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Abstract

The importance of relationship marketing in tourism is to some extent confirmed by the rapid expansion of scientific papers in this area. The primary aim of the presented study was to point to the scientific development of relationship marketing in relation to tourism until 2018. The analysis contained data from the Web of Science (WOS) Core Collection and compared 1565 scientific outputs. A bibliometric analysis based on the neural network principle was used to achieve the main aim. The bibliometric analysis and its graphical presentation can help researchers and experts better understand the current state of knowledge in the scientific field. Several authors clearly emphasized activities supporting the development of relationship marketing in tourism with regard to the demonstrable positive impact on this segment. The results of the analysis primarily pointed out that scientific theory focuses mostly on areas such as "tourism", "influence", "model", "behaviour", "network", "experience", "attitudes". As secondary outputs of the analysis, we can include an examination of the origin of studies on the analysed issue from several perspectives.

Keywords

Tourism. Relationships marketing. Bibliometrics. Web of Science.

***JEL* classification**

C45; L83; Z32; M31

1. Introduction

Businesses make great efforts to differentiate their offer and gain a competitive advantage. To this end, enterprises focused on measuring the quality of their products and customer satisfaction, trying to identify their shortcomings that they could subsequently remove. This approach has become ubiquitous among companies, but now enterprises are looking for other ways to gain differentiated benefits. Relationship marketing seems to be a very promising tool. Relationships are complex and multidimensional elements of society as a whole and, for this reason, enterprises should focus on relationships with their customers. In terms of customer relationship management (CRM), it is about building trust, commitment through frequent interactions in order to achieve mutual cooperation, compatible values and loyalty to the company. Relationship marketing is discussed by many authors in their studies, for example Hunt et al. (2006) or Larentis et al. (2018) dealt with this issue. Relationship marketing uses the methods that help to gain customer loyalty, which leads to increased competitive advantage and profitability. Kim et al. (2007) identified the following benefits of CRM: (1) increasing customer loyalty and customer retention, (2) increasing profitability, (3) creating value for

customers, (4) adapting products and services, (5) increasing the quality of products and services. The aim of relationship marketing is to create long-term profitable relationships between partners. In the context of the convenience goods market, private labels in traditional categories are considered a tool for developing effective relationships. Miquel-Romero et al. (2014) pointed to the use of relational approach to explain private label loyalty and the success of store brand extension strategies. Their study shows that customer experience, satisfaction, trust and commitment to private labels play an important role in customer loyalty to private labels for everyday consumer goods, increasing consumers' propensity to buy private labels in new categories such as durable goods. Therefore, creating trust and commitment, which will ultimately lead to in loyalty, is a strategic objective and a source of long-term profitability for retailers.

Frajtová-Michaliková and Kramárová (2010) stated that customer loyalty reflects the company's ability to meet customer needs with an expected utility, and a comprehensive customer view of the company in terms of overall satisfaction. Many studies have confirmed the relationship between customer satisfaction and willingness to buy again from the same enterprise, resulting in an extensive and intensive acquisition of customer. Popovic et al. (2018) conducted research focused on identifying the basic factors of hotel supply that could determine the impact on the relationship between the satisfaction of hotel guest and the likelihood of their return. The research confirmed the existence of a high degree of correlation between guest satisfaction (with hotel services and tourist offer) and the probability of returning to the selected Montenegrin destinations. Many studies have addressed customer satisfaction in tourism, such as Albayrak et al. (2017) or Alegre and Garau (2010), confirming the importance of this issue. The following paragraphs are devoted to clarifying the fundamental knowledge on this issue.

Customer-oriented company

The objective of the company's planned and systematic customer-focused activities in the field of relationships is to create and strengthen trust and good relationships between company and important public groups with an emphasis on a favourable company image, goodwill and corporate identity (Štefko et al. 2012). The company's ability to build and maintain successful long-term relationships is one of the crucial tasks in today's financial sector. The idea is that loyal customers buy more, show a higher willingness to spend and act as advocates for the company (Hegner-Kakar et al. 2018). In this context, a profit-oriented company that loses customers is considered very costly. For this reason, it is necessary to emphasize the need to strengthen the company's customer loyalty strategies. Many studies have confirmed that the costs of maintaining a customer are lower than the cost of getting a customer (Oluwafemi and Adebiyi 2018).

Customer loyalty is seen as the key to business success. It can also be considered the market currency of the 21st century, which suggests that the value of customer-oriented companies can be determined by the degree of customer loyalty. Studies have shown that increasing customer loyalty can affect business profitability and can lead to lower marketing and customer acquisition costs (Singh and Sirdeshmukh 2000, Gee et al. 2008). Baloglu et al. (2019) dealt with the loyalty of tourism customers, namely the spa and wellness industry. The results revealed that intrinsic motivation significantly influenced memorable experiences. Subsequently, the memorable experiences and emotional well-being significantly affected the loyalty of spa customers. Also, Kim and Lee (2018) confirmed that brand awareness and

perceived quality have an impact on brand image, and brand image is related to brand loyalty in tourism.

Reichheld (1993) showed that, depending on the industry, a 5% increase in retention can increase the company's profitability by up to 60%. It is clear from this that maintaining loyal customers can positively affect the long-term prosperity of companies (Kuusik 2007).

The customer-oriented company focuses its attention on customer loyalty and works with 8 loyalty factors (Ansari and Riasi 2016): (1) satisfaction, (2) transition barriers, (3) trust, (4) commitment, (5) perceived value, (6) perceived quality, (7) intuitive image, (8) empathy. The findings of the study showed that although satisfaction and perceived value are positively associated with customer loyalty, they affect the degree of loyalty with different magnitudes. Specifically, it was found that customer satisfaction has a stronger impact on customer loyalty compared to perceived value. Therefore, customer-oriented companies should allocate more resources to strategies to increase customer satisfaction and relatively fewer resources to strategies to improve perceived customer value. The findings further indicated that trust, perceived quality, empathy and commitment have a significant impact on customer satisfaction, thus managers should focus on these factors in order to indirectly increase customer loyalty. Based on the findings, it is also suggested that managers focus on customer trust, perceived quality and empathy in order to indirectly increase customer loyalty by improving perceived value. A better understanding of these factors can help managers more effectively design their strategies to achieve higher levels of customer satisfaction, perceived value, and loyalty (Ansari and Riasi 2016).

Customer Relationship Management - CRM

Relationship marketing can take many forms and has the potential to increase understanding of many aspects of business strategy (Hunt et al. 2006). Implementing a customer relationship management (CRM) strategy in a business is generally considered a way to gain competitive advantage in the market. Companies that implement CRM can build better relationships with their customers, increase customer loyalty, increase revenue and reduce costs (Blery and Michalakopoulos 2006). Many studies focus on CMR, but there is no accepted definition of this term. Ngai et al. (2009) stated that CMR is a comprehensive set of processes and tools that support business strategies aimed at developing long-term and profitable customer relationships. Hung et al. (2010) defined CMR as a management strategy that helps enterprises collect, analyse and manage customer-related information using information technology tools and techniques to meet customer needs and build long-term and profitable relationships. Reinartz et al. (2004) noted that CRM is a systematic process for managing the initiation, maintenance, and termination of customer relationships at all contact points in order to maximize the value of the relationship portfolio. The necessary requirement to support CRM in practice is the right information about customers and their needs, enabling the enterprise to deliver a product or service at the right time and in the right place (Wessling 2003).

A practical framework for applying the CRM strategy is the vision of maximizing business profit as the main objective, which can be effectively achieved through long-term relationships and satisfied customers. A successful CRM strategy helps the company learn more about customers than competitors, effectively develop and use this information in business processes, thereby increasing the company's profitability. Wessling (2003) summarized the following benefits for CRM strategy: business process fluency; reach for more customers; customer-

centric time optimization; competitive differentiation; enhanced company's image and identity; real-time information access; reliable prediction; communication between marketing, sales and service departments; increase teamwork efficiency; increase employee motivation. Many studies have addressed CRM in tourism, for example Fortmuller et al. (2018). Papaioannou et al. (2018) examined customer-oriented strategy and business performance in four-star and five-star hotels in the Region of Peloponnese. The findings indicated that the customer-oriented strategy was widely applied in hotels and that there were significant and positive relationships between the customer-oriented strategy and the company's performance.

The rise of social media challenges the traditional notion of CRM and led to the emergence of social CRM (Chan et al. 2018). Sigala (2018) performed a study that captures the implementation of social CRM in tourism and hospitality. Five approaches for implementing social CRM are proposed: collecting, analysing and interpreting customer insight; monitoring and improving the performance of CRM; developing holistic and seamless personalised customer experiences; gamifying CRM and loyalty programmes; and nurturing community relationship management.

Based on the above-mentioned findings, it can be stated that relationship marketing is an important research issue, including in the tourism sector. For this reason, the presented study focuses on scientific research in this area.

2. Materials and Methods

The primary aim of the presented study was to point to the scientific development of relationship marketing in relation to tourism until 2018. This aim was achieved by using scientific outputs from a scientific database and by applying bibliometric analysis. Inputs (scientific articles, books, conference outputs, etc.) were obtained from the Clarify Analytics Web of Science (WoS) Core Collection. These scientific papers were determined by keywords such as “relationships”, “marketing”, “tourism”. The data consisted of 1565 outputs, which contained title, authors, year of publication, abstract, keywords, references and all available information offered in the WOS Core Collection. The presented research can be included in the field of bibliometric research. The bibliometric analysis itself was divided into three parts in the result section. The first part is devoted to a descriptive analysis, in which the frequency of publication in the analysed issue is provided. This part also shows countries in terms of the frequency of scientific outputs as well as the production of individual authors over time. The second part of the analysis is focused on the evaluation of citations in the given issue. In the last third part, the thematic structure in the specification of keyword links is discussed. The last part also provides the outputs of the authors with the highest contribution, as well as areas (topics) in which the issue of relationship marketing in tourism was clustered. The R programming language and the library of bibliometric analysis (bibliometrix) were used in the analysis (Aria and Cuccurullo, 2019).

3. Results

3.1. Descriptive analysis

The analysis consisted of 1565 scientific papers from 1994 to 2018. In 1994, two papers were identified in the field of relationship marketing, and we can talk about the first scientific contributions to this issue. In one of these papers, the authors present a very valuable idea: effective tourism marketing is impossible without understanding of consumer motivation (Fodness, 1994). The following Figure 1 shows the development of a number of scientific outputs.

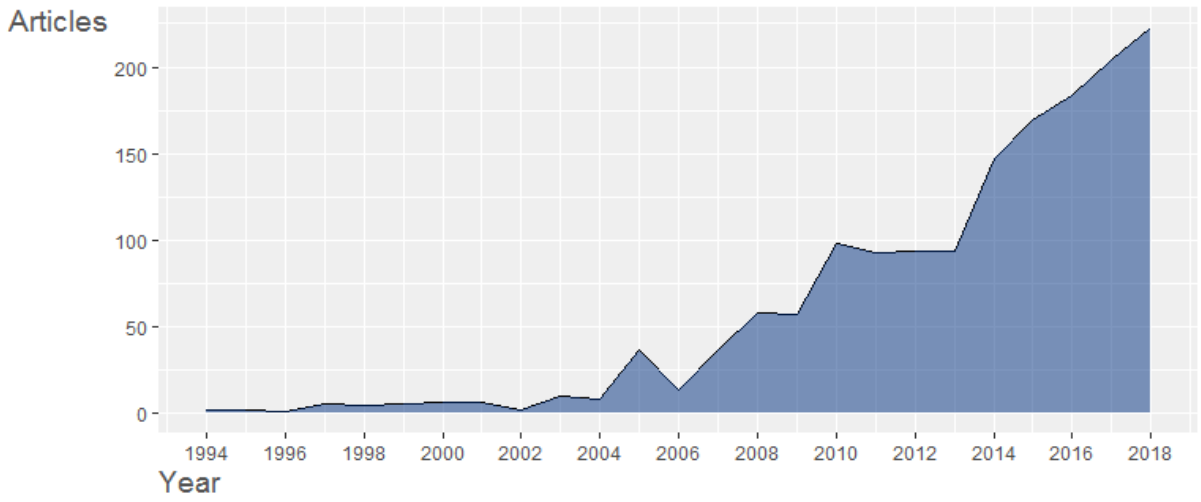

Figure 1. Development of scientific outputs from 1994 to 2018
Source: own processing

Based on Figure 1, it can be stated that the interest in this issue was minimal until 2004. The highest number of publications in this period was in 2003, when 10 documents were published. After 2004, scientific productivity in this area was more intense. The average citation rate was 12.15 citations per document. In the given documents, 3176 authors were identified, with approximately 2.03 authors per document. The largest categories included articles (n = 1202), proceedings papers (n = 252), and reviews (n = 44).

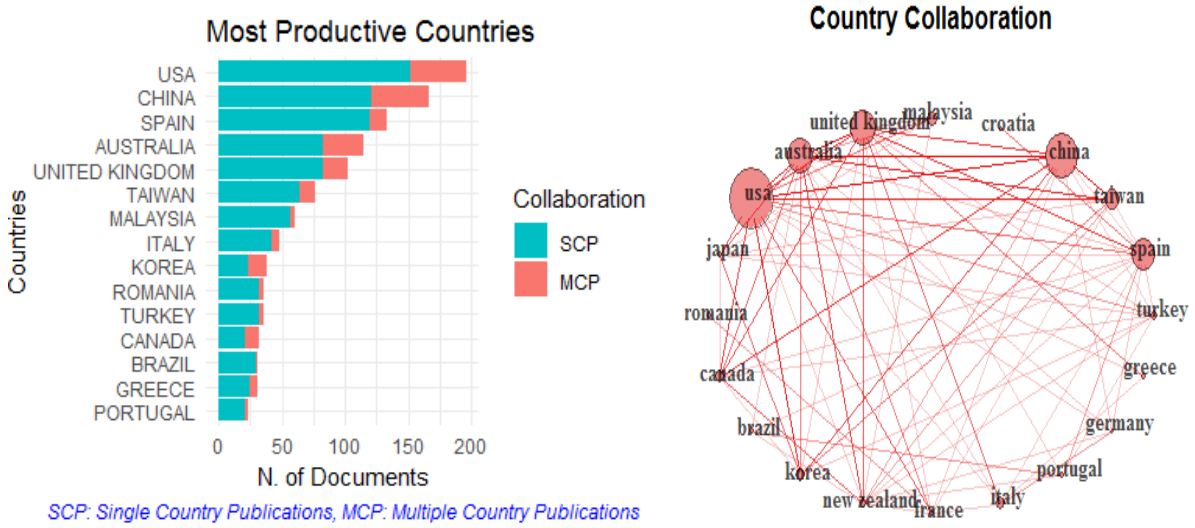

Figure 2. Production and cooperation of countries
Source: own processing

Figure 2 shows the production of countries, which is characterized by the cooperation of authors from various countries. When analysing the collaboration of the authors, it can be noted that the highest degree of cooperation was between countries such as the United States and China or the United States and Taiwan. The most productive authors in this field were Asian authors such as Law, R. (n = 10); Li, X. (n = 9); Lee, S. (n = 9) or Wang, Y. (n = 9). The following Figure 3 shows the production of the authors.

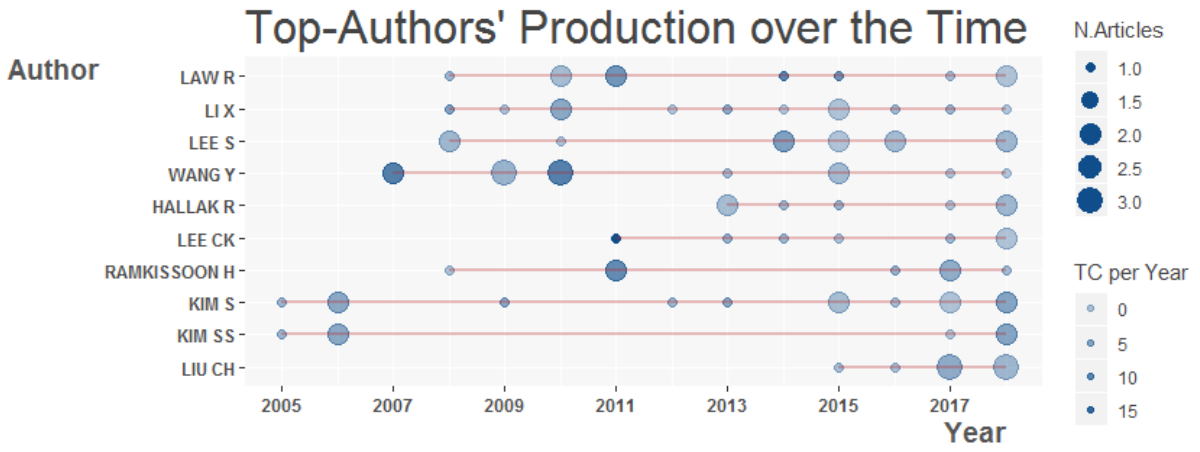

Figure 3. Production of authors
Source: own processing

During the analysed period, based on the number of outputs (N.Articels) and the number per year (TC per Year), the authors shown in the previous figure can be considered the most productive authors in this field.

3.2. Citation analysis

The most cited countries were the United States (3995), Spain (2440), and the United Kingdom (2242). The most frequently cited papers are listed in Table 1 below.

Table 1. Most cited papers

ID	Paper	Times Cited	Times Cited per Year
1	BIGNE JE, 2001, TOURISM MANAGE	610	33.89
2	BEERLI A, 2004, TOURISM MANAGE	328	21.87
3	KOZAK M, 2001, ANN TOURIS RES	325	18.6
4	FODNESS D, 1994, ANN TOURIS RES	322	12.88
5	KIM H, 2003, ANN TOURIS RES	310	19.38
6	HOSANY S, 2006, J BUS RES	266	20.46
7	SAUTTER ET, 1999, ANN TOURIS RES	255	12.75

8	WILLIAMS P, 2009, ANN TOURIS RES	248	24.80
9	GETZ D, 2006, TOURISM MANAGE	248	19.8
10	BORNHORST T, 2010, TOURISM MANAGE	229	25.44
11	SONMEZ SF, 1998, ANN TOURIS RES	204	9.71
12	NURYANTI W, 1996, ANN TOURIS RES	195	8.48
13	HOSANY S, 2010, J TRAVEL RES	178	19.78
14	KIM MJ, 2011, TOURISM MANAGE	177	22.12
15	MONEY RB, 2003, TOURISM MANAGE	177	11.6

Source: own processing

Bigne et al. (2001) stated that the image of tourism is a direct predictor of perceived quality, satisfaction, intention to return and willingness to recommend a destination. This confirms the role of image as a key factor in destination marketing. Kozak (2001) argued that satisfaction affects willingness to return, but this effect is stronger in more developed regions. The results of a study conducted by Beerli and Martín (2004) suggest that: (1) motivation affects the affective component of the image; (2) holiday travel experiences are significantly related to cognitive and affective images; and (3) socio-demographic characteristics affect cognitive and affective image assessment.

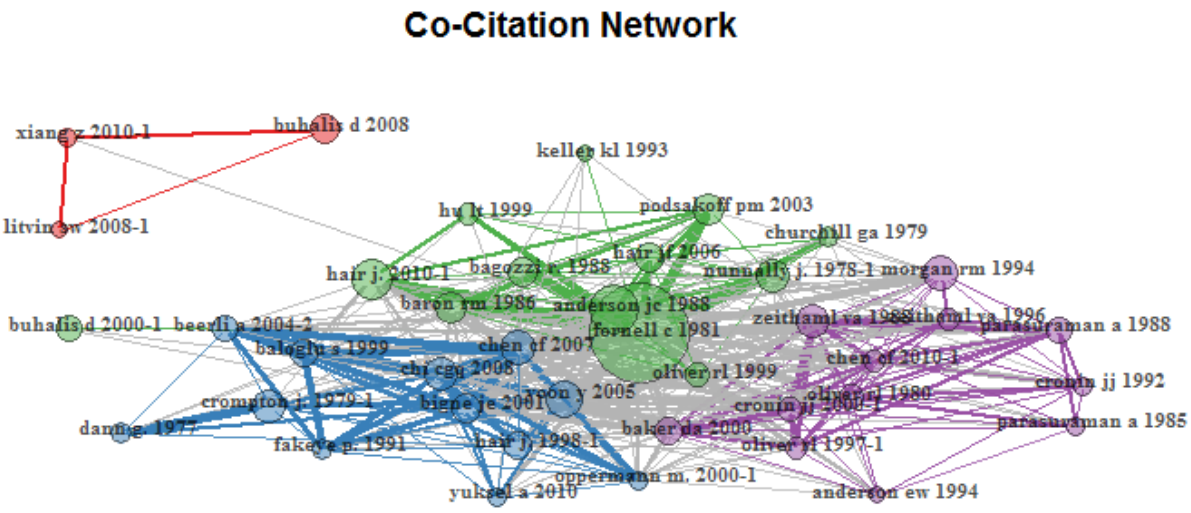

Figure 4. Co-citation network of authors
Source: own processing

The co-citation network in the previous Figure 4 is divided into 4 clusters and shows the links between the 40 most cited authors. Fornell C. (1981), who analysed "structural equation models" (SEM), can be seen in the green cluster. This methodological tool is still often used in the analysis of relationship marketing and tourism.

