and complexity of the external environment (Emery & Trist, 1965). This, in turn, has increased risks in applying the offshoring strategies and unpredictability of the outcome. For instance, such a risk could represent a hidden cost of setting up relocated business functions and increasing wages of labour in developing countries and regulations imposed by governments.

Technology not only has affected individual stages of the offshoring market life cycle but also determined new trends and related skills required for performing those relocated business functions. This, in turn, has triggered progress in the adaptation of technical capabilities in low wage countries in order to secure contracts from overseas. For instance, banks, financial institutions and insurances' back offices hold between 40 and 45 per cent of the relocated services with a strong focus on IT processes (Palugod, 2011).

The mutual benefits for both exporting and importing business could be evident from the increasing number of exported services per year and the rising volumes of economies of developing countries. For instance, Telstra, the Australian telecommunication provider, halved its IT $AUD 1,5 billion costs mainly by relocating 800 skilled jobs to India in 2003 (Grant, 2005). On the other side, the import of those services has become a vital source of income. China's enormous growth of GDP with $USD 48 billion in 1962 compared to $USD 14000 billion in 2018 (China GDP, 2019) could provide strong evidence of benefits arising from foreign investments.

Furthermore, offshoring opens the door to developing countries to innovate and improve their wellbeing. Hansen et al. (2008) argued that offshoring is a crucial element for the integration of developing countries in the global economy. With the pouring of foreign investments, developing countries have adopted the latest technology as well as the required skills to compete at a global level.

Some of the suppliers providing supporting services to multinationals have evolved in world-class businesses (Hansen et al., 2008). Their ability to challenge mature and developed organisations is evident through their high-quality outputs with low prices. Christensen (2007) described this behaviour as a disruptive strategy where cheaper products target the underserved market.

The benefits arising from offshoring strategies have reached far beyond financial initiatives and utilised the favourable market conditions that offered competitive prices for transport and communication. Those costs further accelerated globalisation process removed impediments for businesses to orchestrate their function of distance.

Disruption of the offshoring market and Robotic Process Automation

Although the literature indicates that the offshoring market will continue to grow, technology innovation suggests that deploying Robotic Process Automation (RPA) could seriously disrupt the offshoring market.

PR Newswire (Anonymous, 2017) stated that RPA market, based on the Global report would potentially worth $2.647 million by 2022 with a compounded annual growth rate (CAGR) of 30,14% between 2017 and 2022. It is assumed that most of the market is to be held by banking, financial and insurances services (Anonymous, 2017). This could raise the question of why the RPA market could disrupt the offshoring market?

RPA is a software that incorporates Artificial Intelligence (AI) and Machine Learning (ML) in order to automate standardised work. This makes RPA capable of handling high volume tasks without an error for a fraction of offshoring price (Anonymous, 2017). The RPA is a software that mimics workers using, for instance, ERP or productivity tools. "An RPA robot is integrated across IT systems via front-end, as opposed to traditional software, which communicates with other IT systems via back-end. In practice, this means that the software robot uses IT systems exactly the same way a human would, repeating precise, rule-based steps, and reacting to the events on a computer screen, instead of communicating with system's Application Programming Interface (API)" (Asatiani&Penttinen, p 68, 2016). Combining the RPA with other tools such as Optical Character Recognition (OCR), Natural Language Processing (NLP), Machine Learning (ML) further increases the scope of tasks that could be performed by software robots.

When organisations plan what type of process is to be offshored, the dialogue is very often shaped around the cost advantage and the impact on quality and control, if operations will be handed over to a developing country. However, Robotic Process Automation does not have to compromise between price and quality. Automated processes are not affected by seasonal peaks, unlike offshoring, where the additional work has to be resourced and paid for. The advantages of the RPA compared to the offshoring strategies are substantial. According to Peter Ilgo (Illgo, 2019), the Managing Director of Automation CoE, deploying RPA reduces the labour cost by 40 to 80 per cent while providing other benefits such as:

- Accuracy – the robots do not commit errors
- Scalability – almost-fixed costs regardless of the volumes
- Compliance – the robots execute the process precisely as designed
- Topline improvement – robots provide time for people to focus on customer
- Customer satisfaction – faster and accurate service
- Employee satisfaction – the robots perform repetitive non-attractive tasks.

Moreover, RPA is not sensitive to dramatic changes in the external environment. For instance, the recent interventions by the US government in trading by imposing tariffs on Chinese products and services drastically increasing its costs. This not only resulted in multinationals' losses and relocating businesses elsewhere, but it has increased investment risks and speculations, which might affect the offshoring market in the long run. Another challenge for the relocated function is the increase in wages that drives the prices of products and services and slicing multinationals' profit. However, those challenges might indicate that the offshoring market will not be able to hold its position moving forward; however, there is no evidence sighted that the market would go through rapid changes.

Conclusion

The offshoring strategy has undoubtedly been benefitting both multinationals and developing countries for over five decades now. As a result, the world has witnessed the shift of a large portion of global manufacturing and some supporting process to developing countries which provided opportunities to breed new reliable organisation with the ability to compete in the global market.

However, there is evidence sighted that the offshoring market is being disrupted by new technologies; the statistical data does not provide enough evidence that would suggest a rapid decline in offshoring activities. It is expected that some of the multinationals business function will be re-shored back to the country of origin or that new opportunities will instead be utilising the benefits of RPA. The estimated market value and the time frame will also depend on the adoption rate, which could be skewed through acceleration caused by the technology progress, and therefore, this information should only be informative.

It is suggested that the study could progress with a research focus on the impact of RPA on the offshoring market and developing countries to discuss their options of how to secure investments and improve their wellbeing.

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Interconnections between the pre-merger-and-acquisition process factors perception and the cross-border merger and acquisition motivation attributes assessment

Súvislosti medzi vnímaním faktorov pred-fúzijno-akvizičného procesu a posúdením motivačných atribútov cezhraničných fúzií a akvizícií

Abstract: *The main objective of the presented research is to find interconnections between the specified factors of perception of the pre-merger-and-acquisition process identified by the aDM&A methodology (ante-Determinants of Mergers and Acquisitions) and the perception of motivation attributes of cross-border merger and acquisition implementation by means of the mM&A methodology (Motivation Attributes of Cross-Border Mergers and Acquisitions). The analysis was carried out based on the data collected from 120 companies located in the European Economic Area. The context analysis was performed between four factors of the pre-merger-and-acquisition process perception (Synergy potential, Business environment, Investment benefit, and Financial management) and six motivational attributes (Growth acceleration, Synergistic attributes utilization, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion). The correlation analysis confirmed existence of several statistically significant correlations between the assessment of the pre-merger-and-acquisition factors and the assessment of the merger and acquisition motives. As for the limiting factors and the future research orientation in this field of knowledge, it is crucial to highlight the acceptance of a holistic approach in terms of a comprehensive, interdisciplinary examination of this issue and, simultaneously, to draw attention to the impact of sociocultural and global factors, which influence the cross-border M&A processes.*

Key words: *cross-border, merger, acquisition, factors, assessment, motivation*

JEL Classification: G 34, F 20, A 10

Introduction

Capital re-allocation through implementation of cross-border mergers and acquisitions (M&A) is one of the major global phenomena. These processes are an important indicator of economic activity and the development of capital markets. Cross-border mergers and acquisitions are one of the major types of foreign investment worldwide, which has been documented by a 27% increase in M&A volume value globally in the third quarter of 2018 compared to the same period a year earlier and, according to [1], reaching a value in this period in absolute terms of $3.0 trillion. The implementation and efficiency of M&A processes is multifactorially conditioned. Factors of different macro- and microeconomic nature enter these processes, as evidenced by numerous published research studies (e.g. [2]-[17]).

One of the important aspects is also their subjective perception. Within the framework of this concept, the paper focuses on the managerial view and identification of the links between the perception of the cross-border merger and acquisition motivation attributes and the specified perception factors of their implementation in the pre-merger-and-acquisition process. The merits of this view were also based on our efforts to implement the concept of approach to behavioral economics, which by means of the

synergy effect supports the exploration of the potential of the economic sciences by more real psychological aspects of the economic and managerial behavior. It is the concept of behavioral economics that is currently one of the innovative disciplines with regard to the ability to integrate psychological phenomena into economic models so that these predict human behavior and decision making more accurately and reliably.

Literature review

In order to analyze the pre-merger-and-acquisition process, knowledge published in various scientific studies, e.g. [2]-[11], [13], [18]-[20], should be taken into account. In this context it is thus possible to specify several factors of this process.

The first factor is synergy potential, which in terms of M&A efficiency is the achievement of synergies in the following directions: performance synergy, financial synergy and operational synergy. Performance synergy, together with the potential financial synergy, integrate the growth trend of the overall performance of the target enterprise (cash flow, capital expenditure requirements), lower capital costs due to better access to credit resources at lower interest rates and lower tax rates, provided that the specific legal form of the related undertakings is appropriately chosen. Ultimately, performance synergies with financial synergies lead to a reduction in total tax costs and even permanent tax savings. Operational synergy results from the merging and improvement of the operational efficiency of the various business areas of the merged enterprises, in particular in the areas of product manufacturing and service provision, knowledge capital and know-how within the merged enterprise and ultimately to more efficient management and elimination of duplicate activities as well as the concentration of knowledge, know-how, research and development.

In the pre-M&A phase, account should also be taken of information relating to the selected aspects of the business environment, such as the strategic relationship between the acquirer and the target business, the cultural aspects and the resulting differences, the geographical location of the investment, access and compatibility of the target business with the information system's infrastructure of the business of the acquirer.

When creating an investment benefit from a merger or acquisition transaction, the following indicators must be considered: acquisition premium, multiple bids, due diligence, investment banking advisory. In a merger or acquisition, an enterprise gains the opportunity to control the assets of another enterprise or the entire enterprise at a price that reflects the acquisition premium, while the price offered, including the acquisition premium, depends on the competitive position of the target company, its market share, the existence of a brand, goodwill and know-how.

Another factor of the pre-M&A process, besides the aforementioned synergy potential, business environment, and investment benefit, it the financial management of an M&A transaction, which has the effect of an umbrella of financial synergy due to the spread of investment risk in the new business, thereby strengthening the financial stability of the larger company with a better capital structure and better access to credit facilities at lower interest rates (lower foreign capital costs). At the same time, as the financial opportunities of the company increase, potential improvements in the brand and reputation of the company occur, which is subsequently reflected in the growth of the market value of the company (expressed by higher prices of the company shares).

When the pre-M&A factors are considered, there is another issue arising before their implementation and that is the motivational attributes of mergers and acquisitions. These attributes can also be specified within the framework of the already published findings in this area of knowledge [21]-[23]. In the context of implementation of the pre-M&A process, taking into account the success of the entire transaction (in the post-M&A phase), these attributes can be described as growth acceleration of the acquiring company, utilization of the synergistic attributes of the acquired company with the reference to the acquiring company, achievement of the personal goals, vision, and particular objectives of the acquiring company´s chief executive, broadening the acquiring company´s customer base by extending products and services, capturing the scale economies to save costs through combining two firms within an industry, and expanding the capacity at less cost than constructing new properties. All these motives, along with the pre-merger factors, will be analyzed in the following research study.

Research methodology

In order to identify and investigate the key factors of the pre-merger-and-acquisition process, a questionnaire research was carried out to identify significant factors related to decision-making and the subsequent preparation of the merger or acquisition process before its implementation. Based on our previous research published in a scientific study [17], four key factors of the pre-merger-and-acquisition process were identified according to our original aDM&A methodology – ante-Determinants of Mergers and Acquisitions, namely Synergy potential, Business environment, Investment benefit, and Financial management.

In the case of identifying and investigating the key motivational attributes of cross-border mergers and acquisitions implementation, our original mM&A methodology (Motivation Attributes of Cross-Border M&As) was also used to identify six motivational attributes of implementing capital reallocation through M&As, namely Growth acceleration, Synergistic attributes utilization, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion.

Building on our previous research [17], our intention in this paper is to characterize the relationship between the perception of motivational attributes of cross-border M&As implementation by means of mM&A methodology (Motivation Attributes of Cross-Border M&A), and the specified perception factors of the pre-M&A process identified by the aDM&A methodology (Ante-Determinants of Mergers and Acquisitions). The context analysis was therefore performed between six motivational attributes – Growth acceleration, Synergistic attributes utilization, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion, and four factors of perception of pre-merger-and-acquisition process – Synergy potential, Business environment, Investment benefit, and Financial management.

Research sample

The identification and specification of the key factors of the pre-merger-and-acquisition process and the motivational attributes of cross-border mergers and acquisitions were based on an analysis of the views of the managers of 120 companies (international corporations) located in 45 EEA countries, which had been subject of a cross-border M&A process in the period of 2010-2016, and which had market capitalization of more than €100 million. Enterprises were selected from the Zephyr database [24]; 1000 companies were addressed.

The responses received from the 120 companies involved in the research were analyzed. This selection can be considered intentional and at the same time volunteer-based. The way in which companies were selected is also related to an adequate level of generalization of the results obtained. The research sample consisted of 108 male managers and 12 female managers aged 21 to 65 years (average age: 42.90 years, standard deviation: 11.270 years) who worked in the company from 1 to 25 years (average: 11.50 years, standard deviation: 6.118 years). These managers held the position within the top management of the company.

Research results

The results of the presented data analysis (by means of Pearson correlation coefficient) confirm the existence of several statistically significant correlations between the assessment of M&A motives and the assessment of pre-M&A factors (Table 1).

Table 1 Links between cross-border M&A motivation attributes and pre-M&A factor assessment

Pre-M&A factors Motivation attributes	Synergy potential	Business environment	Investment benefit	Financial management
Growth acceleration	.169	**.711**	**.347**	.095
Sig.	*.066*	***.000***	***.000***	*.304*
Synergistic attributes utilization	**.289**	.088	-.002	**.713**
Sig.	***.001***	*.340*	*.987*	***.000***

Goal and vision achievement	**.208**	**.747**	**.189**	.084
Sig.	***.023***	***.000***	***.038***	*.360*
Product and service extension	**.419**	**.356**	**.313**	**.347**
Sig.	***.000***	***.000***	***.000***	***.000***
Cost saving	**.320**	**.438**	.066	**.289**
Sig.	***.000***	***.000***	*.471*	***.001***
Capacity expansion	.081	**.365**	**.291**	**.475**
Sig.	*.381*	***.000***	***.001***	***.000***

According to the analysis, the pre-acquisition factor of Synergy potential positively correlates with the motives of Synergistic attributes utilization, Goal and vision achievement, Product and service extension, and Cost saving. This means that those managers, who assessed the importance of synergy potential as a pre-acquisition attribute in the sense of performance synergies, financial synergies and operational synergies at a higher level, also attributed greater importance to the motives of Synergistic attributes utilization, Goal and vision achievement, Product and service extension, and Cost saving.

The results of data analysis also confirmed the existence of statistically significant positive correlations between the assessment of the pre-acquisition factor Business environment and the motives of Growth acceleration, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion. It means that managers, who have assessed the importance of the business environment as a pre-acquisition attribute in the sense of strategic relationship between the acquirer and the target business, taking into account cultural aspects and the resulting differences, geographic location of the investment, access to and compatibility of the target business with the information system infrastructure of the acquirer's company at a higher level, at the same time gave greater importance to the motive of using Growth acceleration, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion.

