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MANAGEMENT OF THE COMPANY PERFORMANCE THROUGH EFQM EXCELLENCE MODEL

Jaroslav GONOS

Department of Economy and Economics, Faculty of Management and Business,
University of Prešov, Slovakia

Katarína ČULKOVÁ

Department of Earth Resources Management, Faculty BERG, Technical University of
Košice, Slovakia

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Abstract

Magazines differ from newspapers in that they can reach narrower target audiences; for example, according to the interests of target groups, there is much creativity, more colors are used, and this is very attractive for readers (Světlík, 2016). Readers read magazines more slowly and consistently than newspapers, which means they can pay more attention to advertising (Světlík, 2018). Světlík (2018) is inclined to believe that there is excellent competition for advertising in magazines, as some agencies are financially dependent on advertisers. It is crucial to captivate and engage the reader when creating an ad. Světlík (2018) states that the product should be sold already in the title and that a picture is sometimes a better option than using words.

The development of new methods and trends is a consequence of globalization, internationalization, and hyperactive competition. The paper aims to propose a model for evaluating the economic efficiency of Slovak mining companies according to European standards to examine the impact of selected traditional and modern methods and their interaction in terms of the financial health of companies. EFQM model helps evaluate the performance of the mining company, focusing on the results that meet the needs of stakeholders increase the efficiency of internal processes, employee involvement, motivation. The result proves that the company is a well-functioning and prosperous company. The company's management is on a professional level, as evidenced by the fact of expansion after the crisis. This evaluation through the EFQM methodology proves that it was not a coincidence. The paper's results contribute to sound management decisions in future strategies ultimately brought about a positive development in the assessment of their economic efficiency in standard European economies.

Keywords: business environment, economic effectiveness, evaluation of the industrial companies, Slovakia.

JEL Classification: D04; D24; G32.

Introduction and theoretical background

The current turbulence in the business environment and globalization processes increases the demands on the behavior of companies in an environment of economic and monetary crisis. Slovakia and the EU Member States and Slovak companies deal daily with the problems of filling the economy with the necessary financial resources how to cope with the problems that have occurred in the recent period. The companies must solve specific problems and their very existence in the future. The principle is to create effective management of the financial situation, taking into account modern concepts at every management level. Given the economic situation in the last five years, Slovak companies must respond effectively to the constantly emerging threats from the external and internal environment, which may ultimately mean a positive or negative state in the company's future development. Acceptance of these facts requires adaptation to significant changes, respectively try to push for new changes in the company's management systems, through comprehensive approaches at the middle level of management and especially at the strategic level using the most modern analytical tools and methods. The owners and managers themselves must react as effectively as possible and implement flexible systems within the company, as this fact often becomes quite problematic by observing from practice. Only large companies are open to the new system, as they are primarily companies with foreign participation and modern foreign management. On the other hand, small and medium-sized enterprises are cumbersome in introducing new concepts and practices.

Manifestations of the crisis in 2008 disrupted the business environment, and a worrying situation arose. Businesses have started to lay off jobs; there has been a risk of job losses, social security has been lost, people's living standards have fallen, and many other phenomena have led to situations long incompatible with our perceptions of an efficient business and market environment. Many companies had to close down respectively. They had to restructure their business portfolios or merge to save their existence. In 2011, this process stabilized, but there were problems with the monetary crisis in selected EU Member States. All this encourages the implementation of several changes in the behavior of Slovak companies and changes in the approach of their business activities. For the above reasons, we decided to examine selected issues that can provide us with a broader dimension in the knowledge of causal relationships that affect the financial situation of companies and are no longer based only on examining classical methods such as ratio financial analysis (Beaver, 1966), financial evaluation of companies through creditworthiness and bankruptcy models (Altman, 1968). In recent years, in addition to the classic pyramid and parallel system of ratios, value criteria for measuring the performance of companies have begun to be enforced. The development of new methods and trends is a consequence of globalization, internationalization, and hyperactive competition. One of the most profound crises in which a company can find itself is the financial crisis, respectively insolvency. The lack of financial resources is the biggest threat for Slovak companies.

EFQM model helps evaluate job satisfaction and work motivation (Ehrlich, 2006), receiving information about how the employees perceive individual aspects of the work. EFQM and other excellence models relate to intellectual capital models; therefore, EFQM presents a tool for the governance of knowledge (Kanj, 2015). Several authors deal with EFQM using it in different conditions. For example, Ruiz-Carrillo, J.I.C., Fernández-Ortiz (2007) analyze the usefulness of the EFQ model in the European

conditions, confirming the merits of the EFQM quality model as an effective tool to measure the quality, widely used by European enterprises. Nenadál (2018) and Nenadál (2020) present the main advantages and weaknesses of the EFQM model, especially from a practical point of view. According to Nabitz et al. (2000), the EFQM approach evaluates mainly as a framework of quality management, serving as a tool for organizational excellence (Köpper, et al., 2019).

The paper aims to propose a model for evaluating the economic efficiency of Slovak mining companies according to European standards through examination of the impact of selected traditional and modern methods and their interaction. The results could help the financial health of companies, contributing to sound management decisions in future strategies, ultimately bringing a positive development in the assessment of economic efficiency of the companies in standard European economies.

Material and methods

The method for evaluating the performance of the chosen mining company is the EFQM model, which will help the company focus on results that meet the needs of stakeholders increase the efficiency of internal processes, employee involvement, and motivation. These aspects are in line with the nine evaluated criteria in the model. The first five criteria are the prerequisites for a business to be successful, focused on the actual activity of the company, compared with the recommended procedures. The other four criteria assess the set results that the organization intended to achieve. All criteria have a certain weight, represented by points, and these express the importance of the company (adapted by Uygur & Sumerli, 2013).

Each criterion is monitored according to sub-criteria. The criteria are as follows:

1. Management (10%) - this criterion includes the effort of management to deepen and support the fulfillment of the company's mission and vision. Two perspectives evaluate this aspect. The first perspective is how management expressed the company's development intentions. The second perspective helps assess how intensely successful employees are in exciting these values and intentions.
2. Strategy (10%) - the assessment focuses on implementing the mission and vision through a stakeholder-oriented strategy. It includes the areas and markets in which the company conducts its business. The company's plans and goals enable the fulfillment of this strategy (Martín-Castilla & Rodríguez-Ruiz, 2008).
3. People (10%) - the criteria examine the management and development of employees' potential. It focuses on evaluation motivation, creating opportunities for further progress, and developing individual skills.
4. Partnerships and resources (10%) - the purpose of the evaluation is to assess the planning and management of relationships with internal entities, suppliers, and internal resources in order to support the strategy and efficiency of processes. At the same time, the organization must keep in mind its current and future needs, the needs of society, and the environment.
5. Processes, products, and services (10%) are the last criterion in assumptions and assess whether the company can design, manage, and improve processes to satisfy and increase value for customers and other stakeholders fully.
6. Results towards customers (15%) - this criterion evaluates the organization's results concerning customers. The ability to meet their expectations and needs is assessed. The degree of anticipation and adaptation to changes in the requirements and needs of current and potential customers is assessed.
7. Results towards employees (10%) - the evaluation focuses on the area of motivation

and satisfaction of employees, which is a prerequisite for their excellent performance. The starting point for the assessment is their opinions and views, and internal performance indicators are used.

8. Results towards the company (10%) - the criterion focuses on assessing the company and its external environment. Communication, friendliness, relationship to the environment is evaluated. An evaluation of relations with governmental organizations and the organizations that control the company is included.

9. Key results (15%) - the last criterion compares the planned results with the achieved results. The company is evaluated in terms of financial, but also in terms of meeting the requirements of all stakeholders.

The overall evaluation represents the sum of the points obtained for the individual criteria. The point evaluation evaluates the degree of success of the approach and the scope of implementation of the basic concepts. The maximum possible number of points that can be achieved is then determined. If a company gets 500 points out of a possible 1000, it is very well managed. The best European companies reach the limit of 800 points in this evaluation. Part of this model is also a scheme that sets out the organization's progress on the path to success. The scheme is RADAR logic, based on the following aspects:

- Result - the task of the organization is to determine the required results,
- Approach - the organization plans and prepares adequate approaches,
- Deployment - develops these approaches,
- Assessment and Review – evaluation and review of the implementation

and achieved results.

When evaluating the area of assumptions (criteria 1 - 5), partial aspects are evaluated and arranged in a clear table. Each criterion is assessed in terms of its fulfillment. This filling is expressed as a percentage. Most preferably, this percentage is divisible by five. Subsequently, we calculated the average percentage value of all three aspects for the given criterion. The average is converted to a decimal number and multiplied by the number of points given for which criterion. In this way, we achieved the final number of points for a given criterion in a given area. In the case of assessing the area of results, i.e., criteria 6-9, the aspects of "adequacy and applicability" and performance are evaluated where trends, objectives, comparison with the best in the industry, and the causes of these results are assessed. The evaluation procedure is the same as for the area of assumptions. We reached the final number of points by summing all the individual criteria received. The EFQM Excellence Model 2010 represents a way to achieve exceptional quality in all areas and activities of the organization (Zgodavova et al., 2017). The application of the model is not very demanding, but we needed an active approach of management and employees themselves in the implementation of this type of self-assessment.

The object of research is a mining company. At the same time, the main activities of its business include natural stone processing, production of stone products, stonework, demolition, demolition work, and preparatory work for construction, plastering work, retail in the range of free trade, wholesale in the range of free trades and intermediation of trade and services in the scope of free trades. The company currently mines Spišský travertine in a surface way; it is currently also represented in the Czech Republic in Prague and Bratislava. It exports its products and works to Germany, Italy, Austria,

Russia, Poland, and the Czech Republic.

Results and discussion

Leadership

The leadership category rates 100 points and represents 10% of the total rating.

1. It evaluates if the leadership develops aim, vision, ethics of the business, and the shared values.

Table 1. Balance of the sub-criteria 1/I

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	70	60	50	60	70	65

Source: own compilation

The company’s strategy is defined. The criteria evaluated ethical and shared values in detail, creating a corporate culture, mission, and vision of the company. The evaluation also implements delegation of powers to lower levels of company management.

2. Management’s commitment to the development, application, and continuous improvement of the management system.

Table 2. Balance of the sub-criteria 1/II

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	80	70	80	70	60	60	71

Source: own compilation

Management motivates employees and strives for their progress. Suggestions for improvement and employees’ opinions are submitted through direct superiors to the director of the company. Internal communication is at a satisfactory level. Managers increase their competencies through training. It is necessary to move training to the lowest levels of employees.

3. Cooperation of the leadership with business partners and consumers.

Table 3. Balance of the sub-criteria 1/III

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	60	70	70	60	50	50	61

Source: own compilation

The company’s management also participates in negotiations with key customers. The company is based on creating long-term partnerships. Personal contact, open communication, and a fair approach are preferred when dealing with customers

and partners. Public tenders realize the acquisition of new orders from new customers.
 4. *Promoting a culture among employees according to the principles of the model.*

Table 4. Balance of the sub-criteria 1/IV

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
60	50	60	50	20	50	50	48

Source: own compilation

The company's management is trying to set an example for employees. It promotes ethical values and strives to establish a corporate culture. This needs to be precisely defined so that ordinary employees can also understand it.

5. *Identification and enforcement of changes in the company by management.*

Table 5. Balance of the sub-criteria 1/ V

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
60	50	60	50	30	40	50	48

Source: own compilation

Management communicates with employees about the reasons for the changes, can identify the need for change, and respond flexibly to the stimuli that give rise to the need for change. As the company grew during the post-crisis period, it is necessary to transfer the responsibility for implementing the required changes to lower levels of management.

Strategy

The strategy can have 100 points, representing 10% of the total evaluation.

6. *The organization's strategy results from the current and future needs and expectations of stakeholders.*

Table 6. Balance of the sub-criteria 2/1

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	60	70	60	70	60	60	64

Source: own compilation

The company's strategy is developed comprehensively, taking into account the company's goals and vision. It contains the needs of existing customers as well as potential ones. The criteria monitor only activities of the competition without evaluation. Predicting market developments is performed on an intuitive basis.

7. *The strategy is based on information obtained from performance measurement,*

research, learning, and activities focused on the organization’s environment.

Table 7. Balance of sub-criteria 2/ II

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	60	60	50	70	50	50	58

Source: own compilation

Own research is a weak point of the company. An external consultant helps to find new approaches to strategies. In cooperation with an external company, training is underway, which needs to be expanded to include a line of lower managers and ordinary employees.

8. Strategy is permanently developing and regularly actualized.

Table 8. Balance of the sub-criteria 2/ III

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
60	60	60	50	50	60	60	57

Source: own compilation

The strategy is sporadically reviewed in terms of its topicality. However, the need to update it responds promptly. The elaboration and communication of the new plan take place immediately.

9. Strategy is communicated and spreading through key processes.

Table 9. Balance of the sub-criteria 2/ IV

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
60	60	60	50	40	40	40	50

Source: own compilation

In order to deepen and develop the strategy, processes are identified and recommended. However, with greater intensity into every area in the company.

People

The people criterion rates maximal 100 points, which is 10% of the total rating.

10. Area of human sources is planned; human sources are managed and improved.

Table 10. Balance of the sub-criteria 3/I

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	70	60	70	60	60	67

Source: own compilation

Recruitment is carried out through selection interviews with the director of the company. The criteria analyze employee data, performance indicators, the functioning of personnel processes, and a system of employee motivation.

11. The employees' competencies and knowledge are identified, developed, and permanently sustained.

Table 11. Balance of the sub-criteria 3/II

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	60	70	60	70	60	60	64

Source: own compilation

All employees undergo mandatory training. Top management participated in seminars and courses of an external company to increase their competencies and knowledge. Immediate superiors evaluated individual employees. Skilled and capable employees enable career advancement. It takes care of retaining quality employees.

12. Employees are engaged and entrusted to the processes performed.

Table 12. Balance of the sub-criteria 3/III

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	80	70	70	60	50	50	65

Source: own compilation

Delegation of powers to lower levels of management: management supports the initiative of employees and their involvement in improvement processes. The process of improvement is also motivated by financial rewards.

13. There is communication between the organization and employees.

Table 13. Balance of the sub-criteria 3/IV

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	80	70	60	60	60	68

Source: own compilation

The company implements an effective way of communication. Communication lines for individual employees are known, but it is not prevented to contact the company's management directly. Due to the rapid expansion, especially senior employees tend to circumvent the established management intermediate elements. E-mail communication is also used because written communication is required. However, personal communication is just as good.

14. *Employees are rewarded, obtaining recognition and care.*

Table 14. *Balance of the sub-criteria 3/ V*

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	80	70	60	60	60	68

Source: own compilation

The wage assessment is approximately 10% higher than the average in the region, evaluated on a fixed basis to which each employee receives a variable surcharge according to the performance. Of course, there is a contribution for meals, provided directly in the company. The shift is created so that individual workers from more remote districts and villages can come together. In this way, the company caters to its employees, reduces their travel expenses, and facilitates attendance. The working environment is satisfactory, but the possibilities for its improvement and improvement are still open.

Partnership and sources

Also, the Partnership and Resources criterion is evaluated by the number of points 100, which represents 10% of the total evaluation.

15. *Internal partnership relations are managed*

Table 15. *Balance of the sub-criteria 4/ I*

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	80	80	70	60	60	70	71

Source: own compilation

The company orientates to long-term fair relationships with its partners, key suppliers, and customers. It is necessary to find compromises between quality and price; given the current paradox, the price of stone products recorded an upward trend in maintaining its previous price level.

16. *Financial sources are managed.*

Table 16. Balance of the sub-criteria 4/ II

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	80	80	70	80	60	70	71

Source: own compilation

The criteria define the financial strategy. A created financial plan is currently monitored and evaluated. Return on investment is regularly assessed. Relations with financial institutions are good.

17. *There is the care of buildings, equipment, and material.*

Table 17. Balance of the sub-criteria 4/ III

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	60	70	60	50	40	40	55

Source: own compilation

The company results from its premises and carries out the maintenance of the premises and production halls. It has its maintenance department, which is in charge of the care and maintenance of the property. Stocks and materials are optimized. Care for them is at a relatively high level.

18. *Technology in the organization is managed.*

Table 18. Balance of the sub-criteria 4/ IV

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
60	60	60	60	30	30	30	47

Source: own compilation

The company regularly renews its computer and technical equipment. However, it does not implement new production technologies too much.

19. *Knowledge and information management.*

Table 19. Balance of the sub-criteria 4/ V

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	70	70	70	30	40	40	55

Source: own compilation

The company represents itself not very externally but uses its website, which contains only primary data and product descriptions. Communication is realized more in person, by phone, or by e-mail.

Processes, products, and services

The sum of points for the Criteria Processes, Products, and Services criterion is 100 points, representing 10% of the total evaluation.

20. *Processes are managed and systematically suggested.*

Table 20. *Balance of the sub-criteria 5/I*

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
70	70	70	60	70	60	60	65

Source: own compilation

The key processes help to enforce the business strategy at the local level. They make sure that they are compatible with each other. Technical procedures are elaborated in detail and strictly adhered to, especially in production. Not all processes in other branches of the company are completed.

21. *There is innovation and processes improvement to satisfy consumers and increase value for all stakeholders.*

Table 21. *Balance of the sub-criteria 5/II*

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	80	70	70	60	60	70

Source: own compilation

The company improves processes based on its knowledge. Customers actively contribute to the design and their requirements. This presents a source of quality assurance to develop new applications of patterns of stone products (tiling, paving) and their specifications in the most efficient time horizon. The company is trying to expand the area of improvement to human resources, management processes, and marketing activities.

22. *Products and services are suggested and improved according to the consumers' needs and expectations.*

Table 22. *Balance of the sub-criteria 5/III*

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	80	80	80	70	50	60	71

Source: own compilation

Continuous communication with customers strengthens the partnership

and enables the company to fulfill its commitment to delivering excellent service and products of worldwide quality. Promotional materials require more sophisticated procedures. In these directions, the support of employees in their creativity also lags.

23. *Production, supply, and service of the products are realized.*

Table 23. Balance of the sub-criteria 5/ IV

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
90	80	90	80	90	80	90	85

Source: own compilation

It is necessary to realize that this is a company unique in providing products and services of this kind, which also meets the demanding requirements of its clients. Therefore, it is an excellently mastered production technology, the quality of materials. The control of material and manufactured products is rigorous. Recently, there has been pressure to increase efficiency (in the field of stone mining under highways), which in this company represents an increase in mining. In addition, thanks to this aspect, the company emerged from the crisis strengthened and is expanding strongly.

24. *Relations with consumers are managed and improved.*

Table 24. Balance of the sub-criteria 5/ V

Approach		Deployment		Assessment and Review			Average
Steady	Integrated	Applied	Systematically applied	Measurement	Learning	Improvement	
80	70	80	80	80	70	60	74

Source: own compilation

The company is based on good and fair relations with customers. The exclusivity of the company's products is determined by the fact that the company has several key customers for whom it is the exclusive supplier. A customer care system is not centralized. Thus, the possibility and space for such care for its customers open up here.

Results towards the consumers

The criterion Results towards customers are essential and evaluated by 150 points, i.e., 15% of the total evaluation.

25. *The criteria reflect consumers' perceptions of the business image, presented products and services, sales, and loyalty.*

Table 25. Balance of the sub-criteria 6/ I

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	Structure	Trends	Goals	Comparison	Reasons	
50	50	50	70	80	80	70	64

Source: own compilation

Much of the customer-related results are based on very regular monitoring and evaluation. Customers are loyal, and the company has primarily regular customers. Consumers perceive production sales service positively, and complaints are minimal.

26. *Performance indexes monitor, understand, predict and improve customer perception.*

Table 26. *Balance of the sub-criteria 6/II*

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	Structure	Trends	Goals	Comparison	Reasons	
80	80	60	70	80	60	60	70

Source: own compilation

The company monitors its turnover and the number of realized productions. It pays attention to complaints and expressions of dissatisfaction on the part of customers. In order to prevent crises, it is necessary to introduce statistics of contracted orders to predict the development of the situation.

Results towards the employees

Results towards customers can reach 100 points. This value represents 10% of the total rating.

27. *It consists of the employees' attitudes to the company, including motivation, satisfaction.*

Table 27. *Balance of the sub-criteria 7/I*

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	Structure	Trends	Goals	Comparison	Reasons	
70	60	60	60	70	50	50	60

Source: own compilation

Company values are set, the vision and mission of the company are communicated to employees. The criteria monitor health and safety at work, fulfilling applicable legislation. Staff training is implemented, and powers are delegated to lower levels of management. Communication is at a reasonable level, but there is no retrospective control. Due to the number of employees, a company director cannot completely understand each individual. However, the management also strives to create an informal and friendly atmosphere. There are no indicators of employee satisfaction.

28. *Attention is given to the performance indexes, such as success in the competencies and engaging transfer.*

Table 28. Balance of the sub-criteria 7/II

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	Structure	Trends	Goals	Comparison	Reasons	
70	70	60	70	80	70	70	70

Source: own compilation

The criteria monitor the productivity of individual employees and work teams, employee turnover with identification of the reasons. The effectiveness of completed training and their contribution to the company is monitored. Work and systematic procedures for handing over individual positions to new employees are described. The results are analyzed, and only the facts are worked on.

Results towards the company

The results towards the company are evaluated with 100 points. This value makes up 10% of the total rating.