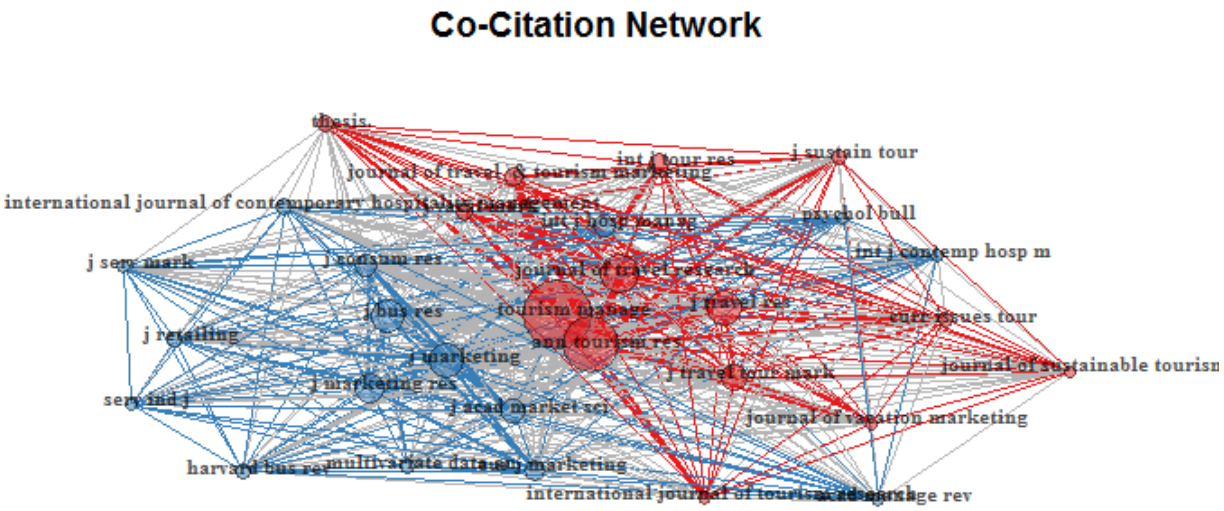

Figure 5. Co-citation network of journals
Source: own processing

Based on the previous Figure 5, it can be stated that "Tourism management" and "Journal of travel research annals of tourism research" are the journals that most often dealt with relationship marketing in tourism.

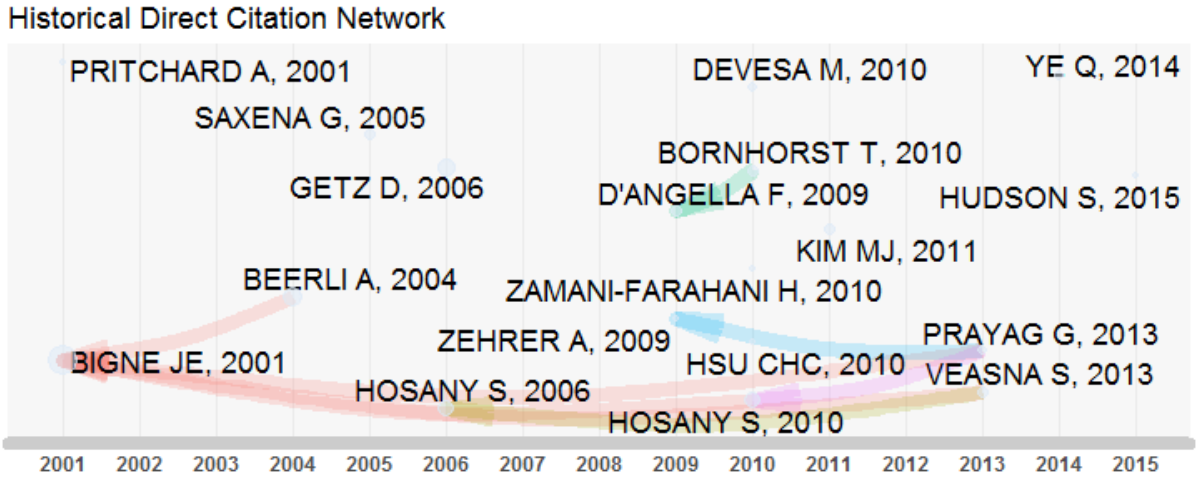

Figure 6. Historical direct citation network
Source: own processing

Figure 6 shows the most relevant direct citation links between authors over time. The analysis was presented by Garfield (2004).

3.3 The conceptual structure (co-word analysis)

The following Table 2 shows the most common keywords in the field of relationship marketing in tourism.

Table 2. Most common keywords

n	Author Keywords (DE)	Articles	Keywords-Plus (ID)	Articles
1	TOURISM	217	TOURISM	198
2	SATISFACTION	64	MODEL	157

3	MARKETING	57	SATISFACTION	134
4	DESTINATION IMAGE	46	IMPACT	98
5	DESTINATION MARKETING	40	PERFORMANCE	84
6	SOCIAL MEDIA	40	BEHAVIOR	83
7	TOURISM MARKETING RELATIONSHIP	34	LOYALTY	80
8	MARKETING	33	MANAGEMENT	73
9	CHINA	29	QUALITY	67
10	CUSTOMER SATISFACTION	27	PERCEPTIONS	63
11	MOTIVATION	26	CUSTOMER SATISFACTION	61
12	INNOVATION	24	PERSPECTIVE	57
13	LOYALTY	24	DESTINATION	56
14	DESTINATION LOYALTY	21	EXPERIENCE	54
15	SUSTAINABILITY	21	SERVICE QUALITY	53

* DE - Authors' Keywords; ID - Keywords associated by SCOPUS or ISI database

Source: own processing

The word "tourism" was the most common keyword in the analysed issue and in the analysed period. Interestingly, the term "model" was one of the most frequently used keywords, suggesting that various mathematical (regression) models were used in the research. "Satisfaction" and "customer satisfaction" were also often used as keywords, indicating the importance of relationship marketing in tourism. The following Figure 7 shows the links between the individual keywords.

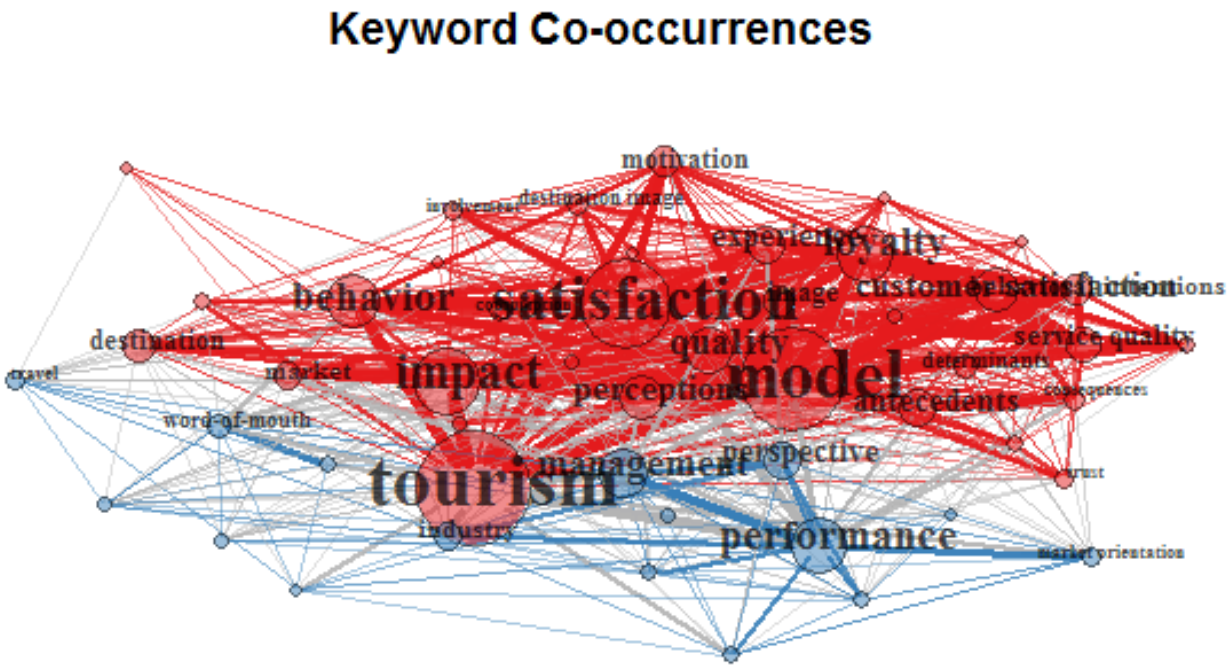

Figure 7. Keyword co-occurrences
Source: own processing

Based on Figure 7, it can be stated that the greatest connection was between words such as "tourism", "model", "satisfaction", while these attributes form the red cluster. The second blue

cluster consists of links between words such as “performance”, “management”, “word-of-mouth”, “travel” and “perspective”.

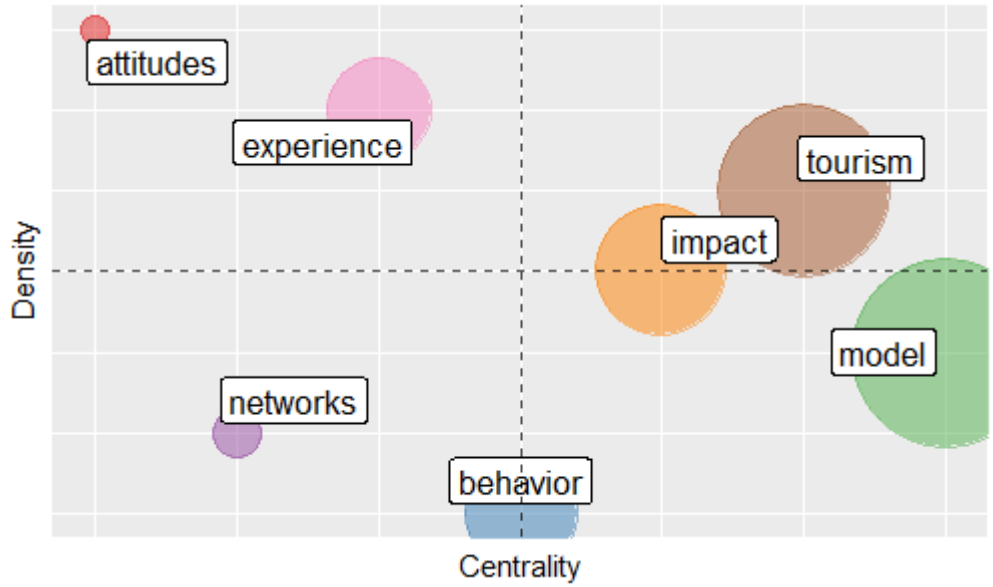

Figure 8. Thematic clusters
Source: own processing

Figure 8 shows that the thematic areas focused on three main clusters, while the first cluster includes words such as “impact”, “tourism” and “model”. The terms “networks” and “behaviour” form the second cluster. The third cluster contains two words, namely “attitudes” and “experience”, it can be noted that this cluster is rather psychological. The principles of this analysis are described in more detail by Cobo et al. (2011).

4. Conclusion

The primary aim of the presented study was to point to the scientific development of relationship marketing in relation to tourism until 2018. This aim was achieved by using scientific outputs from a scientific database and by applying bibliometric analysis. The bibliometric analysis and its graphical presentation can help researchers and experts better understand the current state of knowledge in the scientific field. The data consisted of 1565 scientific papers (scientific articles, books, conference outputs, etc.), which were obtained from the Clarify Analytics Web of Science (WoS) Core Collection. The results show that the scientific interest in relationship marketing in tourism has been increasing since 2004, when an increase in published articles is evident. The most productive authors in the analysed issue were authors from the United States, who most often collaborate with authors from China or Taiwan. The most cited countries were the United States (3995), Spain (2440), and the United Kingdom (2242). Scientific initiatives in the field of relationship marketing in tourism focused mainly on areas such as “tourism”, “influence”, “model”, “behaviour”, “network”, “experience” and “attitudes”. Also, “Tourism management” and “Journal of travel research annals of tourism research” are the journals that most often dealt with relationship marketing in tourism. The presented research can be included in the field of bibliometric research and provides an

overview of a scientific initiative in the field of relationship marketing in tourism, which can help in future research.

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ANALYSIS OF MUTUAL DIFFERENCES OF NEUROMARKETING ATTRIBUTES IN THE CONTEXT OF ACHIEVED CUSTOMER EDUCATION

ANALÝZA VZÁJOMNÝCH ROZDIELOV NEUROMARKETINGOVÝCH ATRIBÚTOV V KONTEXTE DOSIAHNUTÉHO VZDELANIA ZÁKAZNÍKOV

Abstract

The aim of the paper was to examine the differences between assessing the attributes of neuromarketing and customer education. The attributes "store information", "seller information" and "product information" were examined in terms of respondents' highest level of education. Data were obtained by the questionnaire method according to the Neuromarketing methodology. The established hypotheses were verified on a sample of 190 respondents through statistical analysis in the IBM SPSS statistical program. The established hypothesis was confirmed. The sample of respondents showed statistically significant differences in all three examined attributes of neuromarketing (store, product, seller) in terms of the highest achieved education of the customer.

Keywords

Customer education. Neuromarketing. Product. Seller. Store.

Kľúčové slová

Vzdelanie zákazníka. Neuromarketing. Produkt. Predajca. Predajňa.

JEL classification

M31, M39

Introduction

Neuromarketing, as a new area of marketing, examines customers' responses to individual marketing incentives by monitoring brain activity. It thus brings new research techniques with the potential to reveal hitherto hidden information in the human mind [1].

Neuromarketing is a scientific discipline currently practiced by a number of scientists and researchers working in the field of neurology and marketing. Companies invest their money in neuromarketing research to improve their market position and increase their profits. At present, investment in neuromarketing research is becoming almost necessary if a company wants to maintain its competitiveness. Despite the great benefits, however, the ethical issue of neuromarketing is causing a stir. Some researchers believe that it is neuromarketing that threatens the free and logical decisions of customers [2].

Neuromarketing allows us to understand the unconscious processes of consumers that can be used in marketing, ie. consumer expectations and motivation, predicting consumer behavior and evaluating the effectiveness of advertising. Neuromarketing combines psychology, neuroscience, and economics to study consumer behavior using neuroscience technologies to

understand emotions, consumer motivation, and then study how the brain is physiologically influenced by advertising and marketing strategies [3].

Emotions play an important role in unconscious decision-making. According to research consisting in the fact that groups of people with different phobias (fear of spiders, snakes) were presented with images of these animals for a very short time, their participants did not consciously register, but their physiological responses to these stimuli. He thus confirmed the theory of the influence of emotions and unconscious stimuli on other processes in the body [4].

By using the influence of emotions on the customer, marketing creates new tools with which he can influence him/her more. It looks at the customer as an "emotional being". During the decision-making process, emotions play a direct role in both unconscious and conscious decision-making. Emotions are the main motivation for human behavior [5].

The goal of neuromarketing is to obtain information about how the consumer's brain works during the course of marketing incentives. The advantage of this measurement technique is that the results are not affected by consumer prejudices or reluctance to reveal the truth. There is nothing wrong with using this technology, but the biggest problem is that researchers can look beyond the subjects they could designate for this testing. This is why the use of neuromarketing raises ethical concerns, which could be divided into two categories: the protection of consumer autonomy and the protection of various groups that could be harmed or abused by this research. The privacy of individuals involved in neuroscientific research conducted in medical institutions is usually protected by law. However, when neuroscience is conducted for commercial purposes, and thus outside medical institutions, protection by law loses weight and privacy is left to the moral values of researchers [6].

According to [2], neuromarketing is not based on pushing ideas into the consumer's head, nor is it used as a tool to force the consumer to buy, even if they do not even want to buy. Neuromarketing reveals what is already in our heads.

The ethical dilemma stems from the fact that the results obtained from research entities are or can be used to influence their responses (to promote sales, build promotional communication messages, etc.) without respondents being able to censor them. Another objection to these studies is that it suspects companies that potentially manipulate consumers in order to get them to respond or to respond favorably to an organization, regardless of whether the studies conducted have a purely educational purpose or are intended to thoroughly investigate consumers´behavior [7].

We believe that the operation of marketing tools created thanks to neuromarketing knowledge is also related to the level of education of the customer. In this context, it is then necessary to monitor whether customers with higher education respond to the attributes of neuromarketing differently than customers with lower education. This connection examined also [8] and partly [9].

[10] defines customer education as: „any purposeful, sustained and organized learning activity that is designed to impart attitudes, knowledge or skills to customers or potential customers by a business or industry. It can range from self-instructional material for a particular product to a formal course related to a product or service“.

Research methodology

The aim of the research was to identify and specify the differences between the assessment of the attributes of neuromarketing and the socio-demographic indicator - the achieved education of customers. For customer education, we took into account the highest level of completed customer education according to Slovak legislation, while for simplification, we took into account three levels (primary, secondary with high school diploma, higher education).

The questionnaire was created according to the Neuromarketing methodology - information about the store, information about the seller, information about the product. Within the methodology, we found out how the selected attributes of neuromarketing are related to the highest achieved education of the respondents. The methodology contained 30 statements, which were assessed on a 5-point Likert scale with a scale from 1 (certainly yes) to 5 (certainly not).

Attributes that the methodology contained:

1. store - an establishment in which some goods are sold or bought - a sale or purchase is concluded there. There, the customer views the submitted available goods, services with the potential intention to buy the best and most advantageous goods, service. The final decision of the customer whether to buy the goods or services may change in the store, so it is important that the customer feels comfortable there.

2. seller - a person who sells products or provides services to customers. Seller‘s main task is to serve the customer with the intention of selling goods and services. From the point of view of neuromarketing, the behavior and approach of the seller greatly influences the customer's decision-making during shopping.

3. product - a good or service that serves to satisfy needs and desires. Customers can build a strong emotional attachment to certain products, including through the neuromarketing links of their favorite brands.

Results

The following hypothesis was established in the research: We assume that there are statistically significant differences in selected attributes of neuromarketing in terms of customer education.

Using a Post-hoc comparison, we examined the differences in the attributes "store", "seller" and "product" within the highest achieved education of the respondents.

Based on the analysis of variance F = 3.365, **Sig. = 0.037**, we found statistically significant differences in the attribute "store" in relation to the highest achieved education (Table 1).

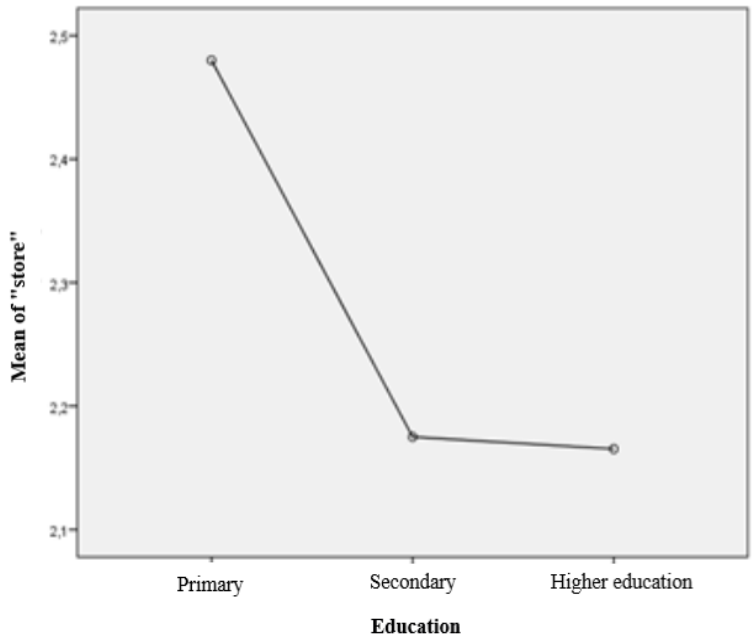
Tab. 1: Post-hoc comparisons in the store attribute in terms of customer education

Customer education	Customer education	Average difference	Significance
Primary	Secondary	0.305*	**0.048**
Secondary	Higher education	0.010	0.992
Higher education	Primary	-0.315*	**0.033**

(Source: own processing)

The "store" attribute recorded statistically significant differences between primary and secondary education and between higher education and primary education, always in favor of primary education (Graph 1). Respondents who have completed university and secondary education appear to be those who are less affected by the "store" attribute during shopping. Respondents with the highest basic level of education are more interested in lighting, pleasant smell and color design of the store interior during shopping. The brand and design of the product packaging are also important to them.

Fig. 1: Display of the store attribute in terms of education



(Source: own processing)

Based on the analysis of variance F = 4.981, **Sig. = 0.008**, we found significant statistical differences in the attribute "seller" in relation to the highest achieved education.

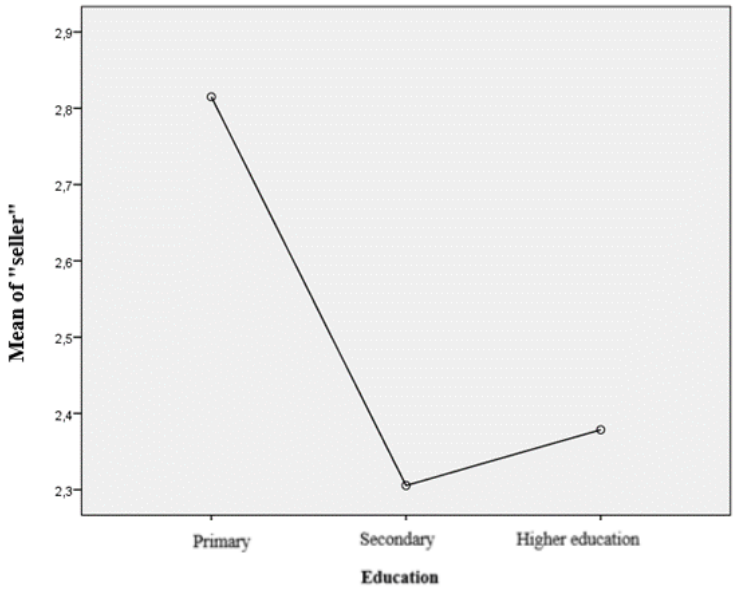
Tab. 2: Post-hoc comparisons in the seller attribute in terms of customer education

Customer education	Customer education	Average difference	Significance
Primary	Secondary	0.509*	**0.006**
Secondary	Higher education	-0.73	0.756
Higher education	Primary	-0.436*	**0.017**

(Source: own processing)

Table 2 and Graph 2 show statistically significant differences between primary and secondary education and between higher education and primary education. From these data, we analyze the result for the benefit of respondents with the highest level of primary education.