The results of the data analysis further confirmed the existence of statistically significant positive correlations between the assessment of the pre-acquisition factor of Investment benefit and the motives of Growth acceleration, Goal and vision achievement, Product and service extension, and Capacity expansion. It means that those managers, who assessed at a higher level the importance of Investment benefit as a pre-acquisition attribute in the sense of the following indicators: acquisition premium, multiple bids, due diligence, investment banking advisory, at the same time attributed greater importance to the motives of Growth acceleration, Goal and vision achievement, Product and service extension, and Capacity expansion.

The correlation analysis of the data also confirmed the existence of statistically significant positive correlations between the assessment of the pre-acquisition factor of Financial management, and the motives of Synergistic attributes utilization, Product and service extension, Cost saving, and Capacity expansion. The managers who assessed at a higher level the importance of financial management as a pre-acquisition attribute in terms of spreading investment risk in a new business, creating the effect of an umbrella of financial synergy, a larger, more financially stable business with better capital structure and better access to credit facilities for lower interest, and in the sense of better financial opportunities for the business as a result of its growth, access to cheaper foreign resources in larger volumes, and lower transaction costs, also attributed greater importance to the motives of Synergistic attributes utilization, Product and service extension, Cost saving, Capacity expansion.

Discussion

As it was presented above, the extracted key **factors of the pre-merger-and-acquisition process**, taking into account the knowledge published in scientific literature [2]-[17] can be characterized content-wise as follows:

1. Synergy potential

Synergy potential in terms of M&A efficiency is the achievement of synergies in the following directions: performance synergy, financial synergy and operational synergy. In any case, the synergy potential leads to a higher value of the post-merger business compared to the difference that arises between the present value of the newly created business and the sum of the present values of these businesses before the merger or acquisition. As with any investment, cross-border M&A is seen by

managers as an opportunity to increase business value, as evidenced by the positive correlation of Synergy potential as one of the key factors of the pre-merger-and-acquisition process with the motivational attributes, such as Synergistic attributes utilization, Goal and vision achievement, Product and service extension, and Cost saving.

2. Business environment

The aspects of the Business environment factor (the strategic relationship between the acquirer and the target business, the cultural aspects and the resulting differences, the geographical location of the investment, access and compatibility of the target business with the information system's infrastructure of the business of the acquirer) contribute, in a comprehensive perception, to building "empires" to diversify and hedge against shocks in the sector, effectiveness of the functioning of the corporation as a whole, and facilitating operational and organizational integration while creating a competitive advantage, ultimately explaining the higher degree of importance of the M&A motivational attributes in the context of Growth acceleration, Goal and vision achievement, Product and service extension, Cost saving, and Capacity expansion.

3. Investment benefit

In an M&A, an enterprise gains the opportunity to control the assets of another enterprise or the entire enterprise at a price that reflects the acquisition premium, while the price offered, including the acquisition premium, depends on the competitive position of the target company, its market share, the existence of a brand, goodwill and know-how. This is confirmed by the positive correlation of Investment benefit as one of the pre-M&A factors with the motivational attributes of the whole process in the form of Growth acceleration, Goal and vision achievement, Product and service extension, and Capacity expansion.

Due diligence is an essential requirement of any transactional activity and a minimum requirement to eliminate the negative consequences of incorrect decisions. In essence, in the case of a merger or acquisition, it is an analysis of the target enterprise, in the case of a sale (by the target enterprise) it is an analysis of an own enterprise, while the purpose of the analysis is to objectively identify the current state of the enterprise, primarily in the legal, financial, taxation, and ecological areas. The basic objectives of due diligence include assessing the compliance of the external presentation of the company under review with its actual status, i.e. whether the undertaking under examination is indeed in a condition as it appears to be externally and a verification that the intended investment will meet the investment criteria required by the investor. In the case of M&A banking advisory firms, investment bankers have developed on the market dominant independent entities that act as "lead architects of business combinations" in a more aggressive role throughout the process.

4. Financial management

Financial management of a M&A transaction has the effect of an umbrella of financial synergy due to the spread of investment risk in the new business, thereby strengthening the financial stability of the larger company with a better capital structure and better access to credit facilities at lower interest rates (lower foreign capital costs). At the same time, as the financial opportunities of the company increase, potential improvements in the brand and reputation of the company occur, which is subsequently reflected in the growth of the market value of the company (expressed by higher prices of the company shares). For this reason, this factor positively correlates with motivational attributes such as Synergistic attributes utilization, Product and service extension, Cost saving, and Capacity expansion.

Motivational attributes of mergers and acquisitions can be specified within the framework of the already published findings in this area of knowledge [21]-[23] and in the context of implementation of the pre-M&A process, taking into account the success of the entire transaction (in the post-M&A phase), in terms of their content as follows:

1. Growth acceleration: accelerate growth of the acquiring company

One of the primary motives for mergers and acquisitions implementation is achieving growth. Companies, which have an ambition to grow, must choose between an internal (organic) growth and a growth through mergers and acquisitions. Internal growth can be a slow and uncertain process, while growth through mergers and acquisitions is a much faster process, although it brings its own uncertainties. Companies can grow in their own industry or outside their business category. Extending beyond the industry means diversifying the business. If a company seeks to grow, it may conclude that internal growth is not an acceptable alternative to it, as the company's slow growth through internal expansion allows competitors to gain more market share. Corporate managers are under constant

pressure to grow, all the more so if the company had managed to grow in the past. However, when demand for products or services slows, growth is difficult to achieve. For this reason, M&As are considered a solution. Managers assume that reallocation of the capital through mergers and acquisitions will lead not only to revenue growth, but also to improving the company's profitability through synergies (using synergy attributes).

2. Synergistic attributes utilization: utilize synergistic attributes of the acquired company with the reference to the acquiring company

The successfulness of mergers and acquisitions depends to a large extent on the ability of managers to manage the pre- and post-acquisition critical success factors with the necessary and constant subjective confidence in the successful implementation of the M&A project in order to benefit from the synergies that are brought by the merging of two companies.

Some mergers and acquisitions are motivated by the belief that the management of the acquiring company can better manage the resources of the target company. The source company believes that its managerial abilities and skills will increase the value of the target company. That is why the acquiring company is willing to pay more for the target company than the current value of the shares of that company. The argument of using the synergic attributes of an acquired company with reference to the acquiring company is particularly valid in the case of large companies applying for small, growing companies.

3. Goal and vision achievement: achieve the personal goals, vision, and particular objectives of the acquiring company´s chief executive

On the one hand, mergers and acquisitions bring positive synergy effects, but at the same time they place greater demands on the management of an even larger company. Managing growth through M&A strategies is ultimately intended to improve the shareholders´ position and bring them higher returns, commensurate with the size of the merged company.

4. Product and service extension: broaden the acquiring company´s customer base by extending products and services

Smaller companies managed by entrepreneurs may offer a unique product or service that sells well and show the potential for further rapid growth. This growing business must gradually oversee a much larger distribution network and will have to adopt a different marketing philosophy that requires a different set of managerial skills. Lack of managerial experience and skills can hinder a smaller growing company and limit its ability to compete in the wider market. It is these management resources that the acquiring company can offer to the target company.

Mergers and acquisitions may also be driven by the desire to gain access to new markets and the associated new client base. For example, if one bank merges with another bank, each acquires the other bank's client base. In some cases, the acquired client base may be a market that was previously unavailable. For instance, if one bank specialized in foreign clients and the other bank in domestic clients, after the merger, the new company will have a more balanced client base.

5. Cost saving: capture scale economies to save costs through combining two firms within an industry

Mergers and acquisitions are a tool for “expanded entrepreneurship” in new areas in order to achieve strategic goals of the new business, while increasing managerial efficiency and performance with an emphasis on the cost savings by joining two companies and achieving synergistic “expanded business” attributes, including expanding the capacities at lower costs, like creating new qualities and skills.

6. Capacity expansion: expand capacity at less cost than constructing new properties

The aim of M&As may also be an effort of a company to acquire a specific skill (in the case of personnel issues) or resources owned by another company. This type of merger occurs mainly when a smaller company has developed specific skills with high added value over several years and it would take a long time for the source (acquiring) company to create the same skills and require significant investment.

The presented results of the obtained data analysis, as well as our previous findings [14]-[16], unambiguously confirmed the multidimensional concepts of both the motivational attributes of cross-border mergers and acquisitions and the pre-merger-and-acquisition process factors. At the same time, these results confirmed the meaningfulness of considering the links between the motivational factors of cross-border mergers and acquisitions and the assessment of the pre-merger and acquisition factors. In this context, it is necessary to draw particular attention to the connection between the Business environment factor and the motives of Growth acceleration and Goal and vision achievement, or the

factor of Financial management and the motive of Synergistic attributes utilization. The presented results confirmed the importance of the primary goal of cross-border mergers and acquisitions to strengthen the financial stability of a larger company and its capital structure. This ultimately allows for market value growth, which correlates highly with the motive of using synergistic attributes. These findings also support the need to adopt a comprehensive cross-border merger and acquisition approach that includes the geographical location of investment related to the cultural, value, political, and security aspects of the society [25]-[27].

Conclusion

Research into the relationship between the perception of motivational attributes of cross-border mergers and acquisitions by means of the mM&A methodology (Motivation Attributes of Cross-Border M&A) and the specified perception factors of the pre-merger and acquisition process identified by the aDM&A methodology present one of the possible concepts of behavioral economics. The results presented in the previous studies as well as in this paper illustrate the merits of this approach. At the same time, they contribute to a holistic view of the issues examined. As in other conclusions, in this case it is necessary to consider the degree of generalization, the universality of the findings. In this sense, there is a need to analyze data from a larger number of companies and to take into account the socio-cultural attributes and the traditional values of the environment in which mergers and acquisitions take place [25]-[27]. In connection with the presented results and their interpretation, it is necessary to point out that this is only one possible view of the motivational structure of cross-border mergers and acquisitions and the assessment of pre-merger-and-acquisition process factors.

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PROFITABILITY OF THE SLOVAK SPA INDUSTRY

ZISKOVOSŤ SLOVENSKÉHO KÚPEĽNÍCTVA

Abstract: *In the European context, Slovakia is considered a traditional spa destination. The aim of the paper is to evaluate the financial situation of the Slovak spa industry and selected spa companies using financial metrics. Quantitative data for the period 2013-2018 were obtained from the Register of Financial Statements of the Ministry of Finance of the Slovak Republic and from the financial statements of individual companies operating in industry according to SK NACE 869 - Other human health activities. The results of the analysis provided a financial perspective on the Slovak spa industry as well as on the largest spa in terms of employment (Slovak Health Spa Piešťany, a.s.), on the most profitable spa companies (Spa Bojnice, a.s.), and on the spa in the Region of the High Tatras (Spa Nový Smokovec, a.s.).*

Key words: *Spa Companies, Indicators, Financial Situation, Profitability*

Kľúčové slová: kúpeľné spoločnosti, ukazovatele, finančná situácia, ziskovosť

JEL classification: Z32, I15

1 Introduction

At present, spa tourism has become one of the major forms of the tourism. The importance of spa and health tourism is also determined by the fact that it is considered, within the marketing strategy of tourism development, as the third most important form of tourism. More and more authors are currently engaged in the Slovak spa industry, its genesis, insights into its past, present, and future. Valuable are the works of the authors of the Faculty of Management of the University of Prešov. Specifically Košíková [6] studied medical tourism, Šenková [12], Vašaničová [13], Mitríková, Sobeková Voľanská, Šenková [11], Litavcová, Jenčová, Košíková, Šenková [9], Jenčová, Litavcová, Petruška, Vašaničová [4], [5] discussed the financial and economic analysis of the Slovak spa companies; Jenčová, Vašaničová, Petruška [3] provided this analysis for the spa companies of the Czech Republic.

Slovak spa industry, with its multiplier effect on the development of business activities, has positive prospects for further development for several reasons. It has a high concentration of natural healing resources, qualified employees, and a rich spa tradition [2]. In our opinion, the Slovak spa industry requires more attention of the state, local governments, business entities, and academic institutions when applying current scientific knowledge in the theoretical and practical field. Therefore, the aim of this paper is to evaluate the financial situation of the Slovak spa industry and selected spa companies using financial metrics.

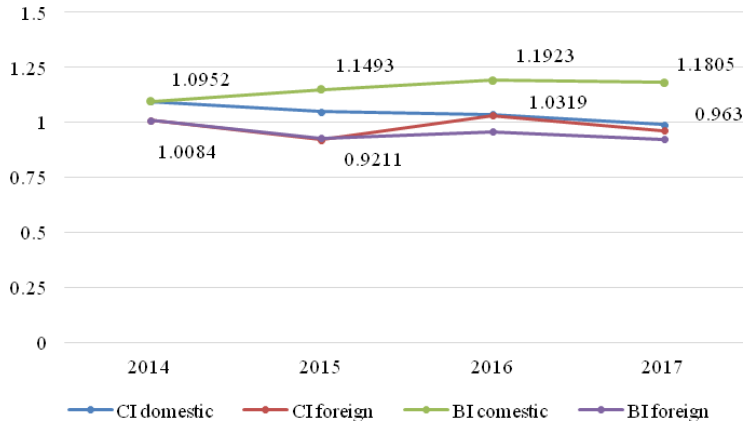
2 Basic information on the Slovak spa companies

In 2018, 21 spa companies employing 3,750 people operated in the Slovak Republic, and their annual turnover was EUR 155,313,938. The largest spa companies include Slovak Health Spa Piešťany, a.s.; Slovak Health Spa Rajecké Teplice, a.s.; Bardejov Spa, a.s.; Slovak Health Spa Turčianske Teplice, a.s.; Spa Trenčianske Teplice, a.s.

For the accounting period, 12 spa companies recorded a profit, and 9 spa companies recorded a loss (Spa Trenčianske Teplice, a.s.; Spa Vyšné Ružbachy, a.s.; Spa Brusno, a.s.; Slovthermae Spa Diamant, Dudince, state enterprise; Spa Sliač, a.s.; Natural Iodine Spa Číž, a.s.; Spa Červený Kláštor Smerdžonka PIENINY RESORT, s.r.o.; Spa Kováčová, s.r.o.; Spa Štós, a.s.). In a base period (2013),

3 spa companies was at a loss (Spa Vyšné Ružbachy, a.s.; Spa Sliač, a.s.; Natural Iodine Spa Číž, a.s.). The total revenue generated for all spa companies is growing at an average rate of growth, which is determined by the geometric mean, by 5%. Most of the operating profit generated from one euro of assets, i.e., highest return on assets was achieved by Spa Nimnica, a.s. (EUR 0.11), Bardejov Spa, a.s. (EUR 0.08). Most of the profit generated from one euro of revenues was recorded in Spa Bojnice, a.s. (EUR 0.27), Spa Nimnica, a.s. (EUR 0.17); Spa Dudince, š.p. (EUR 0.14), Bardejov Spa, a.s. (EUR 0.10). The largest share of added value in total turnover was achieved by Spa Bojnice, a.s. (0.723). Jenčová et al. (2018a, 2018b) stated that according to the results of multi-criteria evaluation and based on quantification of competitiveness, market position or concentration, Spa Bojnice, a.s., and Spa Lúčky, a.s. achieved in the reporting period the best results.
In 2016, spa companies recorded 316,046 visitors, and until this year, the number of spa visitors was increasing. In 2017, there was a decline, the growth rate was -1.55%, and the year-on-year index was 0.98. The highest growth rate of visitors (7.39%) was in the period 2013-2014. Fig. 1 presents the development of base (BI) and chain (CI) indexes separately for domestic visitors and foreign visitors for the period 2013-2017, while the year 2013 is the base period. In 2017, in compare with base year, we can see the decrease in the average number of overnight stays of domestic visitors (9.1), and also of foreign visitors (7.7). However, the year-on-year change is increasing.