29. *Indicators of the company's perception of the company are used, which may be the behavior towards the citizens in the area, involvement in public affairs, reduction of adverse environmental impacts of its activities on the environment.*

Table 29. Balance of the sub-criteria 8/I

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	Structure	Trends	Goals	Comparison	Reasons	
80	60	70	80	80	70	70	72

Source: own compilation

The company strives to reduce energy consumption with respect for the environment. It is a sorted waste. The company has a declared environmental policy. The company has a valid documented environmental management system, which it has implemented and maintains under ISO 14001. The company is positively perceived mainly as a representative of one of the larger employers in the region due to its good currency obtained by dealing with the economic crisis. So far, no reservations have been made about the noise or odor that the company would have caused.

30. *Performance indexes are evaluated, including changes in employment development, cooperation with institutions in certification, foreign trade.*

Table 30. Balance of the sub-criteria 8/II

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	structure	Trends	Goals	Comparison	Reasons	
70	60	60	70	80	70	70	68

Source: own compilation

The company has a valid documented environmental management system, which it has implemented and maintains following ISO 14001. The company introduced the ISO 9001 quality management system in 2007 (Lim, 2020). It is a company whose activities are also focused on foreign trade. Cooperation with the authorities is still without complications.

Key results

Criterion Key results can reach the number of points 150; from the overall evaluation, it represents 15%.

31. *The company confronts financial and non-financial results, considered key results.*

Table 31. Balance of the sub-criteria 9/I

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	structure	Trends	Goals	Comparison	Reasons	
80	80	80	80	80	70	70	77

Source: own compilation

The criteria evaluate production volume, the yield and productivity of individual employees and team productivity, costs and revenues, and fulfillment of the plan and wage costs. These indicators are monitored on both a daily and monthly basis. The criteria do not evaluate the procurement of orders for a longer time.

32. *Performance is a crucial index from finances, external sources, property, knowledge, processes.*

Table 32. Balance of the sub-criteria 9/II

Adequacy and applicability of the results			Results				Average
Extend and suitability	Integrity	structure	Trends	Goals	Comparison	Reasons	
70	70	60	70	70	60	60	65

Source: own compilation

Cash flows are regularly planned. Cash flow is positive. The company has sufficient resources to finance its costs. It can cover maintenance and repair costs from its resources. Credit exposure in the company is absent. The company pays lease payments on time. Inventories are optimized. Management is constantly expanding its knowledge. There is a need to transfer more responsibilities to lower management levels, get feedback from employees, and deepen the corporate culture.

Total evaluation

Table 33 presents a comprehensive overview of the achieved results. We obtained the total number of points awarded to the company by calculating all criterion points. The points of the individual sub-criteria were added up. Next, their average was determined and calculated, which we converted to a decimal number. Each number

was multiplied by an appropriate factor based on the EFQM methodology. Such a result represents the number of points for a given criterion.

Table 33. The total balance of the criteria

No	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%
Sub-criteria	I	65	I		I	67	I	71	I	65	I	64	I	60	I	71	I	77
Sub-criteria	II	71	II		II		II	71	II			70	II		II			
Sub-criteria	III	61	III	57	III			55		71								
Sub-criteria	IV	48	IV		IV		IV	47										
Sub-criteria	V	48			V		V	55	V									
Sum		293		229		332		299		365		134		130		139		142
Average		59		57		66		60		73		67		65		70		71

Source: own compilation

Table 34. Final balance according to EFQM method

Criteria		Average of sub-criteria, in decimal numbers	Number of points assigned to the criterion	Assigned points
1	Leadership	0,59	x100	59
2	Strategy	0,57	x100	57
3	People	0,66	x100	66
4	Partnership and sources	0,60	x100	60
5	Processes, products, and services	0,73	x 100	73
6	Results towards the consumers	0,67	x 150	101
7	Results towards the employees	0,65	x 100	65
8	Results towards the company	0,70	x 100	70
9	Key results	0,71	x 150	107
Total number of assigned points		658		

Source: own compilation

Discussion

The company received 658 points in its premiere self-assessment using the EFQM methodology. The result proves that the company is a well-functioning and prosperous company. The company's management is on a professional level, as evidenced by the fact of expansion after the crisis. This evaluation through the EFQM methodology proves that it was not a coincidence. In the assumptions section, the company received 63 points, and in the results section, 68 points. As the assumptions did not exceed the score of some of the results, it is clear that there are currently many

opportunities and opportunities for improvement. However, some measures can be taken to ensure the business situation. The measures in question were also identified by the analysis carried out.

The balance sheet showed that the company is one of the well-managed companies. All areas of its business have many strengths, and almost no areas have been identified that are neglected or under-managed. However, there are minor shortcomings, which have resulted mainly from rapid expansion, and after which the company can move even higher. Due to the rapid and significant recruitment of staff, which replicates the company's expansion after the crisis, there may be shortcomings in their performance or a sudden drop in orders will make them redundant. However, if they prove successful, they can become internal employees, although the company currently prefers self-employed for certain economic benefits. One of the possible measures to predict the development of the situation is the introduction of statistics of contracted orders for several months in advance. This measure will help the company adapt its production capacity to possible market developments. As the company has only a few large customers, it can track contracted orders in the end. In this way, it will gain precisely the precious time that it was able to use in 2008. Even though the company used the global economic crisis to its advantage, it is not entirely possible to prepare for a crisis about which aspects affect no company or manager it cannot give a clear idea and an accurate picture. It is just impossible. However, as it results from the presented contribution, quick reaction, harsh measures, and especially the willingness and desire to work and not give up are ways to solve an unfavorable situation. Many authors of professional literature mention managerial responsibility, and from our point of view, this is the weak point of Slovak companies. At the first signals of a crisis spreading to the financial world, many companies said that they were not affected, that no crisis would affect them. Of course, these rights have been affected by the global economic crisis or all businesses. Due to the strong connection to foreign markets, it may happen that although the company is not directly an exporter, it is located somewhere in the supply chain of such an exporter. However, if an unfavorable situation already affects the company, managers must communicate with employees in the first place, informing them about the actual state and situation of the company. At the same time, however, executives need to know what they will do, what measures they are applying to reverse the situation, and what it will cost the company. We mean financially, personnel. Even though the company was already in trouble, managers and executives stubbornly told their people that nothing was happening. Subsequently, it was too late for any measures. Our analyses and observations show that when rescuing a company, employees are willing to let themselves be touched for their salary evaluation in the interest of their survival. However, leadership and managers need to lead by example. However, the situation may be unfavorable and complex leadership must keep a cool head and draw up a plan to deal with the situation. However, the reality is different. Measures are taken intuitively recklessly, and management and management are unwilling to admit that they need any external assistance, for example, advice from one of the consulting and advisory companies. When uncertainty spreads among employees, an authoritative leadership style is needed because difficult times require clear leadership and uncompromising quick action. Sometimes management does not respond publicly to a crisis, which employees often explain as arrogance and confession. The fact that the company's management has dealt with people on a level playing field, directly and correctly, is one of those that has helped it overcome difficult times and bounce back from the bottom. The management used the crisis to restart. It prepared the conditions for its offensive, and this approach paid off.

Conclusion

The paper aimed to analyze a comprehensive evaluation of companies based on traditional and modern methods. As a method of such a comprehensive evaluation of the company, we can understand the financial analysis of the mining company. However, the problem is the interpretation of the partial results of the analysis and especially their joint interpretation in the final determination of whether or not the financial and economic condition of the monitored and analyzed company is good or bad. Partial results can often seem a harbinger of a good result, but in the end, the company does not achieve the expected good result, as in a broader context, its results have proved less efficient or show that the company is less economically efficient. The result of financial analysis is often determined based on the chosen method (horizontal, vertical, or ratio analysis) and the indicators themselves. The financial analysis thus assumes that an expert who has several years of experience and the ability to analyze and synthesize will interpret the results. The mentioned limitation of the financial analysis can be supported by the EFQM model, TQM, JiT, lean manufacturing, and kaizen. It can contribute to world-class manufacturing, producing products of increased quality supplies in demanded time and volume, which contribute to the strengthening of the company's market position.

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Correspondence address:

Ing. Jaroslav Gonos, PhD., Department of Economy and Economics, Faculty of Management, Economy and Business, University in Prešov, Konštantínová 16, 080 01 Prešov, Slovakia, email: jaroslav.gonos@unipo.sk

Doc. Ing. Katarína Čulková, PhD., Department of Earth Resources, Faculty BERG, Technical University of Košice, Letná 9, 042 00 Košice, Slovakia, email: katarina.culkova@tuke.sk

ANALYSIS OF PRICES OF PRINT ADVERTISING AND THE EFFECTIVENESS OF PRINT ADVERTISING ON READERS

Eva KALINOVÁ

School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Czech Republic

Jakub HORÁK

School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Czech Republic

Eliška PEŠKOVÁ

School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Czech Republic

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Abstract

This article aims to analyze the prices of print advertising in domestic printing houses and to find out the effectiveness of print advertising in paper form on the readers. The primary source of data is document analysis, i.e. data from price lists of Mafra, Vltava Labe Media and Burda international publishing houses. The data needed to determine the effectiveness of print advertising in paper form is obtained through the CAWI method, which is one of the questionnaire survey methods. One hundred respondents answered the questionnaire. The comparison method is used to evaluate the data. The results show that the advertising prices of individual publishing houses vary. Research has also shown that readers prefer the online form of press because it is easier for them, and they do not have to buy printed newspapers and magazines. The results also suggest that advertisers choose multiple magazines in different formats and at different publishing houses and do not focus on just one magazine or publishing house. The work helped advertisers recommend which publishing house offers the most financially advantageous advertisement and show a price comparison of advertisements at individual publishing houses.

Keywords: *advertising, print, prices, print effectiveness, marketing*

JEL Classification: M31, M37, P22

Introduction and theoretical background

In marketing, the concept of advertising is often discussed, being very important for companies, as it ensures the transfer of information to customers. Advertising occurs almost everywhere, for example, in television commercials, radio stations, billboards, or print. Print advertising is a type of mass advertisement that has its tradition, it has built credibility with people, but due to the influence of online media, the number of advertisers is declining (Světlík, 2018). Unlike television advertising, print advertising can provide readers with more information, not limited by time (Kokemuller, 2018). Print advertising is considered very expensive, especially according to the placement of the advertisement (Karlíček et al., 2016). If companies repeatedly use print advertising, it can cost up to several million CZK (Karlíček et al., 2016). It also depends on the choice of publication. Costs may vary depending on the chosen medium, whether newspapers or magazines. Other factors that increase costs are the size of the ad (in what format it will be), the colour, the length of time the ad will be displayed, or the days on which the ad will appear.

Newspaper advertising is also a local medium, a great advantage for companies, mainly targeting a specific group of people and a particular part of the local or regional market (Světlík, 2016). The disadvantage is the newspaper's longevity, since readers often throw away the newspaper after reading it, and with it the advertisement unless the reader keeps a snippet (Světlík, 2016).

Magazines differ from newspapers in that they can reach narrower target audiences; for example, according to the interests of target groups, there is much creativity, more colours are used, and this is very attractive for readers (Světlík, 2016). Readers read magazines more slowly and consistently than newspapers, which means they can pay more attention to advertising (Světlík, 2018). Světlík (2018) is inclined to believe that there is excellent competition for advertising in magazines, as some agencies are financially dependent on advertisers. When creating an ad, it must be captivating and engaging the reader. Světlík (2018) states that the product should be sold already in the title and that a picture is sometimes a better option than using words.

This topic could change the opinion of some companies on print advertising in a positive direction, i.e. that they would advertise more in print advertising and find out at which publishing houses an advertisement is the most financially advantageous. Companies may also be interested in what print media is better than, for example, television or online media. This work could also be of interest to publishing house owners and agencies because, as mentioned above, some agencies only survive on money from advertisers.

At present, new possibilities of advertising distribution channels are coming from the Internet, respectively, from Internet browsers (Olbrich and Schultz, 2014). Many potential users of advertising (at the input and output level) move comfortably at low cost in a virtual environment - in the whole socio-economic perspective. This environment offers advanced options and is very competitive with classic print advertisers. The situation surrounding classic print advertising in mainstream periodicals seems untenable (Silk and Berndt, 2021; Danaher and van Heerde, 2018; Goldfarb, 2014).

This work aims to analyze the current prices of print advertising in dailies and magazines published in the Czech Republic and to find out in which publishing houses advertising is the most financially advantageous. The sub-objective is to

determine how newspaper and magazine readers follow print advertising and whether they prefer online or paper print. The reason for analyzing print advertising prices is to find out whether it pays off to invest in print advertising. The research would provide print advertising prices for publishing houses, which would be crucial for entrepreneurs or investors when deciding to invest in print advertising. The research results should bring a satisfactory result to both the inquirer (company - entrepreneur) and the supplier (publishing houses).

Regarding this topic, the following research questions arise: What are the current print advertising prices at these publishing houses in the Czech Republic? Which publishing houses offer the most financially advantageous advertising offer? How much do readers of the paper media pay attention to the advertising placed in it? Do readers prefer online or paper media?

The price of print advertisement and its effectiveness on readers is widely discussed, especially among advertisers, i.e. companies that use advertising to promote their company. There is a so-called Union of Publishers, which supports and ensures the publication of periodicals and the provision of content on the Internet in the Czech Republic (Union of Publishers, 2021; Atabek and Atabek, 2015; Trivedi, Teichert, and Hardeck, 2020). The Union of Publishers, through the Millward Brown agency, conducted a survey in 2003 on the effectiveness of print advertising compared to television advertising. It was found that print advertising in the Czech Republic works similarly as it does abroad; if it is creatively and very interestingly produced, it has the same effects as television advertising. The research also included whether print advertising was ineffective when launching a new product. The result was that print advertising creates more public awareness than a television campaign, and the essential thing in print advertising is comprehensibility, message relevance, and credibility. According to the Union of Publishers (2021), the so-called combined method was chosen for the research with a standardized part of the questionnaire survey, which was created according to target groups, and 21 in-depth interviews were conducted with an elite group of respondents. The respondents were directors or workers of marketing departments, employees of media agencies, and directors of advertisements (Union of Publishers, 2021).

Each \$1 increase in online advertising resulted in a 22% decrease in print advertising between 2005 and 2010 (Sridhar & Sriram, 2015). In contrast, the Indian newspaper industry expects growth of around 6% (Priyadarshi et al., 2010). The IMARC Group (International Market Analysis Research and Consulting Group) (2018) favours that, despite increased interest in digital media and public interest in a better quality of the environment, advertisers still use print advertising to promote their company, new products or draw attention to various events. Advertisers using local, regional, or national newspapers and magazines to better target groups have increased the demand for print advertising worldwide (IMARC, 2018). According to a report issued by the IMARC Group in 2020, print advertising still has a significant share of the global market, despite the digitalization of the media and other competitors. IMARC Group (2019) states that print advertising still has a significant share of the global market, primarily readers who regularly subscribe to newspapers or magazines, i.e. subscribers. Another reason may be that the print ad is not too intrusive, and another advantage is that it gives the reader unlimited time to study the ad carefully. The report also states that interest in print advertising is declining in developed countries but is experiencing balanced growth in developing countries. According to IMARC Group (2019), the global print advertising market will likely decline sharply in the next five years.

Union of Publishers (2010) points out that print advertising brings the brand more sympathy and, unlike television advertising, the company does not have to invest too much in print advertising. Depken (2004) argues that the average income of a reader, his or her age, the number of pages printed per year, and the impression that the advertisement makes can increase the price of the advertisement.

Carson (2015) states that research into the financial crisis of print newspapers in Australia caused by the rise of digital paywall systems (systems that restrict access to a website) used a method of comparison and data analysis to collect data. The result of the research was that a paywall did not have much of an impact on retaining a large number of online subscribers.

Hampel et al. (2012) claim that more and more companies use premium printing technology. With the help of a field experiment, the general population was interviewed, and the main subject of the research was to find out what effect premium printing technology has on consumer behaviour and whether it is more effective than the classic form of print advertising. The results have shown that premium printing technologies add more prestige to advertising and increase consumer interest in both advertising and the company's brand (Hampel et al., 2012). Magazines are readable, create a personal relationship with the reader, make readers pay more attention to advertising and, consequently, make subsequent decisions, such as buying a product, or lead readers to look at the website of the company being advertised (Union of Publishers, 2009). Union of Publishers (2010) states that it has been working with Nielsen Atmosphere advertising monitoring data since 2010, where monitoring presents data on prices set for specific advertisements according to advertising price lists, but without bonuses or discounts.

Advertisers provide drug information to consumers who are considering different treatment options. An experimental method and a questionnaire survey (Aikin et al., 2018) were used to investigate consumer responses to price comparisons and information in prescription drug advertising. The result of the research was that people remembered the advertisement after publication, but it brought them more uncertainty about risks, effectiveness, and savings. Other respondents did not notice the advertisement, even though it was put in a prominent place (Aikin et al., 2018).

To support the comparison method, it is possible to use document analysis for data collection, which will bring the necessary information to the research. Using document analysis and the comparison method, it is possible to find out the current prices of print advertising at the listed publishing houses in the country, and it is also possible to obtain answers to research questions. Using the CAWI method, it is possible to determine the effectiveness of print ads on readers and other readers' preferences.

Material and methods

We contacted five publishing houses in the Czech Republic via e-mail, with only one publishing house, Burda International, having responded, stating that they did not have older price lists available. We then contacted the publishing houses by phone, but unfortunately, they could not provide price lists. Only the Mafra publishing house referred us to their website containing older print advertising price lists. The data will be obtained through the Mafra publishing house price lists on their website. The price lists of the print advertisement of the Mafra publishing house will be compared from 2015 to 2021. The Lidové noviny newspaper and the Téma magazine will be compared. The data will be needed to determine the development of Mafra's print advertising prices.

To answer the research question, it will be necessary to compare the current price lists of print advertising, i.e. the price lists for 2021, which are located on publishing houses' websites. Three publishing houses will be compared, i.e. Mafra, Vltava Labe Media, and Burda International.

Subsequently, the data will be obtained using the CAWI method to answer the following research questions: "Do readers prefer online or paper media? How much do paper media readers pay attention to the advertising that is placed in it?". With the help of a questionnaire survey, these research questions can be answered.

There will be a price comparison between Lidové noviny and Téma magazine. The comparison method will be used, which will be supported by the analysis of documents, i.e. price lists of print advertising of the publishing house Mafra from 2015 to 2021, where prices will be compared over the last seven years. Thanks to the data processed in the table, we can easily compare price changes in individual years or other changes that may appear in the price lists. Price list data will be processed in Microsoft Excel into comprehensive tables. The table for Lidové noviny will include individual years, 4C advertising prices in CZK, various advertising formats, and their prices, advertising dimensions in millimetres (mm), advertising prices on individual days, and prices of examples of unique formats. In the table for the magazine Téma there will be individual years, standard formats (4C) and their prices and dimensions, bleed (overlap of the document intended for printing), and mirrors in mm.

Subsequently, the tables of three publishing houses (Mafra, Burda International and Vltava Labe Media) will be compared using the comparison method, where the answers to the research questions will be found. Here we will compare the current prices of print advertising. The price lists of the print advertisement from 2021 of three publishing houses will be compared: Mafra, Vltava Labe Media, Burda International. Microsoft Excel will be used for spreadsheets to compare currently published price lists. Three tables are created. These tables will answer the following research questions: "What are the current prices of print advertising at these publishing houses in the Czech Republic?" Moreover, "Which publishing houses offer the most financially advantageous advertising?"

The table at Mafra will list advertising prices in CZK, various advertising formats and their prices, advertising dimensions in millimetres (mm), magazine titles. Cosmopolitan, Téma and Speed for life magazines will be selected. Cosmopolitan and Speed for life are monthly magazines, and Téma is published weekly.

The next step will be to create a table for Vltava Labe Media for Glanc, National Geographic, Dům a zahrada magazines. These are monthly magazines. The table will list various formats of advertising prices in CZK and magazine titles. The dimensions of the advertising formats will be listed in a smaller table, where the types of formats and the dimensions of the bleed and the mirror will be in millimetres (mm).

This is followed by creating a table for Burda International for the magazines Elle, Chip and Naše krásná zahrada. These are monthly magazines. The table will list the types of formats and their price in CZK and the names of the magazines. The dimensions of the formats will be given in a smaller table, where there will be types of formats, dimensions of the net format and mirror types in millimetres (mm).

Furthermore, the CAWI method will be used to determine the effectiveness of print advertising on readers. The questionnaire will consist of 20 closed questions and one open question. The questionnaire would include gender, age distribution, and questions such as: Do you prefer paper or online media, whether they follow paper advertising if they switched from print to online printing, what was the reason, or, for example, how do they view paper advertising. These questions provide answers

to the following research questions: "Do readers prefer online or paper media?" Furthermore, "How much do paper media readers pay attention to the advertising placed in it?" The questionnaire will be developed through the Survio internet system and sent to Facebook. 100 respondents will fill out the questionnaire. The answers will be processed into charts.

Results and discussion

There were no price changes in Table 1 and Table 2, which represent the development of the price of Lidové noviny's print advertising from 2015 to 2021. Only different formats have been changed, or various formats have been cancelled.