Fig. 2: Display of the seller attribute in terms of education



(Source: own processing)

Respondents who completed secondary education and higher education appear to be those whose appearance and the overall appearance of the seller is not so easy to convince. Respondents with the highest achieved primary education pay more attention to the physical appearance, cleanliness of clothes and the overall neatness of the seller. Their purchasing decisions are also influenced by their opinion, attitude, commitment and willingness to advise the seller.

Based on the analysis of variance F = 3.476, **Sig. = 0.033**, we found significant statistical differences in the attribute "product" in relation to the highest achieved education.

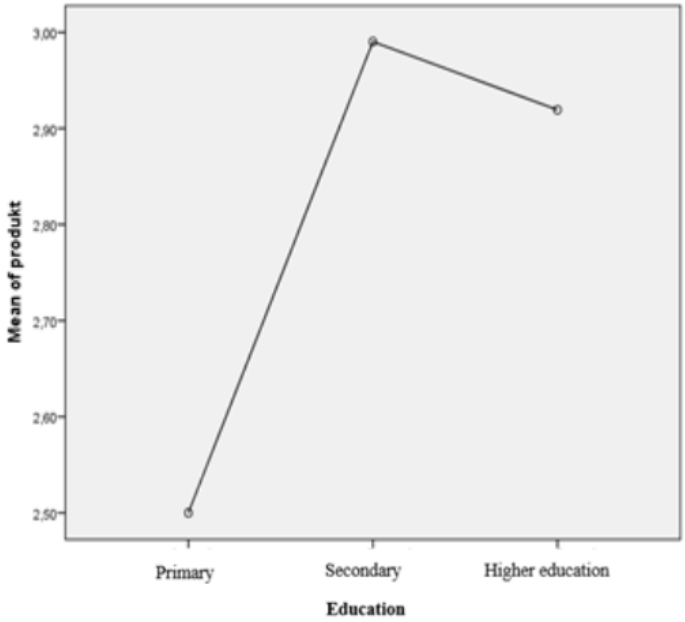
Tab. 3: Post-hoc comparisons in the product attribute in terms of customer education

Customer education	Customer education	Average diffenrece	Significance
Primary	Secondary	-0.49028*	**0.26**
Secondary	Higher educaton	0.07089	0.812
Higher educaton	Primary	0.41939	0.058

(Source: own processing)

Table 3 and Graph 3 show the statistically significant differences between primary and secondary education in favor of secondary education. No other significant statistical differences in the evaluation of neuromarketing attributes in terms of the highest level of education attained were noted.

Fig. 3: Display of the product attribute in terms of education



(Source: own processing)

Respondents with the secondary education are more encouraged to buy discounts, sales, gifts, which they receive for free with a purchase and more often participate in competitions associated with the purchase of the product. In contrast to the respondents with the highest level of primary education, their attention will also be drawn to the event screened through the media.

The established hypothesis was confirmed. The sample of respondents showed statistically significant differences in all three examined attributes of neuromarketing (store, product, seller) in terms of the highest achieved education of the customer.

Discussion and conclusion

By examining statistically significant differences in selected attributes of neuromarketing in terms of the highest level of education attained, we found statistically significant differences in all three attributes - "store", "seller" and "product" in favor of completed basic education. Young people are generally very much based on their image, they have their role models, which they would like to emulate approach. They care more about how they feel in the store, how the seller treats them and the final product itself and its brand, which is most often associated with concepts such as quality, credibility, image, expression of personality or identification. We can say that customers with lower education are easier to accept marketing activities. On the contrary, respondents with the highest secondary education and higher education are not so influenced by these attributes.

Our findings are also confirmed by the research of [11], which states that "service firms have to be aware of the potential difficulty that may arise with educated customers".
As mostly young people have completed only basic education, we also rely on studies concerning them. According to the results of our research, we can agree with a study by Jones (2014), which found based on beverage products that young consumers will change the popularity of the brand through product promotion and discount. Respondents who bought products that were promoted by someone spent on average significantly more than

respondents who did not buy products related to promotion. In this case, the promotion required the purchase of a certain quantity in order to receive a promotional offer; 40% of respondents who used the promotion stated that they bought the quantity for the promotion.

Neuromarketing has a strong future because it provides information that we would never be able to find out with normal marketing methods. Furthermore, more companies are starting to use neuromarketing tools, and we think that this is not just a fashion trend, but that neuromarketing will become the main source of data and data for quality marketing campaigns. It is important to make sure that it is not about manipulating individuals or companies, but about looking for benefits on the part of both the seller and the buyer. We can consider more educated customers to be more demanding, so the use of neuromarketing tools is even more justified.

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RATE OF SPECIALIZATION OF PRODUCTION SECTORS AND SECTORS OF ECONOMIC SERVICES AND ITS IMPACT ON THE VOLUME OF CROSS-BORDER MERGERS AND ACQUISITIONS IN THE SOURCE COUNTRIES OF THE EUROPEAN AREA

MIERA ŠPECIALIZÁCIE VÝROBNÝCH SEKTOROV A SEKTOROV SLUŽIEB EKONOMIKY A JEJ VPLYV NA OBJEM CEZHRANIČNÝCH FÚZIÍ A AKVIZÍCIÍ V ZDROJOVÝCH KRAJINÁCH EURÓPSKEHO PRIESTORU

Abstract: *The main goal of the paper is to quantify the impact of the degree of specialization calculated on the basis of the Michael index on the volume of cross-border mergers and acquisitions in the source countries of the European area in the period 1998-2015. The paper focuses on the degree of specialization (Michael's index), which is defined as the difference between the share of the surveyed commodity group in total national exports and the share of the surveyed commodity group in national imports. In the period 1998-2015, countries such as Belgium, Cyprus, Finland, and Greece achieved an average level of specialization in the manufacturing and services sectors, with a gradually improving business environment.*

Key words: *Export, import, Michaely index, cross-border mergers and acquisitions*

Kľúčové slová: *Export, import, Michaelyho index, cezhraničné fúzie a akvizície*

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JEL: F15, F21, F23

Introduction

During the twentieth century, mergers and acquisitions (M&A) activities expanded and became more and more interesting, mainly due to the growing interest of foreign investors in countries in transition. [1]. Market liberalization and the growing competition associated with it are leading companies to look for ways to improve their competitiveness and increase their market share, with mergers and acquisitions being one of the ways to achieve this. [2].
Cross-border M&As is considered an important strategy to obtain resources and gain access to local markets in host countries [3], but at the same time, M&As are considered to have a high risk for failure [4], particularly due to the problematic integration stage in cross-border M&As [5]; [6]; [7]; [8]; [3]; [9]; [10]; [11].

M&A strategy is based on two main objectives: maximise the synergy potential along with efficiency gains. Therefore, the goal of the integration stage is to seize the synergy potential [12]; [10] and reduce costs [13].

M&As can affect the export competitiveness of a firm in two possible ways. On the one hand, M&A may result in greater monopoly power, and when it is so, lack of competitive threat in the market is likely to reduce efficiency and export competitiveness of the firms. On the other hand, integration of firms through M&A can help the firms to reap the benefits of large-scale production and hence to lower costs and prices of the products in the international market. The nature of impact of M&A on export competitiveness of a firm, therefore, depends on the relative strength these diverse possibilities [14]; [15].
Globalization, liberalization, industrial consolidation, privatization, growing competition as well as rapid technological change are global phenomena that have supported business strategies aimed at external growth, strengthening competitiveness and companies' own key market positions. The allocation of capital within and between countries is becoming increasingly complex [16]. According to Ferenčíková et al., The desire of companies to increase competitiveness (2013) [17] is taking place in an environment of growing simultaneous fragmentation and globalization of markets, the rapid pace of change and the removal of tariff barriers on a global scale, in an environment that is a natural driving force for the growth of multinational corporations in various sectors. M&A are forms of organizational concentration that are part of the growth strategies of companies around the world [18].
According to Bobáková, Hečková (2007) [19], whatever the approaches to defining competitiveness, it is certain that the substantive content of this concept is the different value of the commodity in foreign markets depending on the influence of various factors that determine the country's competitiveness. This is ultimately reflected in economic growth, pricing policy and employment. The qualitative characteristics of the sources of competitive advantage significantly affect the long-term sustainable growth performance of the economy.

The concept of competitiveness is inextricably linked to economic development in a market economy [20].

Bovée, Thill (1992) define competitiveness as the ability of a national industry to innovate and modernize to the next level of technology and productivity. They describe four basic factors of [21] competitiveness:

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

- conditions of demand, including market size, exposure to goods, services and ideas,

- related industries,

- the conditions of the factor, such as natural resources, levels of education and experience and wages.

Data and methodology

As part of this paper, we discuss the degree of specialization (measured by the Michael index) and its impact on the volume of cross-border mergers and acquisitions in the source countries of the European area in the manufacturing sector and in the services sector in the period 1998-2015. The dataset containing records of mergers and acquisitions in Europe was based on

Zephyr data (Bureau van Dijk 2016) [22], which we supplemented with data on exports and imports of individual countries from the statistical offices of the monitored countries.
This database includes data on completed mergers and acquisitions from 16 source countries (Belgium, the Republic of Cyprus, Denmark, the Republic of Finland, the French Republic, the Hellenic Republic, the Netherlands, Luxembourg, the Republic of Malta, the Federal Republic of Germany, the Republic of Poland, the Portuguese Republic and the Republic of Austria, Spain, Italian Republic, United Kingdom) to 25 target countries (Belgium, Republic of Cyprus, Republic of Cyprus, Czech Republic, Denmark, Republic of Estonia, Republic of Finland, French Republic, Greek Republic, Netherlands, Republic of Lithuania, Republic of Latvia, Luxembourg, Hungary , Republic of Malta, Federal Republic of Germany, Portuguese Republic, Republic of Austria, Romania, Slovak Republic, Republic of Slovenia, Spain, Italian Republic, Turkey, United Kingdom) within the manufacturing sector (Chemical, rubber, plastic and non-metallic products, Construction, Food, beverages and tobacco, Gas, water and electricity, Machinery, equipment, supplies ar e-recycling, Metals and metal products, Textiles, clothing and leather) and the service sector (Banking, Hotels and restaurants, Insurance companies, Post and telecommunications, Transport).
Michael Michaely (1962, 1967) [23] constructed the so-called country diversity index in order to measure the overall difference in the composition of the commodity trade. The value of the index ranges from 0-1; the higher the value of the index, the less similar the composition of exports and imports of the observed country.

The Michael Index (MI) has a wide range of applications. Its use is recommended when measuring the degree of similarity of business models, e.g. comparison of import and export models of a country, export and import models of two countries or a group of countries, etc. The index is an excellent indicator of the dynamics of the country's export structure, i. the dynamics of the comparative advantage revealed. It indicates the intensity of the change rather than its direction [24]. The Michaely index is also used as a measure of international trade specialization at the sector level [25].

The Michaely index assesses competitiveness at the sector level on the basis of the difference between the share of the surveyed commodity group in total national exports and the share of the surveyed commodity group in national imports [26]:

$$MI = \frac{X_{ij}}{\sum X_{ij}} - \frac{M_{ij}}{\sum M_{ij}},$$ whereas:

X_{ij} - export of commodity group and country j.

M_{ij} - import of commodity group and country j,

$\sum X_{ij}$ - total national exports,

$\sum M_{ij}$ - total national import.

The formulation of the achieved results depends on the achieved value of the index.

The following applies to the Michael index:

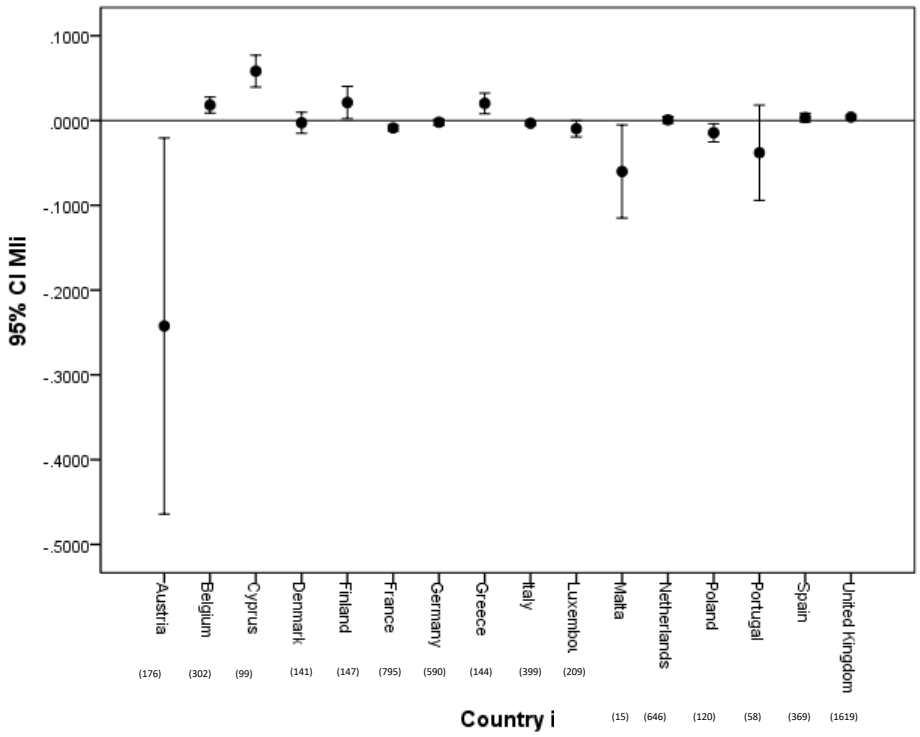
$0 < M_{ij} < 1$ points to a certain degree of country specialization in a given commodity group,

$-1 < M_{ij} < 0$ indicates insufficient specialization of the country in the commodity group.

Analysis and results

The main objective of this paper is to quantify the impact degree of specialization in the volume of completed cross-border mergers and acquisitions in the source countries of the European area in the reference period 1998-2015.

We measured the degree of specialization of the manufacturing sector and services sector in the countries of the European area for the observed period 1998-2015 using the above-mentioned Michael index. We calculated the Michaely index from the obtained data on exports and imports of individual manufacturing and service sectors in the countries of the European area, which is shown in Figure 1.



Legend: The numbers in () are the numbers of M&A in each source country in all sectors

Picture 1 Average values of realized cross-border mergers and acquisitions within sectors in the source countries of the European area in the reference period 1998-2015 (Michaely index)

(Source: own processing)

The average values with a 95% confidence interval of the Michael index in the case of source countries, ie countries from which cross-border mergers and acquisitions were directed, are

shown in Figure 1. For countries whose average values of the Michael index are below the line (with y = 0), we speak of insufficient average specialization of the country. On the contrary, for countries whose average values of the Michael index are above the line (with the directive y = 0), we speak of the average specialization of the country in the sectors we consider (manufacturing sector and services sector). The extreme values are Austria, France, Luxembourg, Malta, Poland and Portugal, where the value of the Michael index is less than 0, and thus the countries do not have narrowly specialized manufacturing and service sectors. During the observed period of years, 15 transactions in the form of cross-border mergers and acquisitions took place in Malta, ie with the decreasing degree of specialization, the number of transactions in the country also decreased. 795 cross-border mergers and acquisitions took place in France and 209 cross-border mergers and acquisitions in Luxembourg. In these countries, the degree of specialization did not affect the number of cross-border mergers and acquisitions carried out. In 2010, France was one of the most important European regions for the development of investment activities, which may have had a positive effect on the number of cross-border mergers and acquisitions in the country.

The calculated Michaely index, which is higher than 0 in Belgium, Finland, Greece and Cyprus, indicates to us the average specialization of countries in the production and services sectors. Using the T bar (T bars) showing the 95% confidence interval for estimating the average value of the Michael index, we see that the highest number of cross-border mergers and acquisitions was in Belgium and Finland, which could be due to the improving business environment. The essence of the degree of specialization is the knowledge that the countries of the European area can increase their standard of living and real income precisely by specializing in the production and provision of services that they can produce and provide with the highest labor productivity and the lowest costs. It is with such products and services that a country will enter into foreign trade relations with other countries in order to obtain from them goods and services that are more advantageous for it to import than to produce and provide at home. The highest number of cross-border mergers and acquisitions in the period under review was in France (795), Germany (590), the Netherlands (646) and the United Kingdom (1619). The number of cross-border mergers and acquisitions in the source countries mentioned could have been influenced by a high-quality business environment, developed infrastructure and scientific and technological advances.

Table 1 Competitiveness of production and service sectors in the source countries of the European area in the reference period 1998-2015 analysed by the Michael Index

		Banks	Chemicals, rubber, plastics, non-metalic	Construction	Education, Health	Food, beverages, tobacco	Gas, Water, Electricity	Hotels & restaurants	Insurance companies	Machinery, equipment, furniture, recycling	Metals & metal products	Other services	Post and telecommunications	Primary Sector (agriculture, mining, etc.)	Publishing, printing	Textiles, wearing apparel, leather	Transport	Wholesale & retail store	Wholesale & retail trade	Wood, cork, paper
		Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli	Mli
Austria	Mean	-1.03	-0.25	0.00	.	0.01	-0.01	0.01	-0.01	0.01	0.02	-0.04	.	-0.06	-0.89	0.00	0.08	0.00	0.01	0.01
	Count	37	15	7	0	10	14	1	9	12	3	28	0	9	1	3	8	2	3	9
Belgium	Mean	-0.03	0.04	0.01	0.00	0.01	0.05	0.00	0.00	0.01	0.03	0.04	0.01	0.00	0.00	0.01	0.00	.	0.01	0.05
	Count	36	21	2	1	19	15	2	9	22	16	110	3	4	4	5	7	0	10	7
Cyprus	Mean	0.00	0.03	0.00	.	-0.03	.	.	.	0.00	-0.04	0.11	.	0.00	.	0.06	-0.02	.	0.03	.
	Count	29	2	2	0	1	0	0	0	1	3	51	0	2	0	1	2	0	4	0
Denmark	Mean	-0.01	0.00	.	0.00	0.00	0.00	0.04	0.01	0.06	.	-0.03	0.00	0.00	0.05	-0.01	0.00	-0.01	0.01	.
	Count	3	8	0	1	17	12	2	1	17	0	54	1	2	1	2	10	2	6	0
Finland	Mean	-0.08	-0.06	-0.01	.	0.01	0.00	-0.03	0.00	0.02	0.03	0.05	.	.	-0.01	-0.02	-0.01	.	0.06	0.04
	Count	7	7	4	0	9	4	1	1	23	10	53	0	0	2	1	3	0	3	15
France	Mean	-0.07	0.06	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.03	-0.01
	Count	122	32	12	2	35	34	13	38	36	9	331	12	3	12	3	21	7	40	11
Germany	Mean	-0.01	0.01	0.01	.	0.01	0.00	.	0.00	-0.01	0.00	0.00	0.00	0.00	-0.02	-0.01	0.00	0.02	0.00	-0.01
	Count	66	38	7	0	12	39	0	14	81	13	216	11	7	7	3	22	10	29	1
Greece	Mean	0.03	-0.04	0.03	-0.02	0.00	.	0.11	0.00	0.02	0.00	0.02	.	-0.01	-0.01	0.09	-0.02	.	-0.02	.
	Count	69	5	2	4	13	0	1	1	5	4	24	0	6	1	3	1	0	4	0
Italy	Mean	-0.01	-0.01	-0.01	.	0.01	0.00	0.00	0.00	-0.01	0.01	0.00	.	-0.03	0.03	0.02	0.00	0.00	0.00	0.00
	Count	47	28	2	0	12	25	13	10	73	9	116	0	7	8	11	18	1	11	2
Luxembourg	Mean	0.04	0.00	-0.01	-0.01	-0.02	0.00	0.00	.	-0.04	0.02	-0.02	0.00	-0.02	-0.02	-0.02	0.01	-0.01	0.01	.
	Count	23	3	3	1	2	2	3	0	4	15	133	2	2	4	2	5	1	2	0
Malta	Mean	0.04	.	.	.	.	-0.18	.	.	.	-0.13	-0.06	0.00	.	.	.	.	.	.	.
	Count	1	0	0	0	0	1	0	0	0	1	11	1	0	0	0	0	0	0	0
Netherlands	Mean	-0.02	-0.01	0.00	0.00	0.05	-0.01	0.00	0.00	-0.04	0.00	0.01	0.03	0.00	0.00	0.01	0.03	0.01	0.01	0.01
	Count	36	30	8	2	34	12	11	15	62	16	298	6	13	8	12	17	6	32	9
Poland	Mean	-0.05	0.00	0.04	.	0.02	-0.01	0.01	-0.01	0.01	-0.12	-0.03	-0.01	.	.	-0.03	0.05	-0.05	-0.04	.
	Count	2	18	1	0	4	1	5	3	14	2	53	1	0	0	1	1	1	9	0
Portugal	Mean	0.03	-0.02	0.01	0.00	-0.08	-0.01	-0.02	0.03	-0.01	-0.05	-0.04	0.02	.	.	-0.01	-0.07	.	0.11	-0.39
	Count	7	10	3	2	3	8	3	1	1	1	10	1	0	0	1	1	0	2	4
Spain	Mean	0.01	-0.05	0.01	0.04	0.03	0.01	0.00	0.00	-0.09	0.01	0.02	0.01	.	0.00	0.01	0.00	0.01	0.02	-0.01
	Count	61	27	15	5	25	25	17	14	19	11	95	3	0	6	1	12	2	11	16
United Kingdom	Mean	-0.03	-0.01	-0.01	-0.04	0.01	-0.01	0.01	0.03	-0.01	0.01	0.01	-0.01	0.00	-0.01	0.00	0.00	0.01	0.01	0.00
	Count	59	60	12	5	54	18	21	21	138	23	954	9	14	27	8	66	9	100	10

(Source: own processing)

The achieved results of the average values of the degree of specialization calculated by the Michael index in the observed period 1998-2015 in 16 source countries of the European area in manufacturing and service sectors and the total number of cross-border mergers and acquisitions in these countries and sectors are shown in Tables 1. The index values are marked in green, the value of which is greater than 0, and thus the country in the given sector achieved a degree of specialization, and in red, the values of indices whose value is less than 0, and thus the country in the given sector did not have the degree of specialization.