Fig. 1 Development of base and chain indexes of number of visitors of Slovak spa companies for domestic and foreign visitors



Source: own processing

3 Data and Methodology

3.1 Data

As we mentioned, there are 21 spa companies in Slovakia. In terms of legal form, they are 16 joint-stock companies (a.s.), 3 limited-liability companies (s.r.o.) and 2 state-owned enterprises. Data entering the analysis were obtained from the Register of Financial Statements of the Ministry of Finance of the Slovak Republic, and from the financial statements of individual spa companies [10]. They are annual and cover a period of 2013-2018. Moreover, we use data on the number of bed places, and on the number of visitors of Slovak spa companies, separately, for domestic and foreign visitors for the period 2013-2017. For three analyzed spa companies (Slovak Health Spa Piešťany, a.s., Spa Bojnice, a.s., and Spa Nový Smokovec, a.s), we use data on the number of employees.

3.2 Methodology

The aim of the paper is to evaluate the financial situation of the Slovak spa industry and selected spa companies using selected financial metrics. We analyze return on investment (ROI) of all 21 spa companies operating in Slovak Republic and other financial indicators (connected with profitability)

among Slovak Health Spa Piešťany, a.s., Spa Bojnice, a.s., and Spa Nový Smokovec, a.s. Specifically, we use indicators of indebtedness, profit margin, total assets turnover ratio, return on assets, return on sales. Besides that, we use absolute indicators of total equity, total assets, earnings before interest and taxes (EBIT), earnings after taxes (EAT), base and chain indexes, and growth rate.

4 Financial Situations of the Selected Spa Companies

In Tab. 1, we present return on investment (ROI) for the period 2013-2018, which represents the ratio of EAT to capital (share of EAT turns out per one euro of total capital). Highlighted cells represent cases where the company had total profitability of more than one percent. In other cases, companies reported a loss or generated less than one Eurocent per euro of total capital.

Tab. 1: Profitability of the total capital of the Slovak spa companies for the period 2013-2018

Spa company	2013	2014	2015	2016	2017	2018
Spa Bojnice, a.s.	0.0321	0.0865	0.0787	0.0873	0.0725	0.0683
Spa Nimnica, a.s.	0.0170	0.0114	-0.0045	0.0282	0.0681	0.0885
Spa Horný Smokovec, s.r.o.	0.0151	0.6537	0.0128	0.0137	0.0624	0.0448
Spa Lúčky, a.s.	0.0047	0.0340	0.0609	0.0576	0.0507	0.0043
Spa Dudince, a.s.	0.0267	0.0306	0.0233	0.0399	0.0477	0.0419
Bardejov Spa, a.s.	0.0506	0.0236	0.0518	0.0190	0.0370	0.0598
Specialized Medical Institute Marína, state ent.	0.0522	0.0506	0.0507	0.0474	0.0357	0.0277
Slovak Health Spa Rajecké Teplice, a.s.	0.0248	0.0073	0.0354	0.0522	0.0233	0.0215
Slovak Health Spa Piešťany, a.s.	0.0246	0.0260	0.0278	0.0130	0.0202	0.0245
Spa Lučivná, a.s.	0.1773	0.0078	0.0040	-0.0383	0.0164	0.0174
Spa Vyšné Ružbachy, a.s.	-0.0169	-0.0245	-0.0103	-0.0006	0.0095	-0.0037
Spa Trenčianske Teplice, a.s.	0.0091	0.0046	0.0047	0.0057	0.0055	0.0068
Slovak Health Spa Turčianske Teplice, a.s.	0.0149	0.0251	0.0201	0.0147	0.0046	-0.0288
Spa Nový Smokovec, a.s.	0.0192	0.0149	0.0105	0.0138	0.0045	0.0075
Slovthermae Spa Diamant, Dudince, state ent.	0.0136	0.0163	0.0075	-0.0242	0.0039	-0.0240
PIENINY RESORT, s.r.o.	-0.0267	-0.0324	-0.0147	-0.0249	-0.0177	-0.0152
Spa Brusno, a.s. (in restructuring)	0.0026	-0.0505	-0.0411	-0.4215	-0.0310	-0.0049
Natural Iodine Spa Číž, a.s.	-0.0316	-0.0113	-0.0260	-0.1236	-0.0826	-0.0904
Spa Štós, a.s	0.0454	0.0450	0.0078	0.0239	-0.1111	-0.0373
Spa Sliač, a.s.	-0.1914	-0.1206	-0.0903	-0.1071	-0.1270	-0.1349
Spa Kováčová, s.r.o.	0.0111	-0.0164	-0.0382	-0.0451	-0.1410	-0.0585

(Source: own calculation)

4.1 Financial Situations of the Slovak Health Spa Piešťany

For more than 100 years, Slovak Health Spa Piešťany has been one of Europe's important, and leading spas in the treatment of rheumatism, rehabilitation of the musculoskeletal system and the nervous system. They use natural resources - unique healing sulphuric mud and thermal mineral water. They offer hotels that are available for all population groups, for example: Danubius Health Spa Resort THERMIA PALACE*****, Danubius Health Spa Resort, Esplanade****, Health Spa Resort ESPLANADE**** wing PALACE, Spa Hotel SPLENDID***, Spa Hotel PRO PATRIA**, Spa hotel Jalta**, Dependance Smaragd** and Šumava**, Vila Trajan** [1].
At present, Slovak Health Spa Piešťany employs 908 employees, ranking them first among the spa companies in the Slovak Republic in terms of employment. In 2015, the number of visitors was 44,558; in 2017, it was 44,413 visitors. Domestic visitors represented, in 2017, 46.15%, and that is exactly 20,497 visitors. In 2015, the number of domestic visitors reached a value of 20,557, and the

number of foreign visitors was 24,001. The number of bed places increased from 2,400 (in 2015) to 2,439 (in 2017). The company has equity of EUR 61,804,384, which is 86.14% of total assets. The overall indebtedness is minimal, because per EUR 1 of total capital turns out EUR 0.14 of liabilities. The total assets turnover ratio is 0.51. During the reporting period, the spas achieved a profit for the accounting period. Taking into account the base period of 2013, in 2018, the growth rate of earnings after taxes (EAT) was 1.36%, and its value was EUR 1,754,972, in compare with the base period. The company posted the largest profit in 2015 when its value was EUR 2,030,187. It is remarkable that already in the following year 2016, there was a decrease to EUR 937,393, which was a negative decrease of 53.82% in relative terms. Earnings before interest and taxes (EBIT) reached from EUR 2.4 to 2.8 million, except 2016, when there is a decrease to EUR 1,411,993. The profit is reflected in the return on assets, which is quantified by the ratio of earnings before interest and taxes to the total assets. In 2018, per EUR 1 of total assets turns out EUR 0.035 of EBIT. In 2016, per one euro of total assets turns out only EUR 0.02 of EBIT. Taking into account the financial productivity metrics, and share of value added in sales or total turnover, it can be stated that, in 2018, in this company, one euro of sales generated EUR 0.63 of value added, which is at the base period level. The chain index of this indicator is greater than one, which means a positive development. In 2018, the profit margin, measured by the ratio of EBIT to the net turnover, reached 6.8%, which represents a negative decrease compared to the previous year (7.2%). Overall, the company achieved the worst productivity indicators in 2016. However, in 2017, it has already seen positive growth in all efficiency indicators and a decrease in intensity indicators.

4.2 Financial Situations of the Spa Bojnice

The basis of the medical procedures in the Spa Bojnice is natural, medicinal, hydrogen-carbonate-sulphate, calcium-magnesium hypotonic akratotherm with a temperature of 28-52 °C, which rises from 9 springs [7]. The spa offers nine treatment houses, specifically, Treatment House Mier, Treatment House Lux, Treatment House Slávia, Treatment House Gabriela, Treatment House Tribeč, Treatment House Zobor, Treatment House Kľak, Treatment House Ploska, Treatment House Leknín, Velčice House – extension to Treatment House Mier [1].

Spa Bojnice, a.s. is the third largest spa in terms of employment. Currently, 259 people are employed here. They ranked first in terms of the amount of profit generated. In 2018, EAT increased to EUR 2,432,473 from EUR 753,653 (in 2013). Company reported the highest net profit in 2016, when the value of EAT was EUR 2,683,753 and EBIT was EUR 3,441,723. An absolute indicator of the forms of profit or loss indicates higher profitability. Every year, the company generates more profits from one euro of revenues. In 2018, one euro of assets generated almost EUR 0.10 of operating profit. In 2018, per one euro of turnover turns out EUR 0.27 of operating profit; in 2016, it was even EUR 0.34. The volume of added value has an increasing trend. In 2018, its value increased to EUR 8,427,357 in compare with the value from 2013, which was only EUR 5,553,605. Financial labour productivity has a growing trend. Equity of EUR 34,142,031 represents 95.83% of total assets, which indicates the non-use of external resources. The total assets of the company increased from EUR 23,464,878 (in the base period of 2013) to the value of EUR 35,624,496, in 2018.

4.3 Financial Situations of the Spa Nový Smokovec

The spas from the Region of the High Tatras are mainly used by people with respiratory problems, with climatotherapy being the main treatment factor. Spa Nový Smokovec, a.s., belongs to the best known climatic spas in Slovakia [8]. Spa area consists of hotels, such as Palace***, Branisko***, Palace Grand*** [1]. The added value of the spa stay is the wellness centres and relax zones with pool.

The spa has 81 employees. In 2018, the annual turnover was EUR 2,821,576, which represents an increase of 41.64% over the base year. The absolute net turnover indicator shows a positive increase over the whole period. The EBIT shows variable development, because, in 2013, it was EUR 76,524 and until 2015 it grew to the value of EUR 96,846. In the next period, there has been a negative decline of 44.7%. Unfortunately, the company shows a profit. Earnings after taxes for the accounting period reached a value of EUR 23,597, in 2018, which was the lowest profit in the period 2017-2018.

The profit is a guarantee of profitability or yield of the spa company. The development of the value-added indicator, which is growing throughout the period under review, is positive. Its value has almost doubled over five years, reaching EUR 934,390 in 2013. In 2018, per one euro of total assets turns out almost EUR 0.41 of liabilities, and it is in the recommended interval. Return on assets was 1.7%, in 2018. In the base year, one euro of assets generated EUR 0.03 of EBIT. Return on sales decreased from 3.8% to 1.9%. The company has seen an increase in the personnel cost indicator, which is negatively reflected in the entire cost.

Summary

The paper pointed to the financial indicators that determine the overall profitability of the spa industry in the Slovak Republic. For analyzed spa companies, profitability as a relative financial metric was assessed using productivity and efficiency indicators. The analysis was mainly focused on financial metrics of profitability, where we took into account the various forms of profit/earnings (absolute indicators taken from the company's financial statements). The results of the analyzes show that Spa Bojnice, a.s., can be clearly ranked among the spa companies with higher profitability. Their long-term spa owner and manager considers decentralization of management and regular evaluation of performance compared to the previous period to be very important [7]. On the contrary, a long-term loss is reported by Natural Iodine Spa Číž, a.s.; PIENINY RESORT, s.r.o.; Spa Brusno, a.s., which are in restructuring.

To increase profitability, all spa companies must practice active marketing on the domestic as well as on the foreign market (due to attract as many foreign clients as possible). An ideal solution would be an increasing number of self-payers. Each spa company should continue to invest, provide hotel reconstruction, should focus on expanding services and focus primarily on innovation. Spa companies with a reported loss need to stabilize this unfavourable economic situation.

In 2019, it is expected that the number of spa visitors will be increased by domestic visitors due to new support measures in the field of tourism, in particular through the introduction of holiday vouchers. For example, according to TANAP (National Park of High Tatras) data, in 2019, 24,000 tourists visited the Region of the High Tatras every day, which is an increase compared to previous years. In general, it can be stated that the Slovak spa industry is successful thanks to its tradition and increasingly participates in the development of tourism in the Slovak Republic.

Súhrn

Príspevok poukázal na finančné ukazovatele, ktoré determinujú celkovú ziskovosť kúpeľníctva Slovenskej republiky. Ziskovosť ako relatívna finančná metrika bola posudzovaná pre kúpeľné spoločnosti pomocou ukazovateľov produktívnosti, účinnosti, pričom najviac sa analýza orientuje na finančné metriky rentability, kde sme brali do úvahy jednotlivé podoby výsledku hospodárenia (absolútne ukazovatele prevzaté z účtovnej závierky danej spoločnosti). Výsledky analýz ukazujú, že medzi kúpeľné spoločnosti s vyššou ziskovosťou možno zaradiť jednoznačne Kúpele Bojnice, a.s. kde dlhoročný majiteľ a manažér kúpeľov za veľmi dôležité považuje decentralizáciu riadenia a pravidelné vyhodnocovanie výkonov oproti predošlému obdobiu [7]. Naopak, dlhodobú stratu vykazujú Prírodné jódové kúpele Číž, a.s., PIENINY RESORT, s.r.o., Kúpele Brusno, a.s. ktoré už sú v reštrukturalizácii.

V záujme zvyšovania ziskovosti musia všetky kúpeľné spoločnosti praktizovať aktívny marketing tak na slovenskom, ako aj na zahraničných trhoch s cieľom získania čo najväčšieho počtu zahraničnej klientely. Ideálnym riešením by bol rastúci počet samoplatcov. Jednotlivé spoločnosti by mali pokračovať v investovaní, rekonštruovaní hotelov, zamerať sa na oblasť rozširovania služieb a hlavne orientovať sa na inovácie. V kúpeľných spoločnostiach s vykázanou stratou je nutná stabilizácia tejto nepriaznivej ekonomickej situácie.

V roku 2019 sa očakáva zvýšenie návštevnosti kúpeľných miest domácimi návštevníkmi vzhľadom na nové opatrenia podpory v oblasti cestovného ruchu, podpory turizmu a najmä zavedením rekreačných poukazov. Podľa údajov TANAPU v roku 2019 denne navštívilo región Vysoké Tatry 24 000 turistov, čo je nárast v porovnaní s minulými rokmi. Vo všeobecnosti je možné konštatovať, že slovenské kúpeľníctvo je vďaka svojej tradícií úspešné a čím ďalej viac participuje na rozvoji turizmu Slovenskej republiky.