Table 1: prices of advertising of the Mafra publishing house's Lidové noviny in the years 2015 to 2018

Year	2015		2016		2017		2018	
Day	Mon Tue Wed Thu Sat	Fri	Mon Tue Wed Thu Sat	Fri	Mon Tue Wed Thu Sat	Fri	Mon Tue Wed Thu Sat	Fri
4C advertising prices in CZK (1mm/1sl.)	118	141	118	141	118	141	118	141
Formats in mm	Prices in CZK							
Junior page A (237 x 345)	x	x	x	x	x	x	x	x
Junior page B (189 x 276)	x	x	x	x	x	x	x	x
Panorama (600 x 435)	x	x	x	x	667 290	797 355	667 290	797 355
1/1 page (285 x 435)	307 980	368 010	307 980	368 010	307 980	368 010	307 980	368 010
Large corner (Junior page) (237 x 345)	203 550	243 225	203 550	243 225	203 550	243 225	203 550	243 225
1/2 page (vertical) (141 x 435)	153 990	184 005	153 990	184 005	153 990	184 005	153 990	184 005
1/2 page (horizontal) (285 x 217)	153 636	183 582	153 636	183 582	153 636	183 582	153 636	183 582
1/3 page (vertical) (93 x 435)	102 660	122 670	102 660	122 670	102 660	122 670	102 660	122 670
1/3 page (horizontal) (285 x 145)	102 660	122 670	102 660	122 670	102 660	122 670	102 660	122 670
1/4 page vertically (middle corner) (141 x 217)	76 818	91 791	76 818	91 791	76 818	91 791	76 818	91 791
1/4 page horizontally (base) (285 x 109)	77 172	92 214	77 172	92 214	77 172	92 214	77 172	92 214
Small corner (93 x 139)	32 804	39 198	32 804	39 198	32 804	39 198	32 804	39 198

1/8 page horizontally (141 x 109)	38 586	46 107	38 586	46 107	38 586	46 107	38 586	46 107
Examples of special formats	Prices in CZK							
Regional ear (45 x 39)	x	x	x	x	30 340	38 780	x	x
Nationwide ear (45 x 39)	31 930	40 810	31 930	40 810	31 930	40 810	31 930	40 810
Supplement ear (45 x 39)	30 340	38 780	30 340	38 780	x	x	x	x
Ad headline (45 x 70)	35 100	41 550	35 100	41 550	35 100	41 550	35 100	41 550
Ad headline (141 x 64)	96 000	113 000	96 000	113 000	96 000	113 000	96 000	113 000
Base headline (285 x 50)	233 870	260 400	233 870	260 400	233 870	260 400	233 870	260 400
Weather forecast ad (nationwide) ** (160 x 20)	28 790	32 550	28 790	32 550	x	x	x	x
Text section ad (nationwide) *** (1 or 2 sl. = price per mm/sl.)	472	564	472	564	472	564	472	564

Source: own processing

Table 2: Prices of advertising of the Mafra publishing house's Lidové noviny in the years 2019 to 2021

Year	2019		2020		2021	
Day	Mon Tue Wed Thu Sat	Fri	Mon Tue Wed Thu Sat	Fri	Mon Tue Wed Thu Sat	Fri
4C advertising prices in CZK (1mm/1sl.)	118	141	118	141	118	141
Formats in mm	Prices in CZK					
Junior page A (237 x 345)	203 550	243 225	203 550	243 225	203 550	243 225
Junior page B (189 x 276)	130 272	156 664	130 272	156 664	130 272	156 664
Panorama (600 x 435)	667 290	797 355	667 290	797 355	667 290	797 355
1/1 page (285 x 435)	307 980	368 010	307 980	368 010	307 980	368 010
Large corner (Junior page) (237 x 345)	x	x	x	x	x	x
1/2 page (vertically) (141 x 435)	153 990	184 005	153 990	184 005	153 990	184 005
1/2 page (horizontally) (285 x 217)	153 636	183 582	153 636	183 582	153 636	183 582
1/3 page (vertically) (93 x 435)	102 660	122 670	102 660	122 670	102 660	122 670
1/3 page (horizontally) (285 x 145)	102 660	122 670	102 660	122 670	102 660	122 670
1/4 page vertically (middle corner) (141 x 217)	76 818	91 791	76 818	91 791	76 818	91 791
1/4 page horizontally (base) (285 x 109)	77 172	92 214	77 172	92 214	77 172	92 214
Small corner (93 x 139)	32 804	39 198	32 804	39 198	32 804	39 198
1/8 page horizontally (141 x 109)	38 586	46 107	38 586	46 107	38 586	46 107
Examples of special formats	Prices in CZK					
Regional ear (45 x 39)	x	x	x	x	x	x
Nationwide ear (45 x 39)	31 930	40 810	31 930	40 810	31 930	40 810
Supplement ear (45 x 39)	x	x	x	x	x	x
Ad headline (45 x 70)	35 100	41 550	35 100	41 550	35 100	41 550
Ad headline (141 x 64)	96 000	113 000	96 000	113 000	96 000	113 000
Base headline (285 x 50)	233 870	260 400	233 870	260 400	233 870	260 400
Weather forecast ad (nationwide) ** (160 x 20)	x	x	x	x	x	x
Text section ad (nationwide) *** (1 or 2 sl. = price per mm/sl.)	472	564	472	564	472	564

Source: own processing

Table 3 and Table 4, which show the development of the print ad price of the Téma magazine from 2015 to 2021, show price changes. In 2017, the price of most formats increased. For the 2/1 panoramic double-sided format, the price increased by 5,71 %, i.e. from the original CZK 350,000, the price increased to CZK 370,000. The price of the 4th page of the cover increased from CZK 240,000 to CZK 280,000; per cent increased by 16,67 %. For the 2nd-page cover format, the price increased from CZK 220,000 to CZK 250,000, in per cent 13,64 %. The format of the 3rd page of the cover also underwent a price increase from CZK 210,000 to CZK 240,000, in per cent 14,29 %. Furthermore, the 1/1 page format increased from CZK 199,000 to CZK 220,000; in percent 0,5 % and the junior page format increased from CZK 185,000 to CZK 190,000; in percent 2,7 %. There was also a price increase for 1/3 page formats (horizontal and vertical) from CZK 90,000 to CZK 95,000; in per cent, 5,56 %. The price of 1/4 page formats (corner, horizontal and vertical) increased from CZK 70,000 to CZK 80,000; in per cent 14,29 %. There were no price changes for the 1/2 page format (vertical and horizontal). In 2018, there were again price changes for most formats. For the 2/1 panoramic double-sided format, the price decreased from CZK 370,000 to CZK 350,000; in per cent, 5,41 %. For the 4th page of the cover, the price increased from CZK 280,000 to CZK 300,000; in per cent 7,14 %, and for the 2nd page of the cover, the price increased from CZK 250,000 CZK 260,000; in per cent 4 %. The format of the 3rd page of the cover also increased the price from CZK 240,000 to CZK 250,000; in per cent 4,17 %. The price was maintained for the large corner (junior page) format, i.e. CZK 190,000. There was also a price increase in the format of 1/2 page (vertical and horizontal) from CZK 140,000 to CZK 150,000; in per cent 7,14 %. The price also increased for the 1/3 page format (vertical and horizontal) from CZK 95,000 to CZK 100,000; in per cent, 5,26 %. For the 1/4 page format (corner, vertical and horizontal), the price increased from CZK 80,000 to CZK 90,000; in per cent 12, 5 %. The following years do not report any price changes or format changes.

Table 3: Prices of advertising of the Mafra publishing house's Téma magazine in the years 2019 to 2021

Standard formats (4C)	r. 2015			r. 2016			r. 2017					
	Bleed dimensions in mm	Mirror dimensions in mm	Price in CZK	Bleed dimensions in mm	Mirror dimensions in mm	Price in CZK	Bleed dimensions in mm	Mirror dimensions in mm	Price in CZK	Bleed dimensions in mm	Mirror dimensions in mm	Price in CZK
2/1 panoramic double page (inside)	420x285	386x261	350 000	420x285	386x261	350 000	420x285	386x261	370 000	420x285	386x261	350 000
4th page of the cover	210x285	181x261	240 000	210x285	181x261	240 000	210x285	181x261	280 000	210x285	181x261	300 000
2nd page of the cover	210x285	181x261	220 000	210x285	181x261	220 000	210x285	181x261	250 000	210x285	181x261	260 000
3rd page of the cover	210x285	181x261	210 000	210x285	181x261	210 000	210x285	181x261	240 000	210x285	181x261	250 000
1/1 page	210x285	181x261	199 000	210x285	181x261	199 000	210x285	181x261	220 000	210x285	181x261	250 000

Large corner (junior page)	135x215	122x200	185 000	135x215	122x200	185 000	135x215	122x200	190 000	135x215	122x200	190 000
1/2 page - horizontal	210x140	181x128	140 000	210x140	181x128	140 000	210x140	181x128	140 000	210x140	181x128	150 000
1/2 page - vertical	102x285	88x261	140 000	102x285	88x261	140 000	102x285	88x261	140 000	102x285	88x261	150 000
1/3 page - horizontal (base)	210x114	181x95	90 000	210x114	181x95	90 000	210x114	181x95	95 000	210x114	181x95	100 000
1/3 page - vertical	72x285	55x261	90 000	72x285	55x261	90 000	72x285	55x261	95 000	72x285	55x261	100 000
1/4 page - corner	x	88x128	70 000	x	88x128	70 000	x	88x128	80 000	x	88x128	90 000
1/4 page - horizontal (base)	210x84	181x65	70 000	210x84	181x65	70 000	210x84	181x65	80 000	210x84	181x65	90 000
1/4 page - vertical	60x285	42x261	70 000	60x285	42x261	70 000	60x285	42x261	80 000	60x285	42x261	90 000

Source: own processing

Table 4: Print advertising prices of the Mafra publishing house for the Téma magazine in the years 2019 to 2021

Standard formats (4C)	r. 2019			r. 2020			r. 2021		
	Bleed	Mirror	Price in CZK	Bleed	Mirror	Price in CZK	Bleed	Mirror	Price in CZK
2/1 panoramic double page (inside)	420x285	386x261	350 000	420x285	386x261	350 000	420x285	386x261	350 000
4th page of the cover	210x285	181x261	300 000	210x285	181x261	300 000	210x285	181x261	300 000
2nd page of the cover	210x285	181x261	260 000	210x285	181x261	260 000	210x285	181x261	260 000
3rd page of the cover	210x285	181x261	250 000	210x285	181x261	250 000	210x285	181x261	250 000
1/1 page	210x285	181x261	250 000	210x285	181x261	250 000	210x285	181x261	250 000
Large corner (junior page)	135x215	122x200	190 000	135x215	122x200	190 000	135x215	122x200	190 000
1/2 page - horizontal	210x140	181x128	150 000	210x140	181x128	150 000	210x140	181x128	150 000
1/2 page - vertical	102x285	88x261	150 000	102x285	88x261	150 000	102x285	88x261	150 000
1/3 page - horizontal (base)	210x114	181x95	100 000	210x114	181x95	100 000	210x114	181x95	100 000
1/3 page - vertical	72x285	55x261	100 000	72x285	55x261	100 000	72x285	55x261	100 000
1/4 page - corner	x	88x128	90 000	x	88x128	90 000	x	88x128	90 000
1/4 page - horizontal (base)	210x84	181x65	90 000	210x84	181x65	90 000	210x84	181x65	90 000

Source: own processing

The following tables 5, 6 and 7 compared the current magazine advertising prices from three publishing houses. First, the advertising prices of the weekly Téma from the Mafra publishing house, the National Geographic monthly from the Vltava Labe Media publishing house and the Chip monthly from the Burda International publishing house were compared. For the weekly Téma, the price of a whole page is CZK 250,000, for the monthly National Geographic, the price of a whole page is CZK 205,000, and for the monthly magazine Chip, the price of a whole page (standard pages) is CZK 123,000. The price of double-sided ads is CZK 350,000 for the weekly Téma, the price of double-

sided ads is CZK 395,000 for the monthly National Geographic and costs CZK 245,000 for the monthly Chip. In the weekly Téma, an advertisement filling 1/2 page vertically or horizontally costs CZK 150,000; for the monthly National Geographic, the price of 1/2 page vertically or horizontally is CZK 155,000, and for the monthly magazine Chip a 1/2 page vertically and horizontally costs 91,000 CZK. For the weekly Téma, the price of 1/3 of a page vertically or horizontally is CZK 100,000, and 1/4 of a page vertically or horizontally is CZK 90,000. In the monthly National Geographic, 1/3 of the page vertically or horizontally costs CZK 155,000, and 1/4 pages vertically or horizontally sell for CZK 59,000. For the monthly Chip, the price of an advertisement on 1/3 of the page vertically or horizontally is CZK 81,000, and for 1/4 page vertically or horizontally, the advertising price is CZK 63,000.

Subsequently, the advertising prices of the Cosmopolitan monthly from the Mafra publishing house, the Glanc monthly from the Vltava Labe Media publishing house and the Elle monthly from the Burda International publishing house were compared. For the Cosmopolitan monthly, the price of the 1st double-page is CZK 635,000; for the Glanc monthly, the price of the 1st double-page is CZK 510,000, and for the Elle monthly, the price of the 1st double-page is CZK 677,000. The 3rd page of the cover costs CZK 345,000 for the Cosmopolitan monthly, and the 4th page of the cover costs CZK 415,000. The price for the Glanc monthly is CZK 270,000 for the 3rd page of the cover and CZK 310,000 for the 4th page of the cover. The price of the 3rd page of the cover is CZK 322,000 for the Elle monthly magazine and CZK 312,000 for the 4th page of the cover. The price of Cosmopolitan magazine 1/2 page vertically or horizontally is CZK 215,000; for the monthly Glanc, 1/2 page vertically or horizontally CZK 155,000, and Elle magazine, the price is 1/2 page vertically or horizontally is 199,000 CZK.

The current prices of print advertising at the Mafra publishing house's Speed for life magazine, the Vltava Labe Media publishing house Dům a zahrada magazine and the Burda International publishing house's Naše krásná zahrada magazine were also compared. For the Speed for life magazine, the price of 1/2 page vertically or horizontally is CZK 150,000, for the monthly Dům a zahrada, the price of 1/2 page vertically or horizontally costs CZK 115,000, and for the magazine Naše krásná zahrada, 1/2 page vertically or horizontally costs CZK 54,000. The price of 1/3 page vertically or horizontally in Speed for life magazine is CZK 105,000, and 1/4 page horizontally is CZK 65,000. For the monthly Dům a zahrada, 1/3 of a page vertically or horizontally costs CZK 89,000, and 1/4 of a page horizontally costs CZK 45,000. The price of the monthly Naše krásná zahrada in the format of 1/3 page vertically or horizontally is CZK 54,000, and in the format of 1/4 page horizontally, it is CZK 30,000.

Table 5: Prices of the print advertisement of the Vltava Labe Media publishing house for the year 2021

National Geographic monthly magazine		Glanc monthly magazine		Dům a zahrada monthly magazine	
Formats	Price in CZK	Formats	Price in CZK	Formats	Price in CZK
Full page	205 000	Full page	233 000	Full page	169 000
Double page	395 000	Double page	420 000	Double page	259 000
1/2 page	155 000	1/2 page	155 000	1/2 page	115 000

1/3 page	155 000	1/3 page	140 000	1/3 page	89 000
2 nd cover page	245 000	1/4 page	125 000	2 nd cover page	195 000
3 rd cover page	225 000	2 nd cover page	280 000	3 rd cover page	179 000
4 th cover page	299 000	3 rd cover page	270 000	4 th cover page	210 000
1 st advertising page	235 000	4 th cover page	310 000	1/4 page - horizontal	45 000
2 nd advertising page	225 000	1 st advertising double page	510 000	1/6 page	35 000
3 rd advertising page	215 000	1 st advertising full page	270 000	1/8 page	22 000
1/4 page	59 000	2 nd advertising full page	250 000	1/16 page	15 000
x		Junior page	213 000	Full page (advertorial)	195 000
x		1/2 page - Glanc tipy	75 000	x	
x		1/4 page - Glanc tipy	45 000	x	

Source: own processing

Table 6: Prices of the print advertisement of the Mafra publishing house for the year 2021

Téma weekly magazine				Cosmopolitan monthly magazine			Speed for life monthly magazine		
Standard formats (4C)	Bleed dimensions in mm	Mirror dimensions in mm	Price in CZK	Formats	Bleed dimensions in mm (clear format after cutting)	Price in CZK	Formats	Bleed dimensions in mm (clear format after cutting)	Price in CZK
2/1 panoramic double page (inside)	420 x 285	386 x 261	350 000	4th cover page	200 x 270	415 000	4th cover page	200 x 270	290 000
4th cover page	210 x 285	181 x 261	300 000	3rd cover page	200 x 270	345 000	3rd cover page	200 x 270	240 000
2nd cover page	210 x 285	181 x 261	260 000	1/1 4c inside	200 x 270	285 000	2nd cover page	200 x 270	260 000
3rd cover page	210 x 285	181 x 261	250 000	1st double page	400 x 270	635 000	1/1 4c inside	200 x 270	200 000
Full page	210 x 285	181 x 261	250 000	2nd double page	400 x 270	610 000	1st double page	400 x 270	430 000
Large corner (Junior page)	135 x 215	122 x 200	190 000	3rd double page	400 x 270	590 000	2nd double page	400 x 270	420 000
1/2 page - horizontally	210 x 140	181 x 128	150 000	1st right page	200 x 270	330 000	3rd double page	400 x 270	400 000
1/2 page - vertically	102 x 285	88 x 261	150 000	1/2 page - horizontally	200 x 131	215 000	1/2 page - horizontally	200 x 131	150 000
1/3 page - horizontally (base)	210 x 114	181 x 95	100 000	1/2 page - vertically	96 x 270	215 000	1/2 page - vertically	96 x 270	150 000
1/3 page - vertically	72 x 285	55 x 261	100 000	1/3 page - horizontally	200 x 86	155 000	1/3 page - horizontally	200 x 86	105 000
1/4 page - corner	x	88 x 128	90 000	1/3 page - vertically	62 x 270	155 000	1/3 page - vertically	62 x 270	105 000
1/4 page - horizontally (base)	210 x 84	181 x 65	90 000	1/4 page - horizontally	200 x 64	95 000	1/4 page - horizontally	200 x 64	65 000
1/4 page - vertically	60 x 285	42 x 261	90 000	1/6 Kaleidoscope	x	25 000	1/6 Quick tips	x	18 000

Source: own processing

Table 7: Print advertising prices of the Burda International publishing house for the year 2021

Format - page	Price in CZK	Format - double page	Price in CZK	Format - small formats	Price in CZK
standard page	271 000	standard double page	541 000	1/2 page horizontal or vertical	199 000
back outer cover	411 000	V-gate: folding envelope 4 page	1 080 000	1/3 page vertical	199 000
back inner cover	343 000	Z-gate: folding envelope 2 page	791 000	1/6 page	55 000
1st ad left next to contents	343 000	1st advert double page	677 000	1/4 page horizontal or vertical	x
1st ad right next to contents	343 000	2nd advert double page	634 000	1/8 page horizontal or vertical	x
2nd advert page	333 000	3rd advert double page	614 000	x	
3rd advert page	322 000	4th advert double page	604 000		
4th advert page	312 000	5th advert double page	593 000		
5th advert page	302 000	6th advert double page	583 000		
6th advert page	302 000	double page advertorial	645 000		
7th advert page	291 000	1st advertorial double page after contents	573 000		
8th advert page	291 000	2nd advertorial double page after contents	567 000		
9th advert page	291 000	3rd advertorial double page after contents	561 000		
10th advert page	291 000	x			
advertorial page	322 000				
Chip monthly magazine					
Format - page	Price in CZK	Format - double page	Price in CZK	Format - small formats	Price in CZK
standard page	123 000	standard double page	245 000	1/2 page horizontal or vertical	91 000
front inner cover	205 000	V unfolding envelope	433 000	1/2 advertorial page	101 000
back outer cover	258 000	advertorial double page	288 000	1/3 page horizontal or vertical	81 000
back inner cover	185 000	x		1/4 page	63 000
1st advertorial page	180 000			1/4 page horizontal	63 000
advertorial page	144 000			1/6 page	41 000
x				junior page	116 000
Naše krásná zahrada monthly magazine					

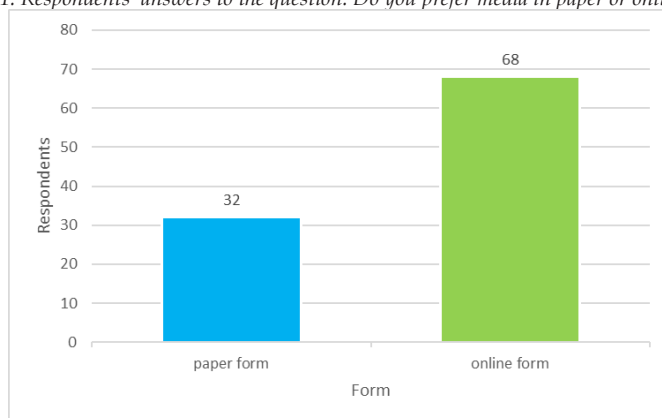
Format - page	Price in CZK	Format - double page	Price in CZK	Format - small formats	Price in CZK
standard page	93 000	standard double page	185 000	1/2 page horizontal or vertical	54 000
front inner cover	129 000	advertorial double page	227 000	1/3 page horizontal or vertical	54 000
back outer cover	139 000	x		1/4 page standard	30 000
back inner cover	118 000			1/4 page horizontal	30 000
1st advertorial page	118 000			1/6 page	20 000
advertorial page	113 000			junior page	79 000

Source: own processing

The following are the respondents' answers, which were obtained using the CAWI method. One hundred respondents answered the questionnaire.

When asked if they prefer more paper or online media, 68% of respondents said they preferred online.