For each source country, the number of cross-border mergers and acquisitions in the sector is also given. Above-average numbers of above-average numbers of observations, whose values were higher than 50% of observations, are marked. The degree of sectoral specialization suggests that countries can increase countries' competitiveness and the number of cross-border mergers and acquisitions by increasing sectoral specialization. Countries that have achieved a degree of specialization in these production and service sectors in the period under review have specialized in the production of goods and services for which they have a higher degree of specialization than the partner country. We have highlighted countries that have implemented an above-average number of cross-border mergers and acquisitions in the manufacturing and services sectors during the period under review.

In these countries, we can see that the higher the degree of specialization in the manufacturing and services sectors, the higher the number of cross-border mergers and acquisitions. The monitored countries have a quality business environment suitable for the monitored sectors in the given sectors, a qualified workforce and a well-developed infrastructure. Source countries in Europe that, on the basis of the Michael Index calculations, have not achieved a degree of specialization and have an absolute disadvantage in producing all products could benefit from engaging in international trade if they export goods or provide services from the most efficient sectors as a second country. International trade in countries makes it possible to allocate factors of production to the most efficient sector, and other goods are simply imported into these countries. As in the case of countries with a degree of specialization, we highlighted a disproportionate number of cross-border mergers and acquisitions in countries that did not have a sufficient degree of specialization in the manufacturing and services sectors during the period under review. The number of cross-border mergers and acquisitions carried out was positively affected mainly by scientific and technological progress, economic growth and the geographical location of these countries.

Discussion

Based on the results of calculations of the degree of specialization (Michael's index) according to the MI index, we can state that the manufacturing and services sectors in the source countries of the European area in the observed period 1998-2015 achieved the degree of specialization in some source countries (Belgium, Cyprus, Finland, Greece, Switzerland and the United Kingdom). Countries that have achieved a degree of specialization were considered suitable countries for several forms of investment, e.g. cross-border mergers and acquisitions. Source countries are attracted mainly due to the country's growing competitiveness, low taxes and improving business environment. The most attractive sectors, which were the main goal of the

merger, are considered to be e.g. banking, chemical, rubber, plastic and non-metallic products, wholesale and retail trade and other services. Countries that have achieved a degree of specialization in the manufacturing and services sectors need to be seen from two perspectives. On the one hand, individual sectors of the countries of the European area face increasing competition from other developed economies, especially in the field of high-tech. On the other hand, production in several sectors is increasingly shifting to low-cost economies, some of which are targeting higher value-added segments.

Conclusion

At present, it is crucial for the countries of the European area to assert themselves while maintaining ever-growing global markets. The constant increase in competition, increasing demands and requirements from companies are reflected in mergers in the form of mergers or acquisitions and thus limit opportunities for weaker and less competitive companies in source countries.

Based on the results of the impact of the degree of specialization (MI) in the source countries of the European area for the period 1998-2015 on the volume of cross-border mergers and acquisitions, we can say that the degree of specialization of source countries affects the volume of cross-border mergers and acquisitions of companies they are looking for trading companies as an investment opportunity.

Záver

V súčasnosti je kľúčové pre krajiny európskeho priestoru presadiť sa a zároveň sa udržať na neustále sa rastúcich globálnych trhoch. Neustály nárast konkurencie, zvyšujúce sa nároky a požiadavky od obchodných spoločností sa prejavujú spájaním formou fúzií či akvizícií a tak obmedzujú príležitosti pre slabšie a menej konkurencieschopné obchodné spoločnosti zdrojových krajinách.

Na základe výsledkov vplyvu miery špecializácie (MI) v zdrojových krajinách európskeho priestoru za sledované obdobie rokov 1998-2015 na objem realizovaných cezhraničných fúzií a akvizícií, môžeme konštatovať, že miera špecializácie zdrojových krajín, vplýva na objem realizovaných cezhraničných fúzií a akvizícií obchodných spoločností, ktoré vyhľadávajú obchodné spoločnosti ako investičnú príležitosť.

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Jana Mitríková

ANALYSIS OF THE ATTENDANCE OF BARDEJOV SPA BASED ON THE EVALUTION OF ARCHIVED UNPUBLISHED DOCUMENTS

ANALÝZA NÁVŠTEVNOSTI BARDEJOVSKÝCH KÚPEĽOV NA ZÁKLADE HODNOTENIA ARCHÍVNYCH NEPUBLIKOVANÝCH DOKUMENTOV

Abstrakt

The main objective of this article was to evaluate the impact of historical events on the visit rate of Bardejov Spa in various periods of its development (in the years of 1814–2016). The collection of information on clients' spa visits, especially the oldest data, was difficult (19th century and 1st and 2nd World War). Much information was available only in the State Archive of the Ministry of the Interior of the Slovak Republic in Hungarian and Latin. The paper summarizes the history of the spa, natural medical sources, spa treatment and indications. At present, the number of guests has an increasing trend, as evidenced by the visit rate for 2016, as well as by current data for 2017. In 2017, there were 27,170 clients. In 2018, Bardejov Spa reached a pick of the visit rate with 31,011 clients. The main clients are the Slovaks, about 90%.

Keywords

Slovak Spa, Bardejov Spa, visit rate, spa tourism, spa treatment

JEL classification: I10; L83

Introduction

The geological development of the Western Carpathians has created preconditions for varied and rich sources of natural healing thermal and mineral waters in our territory. These treasures have been used by residents of this area for the treatment of various diseases since their first settlement (Petraccia et al., 2006; Zálešáková, 2013). According to the water registration at the Ministry of Health of the Slovak republic, 1657 mineral springs are documented in our territory, while 112 of them are recognized as suitable for the purpose of filling in containers and medical care. According to Bodiš et al. (2016), Slovakia can be proud of dozens of unique spa resorts whose treatment effects reached a good reputation not only in our country but also throughout Europe. Nowadays, tourism has undoubtedly become essential to both national and international economies, and each country is currently trying to face the challenges imposed by this industry (Orieška, 1994).

On the basis of the information provided by the Statistical Office of the Slovak Republic, the total number realized in mass accommodation facilities was 14,138,420 in 2016 (10,367,330 in 2010). In 2017 there were 21 spa towns in Slovakia with 31 spa treatments providers and 80 accommodation facilities in total. Total capacity was 12,339 beds and 6,344 rooms. Over the last 10 years, there has been no significant change in this indicator (bed capacity in 2005 was 11,804 beds). The number of visitors in the Slovak spa had rising tendency until 2008, and it rose by almost 10% per year. Probably by the reason of the economic recession, this growth was slowed in 2008 by over 3% and in the following year decreased by more than 18%. In 2009, the growth was again restarted to the level from three years ago, thanks to an increase in the number of domestic visitors (Matlovičová et al., 2013). The number of visitors to spa

facilities in 2016 was 316,046 with a number of overnight stays of 2,741,550; in the year 2017 it was 311,138 with a number 2,733,651 of overnight stays.
The spa tourism share in the total number of visitors to tourist accommodation facilities in Slovakia is 6.3%; the share in the total number of overnight stays in tourist accommodation facilities in Slovakia represents 19.4% (Statistical Office of the SR, 2018). The number of guests of spa tourism accommodation facilities in Slovakia for the years 2005 to 2017 and the average number of overnight stays is presented in the table 1.

Table 1 The number of guests of spa tourism accommodation facilities and their average number of overnight stays in Slovakia for the years 2005 to 2017

Year	Number of guests	Average number of overnight stays
2005	228 822	9.4
2006	253 260	9
2007	276 164	8.9
2008	284 806	9.2
2009	241 309	9.9
2010	259 506	9.6
2011	261 515	9.2
2012	256 380	9.3
2013	278 429	9.1
2014	299 032	8.8
2015	304 975	8.6
2016	316 046	8.7
2017	311 138	8.8

Source: Statistical Office of the SR 2018 www.statistics.sk and authors' own research

In the structure of foreign visitors, clientele from the Czech Republic is clearly dominant and creates nearly 50% of all foreign spa guests (in 2017 it created 48,7%). From other groups, following nations can be mentioned: Israelis (10,9%), Germans (9.4%), Polish (5.3%), Russians (5.0%), Austrians (4.1%). The highest number of overnights, which Slovak spa guests stayed in the Slovak spa, was 10.2 days in year 2009. The foreign guests stayed in the Slovak spa 9,5 days; this highest number was from the year 2005. In the year 2017 Slovak guests stayed 8.7 days, the foreign guests 8 days. Revenue from accommodation (per year 2017) was 61,953,120 Euro, while 45,133,232 of it came from domestic and 16,819,888 from foreign visitors.
In the paper, we summarize data from the Bardejov Spa history covering the area of natural healing sources, spa treatment and indications, facilities, services, architectural development of spa houses and hotels, a visit rate, whose development is included in individual historical stages. The aim of the paper is to clarify the impact of the historical events, in particular periods, on an increase and decrease of the Bardejov Spa visit rate and give a comprehensive view of the main periods of the Bardejov Spa tourism development.
The healing effects of mineral water, quiet and peaceful environment predominantly coniferous forests conditioned the emergence and development of the picturesque spa, in ancient times also called Burcuth. The famous Bardejov Spa is situated in the valley of the Bardejov Brook, about 6 km from the historically significant medieval town Bardejov (Dubcová et al., 2008). In

addition, the spa, spanning 31 hectares, is located in the foothills of the Low Beskid Mountains in northeastern Slovakia and is owned by 33 subjects. Currently Bardejov Spa belongs among one of the best equipped treatment facilities, where its rich tradition and history are combined with modern treatments. Bardejov Spa is among three most popular, most visited and largest Slovak spas with 1631 number of beds. The biggest treasure of the spa is natural medical sources that thanks to the composition are one of the most significant in Europe. The geographical location, mineral springs, natural environment and microclimate are beneficial for the treatment of various diseases. Concerning all Slovak spas, Bardejov Spa has the widest range of indication. The following indications specified by law are treated there: I. Oncological diseases; II. Disorders of blood circulation system; III. Disorders of the gastrointestinal system; IV. Disorders of metabolism and the glands of internal secretion; V. Non-tuberculosis type disorders of the respiratory organs; VI. Neurological diseases; VII. Musculoskeletal system disorders; VIII. Renal and urinary tract disorders; IX. Women´s diseases; X. Professional diseases (Gutek a kol., 2012; Šenková, 2017).

Theoretical basis

The first historical findings of Slovak spa towns include the records, dated back to the 13th century to 1244, on Trenčianske Teplice and Sliač. According to Mulík (1981), the documents from 1247, from the time of Bela IV, about the Bardejov Spa also belong to those records. However, the properties and content of the water from that time are devoid of deeper knowledge. According to Rebro (1979), the spa treatment began to develop in our country at the beginning of the 16th century. Knowledge of mineral springs and their use is evidenced by old folk names of places, such as Štiavnička and Šťava (the *name* of the village comes from a Slovak word-formation base "štiav" that means acidic water), or Teplice and Teplička (the *name* of the village comes from a *Russian* expression "*Thoplica*" for *warm water* that *does not freeze even* in *winter*). During that period, the first record on the use of mineral especially thermal waters was created, namely a document by J. Wernher from 1549 "About the Wonderful Waters of Hungary". Another register on the use of thermal and mineral springs in Austro-Hungary from 1763 was also preserved. Mulík (1969) adds that the occurrence of mineral springs was proved by Matej Bel with his first map of the territory of Slovakia from 1715. The map captured geographical signs and the occurrence of mineral waters - acidulous mineral waters and also bath signs - thermae. The map was published in 1723 in the Bearer of Old and New Hungary (Hungariae antiquae et novae prodomus) (Matlovičová et al., 2013). Nowadays, spa tourism is generally understood as care provided to patients in the spa and aimed at treating the physical and psychological problems of humans. According to Orieška (1994, p.128), spa tourism is "a type of tourism, that requires the existence of spa facilities, using natural healing resources - healing waters, peloids, gases, emanations and climatic conditions." The use of natural healing resources has curative effects on the human body, stimulates the change in the body reactivity leading to adaptation to changed life situations, such as aging, diseases or stress. Spa tourism also represents health-preventive and therapeutic activities under the medical supervision of specialists (Zálešáková, 2008). Even if curative climate and healing waters are particularly important and required for spas, visitors do not come to spa resorts only for health, relaxation and beautiful nature but also for entertainment and cultural enjoyment. Hensel (1951) consider as a spa a place where the natural healing effects of water, gas, and mud are used for continuous therapy. These places are equipped with appropriate spa, dining and accommodation facilities, as well as medical services. Eliášová (2009) further adds that a healing spa represents more than one medical facility, and natural curative resources are used to provide treatment and prevention. In addition, a spa offers help in regenerating health, mental and physical strengths of a human, health care to stabilize the state of health, as well as a number of activities bringing

entertainment and cultural enrichment. The health insurers' limited spa care expenses place greater emphasis on the creation by spas of wellness products and on the building up of relationships through destination management organisations that enable the integration of resources for marketing activities (Derco, 2014).
The 18th and 19th centuries were a golden age of spas in Europe. In almost every country, tourist resorts grew up around the springs and provided the template for later developments in specialized tourism urban landscapes (Warwick & Laing, 2017). Health tourism may seem like a new form of tourism. However, the opposite is true. Health tourism is one of the oldest forms of tourism. Still, certain forms of health tourism have been changing and evolving, e.g. visiting retreats. Certain forms of health tourism have been (re)discovered in many areas of the world recently. This is the real reason why such health tourism forms seem to be new. They are new to a given market but might be rather traditional in other countries (Bushell, 2017). In most European countries, a spa treatment is usually a supplementary element of other medical procedures (Hungary, Spain, France) and not a primary procedure, as in Poland, Slovakia and Germany (Rogers, 2009). The authors Vystoupil, Šauer & Bobková (2017) compare and assess the position of the spa and wellness sector in the structure of tourism in the Czech Republic. The article deals with the brief history of the Czech spa tourism and the development of spa tourism in the spa resorts. The paper of Vavrečková, Stuchlíková & Dluhošová (2017) focuses on the development of balneal care provision and its current state in the Czech spa industry in connection with the changes in legislation. Special attention is paid to two turning points in the balneal care provision: the turn of 2012 and 2013 and the turn of 2014 and 2015, which were significantly affected by the changing legislation. The main topic of the paper the authors Kasagranda & Gurňák (2017) is the evaluation of tourism in Slovakia through a geographic analysis. Kulla (2011) focused his paper on the evaluation of trends and perspectives of Spa tourism in Slovakia and on the changes in guests´behaviour. He compared also structure and infrastructure of spa tourism between the era of socialism and present. This paper briefly evaluates the development and the importance of spa, spa tourism and wellness. The scientific articles on mineral waters and spas in various European countries have been published in a scientific journal that has been mono-thematically focused on Clinics in Dermatology. Mineral water and spas in Bulgaria (Vassileva 1996), Greece (Katsambis & Antoniou, 1996), the United States (Benedetto & Millikan, 1996), Germany (Titzmann & Balda, 1996), Italy (Andreassi & Flori, 1996), France (Karam, 1996). Promotion of balneology in Hungary was published in the Hungarian language in the scientific journal Orvosi Hetilap (Szállási, 1985). The authors Csapó & Marton (2017) presents and highlights the role and importance of spa and wellness tourism in Hungary. Their study examines the supply and the demand side together with competitor analysis and recent trends in spa and wellness in Hungary. The study of authors Roanghes-Mureanu & Tudoric (2014) focused on the evaluation of both natural and man-made resources favourable to the emergence and development of spa resorts in Romania. The author of the paper Widawski (2017) presents the situation of the spa resorts in Poland from the geographical point of view, emphasizing especially the tourist context of their existence.

Methodology

The collection of information on clients' spa visits, especially the oldest data, was difficult (19th century and 1st and 2nd World War). Much information was available only in the State Archive of the Ministry of the Interior of the Slovak Republic in Hungarian and Latin. Some data over several years were not available at all, and some data were not recorded in writing. There are no institutions in this compact form, including the management of the Bardejov Spa, that have been reported by the clients that we were able to obtain. Then we reviewed the historical development of the Bardejov Spa, which we divided into individual time periods. In them we

have tried to include history, attendance, treatment, indications, reconstruction, construction, social life. Subsequently, based on the chronological progress of the development of Bardejovské Kúpele, we have graphically evaluated the bathing experience by means of the mathematical - statistical method, taking into account the years in the individual stages. Using the Gretl statistical program, we created two regression analyzes. The first regression analysis concerned the years 1814-1898 and includes periods of the first great flowering, the period of stagnation to the period of the second bloom of Bardejov Spa. For the second half of the Bardejov spa bath development period from nationalization and spa development in the years 1960-2015, we created a second regression analysis.
Regression analysis represents a summary of statistical methods and procedures used for study and evaluation of relationships between two (or more) variables. Such a relation of one quantity to the other or the dependence of one quantity on the other is possible to express from the simultaneously observed and measured data. Their aim is primarily to estimate parameters, mean values of the dependent variable or prediction of future values. The variable Y, called the dependent variable or explained, is the variable whose dependence on other variables we investigate. Variable X, called an independent variable or explaining, is the variable anticipated to cause changes and to estimate the values of the dependent variable Y. When observing the relationship between the two variables, there is a simple pair regression whose predicted dependence is expressed by the function $y = f(x)$.
To understand the regression model, firstly, it is necessary to explain the individual values:

- P-value (significance level) - if the p-value is <0.05, the H0 hypothesis is rejected and we accept the hypothesis H1 which shows that there is a statistically significant linear relationship between the variables. If the p-value is ≥ 0.05, the H0 hypothesis cannot be rejected, and it is not between variables, there is no statistically significant relationship existent.
- To determine the accuracy of the model, the coefficient of determination is $0 <= R2 <= 1$. The greater the number is, the more variability of the dependent variable the model elucidates, or shows how much variability the regression model (by considered regression dependence) has been able to explain.

The visit rate for individual years is also evaluated by a line graph, which is a graphical representation of our two variables X and Y. The individual point values are in a graph depicted by red crosses, while a blue line in the graph, called the equalizing regression line, graphically represents an estimate of our model. The line is linear and growing, meaning that with increasing values of the variable Y values of variable X also increase.

Results

Based on the study of historical materials about the Bardejov Spa, including spa treatment, construction of accommodation facilities and especially its visit rate, we have prepared an overview of the historical development that we have divided into individual stages. We have tried to include history, the visit rate, treatment, indications, reconstructions, constructions, and social life which conditioned the increase or decrease in the number of guests. In the phase of study of historical sources, we have summed up all the available information into the individual stages that we have divided into the first period of flowering, the period of stagnation, the second period of flowering, the period of the First and Second World Wars, the development of the Bardejov Spa from nationalization and development in the years 2000 to 2016, separately 2017. For the purpose of calculating the regression analysis using the Gretl statistical program, we have chosen the following historical stages from the above-mentioned.

The first evaluating period, concerning the years 1814 to 1898, includes the period of the first great flowering, the period of stagnation until the period of the second flowering of the Bardejov Spa. For the second half of the periods, and that is the period of spa development from nationalization and development in the years 2000 to 2017, we created a regression analysis, in which we recorded the flow of the visit rate, but in the years 1960-2015.

Hypothesis: It is assumed that the reconstruction of the Bardejov Spa facilities, the construction of the center, the improvement of the services and the spa treatment in the years 1960 to 2015 increased the number of guests of the Bardejov Spa.