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ANALYSIS OF THE COMPETITIVENESS OF THE SERVICE SECTOR IMPACTING CROSS-BORDER MERGERS AND ACQUISITIONS IN THE COUNTRIES OF THE EUROPEAN AREA

ANALÝZA KONKURENCIESCHOPNOSTI SEKTORA SLUŽIEB VPLÝVAJÚCEJ NA CEZHRANIČNÉ FÚZIE A AKVIZÍCIE V KRAJINÁCH EURÓPSKEHO PRIESTORU

Abstrakt: *The main objective of this paper is to analyze the competitiveness of the service sector impacts the volume of cross-border mergers and acquisitions in the European area in the reference period 2010-2015. This paper focuses on comparative advantage, namely the model RCA 2 (Revealed Comparative Advantage), which is defined as the ratio of the difference between export and import commodity groups and the sum of exports and imports of these commodity groups. The RCA 2 model assesses the comparative advantage of export and its competitive ability. In 2015, two sectors (hotels & restaurants, post & telecommunications) were competitive. For sectors (insurance companies, banks) that have seen a lower RCA 2 index, companies need to focus on improving service productivity in the sectors under review.*

Key words: *Competitiveness, export, import, comparative advantage, cross-border mergers and acquisitions,*

Kľúčové slová: *Konkurencieschopnosť, export, import, komparatívna výhoda, cezhraničné fúzie a akvizície,*

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JEL: F15, F21, F23

Introduction

Schwab (2006) [1] combines the definition of competitiveness with the concept of productivity. Competitiveness is defined as a set of factors, policies and institutions that determine the level of productivity of the country and also determine the level of prosperity that countries can possess.
According to Bobáková, Hečková (2007) [2], whatever the approaches to the definition of competitiveness, it is certain that the factual content of this term constitutes a different value of the commodity on the foreign market depending on the influence of various factors that determine the country's competitiveness. It is ultimately reflected in economic growth, employment and price policy. The qualitative characteristics of the sources of competitive advantage significantly influence the long-term sustainable growth performance of the economy.
The concept of competitiveness is inherently linked to economic development in a market economy [3]. Bovée, Thill (1992) define competitiveness as the ability of the national industry to innovate and modernize to the next level of technology and productivity. They describe four basic factors of competitiveness [4]:

- strategy, structure and rivalry as conditions for the creation, organization and management of enterprises,

- demand conditions, including market size, exposure to goods, services and ideas,
- related industries,
- factors such as natural resources, levels of education and experience, and wages.

According Ubrežiová (2008) competitiveness of individual countries must be assessed according to the theories, such as [5]:

- Comparative advantage, drafted by David Ricardo based on the theory of absolute advantages, which were drawn up by Adam Smith.
- Heckscher - Ohlin theory of production factors.
- The impact of the life cycle of an international product.
- Theory - the first on the market.
- Porter's theory of competitive advantage - factor conditions, demand factor, composition and strength of competition, job opportunities, responsibilities of government.
- The openness of the economy as a source of increase in labor productivity - quick change of enterprises, reduce market prices, changes in prices, economies of scale of production, the impact of new technologies and assessment of the competitiveness of countries.

The increasing volatility and complexity of the business environment forces companies to reduce their vulnerability to adverse change and subsequently increase their competitiveness in the market [6]. Therefore, companies often try to grow, especially by external means, through mergers and acquisitions, as these provide faster changes and effects compared to the possibilities of internal growth. There are many classifications of motives for mergers and acquisitions [7].

Brakman et al. (2013) provides a broad view of mergers and acquisitions. He summarized the reasons for the merger and acquisition activities of companies and their objectives in five groups [8]: (1) exploiting synergies of growth opportunities, (2) managers' interest in acquisitions, (3) risk dissipation, (4) strengthening market power and (5) changes in the business environment. As trading companies are forced to keep up with local and foreign competition, mergers and acquisitions can involve both domestic and foreign trading companies as a form of investment.

If a company decides to place its products on foreign markets, it has a choice between export and local production through foreign direct investment [9]. If a company decides to produce locally, it can build their own equipment, green-field investment or acquire an existing business through cross-border mergers and acquisitions [10]. In order company profited in foreign markets it must have a competitive advantage over local competitors. Otherwise, local businesses would push it out of the market [11].

Data and methodology

In this paper deals with the comparative advantage and its impact on the volume of cross-border mergers and acquisitions in the European area in the reference period 2010-2015. The dataset containing records of mergers and acquisitions in the European area was based on data from the Zephyr database (Bureau van Dijk 2016) [12], which was supplemented with data on exports and imports of individual countries from the statistical offices of the countries under review.

This database includes mergers and acquisitions data from 16 source countries[1] to 25 target countries[2] in the service sector[3].

Index comparative advantages (Revealed Comparative Advantage) also has only RCA is used to determine the most important goals and to determine the target group of products for export countries. The international economy is used to calculate the relative advantages or disadvantages relative particular country in a particular class of goods and services. The comparative advantage is the basic

[1] Belgium, Republic of Cyprus, Denmark, Finland, France, Greece, Netherlands, Luxembourg, Republic of Malta, Federal Republic of Germany, Republic of Poland, Portuguese Republic, Republic of Austria, Spain, Italy, United Kingdom

[2] Belgium, Republic of Cyprus, Denmark, Finland, France, Greece, Netherlands, Luxembourg, Republic of Malta, Federal Republic of Germany, Republic of Poland, Portuguese Republic, Republic of Austria, Spain, Italy, United Kingdom

[3] Bank, Hotels &restaurants, Insurance companies, Post & telecommunications, Transport

explanation for economists who follow the development of interpectoral trade. In theoretical models, the comparative advantage is expressed in proportions of relative prices assessed without trading. The RCA is defined as the ratio of two shares. In the numerator is the share of the total export of the target country in the total export of the source country and in the denominator, is the share of the total export of the country's product in the total world export of the product. The RCA value ranges from 0 to $\propto$ [13].
The RCA indicator is a very often used instrument for measuring competitiveness. It is suitable for the evaluation of sectoral and more detailed commodity structures. It can be expressed in two modifications, using the logarithmic function (RCA 1) or through the ratio of differences (RCA 2). The RCA 2 indicator, defined as the ratio of the difference between the export and import of commodity groups and the sum of the export and import of these commodity groups, assesses the comparative advantage of export and its competitiveness [14]**.**

$$RCA\ 2 = \frac{X_{ij} - m_{ij}}{X_{ij} + m_{ij}}$$

□□□ □ □ □□□

While: X_{ij} - country export *j* in commodity group *i,*
m_{ij} - country import *j* in commodity group *i*.

RCA 2 index applies [15]:

RCA= -1	indicates that there is no export (X_{ij}=0),
-1< **RCA<0**	**indicates comparative disadvantages,**
RCA=0	**export=import ($X_{ij} = m_{ij}$),**
0 < RCA<1	**indicates revealed comparative advantages,**
RCA=1	**indicates that the import does not exist ($m_{ij} = 0$).**

The formulation of the result is, of course, dependent on the achieved index value. The existence of a comparative advantage of a country in exports in a given commodity group indicates an RCA indicator value greater than 1. If the index of a given commodity group is less than 1, this is a comparative disadvantage [16]**. Indicates that in a given commodity a country exports less than the average for the reference group.**
For an even more detailed identification of the disclosed comparative advantage, Brakman et al. (2006) possible index values into four categories (a-d) determining its size, respectively. intensity [17]**:**

a) **0 < RCA ≤ 1** **no comparative advantage,**
b) **1 < RCA ≤ 2** **weak comparative advantage,**
c) **2 < RCA ≤ 4** **moderate comparative advantage,**
d) **4 < RCA** **a strong comparative advantage.**

Analysis and results

Competitiveness of the services sector was measured by the above comparative advantage index (Revealed Comparative Advantage) – RCA 2. 2 RCA index were calculated on the basis of the data on

exports and imports of individual service sectors in the EU, which are shown in Table 1. We monitored the competitiveness of the service sector over the period 2010-2015.

Table1: Competitiveness of the sector overseeing the services evaluated by a factor RCA 2

Sector	2010	2011	2012	2013	2014	2015
Transport	**0,0414867**	**0,16655542**	-0,1968850	-0,0180444	-0,0076918	-0,0219107
Hotels & restaurants	**0,03811030**	**0,08194167**	-0,4511398	**0,00217901**	**0,13963987**	**0,45843163**
Post & telecommunications	**0,09954575**	**0,16436527**	**0,01861338**	-0,1715388	**0,15527117**	**0,13144266**
Insurance companies	**0,49184812**	-0,0125626	**0,09313619**	**0,48540880**	**0,10501537**	-0,0033965
Bank	**0,5475595**	-0,2632963	-0,7712812	**0,1291296**	**0,52377523**	-0,6234224

(Source: own processing)

Based on the results achieved, we can conclude that in 2015 the sector hotel & restaurants and post & telecommunications sector achieved positive RCA 2 values, thus showing a comparative advantage in exports. Sector post & telecommunications showed a comparative disadvantage in only one year (2013). We can say that the sector plays a key role for companies in the EU in terms of employment. Digitization and the development of electronic commerce positively influenced the development of the sector, which from 2013 to 2015 recorded a 13% increase. From the calculated index value 2 RCA shows that in the sector of post and telecommunications exports of EU countries is higher than the import of EU countries for the period. The exception is 2013, when the import of countries was greater than the export. Sector services in the EU creates favorable conditions for mergers and acquisitions. Companies that want to merge with other companies within the EU, seeking commercial companies in those sectors that are competitive in the market.

Trading companies in the EU are increasingly integrated into global value chains. An important driver of competitiveness of countries can be considered to maximize the proportion of home countries provided services for export. Hotels & restaurants can be included in tourism. The EU tourism sector accounts for around EUR 1.8 million. businesses that generate more than 5% of EU GDP and employ around 5.2% of the total workforce (around 9.7 million jobs). The main objectives of the EU are to keep Europe among the most popular tourist destinations by promoting diversification and quality improvement. In 2015, insurance companies and banks in the EU countries experienced a comparative disadvantage. The essence of the theory of comparative advantages is the recognition that EU countries can improve their living standards and real income just by specialize in manufacturing and services, which are able to produce and provide the highest productivity and the lowest cost. It is with such products and services will go into the country foreign trade relations with other countries, in order to obtain a goods and services that are more favorable for it to import at home to produce and deliver.

Discussion

From the Revealed Comparative Advantage (RCA 2) calculations, you can conclude that the EU service sector is competitive in two sectors (hotels & restaurants, post & telecommunications), which have a positive impact on countries' economic growth and period, the value was higher for export than for country import. Insurance companies and banks in 2015 were characterized by a comparative disadvantage. Competitiveness in the financial sector can be achieved by merging companies in EU countries (as one form of cross-border M&A). Due to the stagnation in the EU in 2015, companies were motivated to consider external growth in services and products provided through mergers and acquisitions, including investments in non-EU countries. 46% of acquisitions made by European companies in 2015 were motivated by geographical diversification and acceleration of growth outside the European continent. For countries in the EU are attractive mainly the United States, where European companies have announced 657 acquisitions worth more than 200 billion. USD. In America, strong German companies invest heavily: Bayer Purchased Merck's Over-the-Counter Medication Division for

$ 14.2 Billion ZF Friedrichshafen acquires automotive electronics manufacturer TRW Automotive for $ 13 billion. USD, Siemens invests 7.7 bn. USD to buy Dresser-Rand and SAP 7.3 billion. into the acquisition of Concur [18].

Conclusion

In today's global world, it is becoming increasingly difficult to establish and maintain on national markets. Globalization is increasing capital mobility and global trade. Continual growth of competition, increasing demands or changes in legislative conditions cause the departure of weak, less competitive companies. It is therefore necessary to address the issue of competitiveness. Based on the results obtained from the comparative advantage calculations under the RCA 2 index, we can conclude that in 2015 the hotel & restaurants and post & telecommunications sector achieved positive RCA 2 values, thus showing a comparative advantage in exports. It means that the services sector creates favorable conditions for mergers and acquisitions in the EU. In 2015, insurance companies and banks in the EU countries experienced a comparative disadvantage. It is important for these sectors to increase the comparative advantage in the form of mergers and acquisitions.

Záver

V súčasnom globálnom svete je čoraz náročnejšie presadiť sa a udržať na národných trhoch. V dôsledku globalizácie sa zvyšuje mobilita kapitálu a obchodovanie v celosvetovom meradle. Neustály nárast konkurencie, zvyšujúce sa nároky či zmeny legislatívnych podmienok zapríčiňujú odchod slabých, menej konkurencieschopných obchodných spoločností. Z uvedeného dôvodu je nevyhnutné zaoberať sa problematikou konkurencieschopnosti.
Na základe výsledkov získaných z výpočtov komparatívnej výhody podľa indexu RCA 2 môžeme konštatovať, že v roku 2015 sektor hotel a reštaurácie a pošta a telekomunikácie dosiahli kladné hodnoty indexu RCA 2, čím vykázali komparatívnu výhodu pri exporte. Znamená to, že sektor služieb vytvára priaznivé podmienky pre fúzie a akvizície v krajinách EÚ. Sektory poisťovacie spoločnosti a bankovníctvo v krajinách EÚ zaznamenali v roku 2015 komparatívnu nevýhodu. Pre tieto sektory je dôležité zvýšiť komparatívnu výhodu formou fúzií a akvizícií.

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Anna ANTONYOVÁ

WHY TOURISM: ANALYSIS THE TRAVELING WITH PURPOSE IN THE EUROPEAN CONTEXT

PREČO TURIZMUS: ANALÝZA CESTOVANIA S ÚČELOM V EURÓPSKOM KONTEXTE

Abstract: *Tourism is a phenomenon whose development depends on many factors. One of the factors reflects the ability to answer the question: Why for traveling? Many reasons can influence the decision for traveling. The specific area might fulfill the tourists' demand. The article analyzes especially various purposes for traveling in the European space. Of the purposes, it stresses personal, professional, business, visits to friends and relatives and, with a trend line, for traveling for holidays, leisure and recreation reasons.*

Keywords: *tourism, traveling with purpose, European context, analysis*

Kľúčové slová: *turizmus, cestovanie s účelom, Európsky context, analýza*

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JEL: I 11, I 19

Introduction

Tourism as international trade in services become an important activity in global market [5]. From this point of view tourism is defined as the sum of those industrial and commercial activities which produce goods and services which are mainly consumed with countries to develop tourism sector for foreign visitors or domestic tourists [2]. Tourism as industry is connected also with marketing level [12] as well as the social context. Economy, that is represented with Gross domestic Product (GDP), is a strong aspect that can influence the tourism level in country [11], although on the other hand, sometimes so-called exotic surrounding might have a promising taste of adventure. However, hospitality services [10] play an important role in decision of every tourist. Gender aspect [9] might play a role in some countries such as for instance in Latin Amerika.