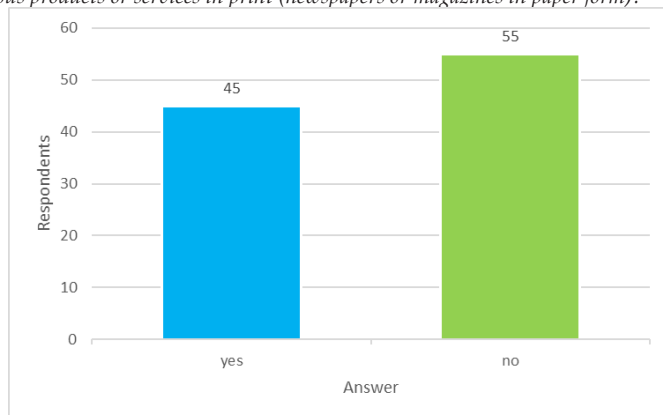
Figure 1: Respondents' answers to the question: Do you prefer media in paper or online form?



Source: own processing

When asked whether they also pay attention to advertising for various products or services in the paper form, the answers were relatively balanced; 55% of respondents pay attention to the advertisements in the paper media, and the remaining 45% do not.

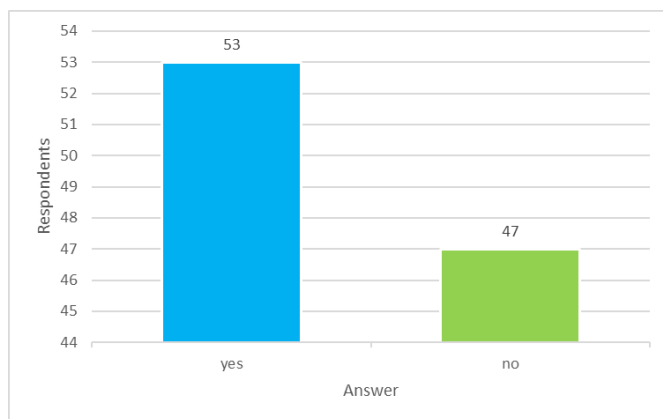
Figure 2: Respondents' final answers to the question: Do you also pay attention to advertisements for various products or services in print (newspapers or magazines in paper form)?



Source: own processing

Another question was, if they are interested in print advertising in paper form, whether they will visit the company's website and 53% of respondents answered yes and the remaining 47% chose to answer no.

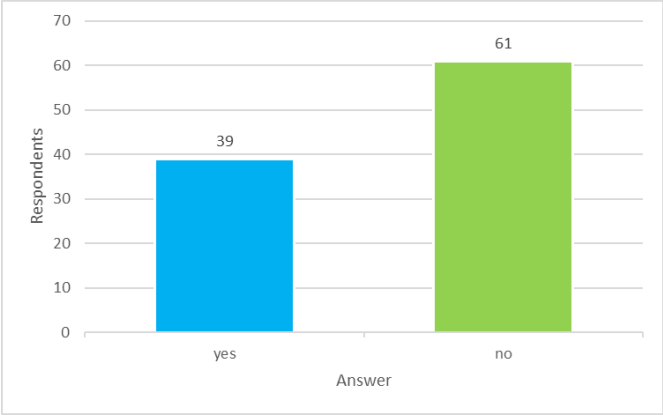
Figure 3: Respondents' final answers to the question: If you are interested in print advertising, will you visit the company's website?



Source: own processing

A follow-up question was whether they would buy the product or service if the advertisement made an impression on them, and more than half of them answered no, and the remaining 39% of respondents chose yes.

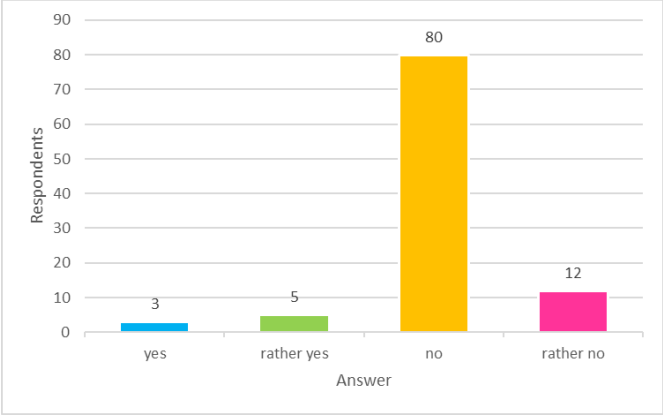
Figure 4: Resulting answers of the respondents to the question: Can a print advertisement in paper form influence you towards buying a product or service?



Source: own processing

Another question was whether the reason for the purchase of paper media is also the advertising in it, and 92% chose the answer no or rather no; the remaining 8% of respondents favoured the answer yes and rather yes.

Figure 5: Final answers of the respondents to the question: Is the reason for buying the paper media (newspapers and magazines in paper form) also the advertising that appears in it?

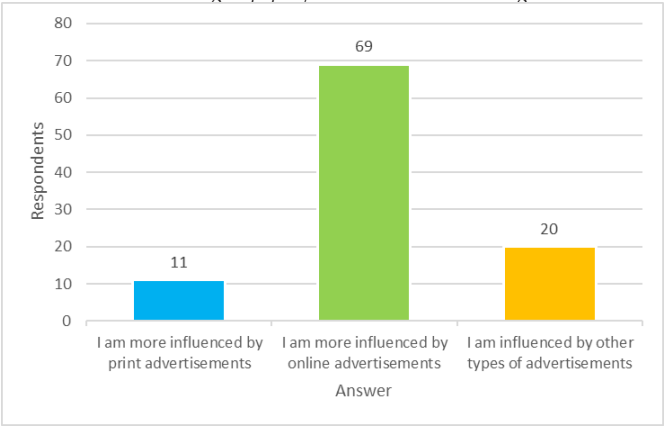


Source: own processing

When asked whether the influence of print advertising in paper form or the influence of online advertising affects them more, more than half, or 69% answered that they are influenced by online advertising, and 11% chose the influence of print advertising in paper form; the remaining 20% chose the answer that they are affected

by a different type of advertising.

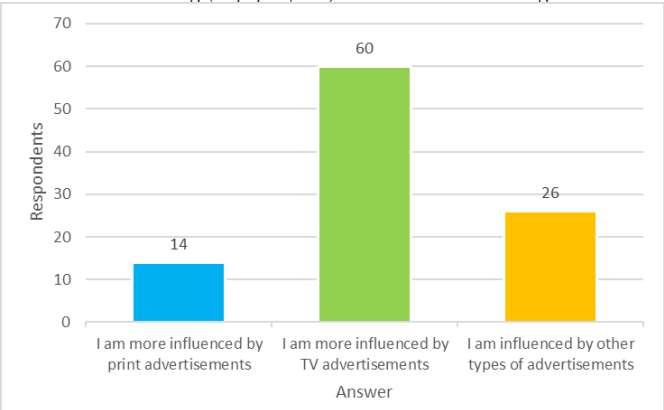
Figure 6: Final answers of the respondents to the question: Are you more influenced by print advertising in paper form or online advertising?



Source: own processing

The situation was similar in the answers to the question of whether the respondents are more influenced by print advertising in the form of paper or television advertising, 60% of respondents chose television advertising, and 14% are in favour of print advertising in paper form, the remaining 26% chose another type of advertising.

Figure 7: Final answers of the respondents to the question: Are you more influenced by print advertising (in paper form) or television advertising?

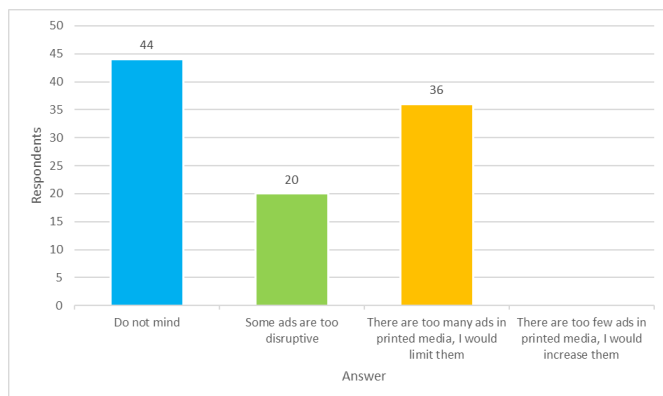


Source: own processing

When asked how paper advertising affects respondents, 44% said they did not mind advertising, 36% would limit print advertising, and the remaining 20% chose

that advertising is too disruptive.

Figure 8: Final answers of the respondents to the question: How does advertising in print in paper form affect you?



Source: own processing

It is clear from the research results that the advertising prices of individual publishing houses vary. The most cost-effective advertising is in Chip magazines from the Burda International publishing house, Glanc from the Mafra publishing house and Naše krásná zahrada from the Burda International publishing house. The most expensive advertisement is in Elle magazine from the Burda International publishing house.

The answer to the research question: "What are the current print advertising prices at these publishing houses in the Czech Republic?" Is that the prices of print advertising range from CZK 15,000 to CZK 1,080,000, but it depends on the size of the format to be chosen, which magazine will be selected and at which publishing house the advertiser will want to advertise?

In finding out the answers to this research question: "Which publishing houses offer the most financially advantageous advertising?" It was found that for the formats full-page, double-page, 1/2 page horizontally or vertically and 1/3 page horizontally or vertically, the magazine Chip by Burda International is the most financially advantageous, and for the format 1/4 page horizontally or vertically, the most financially advantageous is the National Geographic magazine of the Vltava Labe Media publishing house. For the formats of the 1st double-page, 3rd page of the cover, 4th page of the cover, 1/2 page horizontally or vertically, it is the most financially advantageous to choose the Glanc magazine of the Vltava Labe Media publishing house. For the formats 1/2 page horizontally or vertically, 1/3 page horizontally or vertically, and 1/4 page horizontally or vertically, the most financially advantageous is the magazine Naše krásná zahrada by Burda International. According to this research, it is advantageous for advertisers to choose a magazine from each publishing house and not focus on only one publishing house.

Furthermore, the research results show that readers prefer the online form of print and advertising in the paper form does not have much of an impact on them. The reason is the simplicity of the online environment; everything can be found in one place

and thus saves the environment because it saves paper and harmful inks that are used for printing also do not have to be used. This answered the research question: "Do readers prefer online or paper media?"

Another research question was: "How much do readers of the paper print pay attention to the advertising that is placed in it?" In this case, the respondents' answers were balanced. This means that some readers look at the ad, but the rest overlook it and are not interested. This may be because the ad is not compelling, or there are too many ads in the printed media, and readers are overwhelmed.

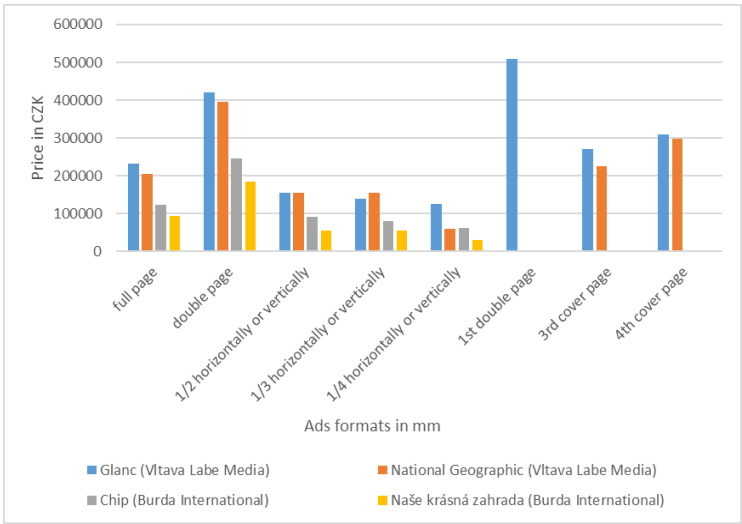
The Union of Publishers (2009) favours that, according to research, magazine readers pay close attention to magazine advertisements and are even more attracted to them than any other type of advertisement. They further state that advertising in magazines leads readers to visit advertisers' websites.

According to the research resulting from the questionnaire survey, the results do not agree with the statements of the Union of Publishers. Current results say that readers are more attracted to online advertising or television advertising, and also, more than half of the respondents use the online form of printing. The agreement of both pieces of research was reflected in the website traffic, i.e. if the reader is interested in an advertisement for a product or service, they will visit that company's website.

The research on the analysis of media proliferation in the Czech Republic in 2010 - 2016 examined advertising on television, radio, and the press. Print advertising was examined based on price lists, and it was found that the number of printed titles increased by 145, but on the contrary, the willingness of advertisers to invest in print advertising decreased. Publishing houses solved this problem by increasing the prices of advertising space. The research concluded that print advertising in paper form is declining, and the number and volume of advertising are further decreasing (Gunina and Kincl, 2017).

Gunina and Kincl (2017) used price list data to research print advertising proliferation, also used for this research. There was a significant increase in prices at the Mafra publishing house for *Téma* in 2017 and 2018. The reason could be the reduced investment of advertisers in advertising, as was the case with the research results of the media proliferation analysis in the Czech Republic.

Figure 9: The resulting price comparison of the most advantageous advertising offers from publishing houses in selected magazines



Source: own processing

Conclusion

The objective of this paper was to analyze print advertising prices and determine the effectiveness of print advertising to readers.

The paper's objective was met, and the research questions were answered. In the results chapter, the price development of the print advertisement of Lidové noviny and the magazine Téma publishing house Mafra from 2015 to 2021 was displayed in the table. The current prices of various formats for selected publications were also displayed here. The Mafra publishing house was Téma, Cosmopolitan, and Speed for life magazines. National Geographic, Glanc and Dům a zahrada were chosen from the Vltava Labe Media publishing house. The last publishing house was Burda International, where the magazines Elle, Chip and Naše krásná zahrada were selected. The current advertising prices (i.e. the prices for 2021) of these magazines were entered into the table together with the formats and were compared using the comparison method. Furthermore, using the CAWI method, it was found out whether readers prefer online print media or paper print media and how print advertising affects them. The results of this questionnaire were plotted in charts.

The work could help advertisers recommend publishing houses that offer the most financially advantageous advertising, and advertisers will also get an overview of the current print advertising prices.

Furthermore, it was found that even though paper print has many advantages, readers still tend to turn to online print media, and advertising in the online environment attracts the reader more.

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Correspondence address:

Ing. Eva Kalinová, School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Okružní 517/10, 37001 České Budějovice, Czech Republic, e-mail: kalinova@mail.vstech.cz

Ing. Jakub Horák, MBA, PhD., School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Okružní 517/10, 37001 České Budějovice, Czech Republic, e-mail: horak@mail.vstech.cz

Eliška Pešková, student, School of Expertness and Valuation, Institute of Technology and Business in České Budějovice, Okružní 517/10, 37001 České Budějovice, Czech Republic, e-mail: peskoe@mail.vstech.cz

TRAVEL AND TOURISM COMPETITIVENESS OF V4 COUNTRIES: THE CASE OF SUSTAINABLE TOURISM

Roman LACKO

Research institute of trade and sustainable business, Faculty of Commerce, University
of Economics in Bratislava

Zuzana HAJDUOVÁ

Department of business finance, Faculty of Business Management, University of
Economics in Bratislava

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Abstract

The Travel and Tourism Competitiveness Index is a relatively well-established indicator of comparing the competitiveness of the world's travel and tourism countries. It is used to a large extent by the academic community. Although its modifications occur and it has several weaknesses, it can still be considered one of the best indices in-country competitiveness. This paper aims to assess and compare TICI in V4 countries, focusing on environmental sustainability. Based on the methods used, we found that the V4 countries, whose values from 2019 we examined in this study, achieve in most cases similar values and rankings among the countries of the world. The most prominent natives occurred in the sub pillars of natural resources, cultural resources, and pillar infrastructure. Significant differences were also noted in some areas related to environmental sustainability; in our opinion, this sub pillar should be given more emphasis given the current measures in the field of sustainable tourism; this could also omit the inclusion of other indicators, which will be more linked to tourism.

Keywords: competitiveness, tourism, V4 countries, travel, sustainability

JEL Classification: L88, C34, C67

Introduction and theoretical background

Competitiveness in tourism is a relatively widely discussed area at both the scientific and practical levels. A wide academic sphere perceives the importance of competitiveness, which deals with the determinants of tourist attendance at the national, regional and destination levels (Kovács et al., 2021). In this study, we will look at the development of selected indicators of the V4 countries in terms of the

Travel and Tourism Competitiveness Index (TTCI), which is published periodically every two years by the World Economic Forum (Calderwood and Soshkin, 2019; Zsigmond et al., 2021). Based on Bălan et al. (2009) is, the competitiveness of the travel and tourism industry is defined taking into consideration a set of reference elements related to the significant dimensions of the industry, such as the business environment, infrastructure, laws and regulations, and resources available. Kayar and Kozak (2010) examined selected TTCI factors before the 2009 crisis. The investigated 13 key factors that affect destination competitiveness and compares the competitiveness levels of EU countries. Their study focuses on detecting influential determinants of destination competitiveness. Using TTCI, 28 countries were clustered according to their competitiveness scores. Cluster analysis and multidimensional scaling techniques were employed to analyse the findings. Many authors are trying to explain the results of TTCI in selected regions in the world. Nazmfar et al. (2019) analysed tourism competitiveness in middle east countries by using TTCI. Their model was performed to analyse the Promethee model and comparative analysis based on data in 2015 and 2017. Pérez León et al. (2020) researched tourism destination competitiveness in the Caribbean Region. The application aims to fill the absence of Caribbean destinations in international rankings. They analysed 33 destinations and 27 indicators, grouped into the four sub-indexes of the TTCI. The application was based on Goal Programming and Data Envelopment Analysis. Their results demonstrate the proposal's explanatory power in building composite indicators to measure the competitiveness of destinations. Based on Vásquez and Llorach (2020), Latin America is also a prosperous and competitive region in travel and tourism. They performed the analysis of the pillars; Mexico ranks first globally, and in the region in Natural Resources, Malta and Jamaica have the same score in T&T Prioritization. They had shown that the region and its countries have managed to position themselves competitively worldwide. Also, Russia has been analysed by Klimova et al. (2018). According to their study, both the positive and negative influencing factors are allocated for a position of Russia in the rating of TTCI. It is noted that despite the ambiguity of the estimates provided by the World Economic Forum, only a complex assessment of the Russian tourism tendencies will allow defining new trends in its development in the competitiveness of Russia.

As four pillars construct the TTCI, many studies focus on one pillar and its sub-indices. Dwyer et al. (2000) dealt with the price competitiveness of 19 tourism destinations. Using Australia as a base country, the paper compares the prices of a bundle of tourist goods and services. Two major categories of prices were distinguished. Recent studies aim at the description of many factors such as cultural resources. Kumar and Dhir (2020) claimed that many authors had highlighted the need to examine the association between a destination's culture and its competitiveness. Their study offers a cultural explanation of travel and tourism competitiveness by investigating the relationship between destination competitiveness, as measured by TTCI, and national culture. Their findings indicate that national culture's individualism, long-term orientation, and indulgence dimensions significantly influenced the TTCI. Their study advises the importance of developing culturally congruent policies to improve competitiveness. According to Bazargani and Kili (2021), the relevance of tourism to the prosperity of nations has long been acknowledged. Their study considered the global perspective of the nexus between TC and tourism performance. The heterogeneous effect is based on the regions and income groups of the countries and the measures of tourism performance. Infrastructure is a universal driver of tourism performance, while policy conditions, enabling environment, and natural and cultural resources are also critical determinants of tourism performance. Based on their findings, countries

worldwide promote the tourism sector's performance, policymakers and stakeholders in the travel and tourism industry should give adequate attention to the improvement of the countries competitiveness. There are attempts to reconstruct the TTCI or propose new index forms. Fernández et al. (2020) claim that destination competitiveness is a multidimensional concept, but multiple factors make its measurement a problematic task. They use all of the simple variables included in the 2017 TTCI, proposing a new methodology for constructing this synthetic index, which solves the problems of aggregation of variables expressed in different measures, arbitrary weighting and duplicity of information. They observe the most influential dimensions in tourism competitiveness. Air transport infrastructures, cultural resources and ICT readiness are the key dimensions that explain the significant disparities.

Moreover, some studies attempted to incorporate innovative approaches, for example, the DEA method. The study of Martín et al. (2015) aims to create a composite index of the travel and tourism competitiveness to rank 139 countries worldwide, and their method was based on the virtual efficiency DEA model. An analysis of the competitiveness by geographical area and income was analyzed. A similar method was also implemented by Perez Leon et al. (2021) and Wu (2011). A more comprehensive and actual study focused on competitiveness in tourism was proposed by de Paula Aguiar-Barbosa et al. (2021), in which authors recommend deepening the analysis in each category of conceptual elements of tourism competitiveness. They advise developing research on new models and monitors of tourism competitiveness that meet its renewed concept and integrate dimensions to consider the perspective of supply, demand, tourists and residents, and not excluding the economic bias concerning the social aspect. Tourism competitiveness has practically no variables related to social; most of the surveys are carried out from the supply or demand perspective, leaving the resident distant from the process. They propose a new version of tourism competitiveness not based on productivity but the social aspect.

Because many authors respect the TTCI index and emphasize the regional aspects of TTCI indices, in this study, we will focus on assessing and comparing TTCI in V4 countries with a specific focus on environmental sustainability.

Material and methods

This section will propose our research methods and methodology that will lead this study to meet its objective. The source of data for this study was the TTCI index values for 2019 published on the website of the World Economic Forum - The Travel & Tourism Competitiveness Report 2019 (World Economic Forum, 2019).