The growth of the visit rate in each period was affected by the following development. In the visit rate graph of the Bardejov Spa (see Figure 2), it is possible to identify an increase or decrease in the number of guests who stayed overnight in the spa in periods of the first great flowering from 1814, during the period of stagnation from 1848 to the period of the second flowering of the Bardejov Spa, finishing in 1898.
The number of visitors at the beginning of the first flowering was also growing thanks to Professor Kitaibel, who developed an analysis of curative springs and suggested indications for particular diseases. That brought the rapid spread of awareness of Bardejov curative waters, as can be seen in the number of guests in 1814, when 800 guests visited the Bardejov Spa, and even more in 1815. Not only medical care was offered at that time in the spa but also a variety of cultural and sports activities to make a patients' stay enriching and entertaining. New summer residences were built, hotels and spa became more and more luxurious. As we can see in the chart, the visit rate was rising constantly. Great popularity during the period was influenced also by the visit of Austrian Princess Maria Lujza and later Russian Tsar Alexander I. As there is no record to clarify why the number of guests dropped to 763 in 1824, we can only deduce that this could be caused by the fact that the Bardejov Spa became more luxurious, and consequently less affordable for inhabitants of the surrounding towns, as the treatments and stays in the spa were quite expensive. Still richer cultural and social life and building of the Institute for Cold Water Therapy increased the number of guests in the Bardejov Spa to 1,000 in 1840. From the visit rate graph of the Bardejov Spa (see Figure 2), we can see a decrease in the visit rate because the following years were not very prosperous for the Bardejov Spa. In the data we obtained, the number of visitors in the revolutionary period was not recorded. We only know that the Revolution and the arrival of Russian soldiers affected the Bardejov Spa to a considerable extent. The entire Pánska Street was destroyed, and there was no efficient investment into the spa development. Moreover, as a consequence of improvements in the railway network abroad, many richer visitors preferred treatment beyond our borders. The fire in 1856 destroyed many houses and the number of spa guests was reduced to only 186. However, this situation lasted only shortly, and in the course of three following years, the number of visitors increased, in 1857 to 285 guests, in 1858 to 465 guests and in 1860 to 630 visitors. Spa tourism grew significantly thanks to low service charges, which could be afforded even by less wealthy people, and thanks to new diseases that began to be treated in the spa (Cassens et al., 2012). The number of guests increased to 1900, as evidenced by the year 1871. Since there are no reports for 1876 why the number of guests was so rapidly reduced to 650, we can only conclude that it was caused by stagnation in a renovation of the spa and ownership changes. The following year 1880, the second period of flowering of the Bardejov Spa began. Through Bardejov financial incentives, the construction of a spa colonnade, a wooden pavilion, and many other improvements, that raised a spa reputation, began. Thanks to a wide range of services, the spa could flourish from 4000 guests. As Mulík mentions (1969, p. 141), inconsistent criteria and reports distort the visit rate of that time, so it is not known why the number of visitors in 1890 dropped to 3500. One of the reasons was an increase in stay and procedure charges, which was not affordable to everyone. The turning point for a rise of the

number of guests was the construction of the Deák Spa Hotel, which raised the total capacity of the spa. The construction of the Bardejov - Prešov railway line in 1895 brought an important progress and new guests, whose number reached 3700. The visit of another prominent European ruler, Elisabeth Empress, known as Sissi, and the construction of the Dukla and Astoria hotels also contributed to a good reputation of the spa which can be seen in the number of guests - 4000 in 1898.

The increase in the visit rate in individual years was really affected by reconstructions, constructions, development of treatment and indications, and visits of well-known historical figures. The growth of the visit rate in each period was affected by the following development. In the visit rate graph of the Bardejov Spa, it is possible to identify an increase or decrease in the number of guests who stayed overnight in the spa in periods of the first great flowering from 1814, during the period of stagnation from 1848 to the period of the second flowering of the Bardejov Spa, finishing in 1898. Based on the shape of the regression line (Figure 3), we can conclude that study of the historical sources and the regression analysis calculation has confirmed the dependence, that the found historical facts (construction and reconstruction of buildings, visits of prominent personalities, etc.) influenced the visit rate of the Bardejov Spa in periods of the development of the spa from nationalization and the spa development in the years 2000 to 2015.

The equalizing regression line in the graph shows the estimate of our model. The line is growing, so we can say that with the rising values of the variable (year) the values of the variable (guests, visit rate) increase, too. For the beginning, it is important to note that the number of guests to the spa was affected by two laws. Namely the Act on Nationalization of spas and springs of 1948, when the reconstruction and restoration of damaged buildings for year-round operations started and the Act No. 43 on Spas and springs. The approval of the spa statute for the Bardejov Spa in 1955, significant for continuing construction and development of the spa, was of great importance, as well. The spa grew up in popularity which was a contribution of the reducing of the number of indications resulted in a better therapeutic effect for patients, so in 1960, 7,000 visitors were treated in the spa. Many guests arrived mainly from the western part of Czechoslovakia and in 1964 the number of visitors rose to 8000. Even though the number of guests fell in the following year, it started to rise again thanks to the doctor František Radáč who contributed to the building of a service centre, colonnades, cinemas and balneotherapy with a heath centre and an indoor pool. The construction of the Hotel Minerál and the opening of a spa open-air museum called skanzen conduced to an increase in the number of guests to 7,637 in 1970. Completion of the construction of the Ozón Hotel raised not only the number of visitors (10,200 in 1975) but also accommodation capacity of the Bardejov Spa. Vibrating social life, lively spa tourism, and high- quality health care showed results in the rise of the number of guests, and, in 1980 with the accommodation capacity of 1,100 beds, it reached 13,800 guests (Kireta, 2012).

Since we have not been able to find any data for the years 1990 to 2000, we can only deduce that the visit rate increased, as in the following years, in 2001 there were 21,904 guests, and in 2003 – 27,689 guests arrived at the spa. In the following year 2004, the amendment to the payment of some healthcare fees marked the spa tourism; consequently, the number of guests was reduced to 21,937. In 2007, the number of guests rose to 23,943, but the global economic crisis and the euro adoption brought further decrease in the visit rate, and only 16,267 patients visited the spa in 2009 (Kireta, 2012; General Director of Bardejov Spa, 2018).

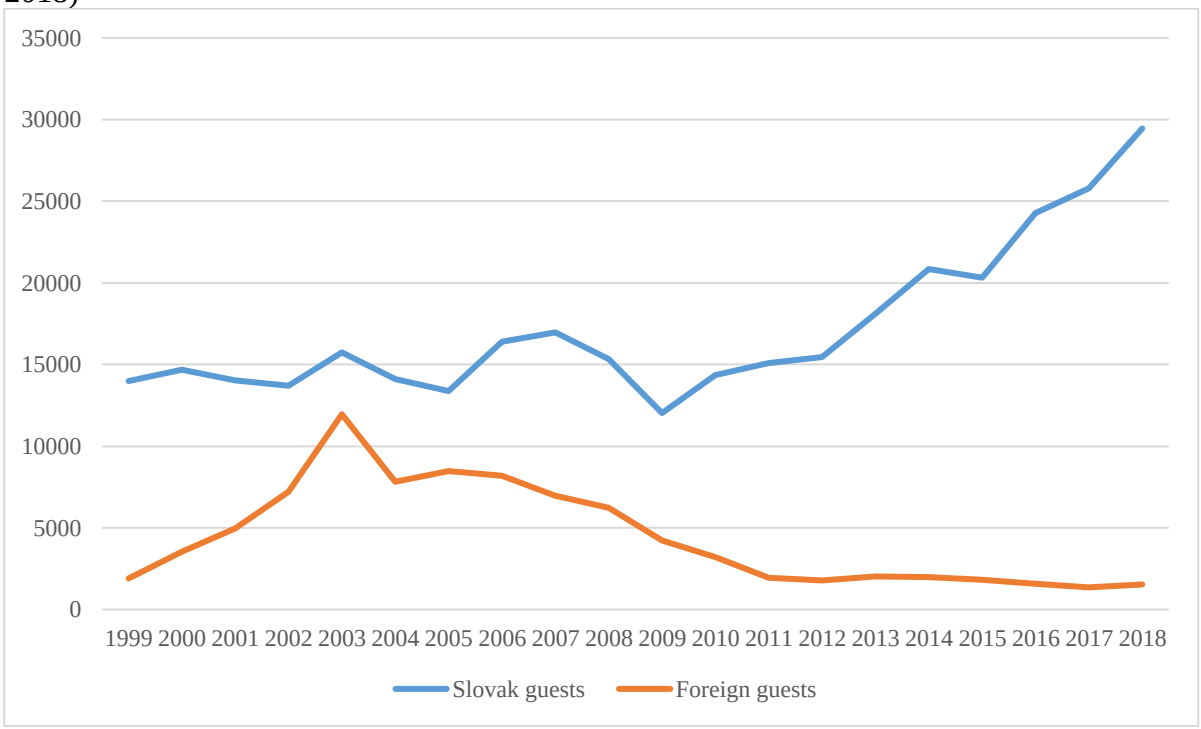
Table 2 The regression analysis of the Bardejov Spa's visit rate for the period from 1960 to 2015

	Coefficient	Standard deviation	P-value
Constant	−554,536	72,802.5	0.0001
Year	286.507	36.8691	0.0001
Determination coefficient	0.742904		

Source: Own processing using Gretl statistical program

Based on the results from the regression model, we can conclude that there was a high growth in the guest rate. As a result, there is a statistically significant linear relationship between these variables (year and visit rate), so we can say that the visit rate in individual years was also influenced by the development (reconstructions, constructions, indications, treatment). The value of the determination coefficient, in this case, is estimated at 0.742904, which is 74%, and represents a high dependency. The remaining 26% of the variability are caused by factors not included in the regression model and other accidental impacts. We have used HAC to correct standard errors, and our hypothesis has been confirmed. At present, the number of guests has an increasing trend, as evidenced by the visit rate for 2016, as well as, current data for 2017. In 2017, there were 27,170 clients. In 2018, Bardejov Spa reached a pick of the visit rate with 31,011 clients.

Figure 1 The visit rate of Slovak and foreign guests in the Bardejov Spa (the years 1999 to 2018)



In 2011, another amendment to the Health Care Act was adopted which caused some decline in the number of patients, as well. This number leveled off thanks to the opening of a new Wellness Centre and Centre for Men's Health, and the introduction of a fibro-elastography examination of the liver. The number of guests increased to 17,268 at the end of 2012. In 2015, the Mineral Hotel was rebuilt into a luxurious congress Hotel Alexander ****, which brought accretion of the accommodation capacity. In the present, the company Bardejovské kúpele a.s. has the accommodation capacity of 1196 beds in 613 rooms, in the main season, available. The

number of employees ranges from 245 (+ 92 outsourcing), that makes it the second largest employer in the Bardejov District.
In 2016, the Bardejov Spa reached a pick of the visit rate with 25,863 clients which was 14.46% higher than in 2015, in 2017 there were 27,170 clients. Year-on-year, the number of overnight stays increased by 9% and reached 251,884. From the year 2003 the number of foreign tourists 11,955 reduced to the number 1,551 (in 2018). With the growth of domestic clientele, the share of the foreign clientele was reduced.

Discussion

In general, health and spa tourism are increasingly becoming an important economic and marketing strategy for hoteliers, resorts and tourist destinations that attract tourist visits. The importance of the Slovak spa tourism is determined by the fact that according the marketing strategy of its development, is considered the third most important form of tourism. The summer tourism, the water stays and winter tourism together with winter sports. Its priority status is also determined by the fact that the medical spa is considered to be the main product line of the Slovak tourism. The response to the mentioned problems was marketing activities strengthening at the level of the individual spa resorts and at the national level. Orientation is focused on the key markets represented by neighbouring countries with relatively good transport, respectively with historical and social linkage with the past (the Czech Republic, Hungary, Poland and Ukraine), as well as on countries that have significant long-term presence within the number of tourists (Germany, Russia, Italy, the United Kingdom) (Stratégia 2013 cit. in Matlovičová et al., 2013).
The average yearly spa treatment is 120,000 inhabitants of Slovakia. In 1996, they were 117,683 and in 2015 it was 119,424. However, while health insurance companies paid 100% of the cost of spa treatment 20 years ago, only 51% last year. In 1996, health insurance revenues amounted to € 1.14 billion, and in 2015 insurance choices amounted to € 4.23 billion. Overall in 2015, the Slovak spa visited 154,000 clients. Those foreign come mostly from Germany, the Czech Republic, Poland or Russia. On the contrary, the interest in the Slovak spa does not have the inhabitants of France, Portugal or Spain. Only about 60% of the bed capacity is used in health care in the Slovak spa. The Association also deals with specific insurance measures. "We have expressed dissatisfaction with the fact that reviewers to approve proposals for spa care make obstructions that we think are beyond the law," said Zálešáková, chairwoman of the Slovak spa association (Zálešáková, 2016).
Since January 1, 2019, VAT on accommodation from the original 20% to 10% has been reduced in Slovakia, also on the basis of the positive experience of other EU Member States, that such a legislative measure will increase the demand for accommodation services in the territory of the Slovak Republic, thus positively supporting further development of tourism in Slovakia (Tlačové správy 2020).

Conclusion

The main objective of the paper was to evaluate the impact of historical events on the visit rate of the Bardejov Spa in various periods of its development (in the years 1814-2016). In the time of the first records of Bardejov acidulous mineral waters stretching back to 1247, nobody anticipated the hidden potential of curative springs and future benefits for the region and all Slovak spa industry. Due to the article extent, we have not been able to do a comprehensive assessment of the state of all Bardejov Spa's development periods. Nevertheless, with the detailed field research, we have summarized all available information into the individual

periods that we have divided into the first period of flowering, the period of stagnation, the second period of flowering, the period of the First and the Second World Wars and the development of the Bardejov Spa from nationalization to the present. In our article, we have captured the historical development briefly, but only in the context of the spa visit rate, for the purpose of calculating the regression analysis. From the above-mentioned historical periods, we have evaluated two following periods. The first period, specified by the years 1814 to 1898, includes the period of the first great flowering, the period of stagnation to the period of the second great flowering of the Bardejov Spa. The second period - the period of development of the spa was defined by the years 1960 to 2015. Based on the regression analysis of the visit rates and the regression line for the given periods, we can conclude that the Bardejov Spa has always had and still has a huge potential in spa tourism, as evidenced by an increasing number of visitors. Although we have to note that some circumstances, such as the fire in 1856, the revolution of 1848 to 1849, stagnation in reconstructions, the First World War and the Second World War, amendments to the law, and often changing lessees, decelerated the progress of the spa. As far as the final evaluation of the individual periods is concerned, each of them has contributed, in a way, to spa tourism and to the development of the entire Bardejov Spa.

The value of the determination coefficient tells us how much variability we have been able to explain in these regression models. The increase in the visit rate in individual years was really affected by reconstructions, constructions, development of treatment and indications, and visits of well-known historical figures. The growth of the visit rate in each period was affected by the following development. In the visit rate graph of the Bardejov Spa, it is possible to identify an increase or decrease in the number of guests who stayed overnight in the spa in periods of the first great flowering from 1814, during the period of stagnation from 1848 to the period of the second flowering of the Bardejov Spa, finishing in 1898. Based on the results from the regression model, we can conclude that there was a high growth in the guest rate. As a result, there is a statistically significant linear relationship between these variables (year and visit rate), so we can say that the visit rate in individual years was also influenced by the development (reconstructions, constructions, indications, treatment). The value of the determination coefficient, in this case, is estimated at 0.742904, which is 74%, and represents a high dependency. The remaining 26% of the variability are caused by factors not included in the regression model and other accidental impacts. We have used HAC to correct standard errors, and our hypothesis has been confirmed.

By evaluating the data obtained over time, we can say that Bardejovské Spa has always had and has a tremendous potential in the sphere of spa tourism, despite the fact that some circumstances like the fire in 1856, the Revolution of 1848-1849, the stagnation in modifications, the first and second world the war and the amendments to the Law on Baths about tenants and others, have greatly marked the progress of these spas and spa tourism. At present, the number of guests has an increasing trend, as evidenced by the visit rate for 2016, as well as, current data for 2017. In 2016, the Bardejov Spa reached a pick of the visit rate with 25,863 clients, in 2017 there were 27,170 clients, 31,011 in 2018. The main clients are Slovaks, about 90%. 5% are clients from Ukraine, Belarus and Russia, and 5% are foreign clients from the Czech Republic, Poland, etc. (Tlačové správy 2020).

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BANKRUPTCY PREDICTION APPLYING MULTIVARIATE TECHNIQUES

PREDIKCIA BANKROTU S VYUŽITÍM VIACROZMERNÝCH TECHNÍK

Abstract: *The paper focuses on the analysis of the corporate bankruptcy prediction using selected statistical multidimensional methods. Existing multidimensional methods are a suitable tool for predicting the bankruptcy of companies, for their graphical representation in space, the identification of clusters of companies with the same bankruptcy preconditions, as well as the identification of bankruptcy factors. The research was carried out on a sample of 343 heat management companies in Slovakia. All of these companies operate local district heating systems. Within this group, there are companies that have a monopoly position in a given geographical area. Of the multidimensional methods, the Principal Component Analysis (PCA) method and the Multidimensional Scaling (MDS) method were used. The resulting graphical representation of both methods yielded significant results. The paper identified the main factors in predicting bankruptcy. It has been found that it is possible to predict bankruptcy of the analyzed sample of companies using three main factors that capture 70% of the information from the applied indicators. It follows that it is not necessary to apply a large number of indicators to reveal the financial situation of companies. In addition, similar characteristics of enterprises make it easier to predict bankruptcy in larger samples*.

Keywords*: Bankruptcy, Multidimensional Scaling, Prediction, Principal Component Analysis.*

Kľúčové slová*: Bankrot, multidimenzionálne škálovanie, predikcia, analýza hlavných komponentov.*

JEL classification: M20, G33, C53

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Introduction

Prediction of business financial distress and bankruptcy is a subject that has gained great interest from researchers in the field of finance. There are a number of methods designed to assess businesses` financial health and predict their possible bankruptcy. Several of these methods are based on mathematical and statistical methods, most of which are regression models or discriminant analysis models. Researchers who deal with this issue divide the mentioned methods into different groups. Araghi and Makvandi [1] classify prediction models to statistical models, models based on artificial intelligence and theoretical models. Balcaen and Ooghe [2] divide failure prediction models into classic statistical models and alternative methods. In the following text, we present the methods that these researchers include in mentioned groups and the example of the author who applied them. Classic statistical models include univariate analysis [3], risk index models [4], multiple discriminant analysis [5], conditional probability

models – Logit analysis [6], probit analysis [7], linear probability modelling [8]. As alternative methods, they mention multi-logit analysis [9], survival analysis [10], dynamic event history analysis [11], multidimensional scaling [12]. decision trees [13], expert systems and neural networks [14]. Alternative methods may include also other multidimensional techniques in addition to the above-mentioned, namely cluster analysis, factor analysis, principal component analysis or correspondence analysis. In this paper we applied multidimensional scaling (MDS) and principal component analysis (PCA).

Multidimensional techniques allow a graphical representation of the financial position of companies, while creating groups of companies with the same characteristics and the same financial difficulties. They make it possible to reduce the number of evaluated financial indicators and to reveal indicators that are essential for the identification of bankruptcy [15].

The aim of the paper was to minimize the number of variables that can be used to predict the bankruptcy of businesses, to detect the symptoms of bankruptcy and to identify clusters of businesses within which there are businesses with similar values of the given variables.

The originality of the research lies in the application of multidimensional techniques to identify symptoms of a possible bankruptcy of businesses.

The remainder of the paper is structured as follows. Section 2 is literature review. This section defines the term bankruptcy and provides the overview of theoretical knowledge about MDS and PCA. The third section `Methodology` describes the data, the analysed sample of businesses and theoretical background of applied methods. Section 4 includes results and discussion of the results achieved. This section lists and compares the results of bankruptcy prediction applying MDS and PCA. Section `Conclusion` summarizes the essential conclusions resulting from the research and brings significant findings.

Literature review

Bankruptcy prediction is one of the crucial issues which have been often studied in accounting and finance literature [16]. From a methodological point of view, the prediction of bankruptcy is a binary classification problem which aim is to differentiate between solvent and insolvent groups of businesses in the best way [17] In: [18].

Altman and Hotchkiss [19] specify two types of bankruptcy. One type is insolvency in a bankruptcy sense, which usually indicates a chronic rather than a temporary condition. A business finds itself in this situation when its total liabilities exceed a fair valuation of its total assets A second type of bankruptcy is company's formal declaration of bankruptcy in a federal district court, along with a proposal to liquidate its assets or attempt recovery.

Models for bankruptcy prediction among others include multivariate techniques PCA and MDA.

PCA is one of the most widely used multivariate techniques in statistics [20]. Preisendorfer and Mobley [21] In: [22] states that the origins of this statistical technique are linked to Singular Value Decomposition (SVD), independently derived by Beltrami [23] and Jordan [24] in the form that is directly related to PCA. The foundations of PCA were laid by Pearson [25], the general procedure of this technique as we know it today was given by Hotelling [26]. According to Jolliffe [22] the motivation of Hotelling was that there may be a smaller basic set of independent variables which determine the values of the original p variables. These variables are called factors in psychological literature, but to avoid confusion with other uses of the word factor in mathematics, Hotelling introduced the alternative term components. He suggested to

choose these components so as to maximize their successive contribution to the sum of the variances of the original variables and called the components derived in this way principal components. The analysis which finds such components was then called method of principal components.

According to Jackson [27] the development of PCA technique has been quite uneven in the following years. There was a great deal of activity in the late 1930s and early 1940s. Things then subsided for a while until computers were designed, which allowed these techniques to be applied to problems of appropriate size.

PCA method is attractive mainly because the main components are uncorrelated. Instead of investigating a large number of original variables with complex internal links, the user analyses only a small number of uncorrelated main components. Principal component analysis is also part of exploratory data analysis. Reduction of the data dimensionality is often used in the construction of comprehensive indicators as linear combinations of original variables. The use of the first main component as a comprehensive indicator is common in the field of economics, sociology and medicine. The first two or three main components are used primarily as techniques for displaying multidimensional data. In many cases, PCA is only one part of a more complex analysis [28] In: [29]. This method was used in such a way by Succurro et al. [30] who implemented tandem analysis based on the use of PCA and Logit model or Canbas et al. [31] who created an integrated early warning system for predicting banks failure applying discriminant analysis, PCA, logit and probit analysis.

The second multivariate technique applied in this research is MDS. It is a "statistical method that optimally maps proximity data on pairs of objects (i.e. data expressing the similarity or the dissimilarity of pairs of objects) into distances between points in a multidimensional space (usually 2 or 3 dimensions)" [32]. Objects can be people, attributes, stimuli, countries, etc., measurements can be correlations between test items, similarity of politicians, dissimilarity of mobile phones, etc. The main aim is to represent these objects as points in low-dimensional (usually 2-dimensional) space in such a way that the distances among the points represent the (dis)similarities as good as possible. The motive for this is the visualization of the data in a picture which makes the data structure much more accessible to researchers than a data matrix with many numbers [33].