Determinants for tourism flow from European countries lie mostly in the construction of transport infrastructure in cooperation with the neighboring countries. In this context also main quality criteria for the passenger transport by railway might be specified [6]: safety, reliability, time keeping, interoperability, comfort, optimal tour, ecology, informative and reach. Gravity model [13] that is used is built especially on setting the coefficients for: language knowledge or similarity, visa necessity, consumer price index, nominal exchange rate, distance, etc. Another problem is ability of intensive recovery of infrastructure in the areas where some economic problem, damage or disaster occur [4].

Presumptions that influence development of tourism are mainly demographic factors, transportation as well as the travel security, political factors, information technology, environmental factors, degree of urbanization [1] and a range of social and economic impacts [14].

Food marketing [8] as accompanying part of tourism means integral part of material (food) and immaterial (services) products. So, tourists as guests should be satisfied quantitively as well as qualitatively, gastronomically, ethnologically, esthetically, etc. The similar issues are connected in connection with passengers' shopping intentions in the hotels or at the airports [7], when the shopping process can be transformed into experience. The quantitative and partly qualitative conditions for adequate food included into tourism services are influenced with private as well as government investment into agriculture and rural development [3].

Methodology

To analyze tourism from the view point of reason why a person make decision to visit some place that is distant from his home, purpose was analyze as a motivation for individual tourism. The analysis is based especially on the data according to Eurostat (https://appsso.eurostat.ec.europa.eu) [Observed: October 10, 2019]. This way aiming to European context, the data for domestic trips with duration 4 nights or over were analyzed. In this context we can recognize a few categories according to reasons:

- personal,
- professional, business,
- visits to friends and relatives,
- traveling for holidays, leisure and recreation.

Results and Discussion

Analysis the traveling with purpose uses especially the graphical methods as well as the statistical method for the curve fitting. Figure 1 comprises graphic representation of domestic trips with purpose with duration 4 nights or over in chosen European countries.

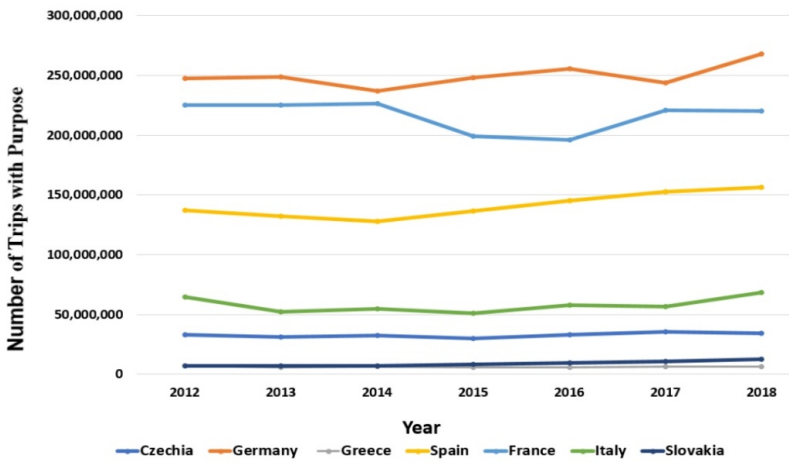

Figure 1. Graphic representation of domestic trips with purpose with duration 4 nights or over. The analyzed data are according to Eurostat (https://appsso.eurostat.ec.europa.eu) [Observed: October 10, 2019].

Figure 2 illustrates the number of domestic trips with purpose with duration 4 nights or over in countries, which are neighboring to Slovakia and are members of European Union.

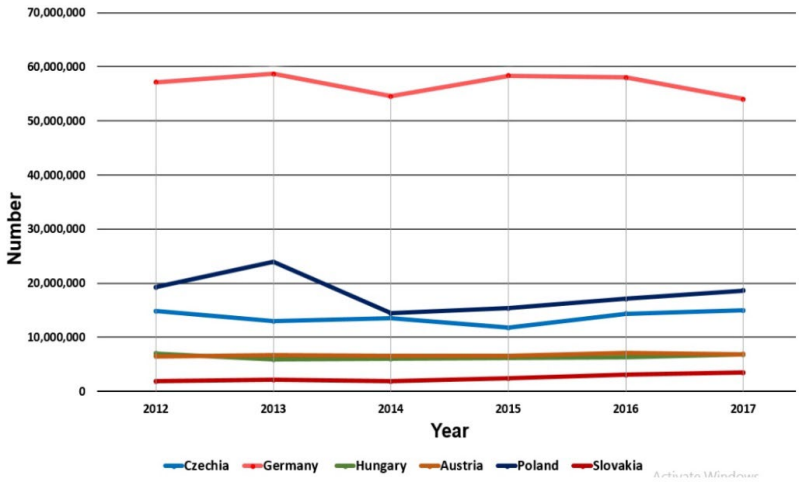

Figure 2. Graphic representation of domestic trips with purpose with duration 4 nights or over in countries, which are neighboring to Slovakia and are members of European Union. The analyzed data are according to Eurostat (https://appsso.eurostat.ec.europa.eu) [Observed: October 10, 2019].

To analyze traveling with purpose, wide variety of reasons is included especially into personal ones as well as to traveling for holidays, leisure and recreation. From the position of travel manager, the most important thing is to fulfill the tourists' motivation. The motivation is related to many hobbies, curiosity or desire for experiences or the opportunity to present oneself.
Of the hobbies, for instance sport can represent quite strong motivation. Sport motivation ranges from tendency to visit some sport event to an active practicing. When we cannot influence the organization of some world game event, we can create an environment for the game of holidaymakers. Other possibilities include for instance swimming, skiing, hiking or rafting, special sports grounds, climbing wall and cycling. Likewise, a playground should be a matter of course within the recreational facilities.
Another reason might be an opportunity to experience own or another nation or country culture. In this area we can include both the teaching of a foreign language as well as learning about musical and dance specific customs of individual cultures, also with the possibility to learn new dance or play a musical instrument.
Figure 3 expresses the number of domestic trips with purpose with duration 4 nights or over in Slovakia according to the categories; with a trend line for traveling for holidays, leisure and recreation reasons.

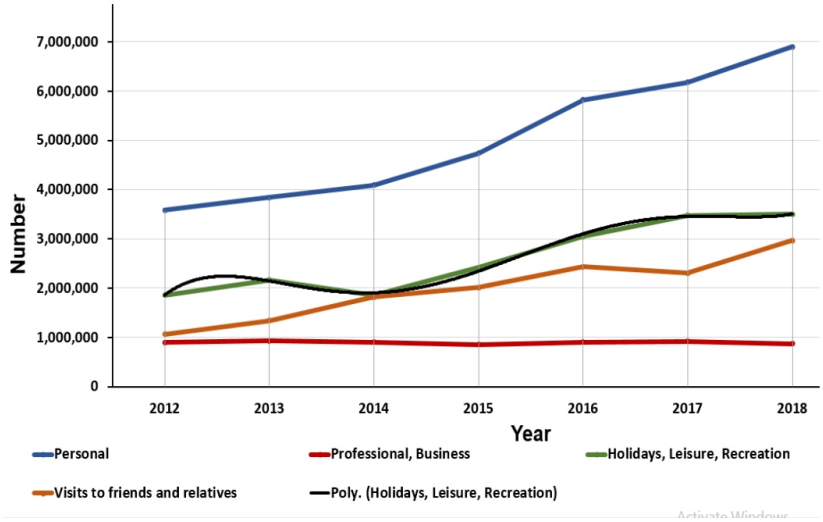

Figure 3. Traveling with purpose in Slovakia according to the categories; with a trend line for traveling for holidays, leisure and recreation reasons. The analyzed data are according to Eurostat (https://appsso.eurostat.ec.europa.eu) [Observed: October 10, 2019].

Expressing the trend line for traveling for holidays, leisure and recreation reasons according to Figure 3 using the semilogarithmic pattern:

$$y = 9956.5x^5 - 214395x^4 + 2E+06x^3 - 6E+06x^2 + 9E+06x - 3E+06 \quad (1)$$

while x means the year and y determines number of tourists.

The value for coefficient of determination:
$R^2 = 0.996$

The tendency is expressed using the polynomial dependency. The value for coefficient of determination has the satisfactory value for the proper expressing the tendency.

Conclusions

Through the analysis we found both a wide range of opportunities as well as reserves for those involved in tourism business. The increase or decrease in the number in the chart can mean not only the financial situation but also the amount, increase or decrease, in recreational opportunities with more or less interesting program. For hoteliers and tourism managers this means, above all, the task not to rely only on providing accommodation for potential clients but also to provide them with a quality program accordance to their interests.

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ANALYTICAL VIEW ON BUSINESS ENVIRONMENT ATTRIBUTE IN CONTEXT OF TRAVEL AND TOURISM COMPETITIVENESS INDEX

ANALYTICKÝ POHĽAD NA ATRIBÚT PODNIKATEĽSKÉHO PROSTREDIA V KONTEXTE INDEXU KONKURENCIESCHOPNOSTI CESTOVNÉHO RUCHU

Abstract: *The Travel and Tourism Competitiveness Index (TTCI) published by World Economic Forum consists of 14 characteristics (pillars) of tourism competitiveness. The aim of this paper is to model pillar Business Environment as a response of 13 other pillars of the TTCI from year 2017. Investigated dataset consists of values of TTCI and its pillars among 136 economies. This article aims to answer the question - how the values of other pillars contribute to the pillar BE - Business Environment. We focus on mentioned relationships of investigated variables with several tools, by using (1) quantile regression on the whole and on the reduced dataset after ordinary least squared stepwise procedure; by using (2) penalized lasso estimates and finally, to compare their results. From the point of view of significance of the coefficients order of variables is different for two methods.*

Keywords: *The Travel and Tourism Competitiveness Index, Regression quantiles, Lasso estimates.*

JEL Classification: *C31, L83, Z32*

Introduction

The tourism industry is constantly changing, due to the modification of customer values, motives, attitudes, and behaviors, impacting not only businesses but also the country. Therefore, this industry is undergoing essential transformations due to various determinants. Their designation, classification, understanding, and assessment allow plan and make strategic decisions for future development. These transformations can be a key for the tourism industry subjects who are able to develop and innovate this area, to increase travel and tourism competitiveness. One of the widely used indicators of the travel and tourism competitiveness of countries all over the world is Travel and Tourism (T&T) Competitiveness Index. This index provides a comprehensive strategic benchmarking tool and contributes to the development and competitiveness of a country.

In general, many factors impact the tourism sector in a country, what is reflecting in a number of indicators that make up the Travel and Tourism Competitiveness index (TTCI). From a methodological point of view used for the period 2015-2017, the top indicator TTCI consists of four subindexes, which are created by several pillars and these pillars are made by further subpillars. For each country under consideration, the index is given by the overall score. Pillars of Enabling Environment characterise the main settings required for operating in a country. Pillars of T&T Policy and Enabling Conditions characterise particular policies or strategic aspects that affect the T&T industry more directly. Pillars of Infrastructure characterise the availability and quality of physical infrastructure in a country. Finally, pillars of Natural and Cultural Resources identify the main reasons or motives to travel [6]. The question is how the individual indicators influence Business environment. This would require extensive analysis, but we will only focus on one part. We are interested in a question, how do the values of other pillars

contribute to Business Environment? We aim to answer this question by using quantile regression and penalized lasso estimates.

When deciding on the choice of destination when travelling abroad, comparing the individual destinations plays an important role [21]. To examine overall tourism competitiveness has a rapidly growing importance in the ever-evolving tourism industry. Crotti and Misrahi [5], [6] determined factors that influence travel and tourism competitiveness using mentioned TTCI. In 2017, the index was divided into 4 subindexes, which were made up by 14 pillars (in total), and 90 individual indicators. A composition of TTCI in 2017 presents next list:

- Subindex I. Enabling Environment, 5 pillars:
  - Business Environment (*BE*),
  - Safety and Security (*SS*),
  - Health and Hygiene (*HH*),
  - Human Resources and Labour Market (*HRL*),
  - ICT Readiness (*ICT*),
- Subindex II. T&T Policy and Enabling Conditions, 4 pillars:
  - Prioritization of Travel and Tourism (*TT*),
  - International Openness (*IO*),
  - Price Competitiveness (*PC*),
  - Environmental Sustainability (*ES*),
- Subindex III. Infrastructure, 3 pillars:
  - Air Transport Infrastructure (*ATI*),
  - Ground and Port Infrastructure (*GPI*),
  - Tourist Service Infrastructure (*TSI*),
- Subindex IV. Natural and Cultural Resources, 2 pillars:
  - Natural Resources (*NR*),
  - Cultural Resources and Business Travel (*CRBT*).

Business Environment (*BE*) is the first pillar of the first subindex of TTCI – Enabling Environment that is directly linked to the economic growth of a country. *BE* is composed of 12 subpillars, namely Property rights, Business impact of rules on FDI, Efficiency of legal frameworks in settings disputes / in challenging regs, Time required / Cost to deal with constructions permits, Extent of market dominance, Time / Cost to start a business, Effect of taxation on incentives to work / invest, Total tax rate. This pillar captures the extent to which a country has a supportive policy environment for businesses. Focusing on this pillar is important, because, nowadays, a rapid pace of change causes, among other things, changes in the business environment. Knowing and understanding the business environment is crucial to the conception, development, and maintenance of a successful management strategy. Successful tourism strategies will require that policy-makers not only understand previous and current tendencies and changes in the business environment but will require the ability to prognosticate novel principal emerging developments and transformations [24]. It is necessary for tourism stakeholders, especially government and business managers, to identify factors determining their country's business environment in order to appropriately coordinate available resources, make decisions, design management strategies and thus create value for tourists. Jin, Weber [13] pointed out that one of the major factors of tourism competitiveness for event organizers are general business environment. Others are economic status, market demand, international standing, accessibility in terms of travel time, convenience and costs, leisure environment, and government support [23]. To better know the business environment, a more comprehensive approach is required.

In this paper, we investigate, how do the values of other pillars contribute to Business Environment pillar? The aim is to examine relations of *BE* with other pillars, which importance is various. At the beginning, we describe the importance of the other pillars that make up the index. First subindex, Enabling Environment, consists of five pillars. *SS* is an essential pillar because tourists usually do not like to travel to dangerous countries and regions. Pillar consists of indicators connected with the "costliness of common crime and violence as well as terrorism, and the extent to which police services can be relied upon to provide protection from crime" [5, p. 6]. Also healthy environments and safe

landscapes, in terms of health and hygiene, can make a significant contribution to increasing the visitor arrivals into the destination [31, p. 284]. *HH* is measured by indicators such as the availability of physicians and hospital beds, prevalence of malaria and HIV. Also low readiness of human resources is barrier to the tourism industry development [30]. Within *HRL* are evaluated factors connected with qualifications of the labour force, and indicators taking into account hiring and firing practices, ease to finding skilled employees, ease to hiring foreign labour, pay and productivity, and female labour force participation. Many authors point out the importance of the Internet in the development of various industries. Accelerating progress in technology related to the Internet has led to progressive changes [28]. Nowadays, there is a growing number of booking travel and accommodation via the Internet, or searching places on the map using mobile applications. Therefore, *ICT* readiness of the country is also a very important pillar describing the competitiveness of the destination.