We assess four countries that belong to the V4 political grouping - Slovakia, the Czech Republic, Hungary and Poland. All four main pillars and 14 sub pillars will be evaluated in this study. Because there is a strong accent on improvement in terms of environmental protection, we decided to examine in more detail the sub pillar of environmental sustainability, which contains the following nine indicators:

- The stringency of environmental regulations
- Enforcement of environmental regulations
- Sustainability of T&T industry development
- Baseline water stress
- Threatened species
- Forest cover change – since the loss of forest is only 0.1 in all countries not included
- PM 2.5 concentration

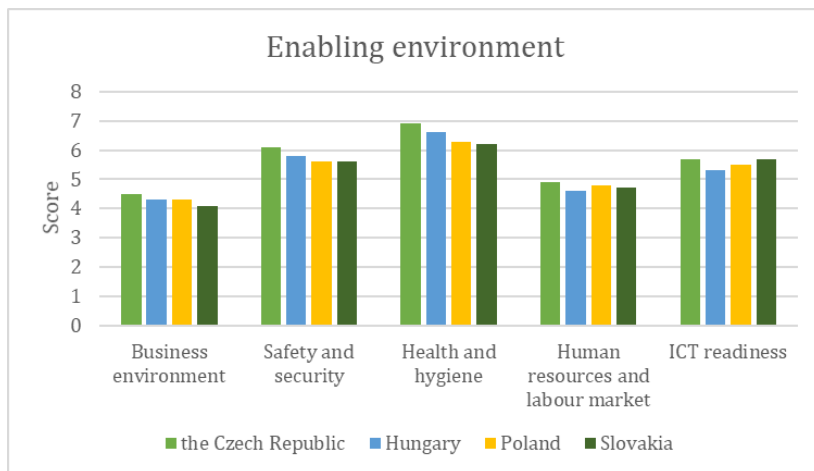
- Environment-related treaties in force
- Wastewater treatment

In the final analysis stage, we propose correlation matrixes, which will help us understand common aspects of indicators in a selected political grouping.

Results and discussion

In this section, we present the results of comparing the values of the TTCI index in the V4 countries and point out selected common but also different aspects in assessing the competitiveness of countries. In figure 1, there are presented values of pillar enabling environment.

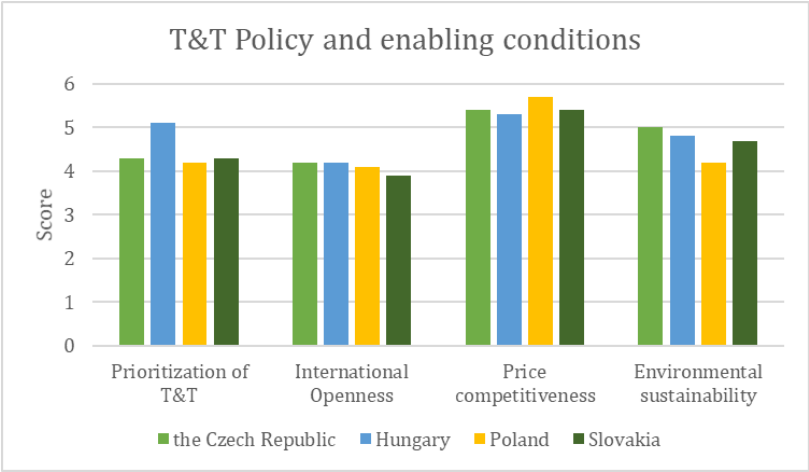
Figure 1 Development of pillar enabling environment in V4 countries



Source: own processing based on data from World Economic Forum (2019)

The pillar enabling environment shows the similarity of the V4 countries, which may also result from similar political and historical aspects. The most sophisticated area of this pillar is the area of Health and Hygiene; on the contrary, the worst area is the area of Business environment. The Czech Republic is at the top in all indicators, but the differences between the countries are not significant. In figure 2, there are presented values of pillar Travel & Tourism policy and enabling conditions.

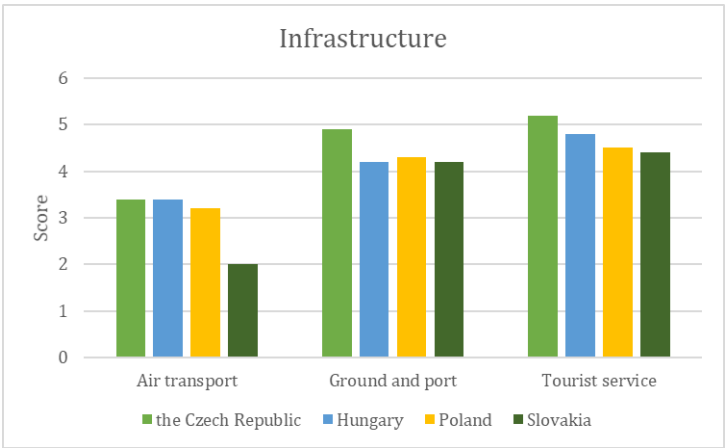
Figure 2 Development of pillar T&T policy and enabling conditions in V4 countries



Source: own processing based on data from World Economic Forum (2019)

The relative proximity of the countries is also confirmed by the T&T policy and enabling conditions pillar. In the case of Travel and Tourism prioritization, Hungary has a slightly higher score, while Poland has a slightly lower score in the case of environmental sustainability. The differences are not very significant in the other indicators. The countries achieve the highest values at price competitiveness, which can be considered one of these countries' most significant competitive advantages. In figure 3, there are presented values of pillar infrastructure.

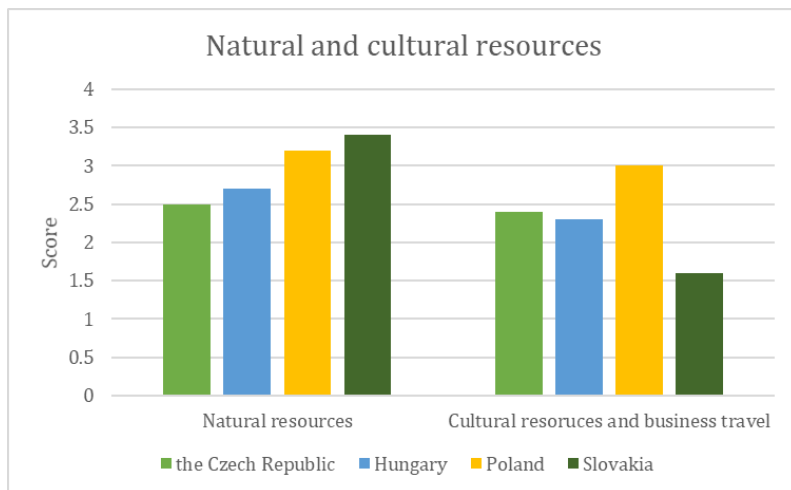
Figure 3 Development of pillar infrastructure in V4 countries



Source: own processing based on data from World Economic Forum (2019)

As far as infrastructure is concerned, the Czech Republic achieved the best score in 2019, which is relatively straightforward, especially in ground and port infrastructure and tourist service. On the contrary, Slovakia lags far behind in air transport, as the airports in Košice and Bratislava do not reach the same capacity and occupancy as the airports in the surrounding countries. It can also be stated that Slovakia achieved the worst score within this pillar. In figure 4, there are presented values of pillar natural and cultural resources.

Figure 4 Development of pillar natural and cultural resources in V4 countries



Source: own processing based on data from World Economic Forum (2019)

The most considerable differences among the V4 countries can be found in the last pillar - natural and cultural resources. While in the previous pillars, the Czech Republic led in many indicators, in the case of natural resources, it lags significantly behind Slovakia, which is the worst in the case of cultural resources and business travel. Poland achieves relatively high values in this pillar. We also provided table 1 with countries' rankings of the individual sub pillars.

Table 1 Ranking of V4 countries in specific sub pillars

Pillar	Sub pillar	Country rank			
		the Czech Republic	Hungary	Poland	Slovakia
Enabling environment	Business environment	62	88	91	105
	Safety and security	18	39	56	57
	Health and hygiene	4	7	24	29
	Human resources and labour market	43	66	53	55
	ICT readiness	32	47	40	33

T&T policy and enabling conditions	Prioritization of T&T	90	35	98	95
	International Openness	25	26	33	47
	Price competitiveness	76	88	40	71
	Environmental sustainability	15	21	81	30
Infrastructure	Air transport	51	52	56	113
	Ground and port	17	41	37	40
	Tourist service	32	49	56	61
Natural and cultural resources	Natural resources	93	81	55	48
	Cultural resources and business travel	39	43	28	73

Source: own processing based on data from World Economic Forum (2019)

Based on table 1, we can show in more detail the indicators the V4 countries excel and,

conversely, in which they are behind other countries in the world. There is an excellent level of health and hygiene in the V4 countries, but it can be stated that health care slightly lags behind the more developed EU countries. Countries also achieve good results in international openness, ground and port infrastructure and environmental sustainability. On the other hand, the V4 countries lag significantly behind other countries, especially in the business environment, prioritization of T&T, and air transport infrastructure. Table 2 presents the results of correlations between all sub pillars.

Table 2 Results of correlations among sub pillars

	Business environment	Safety and security	Health and hygiene	Human resources and labour market	ICT readiness	Prioritization of T&T	International Openness	Price competitiveness	Environmental sustainability	Air transport	Ground and port	Tourist service	Natural resources	Cultural resources and business travel
Business environment	1.0000													
Safety and security	0.8639	1.0000												
Health and hygiene	0.9037	0.9814	1.0000											
Human resources and labour market	0.6325	0.4917	0.4082	1.0000										
ICT readiness	0.0000	0.1842	0.0000	0.6742	1.0000									
Prioritization of T&T	0.0000	0.1262	0.2514	-0.7697	-0.8095	1.0000								
International Openness	0.8660	0.6983	0.8199	0.1826	-0.4924	0.4497	1.0000							
Price competitiveness	0.0000	-0.4480	-0.4260	0.4472	0.1005	-0.6655	-0.1361	1.0000						
Environmental sustainability	0.3599	0.7772	0.7123	0.0379	0.2302	0.3445	0.2770	-0.8765	1.0000					
Air transport	0.8489	0.5867	0.7202	0.2301	-0.5171	0.3542	0.9802	0.0572	0.0873	1.0000				
Ground and port	0.8489	0.8800	0.8141	0.8437	0.5171	-0.3542	0.4901	-0.0572	0.5237	0.4412	1.0000			
Tourist service	0.9087	0.9911	0.9972	0.4670	0.0727	0.1825	0.7870	-0.4016	0.7153	0.6888	0.8541	1.0000		
Natural resources	-0.8742	-0.9230	-0.9781	-0.2457	0.2071	-0.4255	-0.8972	0.4579	-0.6641	-0.8009	-0.6832	-0.9599	1.0000	
Cultural resources and business travel	0.5693	0.0799	0.2021	0.3825	-0.3793	-0.1212	0.6162	0.6876	-0.5420	0.7594	0.2071	0.1899	-0.2557	1.0000

Source: own processing based on data from World Economic Forum (2019)

The results of the correlation analysis suggest that some indicators are relatively strongly correlated between countries. Significant positive correlations include business environment vs health and hygiene, safety and security, international

openness. Then there is the tourist service and health and hygiene. On the contrary, relatively significant negative correlations are price competitiveness vs environmental sustainability, tourist service vs natural resources, ICT readiness vs prioritization of T&T and many others. We also proved that correlations among selected countries considering all sub pillars are high, proving the similarity of V4 countries concerning the TTCI index. See table 3.

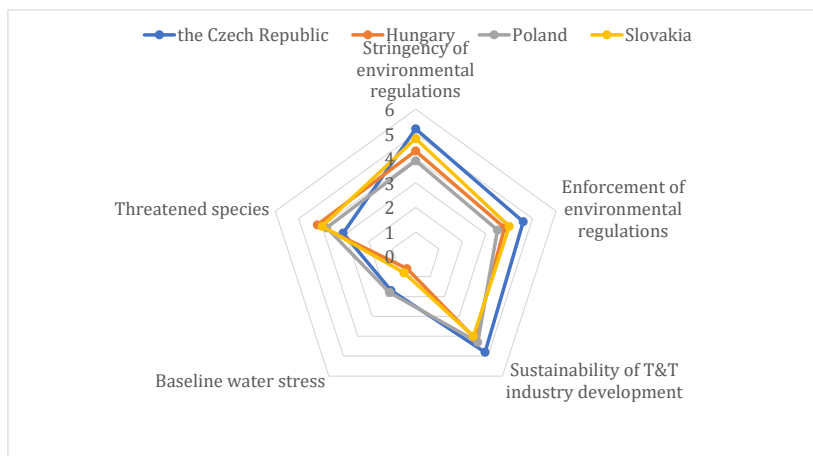
Table 3 Results of correlations among V4 countries

	<i>Czechia</i>	<i>Hungary</i>	<i>Poland</i>	<i>Slovakia</i>
Czechia	1			
Hungary	0.9631	1		
Poland	0.94544	0.93056	1	
Slovakia	0.91452	0.91859	0.93656	1

Source: own processing based on data from World Economic Forum (2019)

Because the world focuses actively on environmental issues, we analyse the individual sub pillar – environmental sustainability; results could be observed in figures 5 and 6.

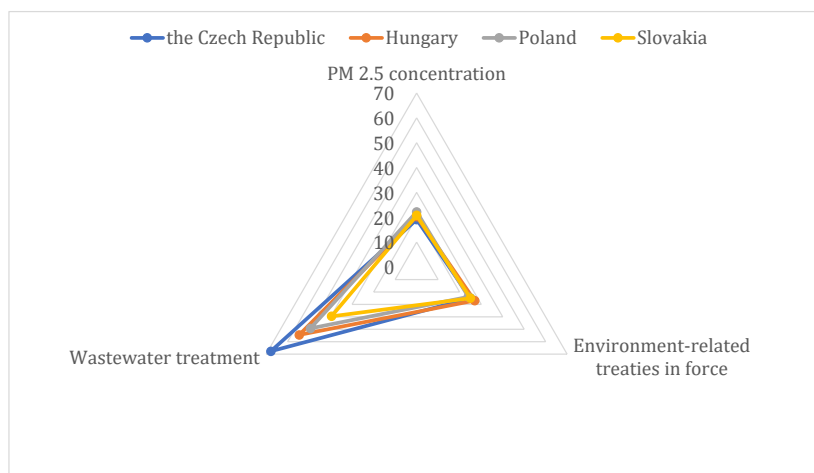
Figure 5 Comparison of indicators related to environmental sustainability sub pillar – part 1



Source: own processing based on data from World Economic Forum (2019)

Based on the above, it can be stated that the Czech Republic stands out the most of these countries. The Czech Republic has the most stringent environmental measures from the V4 countries, while the weakest measures are in Poland, as with the enforcement of environmental regulations. Similarly, the Czech Republic is significantly better in terms of endangered species, with the lowest score.

Figure 5 Comparison of indicators related to environmental sustainability sub pillar
– part 2



Source: own processing based on data from World Economic Forum (2019)

Poland achieves the highest values of PM 2.5 concentration (22.2) and the least by the Czech Republic (19.1). The highest percentage of wastewater treatment is again achieved by the Czech Republic (67.8), while Slovakia lags the most (39.6).

Conclusion

Based on the above results, it can be stated that in most indicators, the V4 countries are similar in the area of the TCI index, and thus both regional and historical or political proximity of these countries is observed. The most significant differences are in natural resources, which the country cannot easily influence and is a great gift of nature. However, the country must be able to take care of these resources, as is the case with cultural resources, where while Slovakia excels in natural resources, it lags in cultural resources. There are also significant differences, especially in the area of infrastructure. As for the selected correlations between individual sub pillars, they can help us understand between specific influences that indicate the interconnectedness of these indicators. Namely, they are connected.

In terms of the environment, sustainable tourism is a highly topical field of research and therefore, a closer examination of phenomena in a wider geographical area, or political grouping could significantly contribute to current research. Even at the level of the V4 countries, it was proved within the selected indicators that the natives are significant in some cases. Therefore, this study can be considered as opening a discussion to a deeper examination of measures that have a real impact on sustainable tourism.

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Correspondence address:

doc. Ing. Roman Lacko, PhD., University of Economics in Bratislava, Faculty of Commerce, Research institute of trade and sustainable business, Dolnozemská cesta 1/b, 852 35 Bratislava, Slovakia. e-mail: roman.lacko@euba.sk

doc. RNDr. Zuzana Hajduová, PhD., MSc., University of Economics in Bratislava, Faculty of Business Management, Department of Corporate Finance, Dolnozemská cesta 1/b, 852 35 Bratislava, Slovakia. e-mail: zuzana.hajduova@euba.sk

TAX AGGRESSIVENESS AND FIRM VALUE: EVIDENCE FROM INDUSTRIAL GOODS COMPANIES ON THE NIGERIAN EXCHANGE GROUP

Ebipanipre Gabriel MIESEIGHA

Department of Accountancy, Faculty of Administration and Management Sciences,
Olabisi Onabanjo University, Nigeria

Joel Adeniyi OKEWALE

Department of Accountancy, Faculty of Administration and Management Sciences,
Olabisi Onabanjo University, Nigeria.

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Abstract

This study assessed the relationship between tax aggressiveness and firm value of industrial goods companies listed on the floor of the Nigerian Exchange Group. The ex-post facto research design was adopted, and secondary data was obtained from the annual reports and accounts of the selected companies from 2006 to 2020. Data obtained were analyzed using descriptive, ordinary least square estimation, fixed and random effects statistical techniques. The study's findings showed that tax aggressiveness has an insignificant effect on the firm value on listed industrial goods companies in Nigeria. Impliedly, when companies employ tax aggressiveness strategies, the firm's value will decrease. Based on the findings, it was recommended that listed industrial goods companies on the floor of the Nigerian Exchange Group should instead not focus on aggressive tax measures aimed at decreasing the firm's value. Again, there is a need to ensure that the code of governance provision and tax implementation have been strictly adhered to.

Keywords: tax aggressiveness, firm value, debt tax shield, non-debt tax shield, effective tax rate

JEL Classification: E62, M40, M49

Introduction

Recently, there has been considerable interest in the relationship between tax aggressiveness and the firm's value in both developed and developing nations of the world. This interest emanates from the fact that stakeholders are more concerned about how a firm can reduce its tax burden to improve its value and performance (Wang, Xu, Sun & Cullinan, 2020; and Bradshaw, Liao & Ma, 2019). According to Rui (2019), He, Ren and Taffler (2019), a tax minimization strategy reduces the firm's tax burden. Similarly, the European Commission (2018); and Hairul, Ibrahim and Siti (2014) see tax aggressiveness as an intentional reduction in the precise tax liabilities of the firm.

In the accounting literature, tax aggressiveness has given rise to several concepts like tax avoidance, planning, sheltering, and these concepts have been used interchangeably with tax aggressiveness (Gebhart, 2017; Dyreng, Hoopes & Wilde, 2016; and Edwards, Schwab & Shevlin, 2016). Evers, Meier and Nicolay (2016) asserted that tax aggressiveness entails some magnitude of complexities to avert its detection by companies; however, the aim is geared towards the maximization of firm value and performance. For instance, when companies can reduce tax liabilities, more incomes are generated, improving firm value and performance.

Remarkably, tax aggressiveness does not contribute to the revenue base of the government; the government sees it as a source of loss and increased reputational risk (Richard, 2014; Goh, Lee, Lim & Shevlin, 2016; and Blaylock, Gaertner & Shevlin, 2015). Again, Hasan, Hoi, Wu, and Zhang (2014) contended that the lack of tax-related information had made shareholders value tax planning differently. While tax aggressiveness may portend dishonesty by the firm management, it assists firms to improve their value as well as performance (Armstrong, Blouin & Larcker, 2012; Chen, Chen, Cheng & Shevlin, 2010; and Dyreng, Hanlon & Maydew, 2010).

The concept of tax aggressiveness has been broadly defined in accounting literature. Landry, Deslandes and Fortin (2013) defined *tax aggressiveness* as the concerted efforts by firm management to outperform tax payments utilizing proactive tax planning, avoidance or sheltering activities. In the same vein, Lim (2011) sees tax aggressiveness as a simple trigger tax management-plan companies use for tax planning to avoid tax payments to the relevant tax authorities.

Tax aggressiveness connotes diverse handling activities aimed at lowering taxable income by the firm (Yeung, 2010; Kim, Li & Zhang, 2011; and Mulyadi, Anwar & Erminus, 2014). Wang *et al.* (2020) opined that the most fundamental reason why companies engage in tax aggressiveness is to increase their net income (value and performance), which creates a positive signal to foreign investors. Implementing an aggressive tax strategy reduces the potential non-tax cost arising from agency conflicts or tax-authority (Desai & Dharmapala, 2009).

Remarkably, tax aggressiveness has been measured in the accounting literature using various measures such as non-debt tax shield, debt tax shield, effective tax rate, cash effective tax, and tax paid to cash flow.

In this study, tax aggressiveness was measured using two proxies: book-tax difference (variations between book-tax and taxable income) and effective cash tax in percentage computed as income tax paid in cash flow statement divided by profit before tax. The gap identified is a dearth of empirical studies that have focused on the link between tax aggressiveness and firm value, particularly those of industrial goods companies listed on the floor of the Nigerian Exchange Group; this is the gap the study

seeks to satisfy. The remaining part of this paper is sectioned as follows: theoretical background, materials and methods, results and discussion, and conclusion.