According to Neophytou and Molinero [34] In: [18] MDS visualizes the hidden relationships between data and reduces them into multidimensional coordinates. The applicability of MDS is broad and this method can be potentially used across many disciplines such as psychology, psychophysics, neuroscience, marketing, political science, sociology, ecology and others [35].

The first algebraic approach to MDS is classical MDS, which assumes metric data as inputs. This approach has been independently proposed by Torgerson [36], Gower [37], and Kloek and Theil [38]. Gower [37] In: [33] was the first to realize that the reduction of principal component analysis dimensions has a dual method that can be obtained by performing classical MDS on Euclidean distances of data matrix rows.
Another basic approach to MDS is ordinal (also called non-metric) MDS. This approach is used in situations where one value is not enough to capture the fact. Non-metric MDS uses the order of the distances between the objects, not their actual values. The pioneer of this approach was Shepard [39] [40], followed by Kruskal [41] [42], who suggested the loss function called Stress, and [43].

Before the application of MDS in bankruptcy prediction, this method was used in accounting and finance. An early application of MDS in accounting was reported by Green and Maheshwari [44]. Subsequently Frank [45] compared international accounting principles using MDS, Libby [46] and Bailey et al. [47] applied the MDS to clarify audit issues, [48] used the MDS to study the value of accounting information to investors In: [34].

Multidimensional scaling has been used as the alternative model for the analysis of business failure because it bypasses many of the shortcomings of discriminant analysis and Logit model. First authors who applied this method for business failure prediction were Mar-Molinero and Ezzamel [12]. In 2001 Mar-Molinero and Serrano-Cinca [49] extended this work and suggested a way in which MDS can be used as an alternative to discriminant analysis or Logit model in order to classify companies as failed or continuing.

The MDS algorithm does not make any assumptions about the distribution of financial indicators on which the analysis is performed. MDS has an important benefit: it visualizes the main features of the situation and thus allows the incorporation of non-quantitative information into the analysis. The reasons why a particular company fails or does not fail and the risk of failure of a particular company are assessed and also visualized. In this way, the MDS opens the door for the judgment to supplement statistical analysis [34].

Material and Methods

The sample of businesses for carrying out this research consisted of 343 companies doing a business in the field of heat supply. The data from financial statements of companies for the year 2016 were obtained from CRIF - Slovak Credit Bureau, s.r.o. [50]. According to SK NACE Rev. 2 the sample of businesses falls under section D "Supply of electricity, gas, steam and cold air". Regarding the legal status of businesses, 15% of them are joint stock companies and the remaining 85% are limited liability companies. The results of the financial analysis show that the analysed companies can have a liquidity problem. Despite the fact that the average value of the Current ratio is 3.92, median is 0.951. Value of this indicator lower than 1 means higher financial risk. This is also reflected in the negative value of net working capital. The analysed companies achieve high creditors payment period, which results in a negative value of cash-to-cash. The assets of these companies change on average once a year. The average return on assets is 5%. The capital structure of these companies is 35:65 in favour of equity. The performance of companies assessed by the EVA indicator indicates that businesses from the analysed sample can be threatened with bankruptcy.

When applying PCA and MDS we used 9 financial indicators, 8 of them were the same indicators which were used by Premachandra et al. [51]. We applied these indicators: TDTA – total debt / total assets used as a leverage measure which indicates long-term financial obligation, CLTA – current liabilities / total assets which indicates a lack of cash flow to fund business operations, CFTA – cash flow / total assets, NITA – net income / total assets, WCTA – working capital / total assets, CATA – current assets / total assets, EBTA – earnings before interest and taxes / total assets, EBIE – earnings before interest and taxes / interest expense. Due to the lack of the data necessary for the calculation, we replaced the last Premachandra`s indicator by similar one ETD – equity / total debt, which was used by Altman [52].

The relationship between MDS and PCA has been studied by many researchers. According to Mar-Molinero and Serrano Cinca [49] who takes into account research of Lingoes [53], Shepard [54], MacCallum [55] and Balloun and Oumlil [56], the general conclusion is that both non-metric PCA and MDS yield the same message about the data. Hout et al. [35] also states that PCA achieves similar results to MDS, but he further discusses this idea. According to this

author the PCA approach is mathematically identical to the metric MDS based on Euclidean distance. By comparison, non-metric MDS is better able to maintain point-to-point distances in the final configuration. In essence, the difference can be best described in terms of the research objectives: PCA focuses more on the dimensions themselves and fitting the variance as closely as possible, while MDS focuses more on the relationships between scaled objects.

In this paper we used MDS and PCA methods to explore relationships between financial ratios of analysed businesses and the differences between bankrupt and non-bankrupt businesses from the analysed sample.

The aim of MDS is to find dimensions that will allow to explain the identified similarities or differences between objects. Within the MDS, any kind of similarity or distance can be analyzed based on the so-called proximity matrix. Unlike other multidimensional methods, MDS does not require a precise definition of the variables used when comparing objects.

The proximity matrix contains three different types of data, namely the distances between the objects d_{ij}, the similarities between the objects S_{ij} and the values of the variables (columns) for the individual objects (rows) x_{ij}. The distance (dissimilarity) d_{ij} represents the distance between objects. The distance matrix D is symmetric [57].

The distance between points *i* and *j* is calculated using the Euclidean distances of the objects according to formula *(1):*

$$d_{ij} = \sqrt{\sum_{k=1}^{p}\left(x_{ik} - x_{jk}\right)^2} \qquad (1)$$

where p is the number of dimensions, x_{ik} is the value of the data from the row i and the column k [58].

The similarity of S_{ij}, expresses how close two objects are. The degree of similarity is calculated for each pair of objects. The similarity matrix S is again symmetric

The similarity of objects can be converted to a distance according to the relationship *(2):*

$$d_{ij} = \sqrt{S_{ii} + S_{jj} - 2S_{ij}} \qquad (2)$$

where d_{ij} represents the distance i and j of the object, S_{ij} expresses the similarity of objects, x_{ij} are the values of variables, from which the correlation matrix of objects R is calculated first and then the matrix of Euclidean distances of objects D is calculated, too [57].

How well the multidimensional object scaling model fits the given data can be assessed by a measure of goodness of fit using the statistical measure *Stress*. The most widely used formulation of the measure of goodness of fit in this respect is the Kruskal's *Stress* [41], which is calculated according to formula *(3)*:

$$Stress = \sqrt{\frac{\sum_{k=1}^{m}\left(d_{ij} - \hat{d}_{ij}\right)^2}{\sum_{k=1}^{m} d_{ij}^2}} \qquad (3)$$

where $\hat{d}_{ij}$ expresses the predicted distance between objects i and j and d_{ij} is the actual distance between objects i and j.

If the value of the *Stress* criterion is close to zero, the fit of the objects using multidimensional scaling reaches the best values. In general, the smaller the value of the *Stress* criterion, the more the calculated and entered object coordinates fit. According to Kruskal [41] *Stress* around 0.20 means insufficient overlap, 0.10 sufficient, 0.05 good, 0.025 excellent and 0.00 perfect fit.

An important task is to determine the total number of required coordinates in the MDS model. Each coordinate represents a latent variable. The goal of MDS is to keep the number of coordinates as small as possible (usually we choose 2-dimensional, maximum 3-dimensional space). If the outcome is a higher number of coordinates, the multidimensional scaling technique is not suitable for the analysis of the data. The number of coordinates is chosen based on the lowest possible value of the Stress criterion.

As already mentioned, the output of multidimensional scaling is the so-called multidimensional object map that allows for comparison of the positions of the examined objects and dimensions. A multidimensional map of objects is to be found in the table and figure below. The graphical form of a multidimensional map makes it possible to explain the input data matrix (proximity matrix) usually using a two-dimensional scatter plot. A multidimensional map of objects does not strictly lean towards one point. Similar objects are close to each other, different are farther apart. If the map is created by the metric method, the distances in the graph are very similar to the distances calculated in the table. In the case of non-metric output, only the order of individual objects is preserved

A particularly interesting characteristic of MDS maps is robustness to discordant observations. If the distance between a point and the rest is very large, this point will be located far from the others. The proximity relationships between other points will not be affected (although care must be taken when using interpretative techniques such as profit analysis). This is in contrast to other techniques used to analyse failure, which tend to be sensitive to outliers, such as Data Envelopment Analysis (DEA) [49].

The aim of PCA is to reduce the dimensionality of a dataset, while preserving as much variability as possible. This method can be based on either the covariance matrix and the correlation matrix [59]. It is a multivariate technique in which a number of related variables (X_1, X_2 …, X_k) are transformed to a set of uncorrelated variables – principal components (PC_1, PC_2, …, PC_k) [60]. The number of principal components is less than or equal to the number of original variables. These components are synthetic variables of maximum variance, calculated as a linear combination of the original variables. The first principal component represents as much variability in the data as possible, and each succeeding component represents as much of the remaining variability as possible [61]. Formally *PCj* can be written according to formula *(4)* [60]:

$$PC_j = a_{1j}X_1 + a_{2j}X_2 + \cdots + a_{kj}X_k \quad (4)$$

where a_{ij} *– component weights,* $j = 1, 2, ..., q$.

If the data is concentrated in a linear subspace, this provides a way to compress the data without losing a large amount of information and simplifying the representation. By choosing eigenvectors with the largest eigenvalues, we lose as little information as possible in the mean-square sense. The PCA therefore offers a comfortable way to check the trade-off between losing information and reducing the dimension of the initial data representation [61].

It is common to use some predefined percentage of the total variance explained to decide how many principal components should be retained (70% of the total variability is commonly used, if subjective, cut-off point), although the requirements of graphical representation often result in the use of only the first two or three principal components. Even in these cases, the percentage of the total variance is the basic tool for evaluating the quality of these low-dimensional graphical representations of the data set. The emphasis in PCA is almost always on the first few principal components, but there are circumstances in which the last few components may be of interest, such as in detection outliers or in some applications of image analysis [59].

Results and Discussion

Using the PCA method, it was possible to identify the main factors of the impeding bankruptcy of companies. Based on the rules for determining the number of main factors, we identified 3 main principal components. These 3 principal components explain 70% of the total variance. These components were derived as eigenvalues from an already created correlation matrix. With each eigenvalue, it was possible to describe the part of the total variability of the original variables, which is expressed in %. The percentages are shown in the Figure 1.

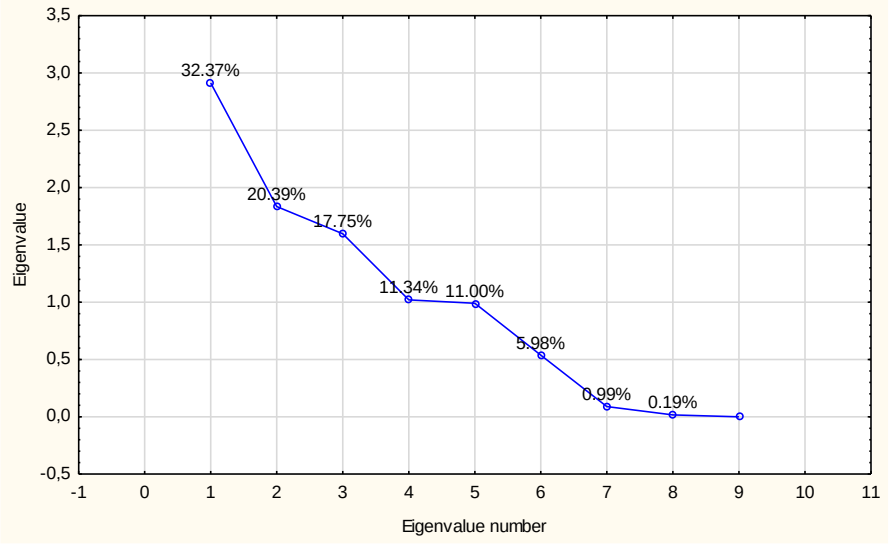

Fig. 1: Eigenvalues of correlation matrix
Source: authors, processed in software Statistica

Table 1 shows the correlation coefficients of the variables with the principal components. The correlation coefficient expresses the extent to which the original variable affects the new principal component, i.e. the higher the coefficient, the more the original variable affects the new principal component.

Table 1 shows that principal component 1 is strongly inversely related to the variable CFTA, NITA and EBTA. These variables describe the profitability of the company.

There is a strong directly proportional relationship between the principal component 2 and the variable CATA. This principal component also has a strong inverse relationship to the TDTA variable. Based on this relationship, it can be stated that the principal component 2 describes the structure of assets, indebtedness and liquidity of the company.

Principal component 3 shows a strong inversely related relationship to the WCTA variable. Based on the above, it can be stated that this factor captures information on the liquidity of the

company. If we included the principal component 4 in our model, we could have got information on the structure of capital/ indebtedness in the form of the ETD variable.

Tab. 1: Relationships between variables and principal components.

Variable	Factor coordinates of the variables, based on correlations							
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
CFTA	-0.965998	0.026104	0.082966	0.004690	0.001083	-0.007916	0.242814	-0.015473
NITA	-0.978147	0.157507	0.008291	-0.005939	0.008342	-0.033887	-0.087096	0.097528
WCTA	-0.062434	0.025869	-0.962078	-0.259380	0.042861	-0.024779	0.010233	-0.001988
CATA	0.152874	0.817398	-0.361376	-0.293974	0.093396	-0.287018	0.019060	-0.003238
EBTA	-0.977305	0.112700	0.037583	-0.020925	0.008409	-0.034538	-0.148911	-0.082980
EBIE	0.003698	0.138357	-0.084992	0.050839	-0.984202	-0.048779	0.001191	-0.000601
ETD	0.001917	0.056962	-0.347097	0.891981	0.092253	-0.268556	0.002857	-0.002077
TDTA	-0.028017	-0.768617	0.133149	-0.260343	-0.026898	-0.567620	-0.003667	0.002608
CLTA	0.200641	0.717320	0.622373	-0.010835	0.042523	-0.236366	0.007210	-0.000978

Source: authors, processed in software Statistica

Based on the above, it can be stated that the variables that can be used to identify the probability of bankruptcy of the company are indicators of profitability, liquidity and indebtedness.

In order to graphically represent the above relationships between the principal components and variables, a figure of variable projection (Figure 2) was drawn up. This Figure shows the original variables in the new coordinate system of principal components 1 and 2. The influence of variables on principal components is evaluated by comparing the vectors of individual variables. The longer the vector, the stronger the effect of the variable; the smaller the angle between the vector and the respective principal component axis, the stronger the influence of the variable on the given component.

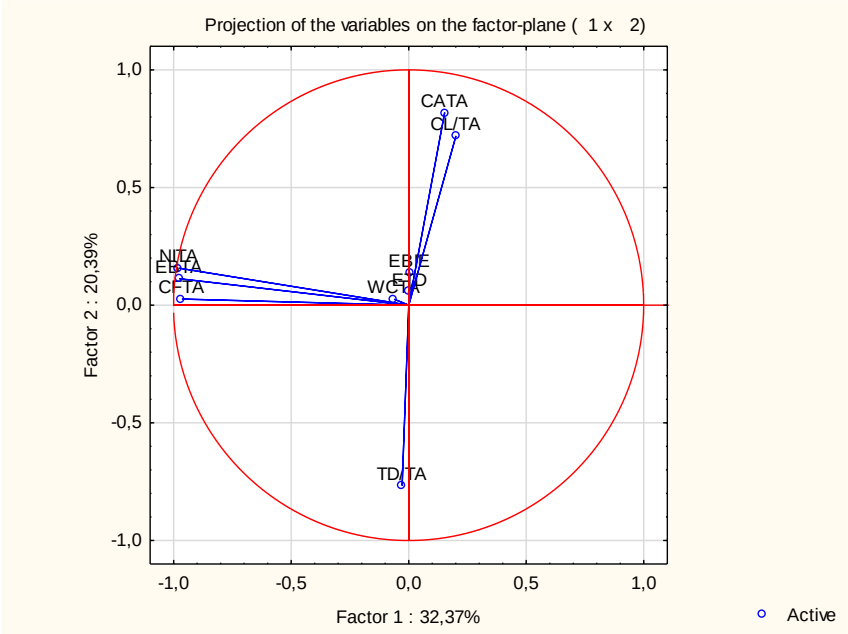

Fig. 2: Projection of variables

Source: authors, processed in software Statistica

From the graphical representation of the projection of variables, it is clear that there is a strong inversely proportional relationship between the principal component 1 and profitability

indicators. The principal component 2 has a strong directly proportional relationship with the variables CATA and CLTA and an indirectly proportional relationship with the variable TDTA.

Projection of cases (figure 3), which was processed using the PCA method, enables us to show individual companies in a two-dimensional space, while each company and the observations related to it are given by the values of all applied variables simultaneously. This case projection, processed using the PCA method, suggests that the whole analysed sample of companies creates a significant cluster in the space around the beginning of the coordinate system. This cluster is given by the coordinates (x: 5,-5; y: -4,4). Outside this cluster are enterprises that achieve extreme values of variables. The space for cluster analysis was defined by the principal components 1 and 2. The principle component 1 shows information on EBTA, NITA and CFTA indicators, while these variables are inversely related to the principal component 1. The principal component 2 shows information on the share of current assets in total assets and the share of short-term liabilities in assets. Therefore, we can say that principal component 2 informs us about the resources that can be used for the development of the company and also about the liquidity of the company.

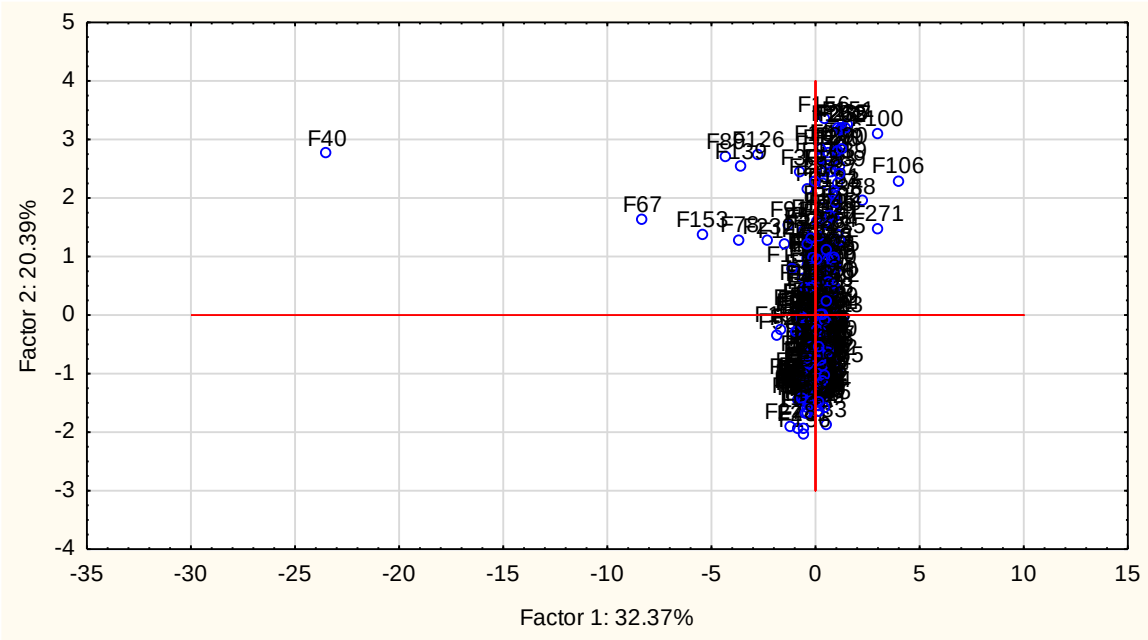

Fig. 3: Projection of cases
Source: authors, processed in software Statistica

For a more detailed description of the companies in the individual quadrants of the case projection, we prepared a larger version.

In quadrant A of the case projection (figure 4), there are companies that perform worse in terms of profitability and achieve better results in terms of liquidity. In order to improve the company's results in the future and prevent bankruptcy, it is necessary to pay attention to improving their profitability.

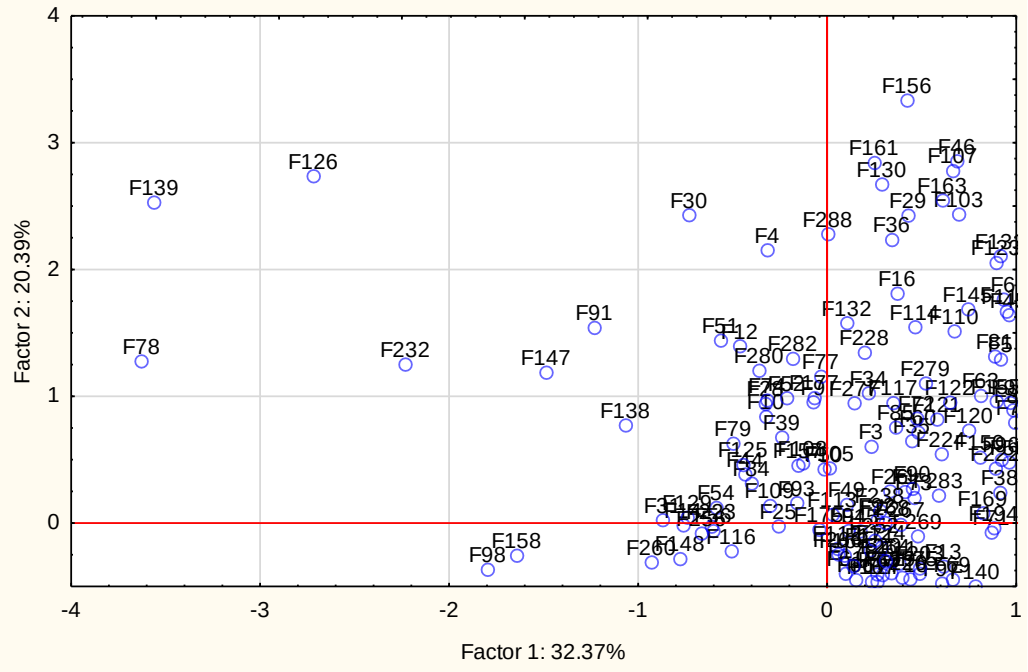

Fig. 4: Quadrant A of the projection of cases
Source: authors, processed in software Statistica

In quadrant B of the case projection figure (quadrant on the top right – figure 5) are companies that achieve very good liquidity results and good profitability results. These companies are among the best performing companies which do not have to worry about going bankrupt.