Government and policy makers also play an important role in the country's travel and tourism competitiveness. They can channel funds to the appropriate areas and thus improve development of tourism sector. Moreover, stability of government policy can attract new investors. All indicators about prioritization of T&T are part of sixth - *TT* pillar of TTCI. Country openness in terms of travel, visa conditions and other restrictive policies are part of the seventh pillar - *IO*. Pricing issue in market conditions is also the specific issue [2] of tourism - pillar *PC*. Specifically, ticket taxes, airport charges, hotel price index, purchasing power parity and fuel price levels determine price competitiveness of tourism industry. Many researches are currently looking at the issue of environmental sustainability in relation to tourism. Consequently, the TTCI designers could not forget the *ES* pillar. It is composed of even ten subpillars connected with stringency and enforcement of environmental regulations, sustainability of T&T development, and indicators assessing the status of water, forest resources and seabeds, proxied by coastal shelf fishing pressure. All of mentioned four pillars belong to second subindex T&T Policy and Enabling Conditions.

Another three pillars connect with infrastructure and compose third subpillar with the same name. “Air transport is an indispensable element of tourism, providing the fastest link between the tourist population and their destinations “[8, p. 52]. The availability of efficient and accessible transport to key business centers and tourist attractions requires a sufficiently extensive road, railroad network, as well as port infrastructure that should meet international standards of comfort, safety, security and transport efficiency [5]. The air infrastructure and ground and port infrastructure is evaluated separately within tenth *ATI* and eleventh *GPI* pillar. Moreover, tourist service infrastructure *TSI* belongs to third subindex. It is about availability of accommodation, resorts and entertainment facilities with appropriate quality and standards.

Unique and distinct natural environment provide resources for tourism development. Subpillars of *NR* also contributes to tourism competitiveness and these include number of World Heritage natural sites, total known species, total protected areas, or quality of the natural environment. Finally, culture is one of the most significant tourist’s motivators in choosing a given destination [4], [26]. A sufficient number of cultural resources, attractiveness or sites including into UNESCO cultural World Heritage sites of the country, therefore, increase its tourism competitiveness, and thus the *CRB* pillar is one of the very important components of the TTCI. This pillar also includes business travel that is measured by international association meetings taking place in a country. These two pillars are a part of last subindex - Natural and Cultural Resources.

Material and Methods

Investigated dataset consists of values of Travel and Tourism Competitiveness Index (TTCI) and its pillars among 136 economies from 2017. The question is how the values of other pillars contribute to the pillar *BE* - Business Environment. This article aims to answer this question by using quantile regression and penalized lasso estimates.

The effect of a change in the Business Environment pillar of the country among 136 countries depending on other 13 pillars contributing to TTCI would be tested by using simple ordinary least squares method, which describes conditional mean of response variable as a linear function of the explanatory variable. The response and all the regressors are continuous variable without missing values. However, 1-2 outliers occur in 8 variables and in one up to 10. And moreover, the collinearity diagnostics confirm that

there are serious problems with multicollinearity. Several eigenvalues are close to 0, indicating that the predictors are highly intercorrelated and that small changes in the data values may lead to large changes in the estimates of the coefficients. The condition indices are computed as the square roots of the ratios of the largest eigenvalue of X^TX to each successive eigenvalue. Six of these indices are larger than 30 (from 31.2 to 78.9), suggesting a serious problem with collinearity [12], [25]. Thus, other methods should be used (see [15], [14]). Kalina et al. [16] used on similar data from the previous period (TTCI 2015) quantile regression and their lasso estimates. In this study, we focus on mentioned relationships of investigated variables with similar tools, by using (1) quantile regression and by using (2) lasso estimates.

For the first, according to Agresti [1], quantile regression models quantiles of a response variable as a function of explanatory variables. This method can be less severely affected by outliers than ordinary least squares. However, when the normal linear model truly holds, the least squares estimators are much more efficient. The OLS model estimates constant effects of the independent variables on the conditional mean of the dependent variable and assumes a normal distribution of errors with constant variance. Quantile regression models were initially proposed by Koenker and Bassett [17] as a method of robust regression that would account for a non-normal distribution of error terms and as a test for heteroskedastic error terms (see more in Koenker [19] and [20]). The quantile reression is widely used in various fields of study, for example in [3], [7]. At the heart of the optimization problem is the minimization of asymmetrically weighted absolute residuals. By asymmetrically weighted residuals, they mean assigning different weights to positive and negative residuals [3]. This results in the minimization equation for conditional quantiles

$\min_{\xi \in R} \sum_{i=1}^{n} \rho_\tau(y_i - \xi(x,\beta))$,

where $\rho(.)$ is the absolute value function that gives the τ-th sample quantile, y_i is the observed value of the dependent variable, and $\xi(x,\beta)$ is the predicted value in the form of parametric function. (More in [17], [18], [19] and [20]).

For the second, the lasso is a popular method for regression that uses an l_1 penalty to achieve a sparse solution. Regression shrinkage and selection via the lasso was proposed by Tibshirani in 1996. As states in his work [29], the lasso minimizes the residual sum of squares subject to the sum of the absolute value of the coefficients being less than a constant. It produces interpretable models like subset selection and exhibits the stability of ridge regression. The lasso does not focus on subsets but rather defines continuous shrinking operation that can produce coefficients that are exactly 0. For standardized predictor variables $x_1, x_2, \ldots, x_p$ (assumed independent n observations for $i = 1,2, \ldots, n$) the lasso estimate is defined by

$$(\hat{\beta}_0, \hat{\beta}) = \text{argmin}\left\{\sum_{i=1}^{n}\left(y_i - \beta_0 - \sum_j \beta_j x_{ij}\right)^2\right\} \quad subject\ to \ \sum_j |\beta_j| \le t$$

where $\hat{\beta} = (\hat{\beta}_1, \hat{\beta}_2, \ldots, \hat{\beta}_p)^T$. For all t, the solution for β is $\hat{\beta}_0 = \bar{y}$. Here $t \ge 0$ is a tuning parameter which controls the amount of shrinkage that is applied to the estimates. The prediction error (mean square error of an estimate $\hat{Y}$ plus variance of residuals) is estimated over a grid of values of s (s is normalized lasso parameter $s = t/\sum|\hat{\beta}_j^0|$, where $\hat{\beta}_j^0$ are the full least squares estimates) from 0 to 1 inclusive. The value $\hat{s}$ yielding the lowest prediction error is selected. Cross-validation and other two methods are employed for the estimation of the lasso parameter t (more in [29]).

Moreover, in 2008 [9] was proposed fast algorithms for fitting generalized linear models with elastic-net penalties. Elastic net penalty is a mixture of the l_1 (lasso) and l_2 (ridge regression) penalties [27]. The algorithm for the elastic net includes the lasso and ridge regression as special cases ([10], [11]). The elastic net solves the following problem (from [9], more general see in [11])

$$\min_{(\beta_0,\beta)\in R^{p+1}} \left[\frac{1}{2n}\sum_{i=1}^{n}\left(y_i - \beta_0 - x_i^T\beta\right)^2 + \lambda\sum_{j=1}^{p}\left[\frac{1}{2}(1-\alpha)\beta_j^2 + \alpha|\beta_j|\right]\right]$$

over a grid of values of λ covering the entire range. The tuning (regularization) parameter λ controls the overall strength of the penalty. The second sum in previous formula is the *elastic-net penalty*. For α=0 it is the ridge regression, and for α=1 the lasso penalty. The elastic net with $\alpha = 1 - \varepsilon$ for some small

$\varepsilon > 0$ performs much like the lasso, but removes any degeneracies and wild behavior caused by extreme correlations [9].

Results and Discussion

Table 1 shows the coefficients of the Business Environment *BE* as dependent variable, which were estimated at the 15th, 20th, 25th, 30th, 40th, 50th, 60th, 70th, 75th, 80th and 85th quantile levels using multiple quantile regression on the 13 pillars contributing to Travel and Tourism Competitiveness Index. The tests of significance were based on the robust bootstrap estimations of standard errors [18]. There can be seen in detail the relationship of each selected quantiles of the dependent variable on the chosen variables. Three out of four covariates having no significant coefficient were omitted from the table (*IO*, *ES*, and *TSI*).

Table 1 Estimated coefficients of Business Environment as dependent variable - a results of multiple quantile regression; "*a*", "*b*", "*c*", "*d*" denotes 10%, 5%, 1%, and 0.1% significance level.

tau	SS	**HH**	**HRL**	**ICT**	TT	PC	ATI	**GPI**	NR	CRBT
0,15	0.025	-0.426^{c}	0.659^{b}	0.351	0.094	0.228	0.110	0.120	-0.140	-0.058
0,20	0.046	-0.407^{d}	0.496^{b}	0.351^{b}	0.064	0.219^{a}	0.141	0.093	-0.138	-0.064
0,25	0.069	-0.390^{d}	0.513^{b}	0.314^{b}	0.043	0.223^{b}	0.132	0.114	-0.105	-0.087
0,30	0.021	-0.358^{d}	0.471^{b}	0.327^{b}	0.086	0.208^{a}	0.145	0.109	-0.115	-0.091^{a}
0,40	0.014	-0.300^{c}	0.377^{b}	0.296^{b}	0.112	0.143	0.145	0.165^{a}	-0.071	-0.080
0,50	0.037	-0.189^{b}	0.351^{b}	0.241^{b}	0.162^{b}	0.003	0.230^{c}	0.137^{a}	-0.049	-0.128^{b}
0,60	0.051	-0.231^{d}	0.383^{c}	0.222^{b}	0.138^{b}	0.031	0.246^{c}	0.093	-0.067	-0.111^{a}
0,70	0.096	-0.199^{c}	0.385^{c}	0.193^{b}	0.061	0.074	0.112	0.147^{b}	-0.054	-0.056
0,75	0.095	-0.181^{c}	0.431^{d}	0.154	0.066	0.047	0.111	0.152^{b}	-0.042	-0.065
0,80	0.077	-0.196^{c}	0.423^{c}	0.239^{b}	0.064	0.026	0.085	0.166^{b}	-0.018	-0.074
0,85	0.070	-0.191^{c}	0.499^{c}	0.234	0.004	0.032	0.100	0.167^{a}	-0.039	-0.088
OLS	0.044	-0.269^{d}	0.515^{d}	0.219^{c}	0.115^{b}	0.090	0.168^{c}	0.136^{b}	-0.111^{b}	-0.073^{b}

Note: the abbreviations at the top of the table are explained on page 2
Source: own calculation in R

Bolded variables in the Table 1 - *HH*, *HRL*, *ICT* and *GPI* have more than 50% of coefficients significant. The quantile regression effect of *HH* reveals a pattern of increasing effect of coefficients, but it is never statistically different from the value of the OLS coefficient. After exhibiting a nearly linear increase in value through the median, the value of the quantile regression coefficient are almost constant on the upper bound of the OLS estimate. An interesting phenomenon is seen taking into account regressor *NR*, at which no significance at any quantile level has been demonstrated despite significant OLS coefficient. Regressor *PC*, which was not significant in OLS, has significant coefficients at low quantile levels for tau from 0.15 to 0.35, while has not at upper quantile levels. For the variables *TT*, *ATI*, *GPI*, and *CRBT*, the wavy shape of the coefficients depending on quantile level signify their significance only at certain intervals of quantile levels. Our results show that a negative relationship between *BE* and *HH* is more and more weaker with increasing quantile level. Similarly, but very softly, it is within a positive relationship between *BE* and *ICT*, *PC* and *ATI*. However, taking into account *PC* and *ATI* on higher quantile levels, we can see no significant relationship with *BE*. *NR* coefficients are significantly different from 0 only in a narrow interval around the quantile level 0.25. *GPI* coefficients are not significantly different from 0 in interval circa from 0.45 to 0.7. *CRBT* coefficients are significantly different from 0 up to quantile level around 0.8.

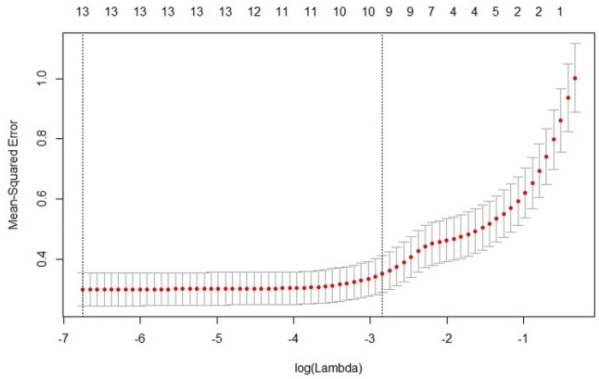

Figure 1 Lasso - the cross-validated error rates Source: own calculation in R

When considering the lasso estimates for our variables which are there standardized, Figure 1 plots of the cross-validated error rates. Each dot represents a λ value along our path, with error bars to give a confidence interval for the cross-validated error rate. The left vertical bar indicates the minimum error (denoted lambda.min) while the right shows the largest value of λ such that the error is within one standard deviation of the minimum (denoted lambda.1se). The top of the plot gives the size of each model [9]. If right vertical bar will be considered, 9 regressors stay in the final model. It is clear from the Figure 2, which variables there are (from 13 variables).

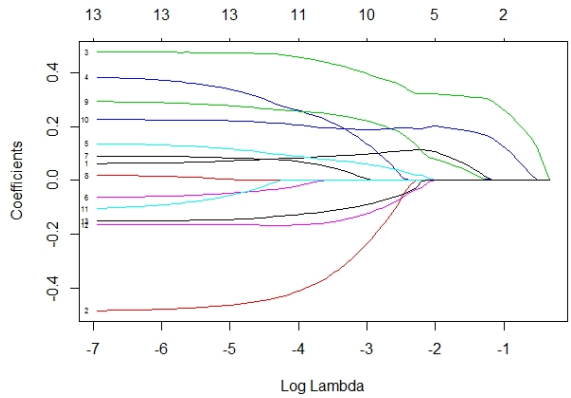

Figure 2 Lasso estimates of regression parameters for all 13 regressors; coefficients are numbered as follows: 1-*SS*, 2-*HH*, 3-*HRL*, 4-*ICT*, 5-*TT*, 6-*IO*, 7-*PC*, 8-*ES*, 9-*ATI*, 10-*GPI*, 11-*TSI*, 12-*NR*, 13-*CRB*.
Source: own calculation in R

Figure 2 shows the estimates of 13 regressors for LS-lasso. According to [11], each curve in Figure 2 corresponds to a variable. It shows the path of its coefficient against the *Log* λ of the whole coefficient vector at as tuning parameter λ varies. The axis above indicates the number of nonzero coefficients at the current λ which is the effective degrees of freedom (df) for the lasso [11].
When using LS-lasso regression on standardized and strong correlated variables, it is possible to see some deviation from the output of quantile regressions performed on both the original and reduced regression sets. The value of lambda.min, e.g. lambda that gives minimum mean cross-validated error was obtained in 0.00205 with df=13, thus all of 13 variables are taking into the model. If we took into account lambda.1se, the largest value of lambda such that error is within 1 standard error of the

minimum, λ=0.04846, the 9 regressors stay. If the comparable lasso coefficients of the standardized predictors for lambda.1se are ranked according to size in descending order, their rakining is as follows: *HRL, HH, ATI, GPI, ICT, NR, SS, CRBT, TT, PC*-near zero, and for *IO, ES, TSI* are zeros.