Theoretical background

Remarkably, tax aggressiveness does not contribute to the revenue base of the government; the government sees it as a source of loss and increased reputational risk (Richard, 2014; Goh, Lee, Lim & Shevlin, 2016; and Blaylock, Gaertner & Shevlin, 2015). Again, Hasan, Hoi, Wu, and Zhang (2014) contended that the lack of tax-related information had made shareholders value tax planning differently. While tax aggressiveness may portend dishonesty by the firm management, it assists firms to improve their value as well as performance (Armstrong, Blouin & Larcker, 2012; Chen, Chen, Cheng & Shevlin, 2010; and Dyreng, Hanlon & Maydew, 2010).

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The concept of firm value occupies a significant thread in the accounting literature, given that firm value is a solid basis for assessing the firm's progress. *Firm value* is the benefits resulting from shares and operations of the firm, which are disclosed in the financial statements. Firm value could be measured with variables such as Tobin's Q, market value-added, market-to-book value, annual stock return, total assets, dividends yield, and turnover, among others (Kabayah, Nu'aimat, & Dahmash, 2012).

In the views of Al-Matari, Al-Swidi and Fadzil (2014), firm value forms the core of strategic management. Most strategic studies use firm value to examine various strategy contents and process concerns (Kapopoulos & Lazaretou, 2007). Firm value measures are characterized by their forward-looking aspect and their reflection of expectations of the shareholders regarding the entity's future value, which has its basis on either prior or existing value of the firm (Wahla, Shah & Hussain, 2012). This study measured the firm value using the natural logarithm of total assets.

This study is based on the agency theory, which shows the relationship between the providers of funds (known as the principal) and those entrusted to manage the firms' affairs (known as the agent). The agency theory was proposed by Jensen and Meckling (1976) and emphasized that agency conflict between the principal and agents who are delegated to run the corporation's affairs. Agency theory buttresses the variation in decisions (the two parties often have diverse goals and attitudes toward enhancing the firm's value (Chen, Chen, Cheng & Shevlin, 2010; Yeung, 2010).

The axiom of the agency theory is that tax management or planning is a firm's strategic choice defined by a contract (actual or implied) between shareholders and tax managers. Lanis and Richardson (2011) showed the sub-optimal contracts emanating from firms' tax aggressiveness strategy for two (2) reasons. *Firstly*, managers should be

assured with *ex-ante* compensations to reduce tax liabilities; *secondly*, managers' attempt to reduce firms' tax liabilities would compromise internal control systems (Chen *et al.*, 2010; Landry *et al.*, 2013).

The relevance of agency theory to this current study on tax aggressiveness and firm value is that managers can create on purpose and take advantage of opaque internal control function for personal gains at the expense of shareholders, thus creating room for tax aggressiveness. Hence, the desire by management to employ tax aggressiveness may positively or negatively affect firm value and performance (Mulyadi, Anwar & Erminus, 2014). Given this theoretical viewpoint, this study seeks to assess whether tax aggressiveness significantly affects the firm's value.

There is a dearth of studies on the relationship between tax aggressiveness and firm value in Nigeria, particularly those of listed industrial goods companies on the floor of the Nigerian Exchange Group. Balakrishnan, Blouin and Guay (2012) investigated the link between tax aggressiveness, earnings quality and transparency. Findings indicated that tax aggressiveness decreases corporate transparency and earnings quality. Similarly, Ftouhi and Zemzem (2013) assessed the relationship between the board of directors' characteristics and tax aggressiveness of French firms from 2006-2010. The regression result showed that board size and the percentage of women on the board influence the activity of tax aggressiveness.

Kraft (2014) examined the factors that determine the effective tax rate in Germany. Results indicated that larger firms and firms with higher free cash flow appear to have a higher effective tax rate. More again, leverage and operating lease expenses tend to be negatively associated with the effective tax rate. Evers *et al.* (2016) assessed the implications of tax aggressiveness on firms' opportunistic behaviour via meta-regression. Results indicated that tax aggressiveness suggests opportunistic reporting behaviour and even more so of earnings management.

Goh *et al.* (2016) evaluated the relationship between tax avoidance and a firm's cost of equity capital. The regression result showed that the tax avoidance effect is sturdier for firms with improved outside monitoring; more so, In addition, the result revealed that equity investors expect a lowered expected rate of return as a result of positive cash flow effects of tax avoidance. Gebhart (2017) offered a comparative analysis of effective tax rate and book value difference measures of tax aggressiveness. The study found that although there are variations between single measures of tax aggressiveness and those variations continue over time.

Rui (2019) assessed the effect of tax aggressiveness on investment-cash flow sensitivity using regression. Findings showed that enterprises with a high tax aggressiveness have high investment cash flow sensitivity; however, enterprises' tax aggressiveness directly augments cash flow and suppresses cash flow by increasing deferred financing costs. He *et al.* (2019) examined the impact of tax aggressiveness on analyst coverage and forecasts via pooled ordinary least square regression fixed and random effects models. Findings showed that analyst coverage negatively correlates with tax risks; more so, evidence was found for analyst forecasts and tax aggressiveness. Given the diverse viewpoints on tax aggressiveness, this study was carried out to assess how and why tax aggressiveness impacts the value of the firm of industrial goods companies listed on the floor of the Nigerian Exchange Group.

Materials and Methods

This study used the *expo-facto* research design by obtaining secondary data from the annual reports and accounts of selected industrial goods companies listed on the floor of the Nigerian Exchange Group (NEG). The study population consists of all industrial goods companies on the NEG at 2020. As of 31st December 2020, there were ten (10) industrial goods companies listed on the floor of the NSG. In order to arrive at a sample of the study, the simple random sampling technique was adopted based on the need to have an unbiased sample size that affords each member of the population an even chance of being selected.

Based on the availability of required information to achieve the study's objective, seven (7) industrial goods companies with financial statements covering the period of 2006 – 2020 were selected. The study examined the impact of tax aggressiveness on the firm's value using book-tax difference and cash practical tax approaches. The dependent variable is firm value, while the independent variable is tax aggressiveness. Panel data regression was used given the nature of the study's variables since they are company-specific data. More so, panel data has been employed by several researchers such as Okoro (2014); Okoro and Ihenyen (2020) in their investigation of company-specific data. The following estimated models were set up to investigate the hypothesized relationships between the tax aggressiveness and firm value.

The general form of the panel data model is specified as:

$$Y_{it} = \beta_0 + \beta BC_{it} + \mu_{it} \quad \text{----- eq. 1.}$$

Where: Y_{it} = dependent variable (firm value); β_0 = constant; β = coefficient of the explanatory variable; BC_{it} = explanatory variable in the model; it = All seven industrial goods companies in sampled periods; μ_{it} = error term (assumed to have zero mean and is independent across period). The study adopts the models of He *et al.* (2019); Rui (2019); and Gebhart (2017); the model of our study is expressed as:

$$EVA = f(BTD) \quad \text{----- eq. 2.}$$

Given equation 2, the model of our study is expressed as follows:

$$FVAL = f(BTD, CTFR) \quad \text{----- eq. 3.}$$

Based on equation 3, the model of our study is expressed mathematically as follows:

$$FVAL_{it} = a_0 + a_1 \beta BTD_{it} + a_2 CTFR_{it} + \mu_{it} \quad \text{----- eq. 4.}$$

Where: $FVAL$ = Firm value (measured using the natural logarithm of total assets); BTD = Book-tax difference (variations between book-tax and taxable income); $CTFR$ = Cash effective tax in percentage computed as income tax paid in cash flow statement divided by profit before tax. A-priori expectation of the relationship is that $a_1, a_2 > 0$. In other words, the study expects that the parameter(α) of the independent variable will have a significant impact on the dependent variable.

Data obtained were analyzed using descriptive (mean, median, standard deviation, minimum, maximum, skewness, kurtosis and correlation) and inferential (regression, fixed and random effect and Hausman specification tests) statistical tech-

niques. The data were analyzed using STATA 13.0 statistical software.

Results and Discussion

Table 1: Summary statistics for tax aggressiveness (CTFR, BTD) and firm value (FVAL)

	FVAL	CTFR	BTD
Mean	6.6539	16.7119	2.5909
Median	6.4566	9.5936	1.9144
Maximum	8.7617	251.4077	13.9492
Minimum	5.0927	-50.655	0
Standard Deviation	0.9021	29.4150	2.7582
Skewness	1.6249	4.9079	1.4395
Kurtosis	3.9185	4.0172	5.4019
Probability	0.00000	0.00000	0.00000
Observations	105	105	105

Source: Authors' elaboration

From Table 1, variables of firm value (FVAL), cash effective tax (CTFR), and book-tax difference (BTD) exhibited positive average values. This is expected, given the characteristics of the studied period, which are linked to the improvement in International Financial Reporting Standards and in Nigerian tax laws. The standard deviations range from 0.9021 (FVAL) to 29.4150 (CTFR); the high variations imply high book-tax conformity, which encourages the firm value of the selected industrial goods companies listed on the floor of the Nigerian Exchange Group. This result conforms to Blaylock *et al.* (2015).

Furthermore, all data series (FVAL, CTFR, BTD) displayed non-zero skewness; however, all the variables skewed to the same direction as indicated in the positive signs attached to the skewness values. Remarkably, all the variables have normal distribution as shown by the kurtosis and probability values. Thus, the data of tax aggressiveness and firm value satisfies the normality test.

Table 2: Karl Pearson Correlation Matrix for Tax Aggressiveness (CTFR, BTD) and Firm Value (FVAL)

Variables	FVAL	CTFR	BTD
FVAL	1.0000		
CTFR	-0.0900	1.0000	
BTD	-0.2349	-0.2438	1.0000

Source: Authors' elaboration $p\text{-value} = 0.80$

Table 2 shows the correlation result for tax aggressiveness measures (CTFR, BTD) and firm value (FVAL) of the industrial goods companies in Nigeria. The Karl Pearson correlation for tax aggressiveness measures is negative while firm value is positive, indicating a negative relationship between tax aggressiveness and firm value

during the studied period. Again, the highest correlation did not exceed the maximum threshold of 0.80, indicating the non-existence of multicollinearity among the pairs of independent variables (CTFR, BTDR).

Table 3: Variance Inflation Factors (VIF) Result

Variables	VIF	1/VIF
BTDR	1.06	0.940557
CTFR	1.06	0.940557
Mean VIF	1.06	

Source: Authors' elaboration

Table 3 shows the regression diagnostic test results (VIF); the Mean VIF= 1.06, which is less than the benchmark VIF value of 10.0, suggesting the nonexistence of multicollinearity problem in the empirical model of tax aggressiveness and firm value. This implies that the data series is good enough in conducting further statistical tests.

Table 4: Ordinary Least Square (OLS), Fixed (FE) and Random Effects (RE) Results for Tax Aggressiveness (BTDR, CTFR), and Firm Value (FVAL)

Estimator Variable	OLS (Obs.=105)		FE (Obs.=105)		RE (Obs. =105)	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
BTDR	-0.0016 (-0.05)	0.959	-0.0015 (-0.05)	0.964	-0.0015 (-0.05)	0.961
CTFR	-0.2727 (1.45)	0.149	-0.2786 (1.42)	0.157	-0.2728 (1.45)	0.146
_cons	6.4378 (0.35)	0.729	6.5019 (0.35)	0.728	6.4396 (0.34)	0.731
R-Squared	0.0164					
R-Sq. Adj.	0.0009					
F-ratio	1.06					
Prob. F.	0.3508					
R-Sq. (within)			0.0169		0.0168	
R-Sq. (between)			0.0085		0.0101	
R-Sq. (overall)			0.0163		0.0164	
Hausman Test						0.8449> 0.05

Source: Authors' elaboration

(Notes: *sig**@5% level; Items in parentheses are t-ratios, z-scores)

Table 4 shows the OLS, FE and RE results for tax aggressiveness (BTD, CTFR) and firm value (FVAL). *Firstly*, since the Prob. > chi2 (0.8449) is more significant than 0.05; it suggests that the null hypothesis was accepted, showing that the result of RE is suitable to FE; thus, the RE result is more desirable. *Secondly*, the OLS result showed that tax aggressiveness measures (BTD, CTFR) are insignificant at a 5% level in explaining the firm value of industrial goods companies in Nigeria.

Using the OLS and RE results, coefficients of BTD are -0.0016 and -0.0015, and CTFR are 0.2727 and 0.2728, respectively, suggesting that when listed industrial goods companies in Nigeria engage in tax aggressiveness, it leads to approximately -0.15% decrease in firm value (FVAL); however, with cash effective tax, it leads to approximately 27.27 increases in firm value. The t-test results of BTD and CTFR are -0.05 and .45, respectively; the t-test results confirm that tax aggressiveness is insignificant in explaining the variations in firm value. Nevertheless, R2 is 0.0164 using RE; this implies that BTD explained a 1.64% variation in firm value. Again, the f-ratio is 1.06 (p-value = 0.3508 > 0.05) which is insignificant, indicating that tax aggressiveness has insignificant impact on firm value.

Table 5: Wald Statistics for Tax Aggressiveness (BTD CTFR) and Firm Value (FVAL)

Wald Ch2				2.93	
Prob. Ch2				0.4132	

Source: Authors' elaboration

The results of the Wald statistic is 2.93 with Prob. value of 0.04132, suggesting a rejection of the null hypothesis and acceptance of the alternate hypothesis that tax aggressiveness has no significant effect on firm value. The results, in part, agree with the findings of He *et al.* (2019) and disagree with the findings of Gebhart (2017); and Goh *et al.* (2016).

Conclusion

This paper adopts a book-tax gap method to assess the link between tax aggressiveness and the firm value of industrial goods companies listed on the floor of the Nigerian Exchange Group from 2006-2020. Data were obtained for seven (7) industrial goods companies listed on the floor of the Nigerian Exchange Group. Panel data regression was used, and analyses were based on descriptive and inferential statistics. On the aggregate, the Wald statistics showed that tax aggressiveness negatively and insignificantly affects firm value.

The study concludes that firms with increased tax aggressiveness levels have reduced book value than those with lowered tax aggressiveness levels. However, no effect of cash effective tax and book-tax difference on firm value was established in the study. The results suggest that tax aggressiveness does not increase firm value. Given the study's findings, it was recommended that listed industrial goods companies on the floor of the Nigerian Exchange Group should instead not focus on aggressive tax measures aimed at decreasing the firm's value. The relevant tax authorities and regulatory framework of companies in Nigeria should ensure that the code of governance provisions and tax implementation should be strictly adhered to by listed industrial goods companies in Nigeria.

This study focused on tax aggressiveness and firm value (firm value was measured via the natural logarithm of the total asset); thus, future research should assess other components of firm value (like market value-added, market-to-book value, annual stock return, turnover) as they relate to tax aggressiveness in Nigeria. Also, future research should focus on the other sectors of the Nigerian economy such as agriculture, service, oil and gas, financial services, among others, to validate whether tax aggressiveness significantly affects the firm's value in Nigeria.

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Correspondence address:

Ebipanipre Gabriel MIESEIGHA, Department of Accountancy, Faculty of Administration and Management Sciences Olabisi Onabanjo University, P.M.B 2002, Ago-Iwoye, Ogun State, Nigeria.

Email: ebigabriel2007@yahoo.com

Dr. Joel Adeniyi OKEWALE, Department of Accountancy, Faculty of Administration and Management Sciences, Olabisi Onabanjo University, P.M.B 2002, Ago-Iwoye, Ogun State, Nigeria. Email: waleadeniyi2005@gmail.com

REVIEW OF A SCIENTIFIC MONOGRAPH

Ladislav MURA

Department of Economics, Faculty of Economics and Informatics, J. Selye University

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The world economy is currently experiencing an extremely difficult period, with numerous crisis situations which the whole economy along with regional economies and all business entities must face. The development that the world economy and all business entities are in at present has never been so dynamic. The development of national and regional economies are manifested at worldwide level and, conversely, worldwide development trends are also reflected at lower levels of the economy. The most significant factor affecting development has been globalization, the development, processes and stages of which significantly affect the functioning of specific economies. All changes at the global, subsequently national and regional level can significantly affect business activities not only at the international level, but also at lower ones. The development of international economic relations needs to be monitored in as much detail as possible, and that chronologically and with an emphasis on those determinants that can have the most significant impact on the functioning of economic and business entities. Based on the above fact, the interest of authors, Táncosová Judita, Fabuš Michal & Lincényi Marcel, to elaborate a monothematic scientific work focused on *The origin and development of international business and management* (title of the book) is well justified. The scientific monograph was published in 2020 by the renowned publisher of scientific literature, Wolters Kluwer.

Interest in studying the origin as well as the past and present trends in international business and international management is on the rise, and that due to the current globalization and internationalization trends, which can be traced in all economic and social activities. There is also a growing interest in the topic among in scientific, academic, social or economic circles. There is also a significant increase in the interest of college and university students to study these important development tendencies. Therefore, I am convinced that scientists and businesses will also welcome this book and that processing the current information available on the topic is necessary and useful from the perspective of international business and international management. This scientific monograph provides a rather comprehensive, especially a theoretical, view of the issue. During the elaboration and presentation of the partial problem areas, the authors reflected on the needs of the current state of knowledge, science, research, economic practice and other determining attributes. It is to be appreciated and noteworthy that the book is based on the latest literary sources. In their interpretations, the authors rely on scholars renowned worldwide and in Slovakia. This enabled them to create a piece that reflects on international research and also on the aspects of Slovak business entities doing business in an international environment.

The scientific monograph has a reasonable length of 140 pages, which

is seven author's sheets. It is written in Slovak language, in a professional style, paraphrasing scientific literature and is supplemented by an English summary. In addition to the core chapters, in which the authors deal with partial problem areas, the monothematic work includes an introduction, conclusions, brief information about the authors and a bibliography. Each chapter starts with the identification of the meaning, purpose and focus of the chapter. After introducing the researched issues, the first chapter deals with the origins and development of international business with a subtitle theoretical background. Here, the authors focus on two sub-areas: the stages of the internationalization of economic life and the emergence and development of international economic relations and their current forms. In the second chapter, the authors build on previous knowledge and deal with the notion and forms of international trade. In this chapter, the attention is devoted to the theoretical definition and origin of international business and international enterprises, the forms of international business and, last but not least, the factors and effects of international business. International trade and management are strongly affected by globalization. The third chapter of the book deals with the impact of globalization on international business. International business activities cannot be conducted aimlessly and chaotically. This is where the important role of management comes into play; therefore, it was necessary for the authors to deal enough with international management as a result of international business.

All business activities bring along a certain degree of business risk. This is also the case in an international business environment. The authors deal with the definition and possible elimination of risks in the fifth chapter. Risk management is one of the strategic tasks of management and, therefore, Chapter 6 deals with international strategic orientation and strategic decision-making. In one of the subchapters, the authors also analyse the current crisis situation and provide some essential information on it, which needs to be described at that point. The authors deal with other managerial issues in Chapter 7: Management in international businesses. An appropriate organizational structure is certainly a key to successful management. Average entrepreneurs and managers need to face considerable demands today. However, the pressure on managers in global businesses is even bigger. This is addressed in another subchapters. The next chapter of the monothematic publication deals with a dynamic field of marketing, i.e. international marketing. The authors start off from the marketing mix, planning, strategies and trends in international marketing with reference to new methods and marketing innovations. The fact that the authors have an excellent overview of the issue is shown also here. The final chapter is on international business ethics and culture. Both aspects are particularly important in international trade and should not be neglected. Both ethical business behaviour and cultural diversity affect the business activities of all entities operating on a global and transnational scale. In conclusion, it can be stated that the reviewed publication presents up-to-date facts and a necessary range of information that can be utilised not only by academics, students of economics and management, but also by entrepreneurs.

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Correspondence address:

doc. PhDr. Ing. Ladislav Mura, PhD., MSc., Department of Economics, Faculty of Economics and Informatics, J. Selye University, Bratislavská cesta 3322, 945 01 Komárno, Slovakia, email: mural@ujs.sk

POST-PANDEMIC TRAVEL BEHAVIOUR: CASE FROM REPUBLIC OF SERBIA

Danijela PANTOVIĆ

Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Serbia

Marija LAKIĆEVIĆ

Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Serbia

Tijana PETROVIĆ

Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Serbia

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Abstract

This paper explores perceptions about tourists' behaviour after a pandemic. Perceptions during the pandemic are also important, so on this occasion, they are connected with the planned tourist trips in the future. The research makes a new contribution to the understanding of tourists' behaviour during and after the pandemic and planned trips in the future. The research aims to test the model of planned trips in the future to identify post-pandemic travel behaviour. The data were collected on the territory of the Republic of Serbia by the method of an anonymous questionnaire. Five latent variables were used for data analysis: intra pandemic perception, attitude, subjective norm, perceived behavioural control, and post-pandemic travel. The SEM-PLS structural equation model using intelligent PLS software (version 3.0) was used in the data analysis. The results show that the used independent variables (attitude, subjective norm, perceived behavioural control) significantly impact the intention to visit a destination in the future.

Keywords: tourism, Covid-19, post-pandemic travel intention

JEL Classification: Z320, Z300, C500

Introduction and theoretical background

The Covid-19 epidemic, which originated in China, has become a global pandemic, and in order to stop the spread of the disease, almost all countries around the world have introduced restrictive measures, i.e., travel restrictions (Tóth, Kálmán & Poór, 2021; UNWTO, 2020). The new coronavirus disease (COVID-19) global spread has generated an unprecedented crisis that has dramatically impacted public health, individuals' daily lives, and economic systems (Nicola et al., 2020).

According to available data released by the World Tourism Organization (UNWTO, 2020), 45% have decided to partially or entirely close their borders to tourists, 30% have decided to partially or entirely suspend international flights, and 18% have applied various travel restrictions, such as closing its borders for travelers from certain countries of origin (UNWTO, 2020).