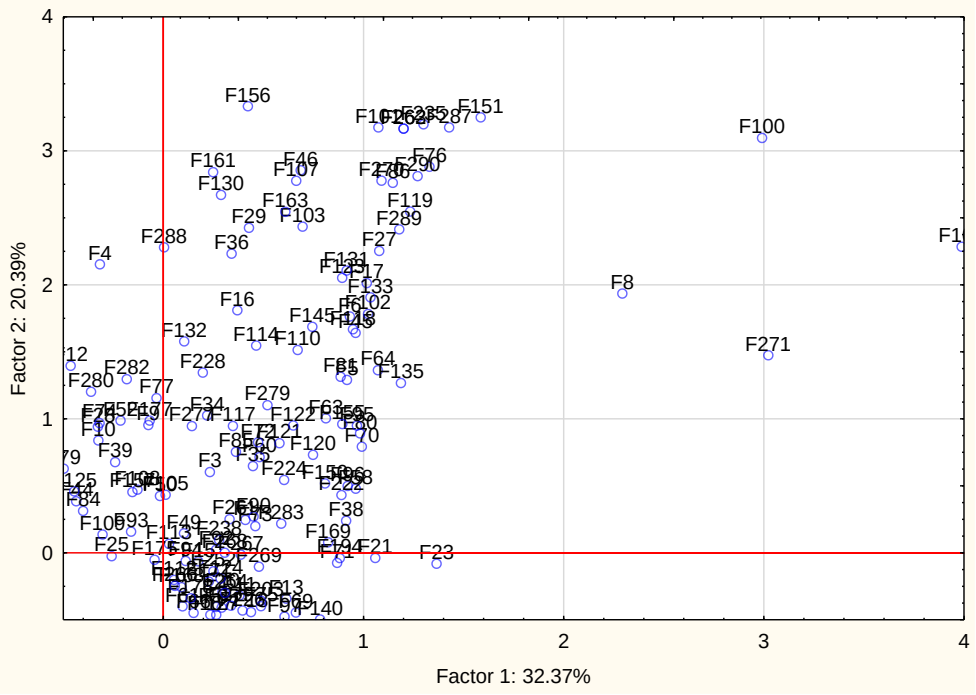

Fig. 5: Quadrant B of the projection of cases
Source: authors, processed in software Statistica

Very good results in terms of profitability and liquidity problems are shown by companies located in quadrant C of the case projection figure (quadrant at the bottom right) (figure 6).

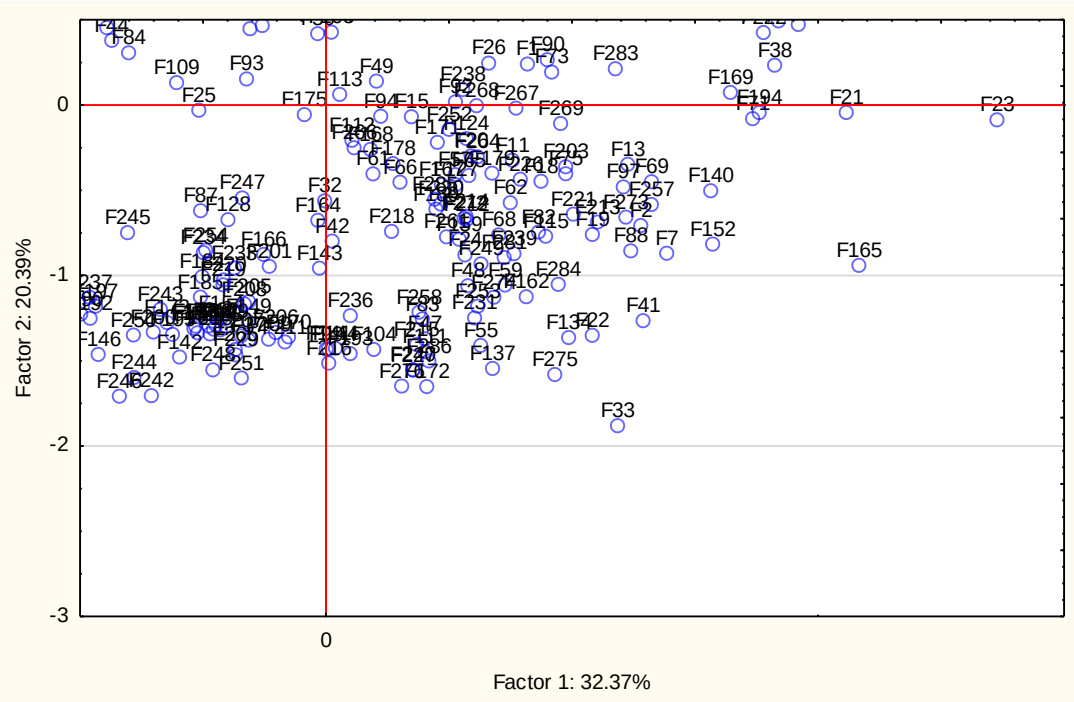

Fig. 6: Quadrant C of the projection of cases
Source: authors, processed in software Statistica

Businesses located in quadrant D of the case projection figure (bottom left quadrant) (figure 7) have problems with the principal component 1 and 2 and the variables that describe these components.

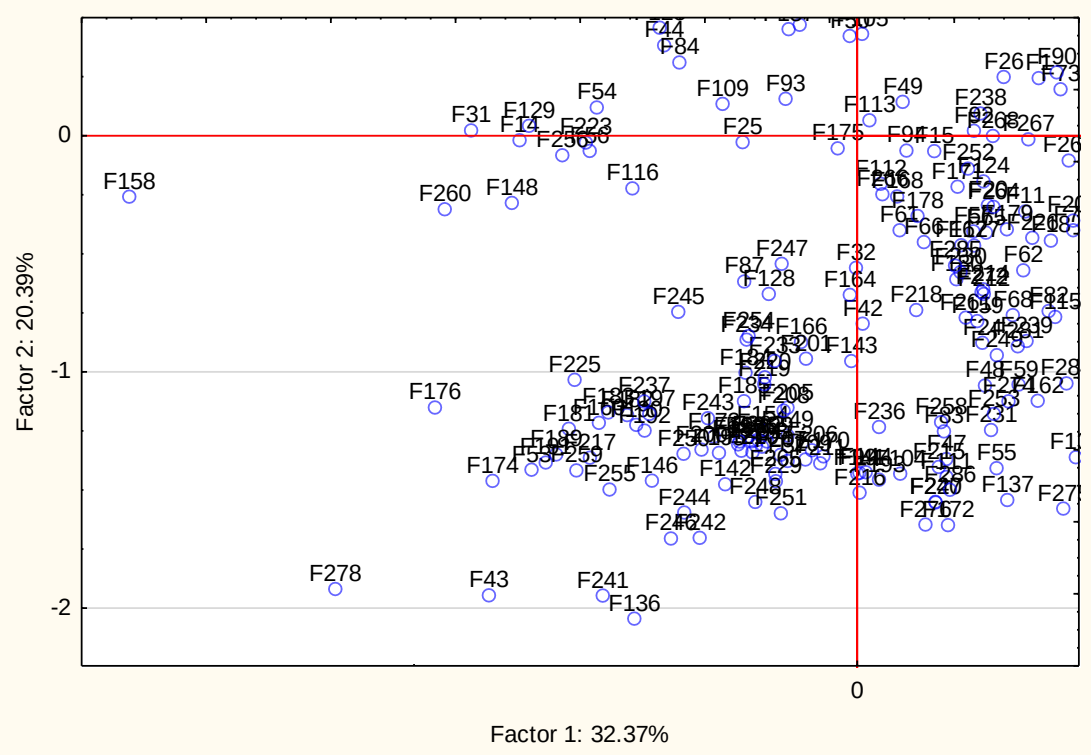

Fig. 7: Quadrant D of the projection of cases
Source: authors, processed in software Statistica

These companies achieve the worst results in the given variables and it is assumed that they are in financial distress, thus meeting the bankruptcy criteria. This argument is reinforced by the fact that the principal component 2 is inversely proportional to the variable indebtedness of the company. Therefore, this quadrant features companies that show problems in the area of corporate debt.

In addition to the PCA method, the MDS method was also used. This subjective map created the preconditions for determining similarities between companies on the basis of used variables. The measure of goodness of fit was Kruskal's criterion of maximum likelihood - Stress and Shepard diagram.

The Figure 8 shows that companies tend to form clusters. It also allows us to identify relationships that make it easier to identify clusters and the structure of all objects.

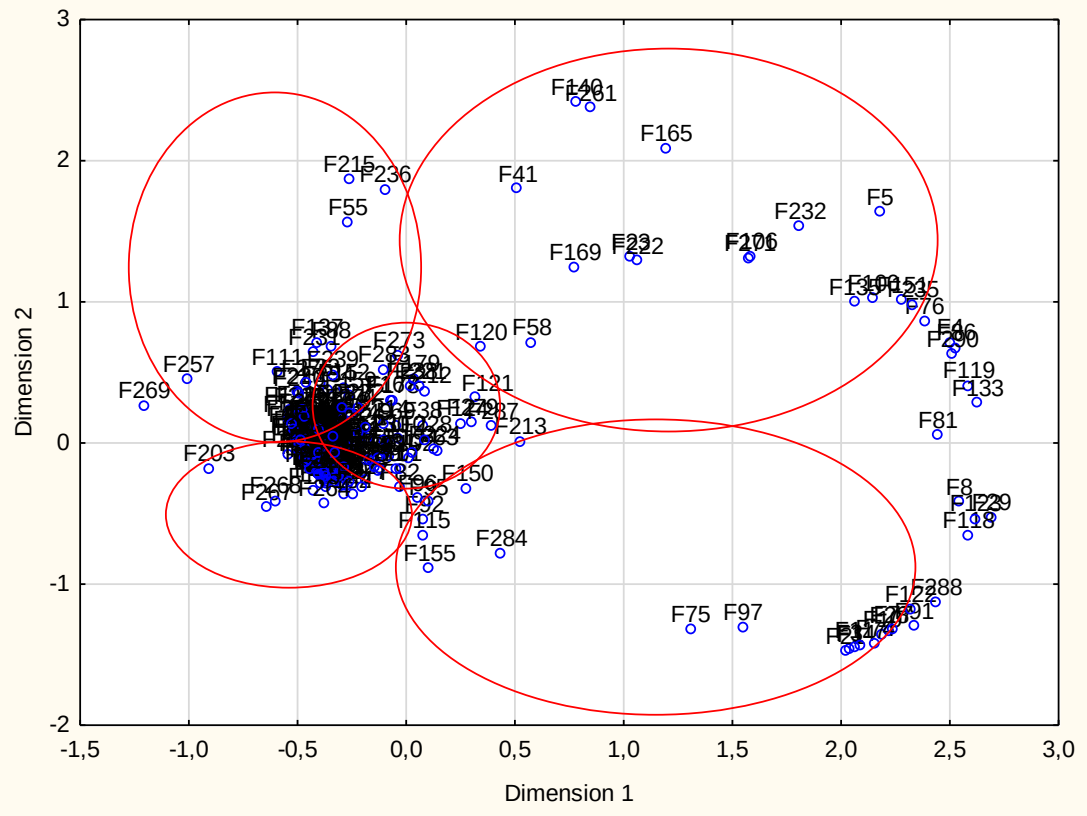

Fig. 8: MDS map
Source: authors, processed in software Statistica

The Shepard diagram (figure 9) shows the calculated distances depending on the actual similarities. All points lying close to the curve represent a good model. Points far from the curve represent insufficient fitting.

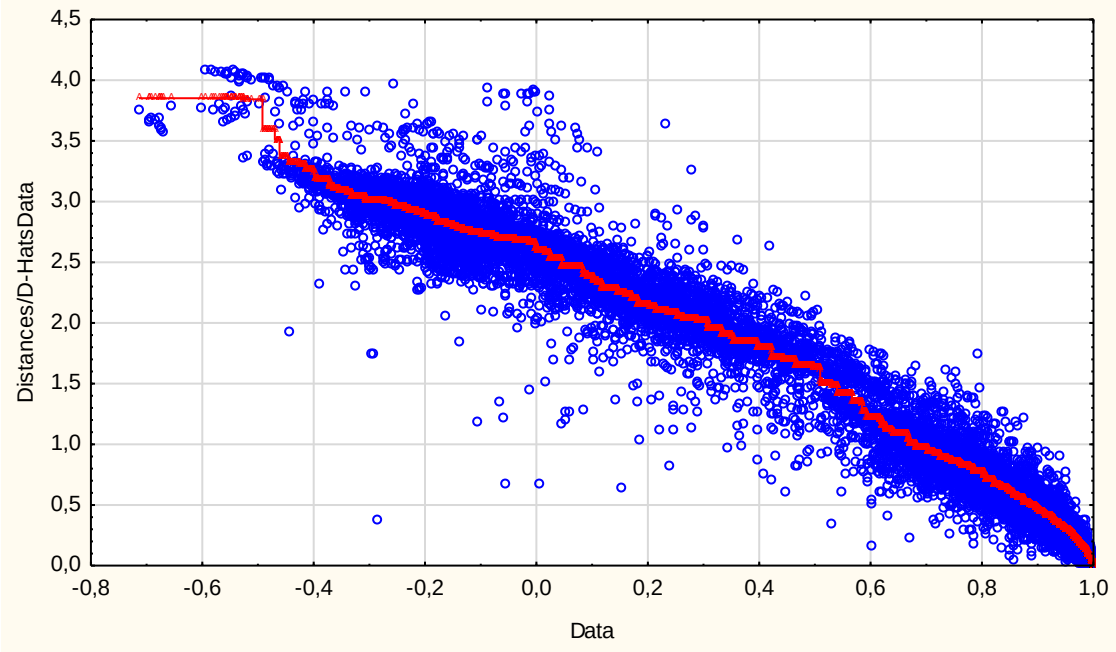

Fig. 9: Shepard diagram
Source: authors, processed in software Statistica

Based on the results of the Kruskal's criterion, which reached the value of 0.08 and the course of the Shepard diagram, it can be stated that the constructed model has a good predictive value.

Summary

The use of multidimensional statistical methods is of great use in assessing the state of the industry and the businesses active within. The paper analyzes the heat management industry and the position of companies within the industry. The applied methods facilitated and accelerated the processing of large amounts of data, made it possible to reduce the number of data dimensions, and thus created a precondition for the use of other important analytical procedures. Thanks to the methods used we were able to display data in simpler and clearer way. The selected group of variables can be replaced by three factors that capture information about the financial situation of a given sample of companies in great detail. These are factors that inform us about the company's profitability, liquidity and capital structure – the most important factors in determining symptoms of bankruptcy. By targeting them, it is possible to improve the financial position of companies and prevent them from going bankrupt. The MDS method makes it possible to identify clusters of companies that are not distant from each other and have similar characteristics. Based on the above, it is possible to identify a group of companies that is expected to go bankrupt. Finally, it should be noted that the results of these methods should be verified by less subjective methods, e.g. discriminant analysis, logistic regression, Data Envelopment Analysis or neural networks.

Súhrn

Používanie viacrozmerných štatistických metód poskytuje značnú pomoc pri hodnotení stavu priemyselného odvetvia a podnikania v ňom. V predmetnom príspevku bolo analyzované odvetvie tepelného hospodárstva a pozícia podnikov v rámci daného odvetvia. Aplikované metódy uľahčili a urýchlili spracovanie veľkého množstva údajov, umožnili zníženie počtu rozmerov údajov, a tým vytvorili predpoklad pre uplatnenie ďalších významných analytických postupov. Prínosom aplikovaných metód je skutočnosť, že grafické zobrazenie predstavuje jednoduchšiu interpretáciu dosiahnutých výsledkov a je prehľadné. Vybranú skupinu premenných je možné nahradiť troma faktormi, ktoré dostatočne zachytávajú informácie

o finančnej situácii danej vzorky podnikov. Ide o faktory, ktoré zachytávajú informácie o rentabilite, likvidite a kapitálovej štruktúre podniku, ktoré patria k symptómom bankrotu podniku. Ich cieľovým riadením je možné zlepšiť finančnú pozíciu podnikov a zvrátiť predpoklad ich bankrotu. Metóda MDS umožňuje identifikovať zhluky podnikov, ktoré nie sú od seba vzdialené a vykazujú podobné vlastnosti. Na základe uvedeného je možné určiť skupinu podnikov, ktorá má predpoklad bankrotu. Na záver je potrebné poznamenať, že výsledky týchto metód je vhodné verifikovať aplikáciou menej subjektívnych metód, a to napr. diskriminačnou analýzou, logistickou regresiou, metódou Data Envelopment Analysis alebo neurónovými sieťami.

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IMAGE EVALUATION OF NATIONAL PARKS IN THE SPIŠ REGION

HODNOTENIE IMIDŽU NÁRODNÝCH PARKOV REGIÓNU SPIŠ

***Abstract**: This study deals with tourist satisfaction in the destinations of Spiš region (High Tatras, Pieniny and Slovak Paradise). The main aim is to examine how destinations differ mutually based on individual satisfactory attributes including services and various types of facilities and other characteristics of destination. Respondents evaluated their satisfaction on 5 point scale and after that data was analyzed by correspondence analysis. We found out there are some differences between destinations, however they offer diverse type of experiences for visitors. Even when High Tatras are obviously better in many ways, this destination is considered more commercialized with higher prices, otherwise it is well known in abroad as well. Pieniny and Slovak Paradise destinations have a huge potential to provide amazing experiences too, but better infrastructure construction would help.*

***Keywords**: High Tatras; Slovak Paradise; Pieniny; destination image; correspondence analysis*

JEL classification: C10, M30, L83, Z32

Introduction

Tourism is very widespread and important for many entrepreneurs. Tourism in general is recognized as one of the key development sectors in all countries, and also represents a major source of income, jobs and wealth creation. It plays a vital role in promoting the image and perception of the country at international level, and also affects domestic policy. This scale of impact and importance creates challenges to measure tourism competitiveness [1].

Maximizing the benefits and minimizing the negative impacts on tourism is possible through successful destination management [2]. Szpilko (2017) [3] claims that the development of tourism is closely linked to the functioning of destination management organizations and the products they offer. For the development of the tourism product, there is a specific need for cooperation of several subjects. A precondition for the development of the destination is to ensure cooperation between the public and private sectors, in which everyone has their own tasks to fulfill. The ultimate goal of destination management, but marketing as well, is to achieve growth and sustainability of the target country by developing its unique image, coordinating private and public tourism components, providing information for visitors, maintaining customer satisfaction, ensuring sufficient investment in attractions, etc. [4]

If the destination is the whole country, its image can be an important factor that will influence the international image of the tourist destination and its choice [5]. Destination image is frequently described as simply "impressions of a place" or "perceptions of an area" [6]. Hunt (1975) [7] defines image as "Perceptions held by potential visitors about an area." The image of tourist destinations is according to Teviana et al. (2017) [8] a reflection of the tourist attraction that consumers perceived. He says that tourist attraction comprises all elements possessed of a place that attracts visitors. These elements include landscapes for viewing, activities to follow, and experiences to remember.

According to Luštický, Musil (2019) [9] the Conceptual Model of Destination Competitiveness is the most widely used conceptual model of destination competitiveness. The model modified Porter’s Competitiveness Framework to the environment of tourism destinations and

distinguishes 36 attributes of competitiveness grouped into 5 key factors: (1) supporting factors and resources, (2) core resources and attractions, (3) destination management, (4) destination policy, planning and development, (5) qualifying and amplifying determinants. It also points out the importance of the environment surrounding the destination, namely the global macro environment and the competitive microenvironment. There is a belief that stakeholders are the main development power in tourist destination and intensive cooperation with stakeholders is a crucial condition for reaching a sustainable competitive advantage [10].

The criteria for comparison are the main factors of competitiveness, which are decomposed into a two-layer hierarchical structure [9]:

1. destination resources
    a. primary resources (nature and cultural sights)
    b. secondary resources (tourist infrastructure, attractions, fun, and relaxation)
    c. supporting resources (basic infrastructure, transportation, hospitality, business environment)
2. acceleration factors
    a. price level
    b. quality of tourist services
    c. safety
3. demand conditions
    a. destination's awareness
    b. destination's image
    c. tourist preferences
4. situational conditions
    a. competition
    b. macro-trends (political, economic, social, technological)

People find the feelings of satisfaction and fulfillment of needs that are currently different from the previous generation. We can also see an increase in the number of domestic guests in accommodation facilities in Slovakia [11], which represents an even higher proportion of visitors than foreign ones. Visitors prefer rather shorter holidays and longer weekends than long-term summer holidays [12]. These authors describe that the change in visitor behavior is noticeably observed, their mobility is higher, when they look for adventures and experiences and more various destinations may be visited during one vacation.