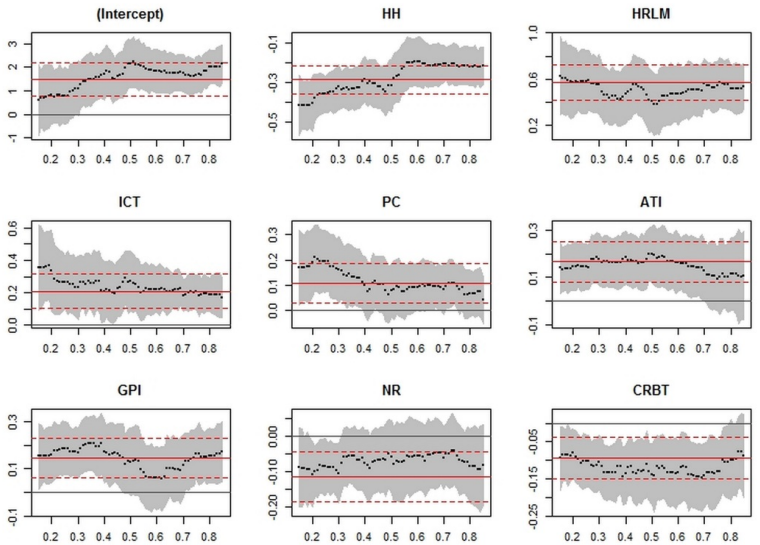

Figure 3 Quantile regression process for Business Environment with 8 regressors
Source: own calculation in R

For OLS regression with all 13 regressors for dependent *BE* was used stepwise procedure that eliminated 5 variables: *SS*, *TT*, *IO*, *ES,* and *TSI.* Result of quantile regression using 8 remaining regressors is presented in Figure 3. It is a compact way of presenting information on the OLS and the quantile regression coefficients with a series of effects displays in. In each panel, the value of the OLS coefficient is represented by a solid line, the values representing a 95% confidence interval around the OLS coefficient are represented with dashed lines. The quantile regression coefficients are represented by the black dots, and a 95% confidence band around the quantile regression coefficient estimates is represented by the gray band. By comparing Table 1 and Figure 3 it is possible to find out that the pattern of development of quantile coefficient in Figure 3 is very similar to Table 1, taking into account 8 selected regressors. For regressors *PC*, *ATI*, *GPI*, *NR,* and *CRBT* we can see (in contrary to the result presented in the Table 1) more extensive sections of quantile levels, in which the corresponding coefficient is significantly different from 0.

Summary

The tourism industry is considered to be a complex system of relationships [22]. Unleashing new growth potential of industry within a given country requires enhance its competitiveness [16]. Therefore, our goal was to reveal how the values of other 13 pillars concerning competitiveness in tourism contribute to the pillar *Business Environment*. For the first, standard OLS and quantile regression for all 13 regressors on the *Business environment* as dependent variable was used. Second, the lasso estimates was performed. Third, on set of regressors after elimination by stepwise OLS procedure quantile regression was used.

Approximately ranked regressors according strength and quantity of their significancy at various quantile levels by using first procedure - quantile regression on all data set, are: *HH*, *HRL*, *ICT*, *GPI*, *ATI*, *CRBT*, *TT*, *PC*, *NR* and four no significant *SS*, *IO*, *ES* and *TSI*.

Taking into account second method - lasso estimates, if the comparable lasso coefficients of the standardized predictors for lambda.1se are ranked according to size in descending order, their rakining is as follows: *HRL, HH, ATI, GPI, ICT, NR, SS, CRBT, TT, PC*-near zero, and for *IO, ES, TSI* are zeros.

For OLS regression with all 13 regressors, for dependent *BE,* stepwise procedure was used that eliminated 5 variables: *SS*, *TT*, *IO*, *ES,* and *TSI.* Reused quantile regression on a set of reduced variables after this stepwise procedure leads to approximate ranking of remaining regressors: *HH*, *HRLM*, *ICT*, *CRBT*, *GPI*, *ATI*, *PC* and *NR*.
When using LS-lasso regression these are different from the selection of OLS stepwise. By using LS-lasso, we have variables *SS* and *TT*, and to the contrary, in the result we miss *PC* variable. In the next step it is needed to use RQ-lasso, as in [16], and continue experimenting with the elastic net.
In-depth statistical analysis of variables for each area, also for tourism, the results can helps policy makers set parameters to achieve increased competitiveness.

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CONSTRUCTION OF LOGIT MODEL APPLYING SELECTED FINANCIAL INDICATORS

KONŠTRUKCIA MODELU LOGIT UPLATŇOVANÝCH VYBRANÝCH FINANČNÝCH UKAZOVATEĽOV

Abstract: *The prediction of bankruptcy or financial health of companies is nowadays a highly discussed topic. There are many models for bankruptcy prediction. The method of logistic regression seems to be a very suitable approach to the solution of the problem. Using this approach, it is possible to apply selected financial indicators that are the bearers of the financial health of the company, taking into account risks and specificities of the industry in which the company operates. Thanks to that it is possible to construct a model for predicting company's future success or failure. The aim of the paper is to predict bankruptcy of analyzed sample of businesses with the use of selected financial indicators that will serve as inputs in the Logit model. The outputs of this model will enable the construction of a business prediction model. The research was carried out on a sample of heat management companies. The data necessary for processing were provided by CRIF - Slovak Credit Bureau, s.r.o. for the year 2016. The benefit of this research is to identify financial indicators that are important in the area of the prediction of bankruptcy of heat management companies and construct a specific prediction model for the sample.*

Keywords*: Bankruptcy, Logit, Financial Indicator, Model, Prediction*

Kľúčové slová*: Bankrot, Logit, finančný ukazovateľ, model, predikcia*

JEL classification: M20, G33, C53

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Introduction

The precondition for competitiveness of businesses is their financial health. Therefore it is necessary to pay more attention to evaluating businesses` financial health and predicting their bankruptcy (Štefko, Slusarczyk, Kot, Kolmasiak 2012). The loss of competitiveness as a cause of bankruptcy examined Suhányi and Suhányiová (2017).
Determining the probability of company's bankruptcy is becoming one of the most important tasks of risk management. The risk can be expressed as a quantitative and qualitative threat, while it is characterized by the probability of the occurrence of risk situation which can culminate in the crisis of a system and consequently its bankruptcy (Tej, Bartko and Ali Taha 2013).

Empirical studies to date have found that inefficiencies, high corporate indebtedness, and solvency problems are a prerequisite for bankruptcy (Altman 1968). Achim et al. (2012) (In: Mihalovič 2015) claim that the risk of bankruptcy of a company is closely linked to economic and financial risks. While financial risk depends on the level of indebtedness, economic risk depends on the ratio between fixed and variable costs. In general, knowing these indicators allows us to quantify the risk of a company going bankrupt. Although there is no uniform definition of bankruptcy, it is appropriate to follow the

definition of Dimitras et al. (1996), according to whom bankruptcy is a situation where a company is unable to pay its creditors, shares to shareholders, suppliers, has an overdraft account or a company has gone bankrupt under applicable law. According to Venkataramana, Azash and Ramakrishnaiah (2012) bankruptcy is a situation where the liabilities exceed the assets in the company, generally it happens due to under capitalization, not maintain sufficient cash, sources are not utilize properly, in efficient management in all activities, sales decline and market situation deteriorates Baldwin and Mason (1983) define bankruptcy as a failure of a company to comply with loan agreements and pay dividends. Andrade and Kaplan (1998) identify two forms of financial distress: the first is aimed at debt recovery and the second is an attempt to restructure the debt so as to avoid a baseline situation. The research by Jensen (1989) and later Whitaker (1999) suggests that addressing the financial difficulties of businesses that lead to corporate bankruptcy requires measures to improve the efficiency and performance of businesses. Trahms et al. (2013) contributed most to the research into the causes of bankruptcy (In: Mihalovič 2015). They state that complex indicators of business performance decline must be studied into detail in this regard. Úradníček (2010) (In: Gundová 2015) points out that there have been some long-term anomalies showing symptoms of future problems that are characteristic of the companies at risk in companies before they entered into crisis. He further states that these symptoms are manifested mainly in the performance of the company, and are evident from the values of various financial indicators and models.

Literature review

Nowadays, there are a large number of models, theoretical and practical, designed to assess the financial performance and probability of bankruptcy. Several models are based on mathematical - statistical methods (mostly regression models or discriminatory analysis). Prediction models are the basic tool for analyzing the financial health of a company and predicting its financial distress. However, it is questionable whether these models will provide credible and sufficient information about the financial situation of a company in all industries without taking into account special requirements of these industries. Based on the above, the aim of the article is to select the appropriate financial indicators and then use them in the Logit model. The acquired outputs will enable the construction of a predictive model for companies operating in the field of our choice.

The origins of prediction models date back to 1930, to the studies concerning the application of ratio analysis to predict future bankruptcy. Research into prediction models until the mid-1960s was based on the application of one-factor analysis. Fitzpatrick (1931) was the first to predict bankruptcy by comparing the financial indicators of solvent and insolvent companies in his study. In the following years, research was conducted by Mervin (1942), Chudson (1945), Jackendoff (1962) and Beaver (1966) (In: Delina, Packová 2013). The one-factor study by Beaver (1966) is generally the most widespread and most used. Beaver has shown that financial ratios can be useful in predicting a company's financial distress (Šarlija, Jeger 2011). He confirmed that not all financial indicators can be applied to predict the difficulties of companies. Since the use of simple financial indicators has been questioned in practice, due to their possible bias by management decisions, Beaver suggested using a dichotomous classification test (Kidane 2004). Using this test, multiple financial indicators, with the greatest predictive ability, are identified and used as one predictor with multiple degrees of freedom. The essence of this method is to find such a linear combination of characteristics that best distinguishes two groups of companies, those facing bankruptcy and those not (Spuchľáková and Frajtová - Michalíková 2016). The one-factor analysis was later replaced by a multi-factor analysis. In 1968, Altman published the first study with multi-factor analysis, which is still very popular today. Since the Altman study (1968), the number and complexity of these models has increased dramatically. In the early period of prediction models, the discriminatory analysis was very popular and used by a vast number of researchers, like Beaver (1966); Altman (1968); Altman et al. (1977); Blum (1974); Deakin (1972); Norton and Smith (1980); Wilcox (1973); Taffler (1983). Altman's original model required that the assumptions of multinormality, homoskedasticity and linearity are met. These assumptions for financial indicators were often not met. If any of the variables is categorical, this method gives distorted results (Cisko and Klieštik 2013). However, the main drawback of this method is that although it is able to identify the companies that are likely to go bankrupt, it is unable to estimate the probability with which this situation occurs. Based on these shortcomings, the next step in the theory of bankruptcy prediction was to develop

methods and models that would be able to provide such information (Mihalovič 2015). That is why logistic regression has begun to be preferred even though it does not meet the above prerequisites. Logistic regression, also called the Logit model, is used mainly in models that have a dichotomous output variable (Klieštik, et al. 2015). Compared to methods based on multivariate discrimination analysis, logistic regression has several advantages. Compared to discriminatory analysis, it has a higher predictive ability and its application does not require compliance with assumptions that could limit its usefulness. In the case of discriminatory analysis, it is also required to fulfill the assumption that unnecessarily complicates the preparation of data by initial testing. Other advantages of logistic regression include e.g. there is no need to divide values of independent variables, no need to test the importance of individual variables before the analysis, as well as no need for equality of variance-covariance matrices (Gundová 2015). Martin (1977) was the first to use logistic regression to predict bankruptcy. He used selected financial indicators as inputs of the Logit model. Ohlson (1980) used it first in companies. Ohlson, as a pioneer in the application of logit analysis, due to the requirement for the same variance - covariant matrices (Klieštik et al. 2015) disagreed with the application of discriminatory analysis to predict bankruptcy. However, the Logit models also have its weakness, which includes sensitivity to remote observation. In Logit models, the Odds ratio of the predicted variable is calculated as a linear combination of predictors (Klieštik et al. 2015). The logit model thus provides the option of modelling complex relationships between variables, but at the same time assumes a log-linear relationship between the explained and explanatory variables. Logistic regression is especially useful when predicting binary output from continuous independent variables. It should be noted that discriminatory analysis may be more useful for small data sets, but for larger samples logistic regression is more suitable (Mišanková, et al. 2015).

Methodology

The input database of this empirical study was created from the data of 497 enterprises operating in Slovakia in the area of heat supply. The database is from 2016 and was provided by CRIF - Slovak Credit Bureau, s.r.o (CRIF 2018). The sample of companies analyzed falls under the sectoral classification of economic activities SK NACE Rev. 2 to section D 'Supply of electricity, gas, steam and cold air'. Three quarters of these companies are in terms of their legal form limited liability companies. The results of the financial analysis show that the average value of total liquidity is 3.92. However, the median of this indicator is 0.951, which may indicate some liquidity problems. This is also related to the negative value of net working capital, which is caused by the lack of long-term liabilities. The analyzed sample of companies shows a high turnover time of short-term liabilities, which causes a negative value of money turnover. The average time for assets turnover in these companies is one year on average. The average value of return on assets is 5%. In the capital structure of these companies dominate equity in favor of debt. Cost ratio of the companies is high, which results in their lower performance.

To assess the financial health of companies and to predict bankruptcy, we selected 9 financial indicators, 8 indicators according to Premachandra et al. (2009) and 1 indicator according to Altman (1983). Due to the construction of the Logit model, which was aimed at identifying bankruptcy, it was necessary to invert the inputs and outputs of the model. We used two indicators as the output, the indicator LTL/A - long-term liabilities/ assets, used as an indicator indicating the long-term indebtedness of the company and the indicator STL/A - short-term liabilities/ assets, which assesses problems in financing business operations. Six indicators were applied as inputs: CF/A - cash flow/assets, EAT/A - earnings after tax /assets, WC/A - working capital/assets, CA/A - current assets/assets, EBIT/A - earnings before interest and tax/assets, EBIT/IE - earnings before interest and tax /interest expense. The last indicator that was part of the model is the indicator that was applied in the Altman's model (1983) E/L - equity /liabilities. In selecting the indicators that served as inputs to the Logit model, the procedure of Sperandei (2014) was followed. Gradually, all 9 explanatory (independent) variables were tested by creating models using just one explanatory variable. Based on the results, indicators that were statistically significant (in our case P-value ≤ 0.25) were chosen. Selected indicators are presented in Table 1.