The global tourism industry has faced a massive crisis due to the global COVID-19 outbreak. Based on the insight into statistical data, what is noticeable is that global tourism is in a far bigger crisis than domestic tourism. The closure of borders, the abolition of international routes, and the — stay at home recommendations, and measures harmed international tourism (Pantić, 2021). Mass tourism stopped expanding (Stankov et al., 2020), which led to the fact that the world was temporarily deglobalized, and tourist facilities and attractions were closed (Niewiadomski, 2020).

Having all the above in mind, this paper starts from the effects and behavior of the population during and especially after the pandemic. The research of this paper aims to test and create models of planned trips in the future to identify the behavior of tourists after the pandemic. Following the defined problems and goals, the following research hypotheses have been defined:

H1: Perceive behavioural control significantly impacts intention to visit a destination post-covid-19.

H2: Attitude has a significant impact on intention to visit a destination post-covid-19;

H3: Subjective norm significantly impacts intention to visit a destination post-covid-19.

The travel industry was one of the hardest hit by the pandemic. The COVID-19 epidemic had caused the most significant crisis international tourism had faced since the 1950s when UNWTO began analyzing international tourism trends (Golets et al., 2021).

Elements that influence tourists to take a planned trip

In order to understand and predict how tourists will behave after the pandemic, we need to pay attention to those elements that affect the choice of travel destination.

One of the elements that tourists consider when choosing a destination is security and safety. In this context, it is necessary to define the *perceived risk* and see

how it affects tourist travel during a pandemic. It is necessary to investigate whether the perceived risk will influence tourists to cancel their trips.

After considering the impact of perceived risk, it is necessary to investigate the *travel intention* after the pandemic. This is important to understand how tourists think and predict how the tourism industry's recovery after the pandemic will go.

The research should also include *changes in tourists' behavior* to react to them promptly. An adequate marketing strategy can be developed to attract tourists to visit the destination by monitoring these changes.

Attitudes, subjective norms, and perceived control of an individual's behavior affect whether the planned trip will be realized. Therefore, it is necessary to consider how these elements affect an individual's intentions to travel.

In order to predict the future actions of tourists, it is necessary first to understand their attitudes and actions. The perceived behavioural control and intention method can predict *the Theory of Planned Behaviour (TPB)*.

Risk perception

Zhu & Deng (2020) define perceived risk as the probability of adverse outcomes (Zhu & Deng, 2020). Tourists' perceptions of risks have a significant impact on the tourism industry. Risk perceptions influence tourists' choice to travel, especially during times of crises, as well as their decisions to choose a specific destination or product (Hajibaba et al., 2015) since the perceived risk and fear of travel by tourists can significantly influence the choice of destination and the behavior of an individual on the trip (Kozak, Crofts & Law, 2007). In a recent contribution, Neuburger and Egger (2020) found that travel risk perception and tourists' willingness to modify or cancel their travel plans significantly increased during the COVID-19 outbreak.

Risk is considered an essential factor influencing tourists' behaviour, as tourism is an intangible service exposed to potential risks and threats (Hashim et al., 2018). Tourism risks include time, satisfaction, psychological, social, physiological, security, and capital risks (Zhu & Deng, 2020). Faruddin et al. (2020) found significant relationships between perceived risk and intention to travel internationally consistent with the kinds of literature that argue that the more risk associated with a destination, the less likely an individual will choose to visit.

Inconsistent results were found by Bae and Chang (2020), in which cognitive risk perception has a significant favourable influence on post-pandemic travel intention, while affective risk perception negatively influenced post-pandemic travel intention. It can be predicted that perceived risk harms the intention toward travelers.

Travel intention

Travel intention, which is "an outcome of a mental process that leads to action and transforms motivation into behaviour", can be seen as a form of behavioural intentions. Related to the description of behavioural intentions, which is "the expectation to behave in a certain way concerning different products and services", travel intentions are the expectation to travel in a certain way or to a particular destination (Isaac & Keijzer, 2021).

Travel intention is a process of transforming travel motivation into travel behaviour. Travel intention will be shaped from perception or attitudes toward a

particular place. Customers will be affected by word of mouth (WOM), reasonable prices, convenient transportation means, safety, and attractive destinations. Tourists' travel behaviour includes travel intention to a destination (Nguyen, Pham & Pham, 2021).

The government's restrictive measures (e.g. self-quarantining, social distancing) and the risk of infection suppressed individuals' travel-related decisions during the COVID-19 pandemic, but this will not necessarily diminish travel intentions and thoughts when it ends. Post pandemic travel intentions reflect the will and desire to travel and visit destinations after the pandemic. Post-pandemic travel intentions involve cognitive judgments of risk messages, as well as causing a certain level of emotional involvement in a pandemic (Xie et al., 2021).

Behavioural changes

Tourists' behaviours, including their selection of destinations to visit, subsequent evaluation of destination decisions and future behavioural intentions, are related to willingness to revisit or support a destination (Coudounaris & Sthapit, 2017). Experience is one of the most powerful predictors of the behavioural intent of a tourist, so it can be concluded that prior experience could be an essential determinant of post-pandemic travel behavioural intention (Rasoolimanesh et al., 2021; Coudounaris & Sthapit, 2017).

Tourist behaviour is the principal problem in the tourism sector, especially when a risk appeared to visit a destination by tourist during the covid-19 pandemic (Jamal & Budke, 2020). During the COVID-19 pandemic, there have emerged numerous changes in consumer behaviour. In order to ensure survival on the market in unstable and uncertain business conditions, it is necessary to conduct marketing research promptly, among other business actions. The results of the research form a base for formulating an appropriate (marketing) strategy. Also, (marketing) managers in tourism need to understand the behaviour of tourists to formulate marketing and destination management strategies based on accurate knowledge of tourist behaviour and future trends (Perčić & Spasić, 2021). It will be necessary to conduct adequate analyses that will help define future strategies based on accurate data on the pandemic, mortality, and its ultimate economic effects (Luković & Stojković, 2020).

Attitudes, subjective norms, and perceived control of behaviour

Na et al. (2016) explained that an individual is more likely to travel if they possess a favourable attitude from their initial assessment to the idea of travel. Subjective norms are predicted to strongly influence an individual's intention to travel (Na et al., 2016). Therefore, the consumer will probably engage in some form of behaviour if they evaluate it positively. Attitudes are formed based on cognitive factors, such as needs, expectations and values. Consequently, attitudes influence the intensity of individuals' intentions (Filipović & Šapić, 2021).

The perception of more significant uncertainty about the future in general, and a destination in particular, may indeed reduce tourists' favourable attitude toward that destination and, thus, their intention to visit it (Quintal et al., 2010). Specifically related to the post-pandemic travel intention, Li et al. (2020) reported significant influences of attitude, subjective norms, and perceived behavioural control on post-pandemic travel intentions. Therefore, this study proposes that attitude, subjective norms, and perceived behavioural control positively affect tourists' travel intentions (Li et al., 2020).

Theory of Planned Behaviour (TPB)

It is not very easy to predict customers' future actions without understanding their attitudes and actions in the tourism industry. According to the Theory of Planned Behaviour (TPB), perceived behavioural control and intention can help predict the behaviour. Behavioural intention refers to the motivational factors that influence a given behaviour where the more substantial the intention to perform the behaviour, the more likely the behaviour will be performed. Perceived behavioural control refers to people's perceptions of their ability to perform a given behaviour. The ability to control behaviour can generate positive outcomes (Nguyen, Pham & Pham, 2021). In their study, Susanto et al. (2021) concluded that all variables in the theory of planned behaviour had a positive relationship with the intention to travel after a pandemic. These findings are consistent with previous studies (Susanto et al., 2021).

Pahrudin et al. (2021) say that the use of planned behaviour theory is helpful to predict tourist behaviour to visit a destination during or post-pandemic covid 19. Also, the same authors conclude that the theory of TPB has been applied in several sectors but has not been applied in a pandemic context except the variable of intention in the medical aspect. A study from 2012 used by the authors uses TPB theory to visit during a health crisis (H1N1). Therefore, it is essential to understand the tourist behaviour whether the post-pandemic covid-19 tourism can be expected to follow the pattern recovery rapidly similar after the SARS and MERS epidemics and to evaluate the factors that influence the tourists' in deciding to visit a destination post-pandemic covid-19 (Pahrudin et al., 2021).

The Belief - Desire - Intention (BDI) model has been a widely studied philosophical theory of practical reasoning and behavioural intention. The present study adopts this theoretical framework to investigate how a country's management of the COVID-19 pandemic helps construct beliefs regarding a destination. This belief can be a motivator for shaping a behavioural intention (i.e. the desire to visit a destination) (Rastegar et al., 2021).

Tourist trips after the pandemic

The consequences of COVID-19 can only be glimpsed at for now, and we will be able to measure and understand them after the pandemic is over entirely. Furthermore, their remediation will be long-lasting, and overcoming the consequences of the crisis and returning the world to a pre-pandemic situation depends on the economic policy carriers and their knowledge and experience (Pantić, 2021).

After identifying the key factors that affected leisure travel intention in the context of the COVID-19 pandemic, the stakeholders in the tourism sector will be able to develop proper marketing strategies for tourism destinations in the future that are focused on the aspects that hold a high level of influence. According to the results of this study, the variables that showed a significant positive relationship with post-pandemic leisure travel intention include attitude, subjective norms, perceived behavioural control, and non-pharmaceutical interventions. Additionally, there is optimism that the tourism industry will recover soon because most respondents in this study have stated their intention to travel abroad for a vacation after the COVID-19 pandemic ends. Respondents showed positive responses to travel after the pandemic and negative responses to travel anxiety or risks (Susanto et al., 2021).

Material and methods

Data were collected from respondents who travelled to tourist destinations in the Republic of Serbia or plan to travel in the future. The study used social media to distribute and collect data, which has been recommended in recent literature as the most efficient way to collect data, with an average response rate of 54% (Ali et al., 2021). Data for data analysis were collected from January to March 2021. The questionnaire to collect data was developed based on previous studies using a five-point Likert scale, in which 1 and 5 refer to disagree and strongly agree, respectively strongly. The measurement items for constructs were adapted from tourism Li et al., (2020).

Of the respondents to whom the request for filling in the questionnaire was sent, 229 respondents filled in. Out of the total number of respondents, the prevalence by gender is almost ideal, 117 male and 112 female. The majority of respondents (142) belonged equally to the two age groups; 21–30 and 31–40 groups, and the majority of respondents (180) hold faculty, master's degree, or PhD.

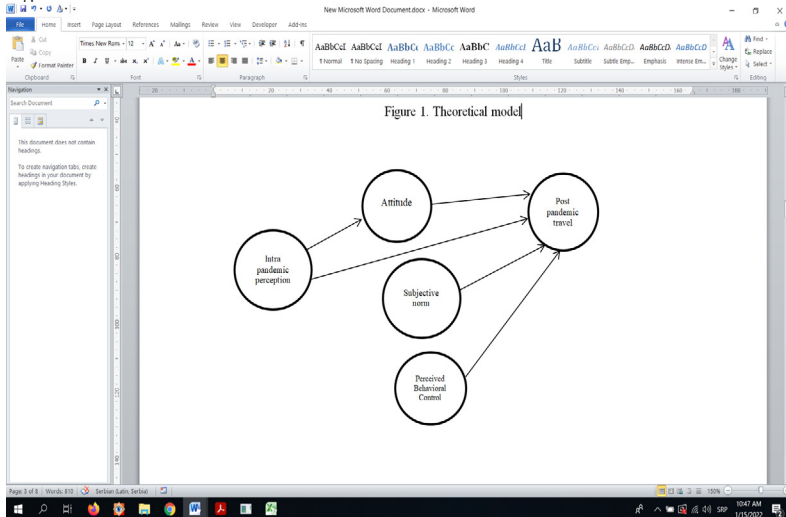
The SEM-PLS structural equation model using intelligent PLS software (version 3.0) was used in the data analysis. Descriptive statistics were used to analyze the demographic characteristics of respondents such as gender, education, age using SPSS software tools.

Results and discussion

In the first step of model analysis using the PLS-SEM model, a measurement model of five latent variables intra pandemic perception, attitude, subjective norm, perceived behavioural control and post-pandemic travel, was set up as a theoretical model.

Figure 1

Theoretical model



Source: Authors Calculation

Considering the satisfactory parameters of model fit and the fulfilment of the conditions for the validity of the concept, a structural analysis was conducted in the next stage. Confirmatory factor analysis was used to estimate the measurement scale of the theoretical model. Using the software package Smart PLS v.3, the path coefficients between the defined groups of variables in the tested model were calculated, and the coefficients of determination (R^2) were determined. Trajectory coefficients (β coefficient) indicate the strength of the relationship between independent and dependent variables. The obtained values of the coefficients of determination are shown in Table 1.

Table 1 Coefficients of determination (R^2)

	R Square	R Square Adjusted
Attitude	0.03	0.028
Post-pandemic travel	0.603	0.599

Source: Authors Calculation

For further evaluation of the model, we used: (1) construct reliability and validity, (2) Discriminant Validity and (3) Regression coefficients after the bootstrapping process. As suggested by Nunnally, the composite reliability of latent variables should not be less than 0.7 (Nunnally, 1994). Also, the average variance extracted (AVE) should not be less than 0.5 (Fornell and Larcker, 1981).

Table 2 Construct reliability and validity of the model

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Perceived behavioural control	0.833	0.845	0.923	0.856
Attitude	0.802	0.803	0.91	0.834
Intra pandemic perception	0.494	0.25	0.51	0.299
Post pandemic travel	1	1	1	1
Subjective norm	0.849	0.926	0.928	0.865

Source: Authors Calculation

Tables 2 and 3 indicate that the model is valid, given that all AVE values are greater than 0.5 and that Cronbach's Alpha factor for all values is greater than 0.7. The exception in both cases is an indicator of Intra pandemic perception, so in this case, we will further conclude about post-pandemic travel, taking into account the fit model.

Table 3 Discriminant Validity of model

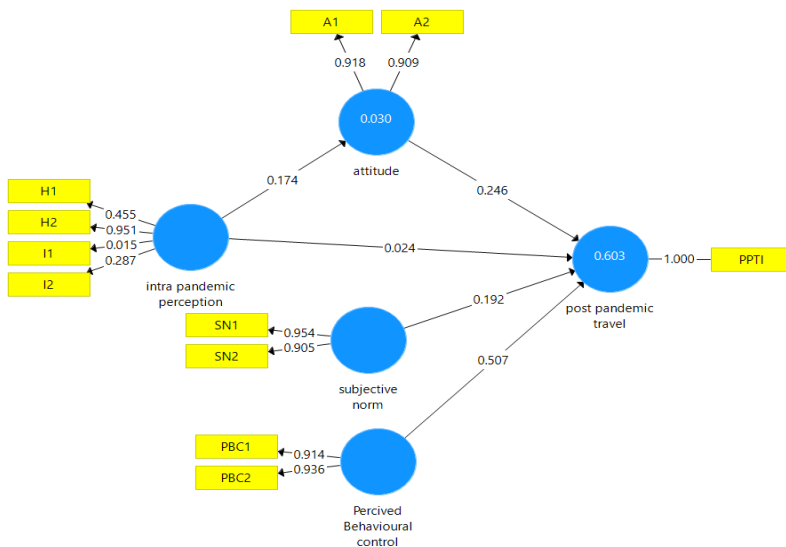
	Perceived Behavioural control	attitude	intra pandemic perception	Post-pandemic travel	subjective norm
Perceived Behavioural control	0.925				

Attitude	0.417	0.913			
intra pandemic perception	0.085	0.174	0.546		
Post-pandemic travel	0.68	0.602	0.153	1	
subjective norm	0.354	0.73	0.219	0.556	0.93

Source: Authors Calculation

After checking the validity of the model, the value of the regression coefficients was calculated, and the results of the PLS-SEM model are shown in Figure 2.

Figure 2 Results of the PLS-SEM model



Source: Data Analyzed

Based on the results shown in Figure 2, it can be concluded that all regression coefficients are positive, as defined in the research hypotheses. However, to test the set hypotheses, it is necessary to calculate the corresponding p-values for all regression coefficients, which determines the statistical significance of the obtained coefficients. Table 4 shows the Regression coefficients after the bootstrapping process.

Table 4

Regression coefficients after the bootstrapping process

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/ STDEV)	P Values
Perceived Behavioural control -> post-pandemic travel	0.507	0.509	0.049	10.403	0
attitude -> post- pandemic travel	0.246	0.247	0.079	3.106	0.002
subjective norm -> post-pandemic travel	0.192	0.19	0.076	2.528	0.012
intra pandemic perception -> attitude	0.174	0.184	0.073	2.374	0.018
intra pandemic perception -> post pandemic travel	0.024	0.022	0.053	0.461	0.645

Source: Data Analyzed

The results shown in Table 4 indicate that all regression coefficients are statistically significant ($p < 0.05$) except for latent variables intra pandemic perception > post-pandemic travel. Given that the regression coefficient showing the relationship between perceived Behavioral control and post-pandemic travel is favourable and relatively high (0.507), it can be concluded that Hypothesis 1 is confirmed and statistically significant. Thus, perceived behavioural control significantly impacts the intention to visit Serbia post-covid-19.

A positive regression coefficient (0.246) was obtained for the relationship attitude and post-pandemic travel, based on which it can be concluded that hypothesis H2 was also confirmed. Considering that the p-value, in this case, is at the level of < 0.05 , this statement is also statistically significant.

The next tested relationship is between subjective norm and post-pandemic travel. A positive regression coefficient (0.192) was obtained, so it can be concluded that hypothesis H3 was also confirmed. The lowest statistically significant coefficient was obtained for the intra pandemic perception and attitude (0.174). However, the coefficient is positive and indicates a positive impact of intra pandemic perception on attitude. Also, there is a positive impact in the relationship between intra pandemic perception and post-pandemic travel, but it is not statistically significant, so we can neither reject nor confirm this hypothesis.

Conclusion

This study highlights the complexity of the problems in the tourism industry during and after the pandemic, as well as the fact that the tourism industry is particularly affected. The results of this study, in addition to a detailed analysis in the Republic of Serbia, offer socially beneficial implications for all stakeholders: agencies, tourists, the entire tourism industry and the state. First of all, the intention of the tourist to visit the destination after the pandemic indicates essential information for creating a

business strategy for industries that are highly affected by the crisis. However, it also imposes a situation that tourists are very aware of their health risks, but they will not give up their planned trips in the future.

Conducted analyzes and research results also have certain limitations. In addition to striving for the model to be comprehensive to visit the destination, the study focused on the tourist intentions of a local destination such as the Republic of Serbia. New research that would build on existing ones could be conducted internationally. In that case, a comparative analysis would be instrumental. In order to fill the gaps in the research, the authors invite other scientific researchers to equally participate in the analysis of this behaviour of the tourist population, which is advantageous both from the economic and from the practical and strategic aspect of the future of tourism.

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Correspondence address:

Danijela Pantović, PhD, Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Vojvodjanska 5a, 36210 Vrnjacka Banja, Republic of Serbia, email: danijela.durkalic@kg.ac.rs

Marija Lakićević, PhD, Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Vojvodjanska 5a, 36210 Vrnjacka Banja, Republic of Serbia, email: marija.lakicevic@kg.ac.rs

Tijana Petrović, PhD candidate, Faculty of Hotel Management and Tourism in Vrnjačka Banja, University of Kragujevac, Vojvodjanska 5a, 36210 Vrnjacka Banja, Republic of Serbia, email: tijanapetrovic650@gmail.com

RESPONSIBILITY OF THE EMPLOYERS AND EMPLOYEES IN HUNGARY: THE IMPORTANCE OF HYGIENE DURING THE PANDEMIC.

József POÓR

Department of Management, Faculty of Economics and Informatics,
J. Selye University, Komárno, Slovakia

Szilvia MÓDOSNÉ SZALAI

Faculty of Economics and Informatics, J. Selye University, Komárno, Slovakia

Szonja JENEI

Faculty of Economics and Informatics, J. Selye University, Komárno, Slovakia

Judit MOLNÁR

Faculty of Agricultural and Food Sciences,
Széchenyi István University, Mosonmagyaróvár, Hungary

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Abstract

Our aim with this paper was to describe the pandemic situation caused by COVID-19 and the liability issue of employees and employers. The research was conducted in Győr-Moson-Sopron County in Hungary, and the results were examined within the framework of quantitative research. We investigated the values experienced by the economic operators. The behavior of the employees was also evaluated from a psychological point of view. During the crisis, health protection and hygiene have become of particular importance. We found that governments and health authorities are usually questioned when examining liability, but employers and employees can also significantly prevent infections and save lives. We discussed in our study the former and current attitudes of the organizations towards ensuring general, food and sanitary hygiene, as well as behavior patterns of the employees. We believe that the findings and lessons of this article are well applicable and can be used in both present and post-pandemic situations.

Keywords: hygiene, pandemic, corporate responsibility, behavioral patterns, eating and sanitary circumstances.

JEL Classification: H12, M12, M14

Introduction

A relatively rare topic studied by researchers is the vulnerability and expectations of workers in their workplaces, even during a pandemic. There are growing appeals for acting. If we do not take action, we will lose an even more active and valuable labor force (ILO, 2020). We believe that our publication will fill a gap and be exploratory. We start our literature review on the history of epidemics because we can learn from the past (Diamond, 2019). Several factors can influence the impact of an epidemic on the population. These components differ from disease to disease and from pathogen to pathogen, but the development of population density and the route of spread of the disease are also significant factors (Mende, 2015). Influencing elements can also include occupational hygiene.