Tourism in Slovakia grows year by year [11] and by our research we wanted to examine how satisfied the tourists are in chosen destinations. We selected Pieniny National Park, Slovak Paradise National Park and High Tatras National Park as our destinations, all from Spiš region and with close mutual distance. Otherwise all parks offer different experiences and are distinguished by various type of nature.

This kind of research has not been examining before, that is why we see our purpose here. It is important to know what features drive visitors to come and even more what insufficiencies exist there in the destinations. The main aim was to detect similarities and differences of image perceiving between chosen destinations and to find out which destination lags based on evaluated attributes. We used correspondence analysis to explore that. The interpretations are about to visually convince about the results as well.

Materials and Methods

Our materials were responses from questionnaires asked to tourist destination's visitors. We demanded to response from relevant visitors who objectively can assess their satisfactory with

individual attributes at visited destination. At main part of questionnaire was needed to express their satisfaction by 5-point Likert satisfactory scale (from very dissatisfied (1) to very satisfied (5)). Questionnaires were asked by us at all three destinations and so 331 respondents participated (99 respondents at Pieniny National Park, 111 at Slovak Paradise, 121 at High Tatras). Most of them were Slovaks (149 respondents), then Poles (71 respondents), Czechs (61 respondents) and of course 32 Hungarians as well. We may say the V4 countries mostly took place at our research. Otherwise there are respondents from 11 different countries together involved.
We placed 17 attributes to evaluate and asked some opened questions too. Following Table 1 shows picked attributes. Later we demonstrate on the map by using indicated attribute tags.

Tab. 1: List of image attributes asked by questionnaire

Attribute tag	Image attribute
atr 1	accommodation services
atr 2	food services
atr 3	transportation facilities
atr 4	shopping facilities
atr 5	cultural – entertaining facilities
atr 6	overview at destination
atr 7	used potential at destination
atr 8	traditions and customs visibility
atr 9	destination promotion
atr 10	cleanliness
atr 11	trails and routes marking
atr 12	accessibility
atr 13	unique atmosphere at destination
atr 14	reasonable prices
atr 15	performed expectations from the locality
atr 16	willingness and friendliness (overall behaving towards visitors)
atr 17	overall satisfaction with trip/vacation

Source: inspired by Mao, Zhang, Bao (2005) and own attributes added too

Research in Spiš region was inspired by Mao, Zhang, Bao [13], who have examined image of other tourist destinations in China. We have undertaken their research method´s attributes that were suitable to examine at our chosen destinations. According to mentioned research we applied correspondence analysis subsequently as well. Our data were analyzed and got outputs that may be interpreted by demonstrating on the map.
We tested our data by chi-squared test. There is an assumption [14] about the expected frequencies, when these values should not be lower than 5, or they can be in a maximum of 20% of the inner cells. If this is that case, chi-square may be used. Based on it, we will assess whether there is an association between the level of satisfaction and the destinations, and thus whether to continue interpreting the results of the correspondence analysis is statistically significant.

Results and discussion

All the data from chosen destinations were analyzed. We have processed multidimensional correspondence analysis with all the mentioned attributes. As we stated before, there was chi-squared test implicated and the value is 3.62411 with p-value 1.000. We intended to keep usual designation of p-value 0.05. Based on that, rows and columns, all the attributes and so the points of destinations emplacement do not relate together. In that case the results of multidimensional analysis are not statistically significant for any other interpretation.

Otherwise we focused on each attribute separately and we can bring out the results which have statistically relevant meaning. We use two dimensions that are enough to explain the outcomes regarding high rate of inertia. Some of the attributes we demonstrate on the map as well.

Services and facilities

For the very first attribute (accommodation services) we offer tables mainly including final coordinates for destination points and inertia, according to which we clarify the results. Then mass describing relative proportion of frequencies is included and the quality column which contains information concerning the quality of representation of the respective row point in the coordinate system defined by the respective numbers of dimensions. Table 2 is composed from row information and Table 3 from column information.

Tab. 2: Row Coordinates and Contributions to Inertia of attribute 1 (accommodation services)

Destination	Coordin. Dim. 1[1]	Coordin. Dim. 2[2]	Mass	Quality	Relative Inertia	Inertia Dim. 1[3]	Inertia Dim. 2[4]
Pieniny	0.141	-0.195	0.275	1.000000	0.089	0.033	0.692
Slovak Paradise	-0.540	0.042	0.346	1.000000	0.566	0.615	0.040
High Tatras	0.390	0.104	0.379	1.000000	0.345	0.352	0.269

[1] Coordin. Dim. 1 = coordinates of dimension 1; [2] Coordin. Dim. 2 = coordinates of dimension 2; [3] Inertia Dim. 1 = inertia of dimension 1; [4] Inertia Dim. 2 = inertia of dimension 2

Source: output from Statistica software

Tab. 3: Column Coordinates and Contributions to Inertia of attribute 1 (accommodation services)

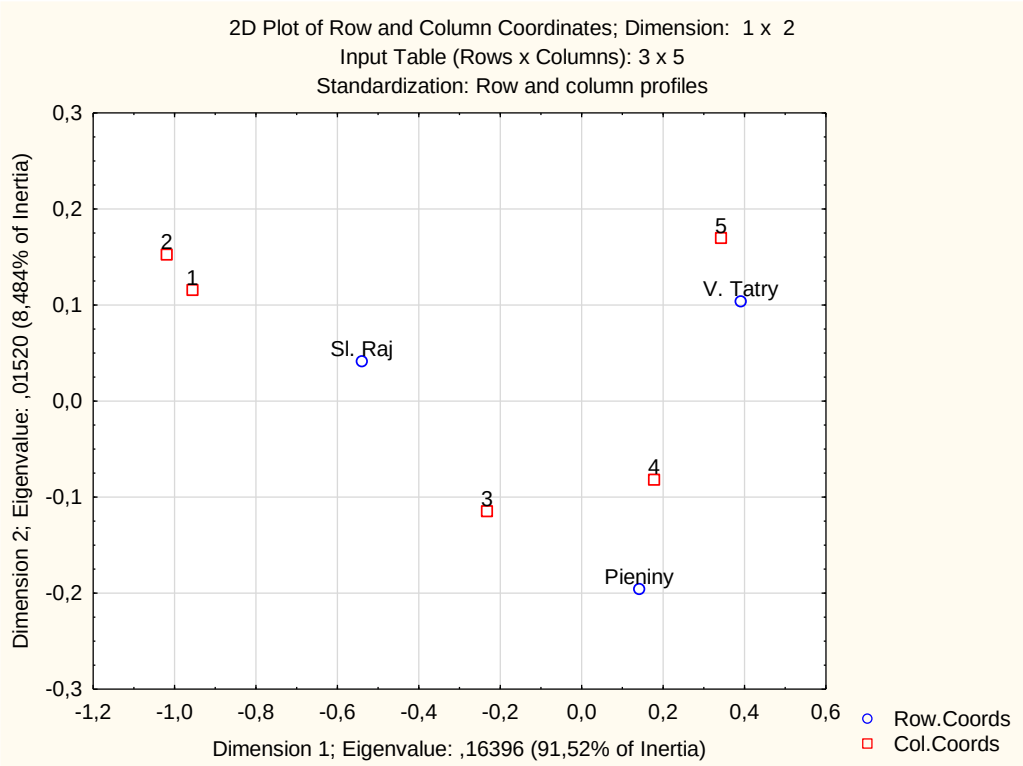
Satisfaction point	Coordin. Dim. 1	Coordin. Dim. 2	Mass	Quality	Relative Inertia	Inertia Dim. 1	Inertia Dim. 2
1	-0.95635	0.115626	0.050336	1.000000	0.260720	0.280786	0.044272
2	-1.01923	0.152791	0.060403	1.000000	0.358108	0.382707	0.092768
3	-0.23255	-0.114810	0.221477	1.000000	0.083147	0.073050	0.192055
4	0.17781	-0.081860	0.409396	1.000000	0.087553	0.078940	0.180459
5	0.34217	0.169857	0.258389	1.000000	0.210472	0.184517	0.044272

Source: output from Statistica software

The first dimension extracts 91.52% of the total inertia, while the second dimension extracts only 8.48% of the total inertia. The sum of the inertia of both dimensions is 100% (total inertia). Given that they cover more than 90% of the inertia, a two-dimensional solution is appropriate for interpretation. However, it follows from the above that dimension 1 has a higher informative value.

According to tables above and its inertia we describe accomodation services attribute based on Slovak Paradise and High Tatras destinations and satisfaction points 2, 1 and 5. Visitors at High Tatras are generally satisfied with the accommodation services and it is not necessary to remedy these services. On the contrary the situation about housing services in the Slovak Paradise is rather dissatisfied. It is visible on the correspondence map very clearly (Figure 1).

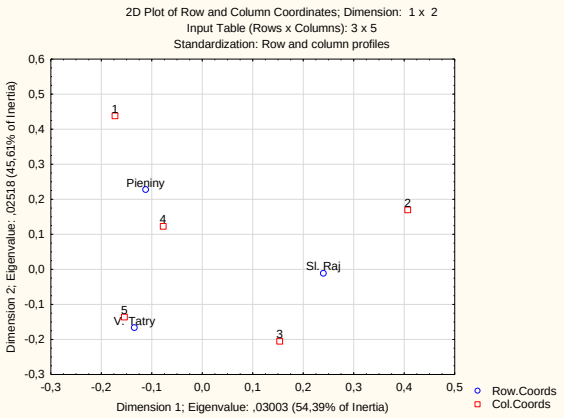
Fig. 1: Attribute 1 (accommodation services) demonstrated on the map



Source: output from Statistica software

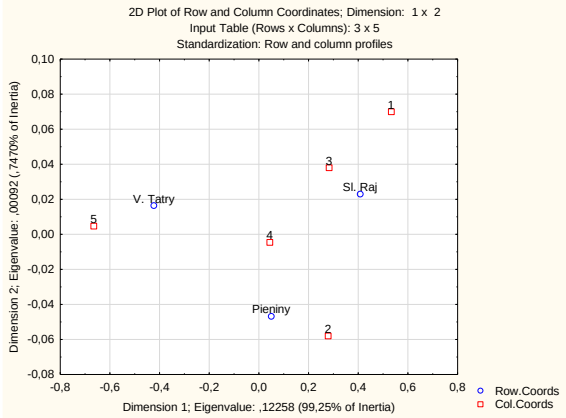
Other services and facilities we explain by the most interesting and significant findings such as the food services that acknowledge the High Tatras destination again. Chi-squared test proved value 17.8879 with p-value 0.021, which confirms significance. Figure 2 demonstrate that.
At third attribute with transport facilities at destinations is chi-squared value 40.1399 with p-value 0.000. The High Tatras destination has its greatest contribution to the analysis and also highly associates with the satisfaction numbered 5 as "very satisfied." It is also necessary to mention the location of the Slovak Paradise had mostly neutral attitude and on the contrary, Pieniny destination is analyzed in a more negative light, depending on the evaluation of other destinations. It is generally true that this national park is located in a very disadvantaged position within the settlement of larger cities. However, if it would attract more attention to this very unique and often undiscovered place and more possibilities of public transport would offer towns of Kežmarok and Poprad for an affordable price, then even this small national park could experience fame compared to the best. Figure 3 below demonstrate this attribute.

Fig. 2: Attribute 2 (food services)



Source: output from Statistica software

Fig. 3: Attribute 3 (transportation facilities)

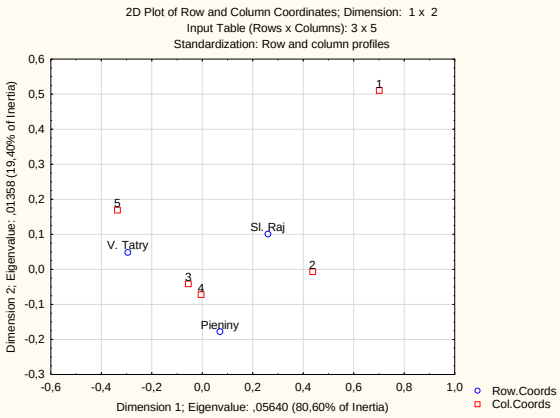


Source: output from Statistica software

The fourth attribute (shopping facilities) has got a value of chi-squared 22.6472 and p-value 0.0038. This attribute is shown on the correspondence map Figure 4. According to the tables with the contribution of inertia, we evaluate the High Tatras destination positively with the level of satisfaction "very satisfied", which corresponds to it the most. Satisfaction point 2 "rather dissatisfied" is also important and mostly relates to Slovak Paradise destination. Pieniny National Park could be interpreted from second dimension with specific satisfaction point as “rather satisfied” in relation to the other destinations. Considering own experiences at destinations we agree the analysis is very objective regarding many opportunities to buy whatever in High Tatras, you can stop for delicious cup of coffee or to buy souvenirs with wide range offer at all busy places or even at highly located cottages in the mountains. Pieniny destination offers good facilities too and there are several places to rent a bike or to take a beer. On the other hand, we must confirm the shopping facilities in Slovak Paradise are on the low level. Anyway, if there are services, then just at starting point when hiking, not during your way through.

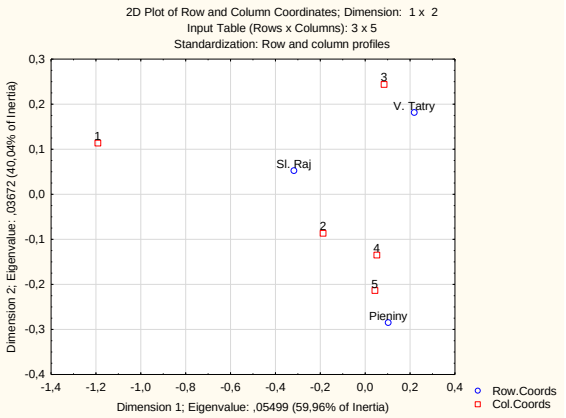
Dimension 1 has an explaining value with inertia of 59.96% for fifth attribute (cultural – entertaining facilities). According to the map (Figure 5), the most influential destination Slovak Paradise has the satisfaction rate "rather dissatisfied" closest to it in relation to other destinations. Furthermore, the High Tatras are relatively important for second dimension, which in this case corresponds to the "neutral attitude" mostly, which did not tell us that much, if we would want to bring some recommendations. In terms of the highest level of satisfaction, Pieniny seems to us to be the best destination, but according to the inertia tables they do not have a high informative value. Pieniny is more significant in the evaluation of the second dimension, which has a minority share in total inertia of 40.04%.

Fig. 4: Attribute 4 (shopping facilities)



Source: output from Statistica software

Fig. 5: Attribute 5 (cultural – entertaining



Source: output from Statistica software

Other features

Other attributes were analyzed in same way, however we will mention the most important and interesting findings here.

Attributes number 7 (used potential at destination), 10 (cleanliness), 11 (trails and routes marking), 12 (accessibility), 13 (unique atmosphere at destination) were tested and p-value was proved as higher than our 0.05 limit or condition about expected frequencies was not accomplished. These attributes will not be interpreted.

The sixth attribute analysis about overview at destination in Slovak paradise recommends to entrepreneurs or the management of the national park to improve the clarity and the general information for people, which would obviously help to the destination´s image. Pieniny is more represented in dimension 2 and in relation to the other two destinations it is most associated with the answer "rather satisfied." We also perceive the destination as more recognizable compared to the Slovak Paradise, we consider it as a more open and it is easier for visitors who are located at some resort which is more or less the starting point for all activities. On the contrary, there are several specific places in Slovak Paradise, such as Podlesok, Píla, Spišské Tomášovce, Čingov, or the villages of Mlynky and Dedinky, while from the entire mentioned are a possible hikes and trails marking are not very helpfully made. The High Tatras corresponds with the best answer number 5 mostly, but according to the inertia table, this answer does not have a strong influence on the interpretation. In any case, the High Tatras are considered to be probably the best known and there are many websites, forums, brochures and various tables that indicate interesting places and if we consider the clarity, it is in very good condition, comprehensive even for foreign visitors.

The attribute numbered as eight (traditions and customs visibility) has got following evaluation. According to the output of the resulting correspondence map, we can observe a high share of total inertia for dimension 1 to have an influential informative value (91.71%). The relative contribution to the inertia is specific for Pieniny (0.642) mainly, while it corresponds a lot to the highest relative inertia column for the answer "very satisfied." Compared to such an exceptional destination as the High Tatras, we review from the map an undeniable competitive advantage of Pieniny in terms of traditions and customs that the visitor can see at the destination. According to the analysis, the High Tatras are perceived rather negatively and we assess it in terms of an open question, where the respondents replied to us about this attribute. By this we explain the Tatras region is often described in superlatives, but in this case the respondents perceive exaggerated commercialization, construction that is not connected with tradition and customs are only marginally visible.

The ninth attribute is about destination promotion and we interpret the issue of promotion as rather neutral for the Slovak Paradise. Respondents do not perceive promotion in any special way, nor significantly known in relation to other destinations. Promotion in High Tatras is associated with great satisfaction. The High Tatras are promoted very precisely not only at home but abroad as well. The Slovak Paradise National Park management should rather think about how to improve the destination's image and attract more international tourists, although we must admit it is quite challenging, especially when the Tatras national park is about 50 kilometers away and metaphorically "steals glory" to other destinations.
For attribute number fourteen we may interpret, that reasonable prices at High Tatras correspond most to "very dissatisfied and neutral attitude," and "rather dissatisfied," which is statistically significant in the analysis. This statement could be expected, as the High Tatras generally rank among the most visited places in the country. Tatras resorts are visited by numerous foreign tourists as well, and that is why prices may be not set according to other reasonable prices in the region. Of course, it is true that prices are often exorbitant for people if they compare them with the average wage. Developers who need to ensure a return on investment for cable cars, hotels and attractions also play an important role. The second destination worth mentioning is Pieniny, which is most suitable for answer 4 as "rather satisfied," but the second dimension with inertia of 28.57% is more important for interpretation. The answer "very satisfied" corresponds the most for Slovak Paradise destination (in relation to other destinations) and is more important at dimension 2. In general, prices in Slovak Paradise and Pieniny are set relatively well and do not affect the image of the destination negatively.
The fifteenth attribute focused on performed expectations from the locality describes Slovak Paradise with rather negative answers in terms of satisfaction and in relation to other destinations. Since it is a matter of meeting expectations, it can be very demanding and especially subjectively satisfying the needs of each visitor. We see the huge potential that the destination offers, the national park has a beautiful natural heritage and amazing forests suitable for tourism. Even according to this analysis, we see the potential is not fully exploited and respondents' expectations are not fully met. In comparison with Pieniny, which have their significance within the inertia of dimension 1, we observe a higher progress within the expectations fulfillment and experiences that the respondents achieved during their stay. Maybe it is caused by the attractions that are offered in Pieniny, which are attractive and remarkable in the country (rafting on the wooden floats).
The explanation of sixteenth attribute is characteristic for Pieniny destination, where the analysis has shown certain results about willingness and friendliness of the people towards visitors. Respondents were “very satisfied” with the behavioral atmosphere and we suppose not just Slovaks were taken in account when evaluating, but Poles as well. Results for two other destinations are not that straightly evaluated.
By the last seventeenth attribute (overall satisfaction with trip/vacation) we found chi-squared value as 40.4411 with p-value 0.00 which designates us high significance. We suppose the overall satisfaction with a trip spent in a tourist destination depends on the presentation of destination´s image. Generally the High Tatras destination is the best perceived destination although many visitors associate it as an expensive or commercial. Other two destinations were not clearly proved for just one exact satisfaction point at this analysis.

Summary

Reason for the relevance of the analysis is the value of data and correspondence maps that show relationships to other destinations. We can easily compare the competitive advantage at least on the basis of attribute visualization in destinations.
In general we may state based on our analysis, the High Tatras destination has an appropriate offer of services. There are cozy accommodations enough, food and shopping services occur at busy places, frequent transport connections are ensured and each visitor find easily suitable standard of services for himself. On the other hand this destination will lose specific atmosphere more and more during the time when developers construct still something new. Prices will grow probably and traditions will be seen at organized festivals only. However, image of this destination is perceived rather in positive way.
Pieniny national park stands out with attributes related with friendliness, traditions and all that obvious. We think this destination is more authentic, because residents are those services providers largely. From our analysis we perceive private transport missing here. Public buses are not that often and by this idea much more tourists would come, mainly those self travelling. Image of Slovak Paradise national park is perceived rather in negative way according to our analysis evaluation. There are several entrepreneurs offering services at starting points or touristic centers, but quality is not always sufficient. We see another problem in organizational managing when planning events, promotion. Better shopping opportunities for visitors and ensuring understandable orientation should be offered for visitors. From our analysis we found out the expectations are not met many times. Otherwise, the nature of this park is awesomely special and differs from High Tatras or Pieniny. Hiking here is more about gorges crossing, passing amazing waterfalls and reefs. This destination has potential to be explored by passionate tourists much more as it is now. That we may achieve by useful services providing and thoughtful planning as well.

We recommend to use the potential of two unnoticed (towards to High Tatras) destinations. It is important to start with the purposeful promotion, which should be in charge of the management of national parks or municipality. It is not only about advertising intending to just sell services quickly, but about informing about the possibilities, activities, edification to spend time in nature with family, educating children about fauna and flora around us. It is necessary to give people the added value they can gain by exploring the places around them. We also think that it is necessary to create positive associations with destinations, because visitors can often be discouraged of the accessibility or infrastructure at these sites.
In addition by improving promotion, it is necessary to be aware of the potential in that location. We want to appeal that the potential of the destinations is very high (especially natural potential, which was admired by almost 50% of respondents who expressed nature as a "top phenomenon" they experienced in the destinations). Though no doubts there is a reason to visit the destination! Future research may be oriented more on satisfaction analyzed by demographical factors, to focus deeply on satisfaction with exact attractions or to study types of tourist's expenditures at the destination.

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