Tab. 1: Indicators entering the Logit model

WC/A	*working capital/assets*
CA/A	*current assets/assets*
CF/A	*cash flow/assets*
EBIT/A	*earnings before interest and tax/assets*
EBIT/	*earnings before interest and tax /interest expense*
LTL/A	*long term liabilities/assets*

Source: authors

Table 2 presents descriptive statistics of the indicators that served as inputs to the Logit model. Enterprises are divided into two groups (Table 2). The first group consists of companies that are expected to enter bankruptcy and the second group consists of companies that do not. Of these values, it is necessary to point out cash flow, which negative value is one of the bankruptcy symptoms. The mean and median of indicators CF/ A, WC/ A, EBIT/ A and EBIT/ IE in companies facing bankruptcy are negative. In the case of the WC/ A indicator, its mean and median are also negative for companies not facing bankruptcy. The sample of enterprises analyzed has a problem with the value of net working capital, which is negative in most enterprises.

Tab. 2: Descriptive statistics of selected indicators

Financial indicators	*CF/A*	*WC/AM*	*CA/A*	*EBIT/A*	*EBIT/IE*	*LTL/A*
Bankrupt businesses						
Mean	-0.015	-0.118	0.241	-0.075	-4.679	0.406
Median	-0.008	-0.052	0.155	-0.037	-0.335	0.418
Standard deviation	0.170	0.368	0.248	0.144	13.460	0.409
Skewness	-3.335	-1.995	1.757	-3.665	-4.108	0.284
Non-bankrupt businesses						
Mean	0.128	-0.056	0.287	0.080	843.173	0.346
Median	0.110	-0.022	0.190	0.060	2.306	0.354
Standard deviation	0.150	0.330	0.260	0.150	11610.880	0.290
Skewness	8.187	-3.361	1.497	9.114	16.436	0.084

Source: own processing in the software Statistica 13.1

To calculate the probability of bankruptcy of the analyzed sample of companies, we chose the logistic regression model (specifically the Logit model). This model belongs to the group of multivariate statistical models. It captures the relationship between the dependent variable Y and the independent variable X. The fundamentals of logistic regression were compiled by Meloun and Militky (2012) (In: Kováčová, Klieštik 2017).

Logistic regression works similarly to linear regression, but unlike linear regression, logistic regression works with a dependent variable in its nominal form (binary logistic regression) Sperandei (2014). The variable y_i can only take two values, $y_i = 1$ if the probability of bankruptcy occurs and $y_i = 0$ if the probability of bankruptcy does not occur. Further, we can assume that the probability $y_i = 1$ is given by P_i and the probability that $y_i = 0$ is given by $1 - P_i$.
By logistic transformation we specify the probability P_i with the use of the following model: $P_i = f(\alpha + \beta xi)$, where x_i are chosen financial indicators, α and β are estimated parameters. P_i is then calculated using the logistic function (1):

$$P_i = \frac{\exp(\alpha + \beta xi)}{1 + \exp(\alpha + \beta xi)} = \frac{1}{1 + \exp(-\alpha - \beta xi)} \qquad (1)$$

According to Hebák, et al. (2015) (In: Kováčová, Klieštik 2017) the Logit model (2) can be defined as follows:

$$\text{log}it = \ln\left(\frac{P_i}{1-P_i}\right) = f(\alpha + \beta x_i) \qquad (2)$$

This formula represents the logarithm of the Odds ratio of both possible alternatives $(P_i, 1- P_i)$. The goal of logistic regression is to calculate the Odds ratio $\left(\frac{P_i}{1-P_i}\right)$ while *ln* in this relationship represents the logit transformation. Using the results of this model, it is possible to determine whether a company is going bankrupt or not. In this classification it is possible to use the "Cut-off Score" (usually at the level of 0.5). Enterprises that have a probability value greater than 0.5 have a higher probability of going bankrupt than those below 0.5. In this context, two kinds of errors appear (Kováčová, Klieštik 2017): type I (alpha) and type II (beta) errors. In addition to calculating these errors, the overall accuracy of the calculations can be calculated to verify the accuracy of the prediction model. Table 3 shows the method of calculating type I and II errors.

Tab. 3: Bankruptcy prediction errors

	Predicted: bankrupt yes	Predicted: bankrupt no
Observed: bankrupt yes	The correct result (TP)	Error type I (FN)
Observed: bankrupt no	Error type II (FP)	The correct results (TN)

Source: Vavrek, et. al 2019, In: Klepáč, Hampel 2016

Type I error (3) is a false assumption of company going bankrupt (false negative rate):

$$\text{FNR} = \frac{FN}{TP+FN} \qquad (3)$$

Type II error (4) is a false assumption of financial health of a company (false positive rate):

$$\text{FPR} = \frac{FP}{TN+FP} \qquad (4)$$

Overall classification accuracy (5):

$$\text{ACC} = \frac{TP+TN}{TP+FN+FP+TN} \qquad (5)$$

To verify the predictive ability of the Logit model, we also chose the AUC (Area Under Curve) method, which measures the area under the Receiver Operating Curve (ROC). This test is a statistical procedure for evaluating correct and false positives as well as correct and false negatives. Analysis of ROC curves describes the relationship of sensitivity and specificity at different levels of discrimination (Klepáč, Hampel 2016; In: Bakeš, Valášková 2018). The basis for model evaluation is the size of the area under the curve - the larger the area, the higher the model's predictive power (Park, Goo, Jo 2004) or the more ROC curve is convex and nearing the upper left corner, model has better discriminatory ability (Gajowniczek, Zabkowski, Szupiluk 2014).

The Hosmer-Lemeshow's goodness of fit test can also be used to evaluate the strength of the resulting model (Hosmer, Lemeshow 2013). Within this test, the population is divided into ten groups according to estimated probabilities and then it is ascertained whether the estimated and observed success/failure in these groups is "reasonably" divided (i.e. whether the estimated frequencies and observed frequencies deviate). The test requires min. 5 cases to be present in the tested group (none of the groups can be less than 1). The null test hypothesis is: "The estimated and observed rates of success and failure do not differ". The test results are Chi-square statistics and p-value, with low p-value and high Chi-square statistics indicate that the model is not suitable.

To verify the significance of the effect of the explanatory variables on the probability „p", we applied the Wald test. With this test, we tested the null hypothesis for individual factors: the explanatory variable does not affect the probability of bankruptcy. It expresses whether β coefficient is statistically significant and different from zero. The test statistic, which has a normal distribution and is a ratio of the estimated coefficient to its standard error, was used to verify the hypothesis:

$$W = \frac{b'}{s_{b'}} \approx N\,(0,1) \qquad (6)$$

The Wald test is an approximation of the Likelihood Ratio Test (LR test). The LR test is based on the maximum plausibility criterion. The model includes those variables that will maximize its maximum credibility. When testing the hypothesis of the significance of the model as a whole, we test the hypothesis that all estimated model parameters are zero. It is therefore appropriate to use the LR Test or the Langrange Multiplier test (Score test). The LR test is as follows (7):

$$R = -2lnL_0\,(-2ln\,L_{max}\,); 0 \leq LR \leq \propto, \qquad (7)$$

L_0 is maximum likelihood of the function, if all the parameters of the function are equal to 0, except for the constants, L_{max} represents the maximum of the function L with respect to all parameters of that function.

By analogy to the coefficient of determination R^2 used in linear regression, several coefficients are applied in logistic regression. We can mention Cox and Snell R^2 or R^2 of Nagelkerke. The disadvantage of Cox and Snell R^2 is the fact that it cannot reach the value of 1. Therefore, Nagelkerke (1991) proposed a modification to remove this deficiency. These coefficients indicate how much variance the model explains.

A very significant output of the Logit model is the Classification table, which indicates how many percent of companies were evaluated correctly in terms of dependent variable.

Results and discussion

Based on the chapter "Methodology", we have chosen 6 financial indicators for the final construction of the Logit model. Using the Statistica 13.1 software, the resulting model has been developed (see Table 4).

Tab. 4: Parameters of Logit model

Parameter	Estimate (b_i)	Standard error	Wald statistic	Lower CL 95 %	Upper CL 95%	P - value	Odds ratio
Constant	0.03934	0.535063	0.00540	-1.00937	1.08804	0.941395	
CF/A	9.63104	3.718342	6.70885	2.34323	16.91886	0.009594	1.52E+0
WC/A	-1.62043	0.869510	3.47304	-3.32463	0.08378	0.062377	1.98E-01
CA/A	2.10608	0.998457	4.44929	0.14914	4.06302	0.034916	8.22E+0
EBIT/A	26.59813	4.821434	30.43336	17.14830	36.04797	0.000000	3.56E+1
EBIT/IE	0.00019	0.000886	0.04758	-0.00154	0.00193	0.827333	1.00E+0
LTL/A	-0.15608	0.779916	0.04005	-1.68469	1.37253	0.841384	8.55E-01

Source: own processing in the software Statistica 13.1

The score achieved in the CF/ A, CA/ A, EBIT/ A predictors is statistically significant at a significance level of 0.05, so we can conclude that it significantly affects the probability of bankruptcy. Based on

Wald confidence intervals, it can be stated, with 95% confidence, that the values of CF/ A, CA/ A, EBIT/ IE are within the specified limits of the interval and none of the intervals contains the value 0 which would mean removing a variable from the model. This does not apply to the indicators WC/ A, EBIT/ NU, LTL/ A, which on the basis of the above results can be considered statistically less significant in relation to the probability of bankruptcy and will be subject to further research. This implies that independent variables CF/ A, CA/ A, EBIT/ A are acceptable for the Logit model. Of these variables, the most significant variable is EBIT/ A. The Odds ratio for these indicators indicates an increase in the probability of a company going bankrupt if the indicator falls by one unit (in the case of these indicators Odds ratio is higher than 1).

Table 5 shows the results of the Likelihood ratio test, Score test and Wald test.

Tab. 5: Results of credibility test

Test			
	Chi-Square	Df	P value
LR	138.380997	6	0.000000
Score	45.944291	6	0.000000
Wald	54.117381	6	0.000000

Source: own processing in the software Statistica 13.1

Based on the LR test results, variables are added to the model to increase the maximum credibility of the model. This test is therefore suitable not only to assess the suitability of the model, but also to assess the contribution of individual predictors to the model. The higher the value of the test statistics, the better the model describes the data.

In addition to the above tests, we also present the results of the Hosmer-Lemeshow test, which indicates a good fit of the model with the data used. The P - value is 0.859, so it is higher than the significance level $\alpha = 0.05$, therefore we accept the null hypothesis that the distribution of predicted and achieved results is the same across all groups of measurements. This model captures the data on which it was compiled.

Nagelkerke's R Square explains 57.1% of the variation, and it can be stated that this model is successful in explaining the "variability" of the dependent variable. The accuracy of the Logit model prediction is 97% for companies not facing bankruptcy and 59% for companies facing bankruptcy (Table 6).

Tab. 6: Classification of cases

Cases	Predicted: no	Predicted: yes	Percent correct
Observed: no	280	9	97
Observed: yes	22	32	59

Source: own processing in the software Statistica 13.1

To assess the discriminatory ability of the model, we constructed a ROC curve. This curve, shown in Figure 1, captures the relationship between sensitivity and specificity. In our case, the AUC area is 91.31%, which we can evaluate positively and thus, we are able to state that our model has a very good discriminatory ability.

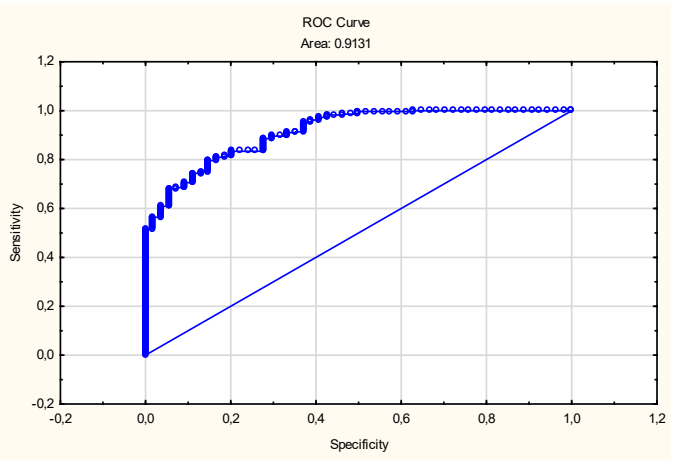

Fig.1: ROC curve

Source: own processing in the software Statistica 13.1

In Table 7 below, type I and type II errors are reported as the total model accuracy, sensitivity and specificity.

Tab. 7: Model prediction capabilities

Parameters evaluating predictive ability of Logit model in%	Type I error	Type II error	Sensitivity	Specificity	Overall classification accuracy	AUC
Logit model	40.74	3.11	59.26	96.89	90.96	91.31

Source: own processing in the software Statistica 13.1

Based on the above results, it can be concluded that the model we have prepared for heat management companies has a very good predictive ability and can be applied in the area of bankruptcy prediction. At the same time, we confirmed that selected indicators according to Premachandra et al. (2009) are suitable predictors of the impending bankruptcy of companies. Finally, we constructed the resulting Logit model, which is shown in Figure 2.

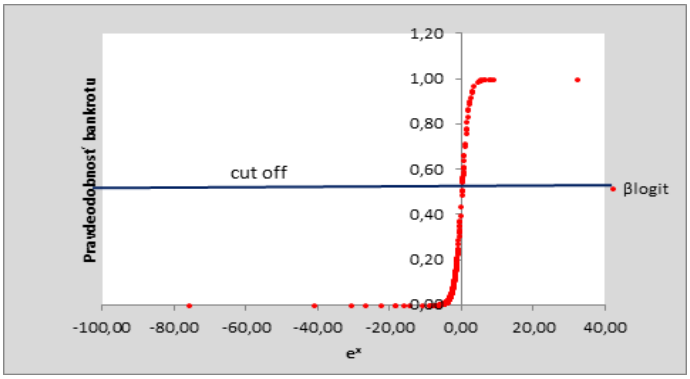

Fig.2: Logit model
Source: own processing in Excel

Figure 2 shows the cut-off line, with businesses above that line facing a probability of going bankrupt and businesses below this line facing lower (or no) probability of going bankrupt.

Summary

The competitiveness of a company is determined by its financial health and its performance. Therefore, monitoring financial health, performance, as well as detecting bankruptcy symptoms is one of the important tasks of controlling and risk management. In theory as well as in practice, a large number of prediction models are applied, which were elaborated by important theorists and practitioners. However, it has been confirmed that it is not appropriate to apply these models to all businesses and all industries. Therefore, the logistic regression and in particular the Logit model seems to be a suitable choice for the creation of prediction models as they take into account specific requirements in the area of bankruptcy assumptions assessment. Logit model achieved overall classification accuracy 90.96%. Compared to other studies Logit model of Araghi and Makvandi (2012) achieved estimation accuracy 81%, overall correct classification of logit model of Mendelová and Stachová (2016) was 77-95%, in the study of Premachandra et al. (2009) logit model achieved overall correct prediction 67%. With the Logit model, it is possible to formulate a prediction model for any company and any industry. It is possible to select appropriate financial indicators as bankruptcy predictors and then test them to formulate bankruptcy symptoms. For the industry analyzed, the following financial indicators were confirmed to be useful: the share of CF in assets, the share of current assets in assets and the return on assets. The first two indicators are predictors of liquidity and solvency, the third indicator is indicator of profitability. On the basis of the above, it can be stated that short-term and long-term predictors have merged, which we can evaluate positively.

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