When creating our model, we consider the lessons and the characteristics of the pandemic and society and identified four interdependent leaders. Our publication focuses on employees, so we deal with the tasks and reactions of the management and the human resources (HR) department.

The previously mentioned HR organization has a significant role in developing and combining atypical and standard work schedules. After all, we point out that the development of occupational health and safety requires two factors: the responsible company and the other is the mature personality of the employees. We conclude our theoretical summary by presenting the pathogens and emphasizing the importance of food and personal hygiene. We believe that a quantitative procedure with online questionnaires is the most appropriate for our research. Although we cannot provide representativeness, we can shed light on essential contexts related to our topic. Thus, we examine, among other things, the relationships between managerial effort and employee compliance and further employee expectations and compliance as well.

Theoretical background

As mentioned in the introduction, our literature review covers several disciplines. In our view, the following information plays an essential role in compiling a cognitive questionnaire that fits our topic and in making a suitable study for testing our basic idea (Banerjee & Duflo, 2019).

History of epidemics

At the level of society, it is essential to distinguish between wars and epidemics among the threats lurking for humanity. Related to this topic is the book Diamond (2019). According to the author, wars and murders accompany our history. However, the technical development and the attitude arising from intelligence significantly influence their outcome on the number of deaths. Due to the low population density in tribal societies, epidemics are less destructive, wars are much more common, while in densely populated areas, infectious diseases are mentioned as the most common cause of death, and wars and murders are less common (Reyes et al., 2013). In this connection, it should also be mentioned that several studies have also highlighted that in densely populated regions, higher levels of health care often result in lower levels of communicable diseases and morbidity (Hamidi, Sabourih & Ewing, 2020).

Various researches have also shown that, out of these two threats examining their effects, epidemics are the winners because they claim far more lives

than wars and terrorist attacks (Kun et al., 2021). One of the most important findings of the author is that we can successfully prepare for the challenges of the future if we intelligently understand everything possible from the past (Christopher et al., 2004). In every crisis, there is the potential for development, for positive changes, for exploiting the opportunities arising from the crisis (Diamond, 2019). In addition, of course, we may encounter new areas and challenges where old, well-proven methods cannot be applied without modification. We can only rely on our previous knowledge (Sheffi, 2017).

It is worth mentioning the epidemics that have wreaked the most significant devastation locally or globally in human history. The plague, also known as the Black Death, struck Europe in the 14th century, killing millions of people, 60-70% of the population in some countries. Overcrowded areas and poor sanitary conditions accelerated the spread of the infection. In order to prevent the spread of the disease, the quarantine institution was first applied in Italy. The word 'quarantine' means 40 days. During this pandemic, the actual and potential carriers of the disease were first isolated (Forrai & Barcs, 2018). Many people are familiar with the great plague in London, which claimed nearly a hundred thousand lives. During this time, the importance of social distancing became clear (Turner, 2018).

During the cholera epidemic, the importance of various public health measures was highlighted. The spread of the epidemic and the collected statistical data were plotted on a map by a London-based doctor, John Snow. Thanks to his research, many lives have been saved by using clean water instead of sewage and realizing the importance of handwashing (Romsics, 2017).

The most effective defense in the fight against epidemics is the development of vaccines. In 1796, Edward Jenner, an English physician, invented the first vaccine in the world. He extracted the active ingredient of the smallpox vaccine from the blood of dairy girls who had previously undergone the infection (Opriessnig et al., 2021). The coronavirus, released in 2019, caused health and economic damage in all countries worldwide in the following year. Effective defense required innovative researchers and doctors like Edward Jenner. Hungary is proud of Katalin Karikó (Trouillard, 2020), who comes from Hungary and has played a crucial role in developing the COVID - 19 vaccine. The biologist graduated from the University of Szeged and currently fills a leading position at a company in Germany, which is revolutionizing cancer drug development. The Pfizer vaccine was developed based on high-speed technology. It does not contain the virus's entire genome and does not cause infection.

More than 900 innovators and business people participated in empirical research. Close to half of them believe that the lesson of the pandemic is that decision-makers, business people, and politicians all over the world may realize that much more money needs to be spent on education, science, and health care from the budget (Anderson, Rainie & Vogels, 2021). They can satisfy themselves that teachers who teach the future generation, researchers obsessed with finding solutions to eternal problems, and doctors, nurses who save us by putting their lives at risk, deserve our respect and financial esteem (Újszászi, 2020).

Many government models have been developed to deal with the crisis. The closure-based model has been used in most countries (Hale et al., 2021). A specific model was followed by the Swedish government, where the emphasis was put on individual responsibility. They survived the first three waves of the epidemic with relatively low mortality (14 people / 10,000 inhabitants), and in the value of GDP, there was a much smaller decline (-2.8%) in Sweden than in other countries (-4 and -6%), such as in the EU (Wéber, 2021).

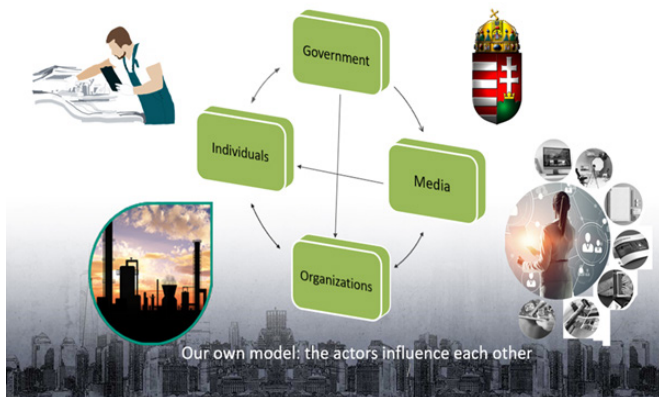
It is essential that we “do not limit our interest to some predatory microorganism.” It is essential to see the bigger picture (Honigsbaum, 2020: 15). In the same vein, it is worth highlighting that “such diseases always have broader environmental and social causes (Honigsbaum, 2020: 15). It is also important to point out in connection with the coronavirus (COVID-19) that the real threat to our civilization is not Covid, but climate change, resource depletion and globalization inequality (Diamond, 2019). Interdependent researchers go even further and believe that “ensuring our health is not possible without ensuring the health of all other living beings” (Einstein, 2021:42). The digital guru and philanthropist of our current world, Gates (2021:288), believes that “innovation, regulation and market structures” that can help solve the problems mentioned above need to be innovated and supported even more than at present.

Models that form the basis of our research

According to the model found in the literature related to our research, health protection includes proactive and preventive measures that became common during the pandemic. Proactive elements include steps to physically prevent the spread of the virus, such as making the use of a face mask mandatory, hand disinfection, frequent surface disinfection, and plexiglass walls when many people are working in large areas and the use of gloves. Preventive tasks aim at screening for potential infections. Among other things, special attention is paid to thermometry and monitoring of employees showing signs of infection. If there is a likelihood of illness, the worker is temporarily banned from work is required to undergo quarantine at home, after which he or she can return to work if the coronavirus test is negative (Cirrincione et al., 2020).

Our model identifies four responsible elements: government, media, organizations, and individuals. All governments have a general strategy to “control the pandemic by slowing down the transmission of the virus and reducing mortality associated with COVID-19” (WHO, 2020:7). The actors consciously and unconsciously influence each other’s actions (Figure 1). In the analysis, we focus not on the elements of the model but the relationships between them.

Figure 1 Responsibility for curbing the spread of the virus



Source: Authors' own research

We first mention the relationship between the organizations and the government. In Hungary, the last one and a half years caused such damage in some industries that the affected organizations cannot recover independently. The government's responsibility is to assess these situations and allocate scarce financial resources most needed. Saving small and medium-sized enterprises is crucial because they are the engines of the economy, the largest employers, the main actors in economic life at the local level (Karácsony, 2020). Government-supported organizations typically retain their employees, so government and organizations affect the individual-organization relationship.

The EY (2021), an international organization of multidisciplinary professional services, surveyed the relationship between individuals and organizations. Their most significant result is that more than half of the workers would change jobs if they were not provided with a certain amount of flexibility and the possibility of working from home even after the pandemic. Executives, civil servants, and employees who have worked for the company for at least ten years insist on their workplace under any circumstances. It is an exciting finding that 61% of the respondents would make vaccination mandatory for office workers. A German research publication listed three reasons for accepting the vaccine:

- news about the side effects of vaccines
- the use of mandatory vaccination
- the characteristics of the responding people (age, gender, income and education)

Regarding the relationship between government and employers, Kőműves and Berke (2021) found that in order to deal with labor market anomalies and retain the workforce, enterprises alone are not enough. Practical government actions and measures are needed in both the field of education and tax policy.

Companies are thinking long-term and also focus on retaining the workforce during this crisis. In terms of the relationship between the organization and individuals, several firms struggled with a shortage of skilled labor before the pandemic, so retention management has become a key area of human resource management in recent years (Poór et al., 2021d). Teleworking plays a significant role, as employees who work at home during the crisis and perform their duties remain valuable organization members (Kőműves and Berke, 2021). Regarding the coronavirus pandemic, it is worth noting that most workers were unfamiliar with the concept of health improvement before the crisis. A sense of well-being was enhanced by wages, appreciation from managers, and extra cash rewards. If the working atmosphere is more pleasant, calmer and more balanced, it will be better. Most of the stress is caused by high workloads, ensuring customer satisfaction, and improper contact with the leaders.

According to research by Berke, Schmidt and Kőműves (2021), 55% of respondents do not like working in their current job. Improving the quality of the relationship between managers and subordinates can be vital to the solution. If we feel that the leader recognizes us, counts on us, and considers our opinions, it is often worth more than wages and other motivating factors. Improving social distancing and health safety measures can increase workers' aversions. Despite all good intentions, it is difficult to determine the sequence of steps that will best protect the health of citizens and make the economy work. Most governments responded to the crisis relatively quickly, even before the excessive increase in the number of deaths. However, the financial protection measures that affected and helped companies came later than the decisions that led to the closure of borders and shops. Measures that most affect individuals include restricting the opening hours of stores and switching to online education. Provisions

affecting companies include wage subsidies, rent freezes, and credit moratoriums (Hale et al., 2021). (Comments: In the next paragraph, we outline the relationship between the government and the media.)

A study finds that if the government is an active player in social media, it strengthens citizens' positive opinions and trust in government transparency (Song and Lee, 2015). In this way, governments can promote their measures to protect health. Many citizens still obtain information from local, print media. Newspapers around the world are struggling with funding problems. According to the financial model developed in Australia, advertising revenues, subscription fees, and sums from the disclosure of government information maintain the operation of newspapers. A \$ 4.5 million advertising support package was applied in the country. They were encouraged to show solidarity with the slogan found in the local print media: „We are all in this together.”

We need to draw attention to the dangers of online misinformation. According to research conducted in Arkansas, USA, false claims, misleading information, false cures and treatments published in the media during a pandemic undermine the government's efforts against the disease and threaten consumers' physical and financial security (Marcoux et al., 2021). Several factors influence the administration of vaccines against the COVID-19 virus. These include the informative and misinformative effects of the media. There is an urgent need and much work to be done through strategic communication to form an objective image (Viswanath et al., 2021). An international study has found that scientists, as a disseminator of factual and reliable information, have played a key role in improving resilience against misinformation at the societal level. Further research is needed to understand what influences the reception, processing, and dissemination of false information (Roozenbeek et al., 2020).

Dr Tedros Adhanom Ghebreyesus, the Director of the World Health Organization (WHO), set out the overarching concept of our model about responsibility. At the beginning of the crisis, in the spring of 2020, at the Virtual press conference on COVID-19, he stated: „This is not just a public health crisis, it is a crisis that will touch every sector – so every sector and every individual must be involved in the fight. We have said from the beginning that countries must take a whole-of-government, whole-of-society approach, built around a comprehensive strategy to prevent infections, save lives and minimize impact.” (Ghebreyesus, 2020).

The impact of the pandemic on the operation of companies and HR activities

International survey on Covid and HRM

A large-scale, international survey was conducted with several universities in Hungary, Austria, Bosnia-Herzegovina, Bulgaria, Romania and Slovakia, examining the changes in corporate and human resource management activities during the three phases of the pandemic. In our paper, Figure 2 shows the duration of the research phases in Hungary and the number of responding public and private organizations (Poór et al., 2021a and 2021b).

Figure 2 Data of the CoronaHR survey

Phase 1	<ul style="list-style-type: none"> • 12 June - 31 July 2020 • 508 responding organizations • 59 organizations from the public sector
Phase 2	<ul style="list-style-type: none"> • 1 August - 15 November 2020 • 1014 responding organizations • 226 organizations from the public sector
Phase 3	<ul style="list-style-type: none"> • 1 March - 20 April 2021 • 263 responding organizations • 52 organizations from the public sector

Source: Authors' own research

One of the critical issues of the research is the change in the order of importance of human functions. In the present case, we focus only on health-preserving activities. Table 1 shows that health care plays an increasing role, moving from eighth to sixth place in the three phases of the pandemic, according to the CoronaHR survey presented in Figure 2.

Table 1 Location of life and health-protecting measures among HR functions

Phase 1	Phase 2	Phase 3
Recruitment, selecting, headcounting, recruitment planning	Recruitment, selecting, headcounting, recruitment planning	Recruitment, selecting, headcounting, recruitment planning
Internal / online communication, providing information	Administration, labour law, labour issues	Workforce retention, motivation, benefit, commitment, satisfaction
Workforce retention, motivation, benefit, commitment, satisfaction	Workforce retention, motivation, benefit, commitment, satisfaction	Administration, labour law, labour issues
Education, trainings, development, e-learning	Internal / online communication, providing information	Internal / online communication, providing information
Wage subsidies, payroll	Education, trainings, development, e-learning	Education, trainings, development, e-learning
Work from home, teleworking, atypical employment	Wage subsidies, payroll	Health and safety in the workplace
Administration, labour law, labour issues	Tasks concerning the pandemic (providing safety tools, dealing with social and psychological problems)	Work from home, teleworking, atypical employment
Health and safety in the workplace	Work from home, teleworking, atypical employment	HR digitalisation, eHR

Source: Poór et al. (2021c)

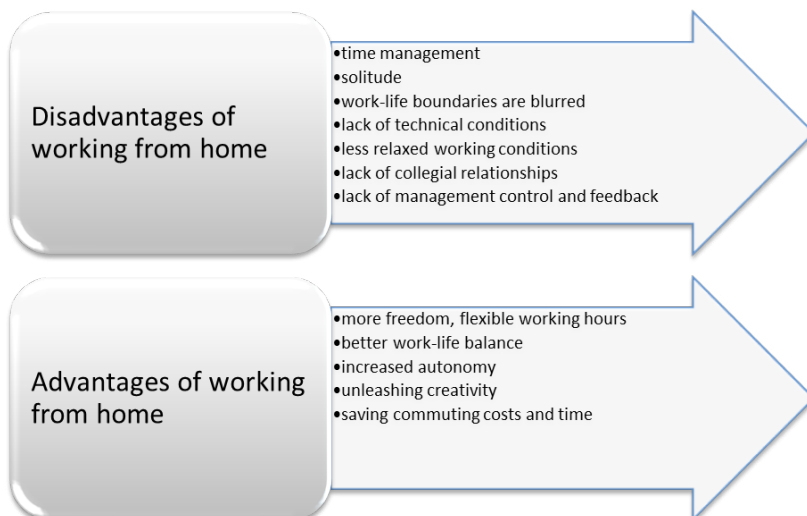
An international research team found that during the COVID-19 pandemic, the practice-oriented exercise of human management functions (training, development, occupational health and safety) had an increased impact on the organization's performance. Protecting health and lives was the most significant challenge for HR professionals in the critical period (Zhong et al., 2021).

Three options: work from home, from the office and hybrid employment

Before the pandemic, barely 3% of Hungarian workers worked from home, which increased to almost 18% during the crisis (CSO, 2020). Regarding working from home, we can say that the workload was reduced for some employees, while it meant full-time workload for others. The phenomenon was observed not only in Hungary but throughout Europe. For those who have never worked from home, 27% complained of reduced free time. The requirements expected by the employer could only be met by sacrificing weekends or extending working hours which has led to work-life balance disturbance, household failures, and difficulties in raising children (Eurofound, 2020). There has been an even more drastic change in the US. Where before the pandemic, 15% of employees worked from home. While during the first wave of the pandemic, almost half of them worked from home (Sull et al., 2020).

Employers should consider telework and hybrid solutions during the phase of recovery. Researches are still ongoing to suggest possible solutions to companies to reconcile the two types of work (Böcskei & Kis, 2020). Working from home is a cost-effective solution, as office costs and cleaning do not have to be counted. It also benefits employees because they do not have to travel and bear its costs. In most cases, personal presence promises specific benefits in sensitive business discussions and decisions. Figure 3 summarizes the advantages and disadvantages of working from home based on the literature (Kazainé, 2020). It is important to emphasize that the positive and negative features presented here are not only Hungarian features.

Figure 3 *Advantages and disadvantages of working from home*



Source: Authors' own research

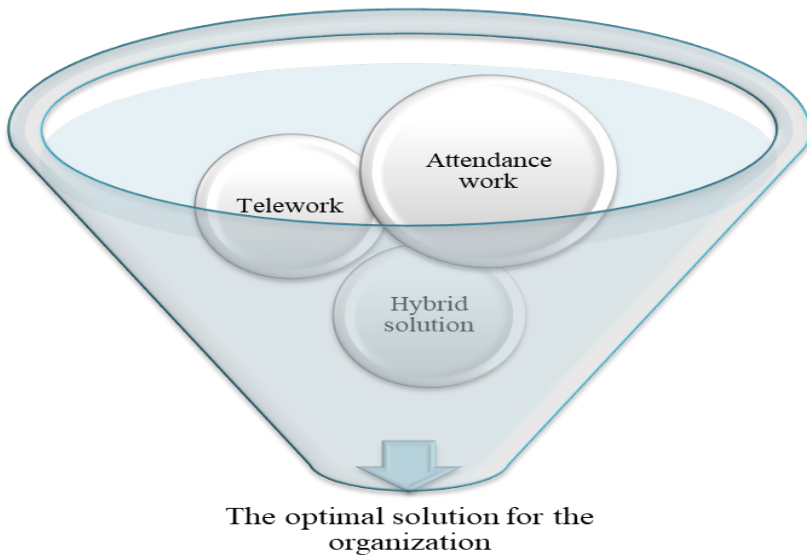
According to another survey conducted in Slovakia, teleworking did not reduce employee satisfaction. The number of people working from home has increased nearly seven times. Many people have only met this atypical form of employment

during the pandemic and, based on their experience, would continue to work from home to some extent. However, organizations need to be careful that isolation, barriers to the flow of information, and marginalization of career opportunities do not override the unquestionable benefits (Karácsony, 2021).

Attendance and teleworking are not the only solutions. A combination of them is also conceivable. It is not yet widespread in Hungary, but it was commonly used in the welfare and creative states (Germany, Great Britain, the Netherlands, Poland, Italy, Denmark, and Austria) before the pandemic, and researchers examined organizational difficulties (Mailand & Larsen, 2018).

In Hungary, work from home has spread due to the coronavirus; therefore, organizations have switched to flexible work forms (Karácsony, 2020). We hope this change in attitude will be enough to select the optimal solution after a pandemic situation.

Figure 4 *Teleworking, attendance work and hybrid employment*



Source: Authors' own research

Responsible organization

The responsible firm integrates self-regulation into the business model. It includes the followings:

- competes hard but fairly,
- provides an attractive return on capital for shareholders,
- manufactures products that consumers like,
- these products make their lives better,
- suppliers want to enter a deal with the company because they benefit from it,
- employees are willing to work for the company and are satisfied with their remuneration and professional development,

- behaves as a good citizen at its premises,
- pays tax on profits (Freeman, 2011).

In a pandemic situation, this list may be supplemented by measures and costs taken for the health and safety of employees. This activity does not contradict the need for long-term profitability. Employers must consider lost human lives and human knowledge capital leaving the irresponsible company.

The results of a survey conducted in Hungary in 2020, involving 277 responding organizations, draw attention to the fact that responsible companies place great emphasis on creating a pleasant work atmosphere, a safe work environment and the opportunity to work from home, which are essential conditions for the success of organizations (Antalik et al., 2020). In times of crisis caused by the coronavirus, ensuring the conditions mentioned before will be a priority. Health protection and safe working conditions are essential to curb the spread of the pandemic. Organizations are trying to introduce home office work in as many jobs as possible. It is essential that organizations, even in isolated circumstances, strive to maintain a pleasant atmosphere and ensure effective online communication between employees through technical devices.

Mature personality

Setting the criteria for a mature personality is worth starting from Erik Erikson's development theory. According to Erikson, the characteristics of a mature personality can be formulated concerning the current developmental state of the individual. Solving the crises and problems that arise in certain stages of life plays an essential role in this evolution. Unresolved crises can result in bottlenecks but are necessary for maturity to enter the next stage of development (Widick et al., 1978).

According to Jeffrey Young, a cognitive therapist and creator of the concept of schema theory, we are born with five primary emotional needs:

- The need for security, stability, acceptance and care.
- The need for autonomy, competence and a sense of identity.
- The need for free expression of emotions and demands.
- The need for spontaneity.
- The need for realistic boundaries.

The author states that if the five basic needs are adequately met in childhood, it plays a vital role in developing mental health. As a result, we can more easily adapt ourselves to the community and other people. Failure to meet the basic needs can lead to mental injuries such as low self-esteem or frequent mood swings. The injured person may be tormented by the following thoughts (Rafaeli et al., 2011).

- People I love always leave me.
- If they get to know me, they find me worthless.
- No one can be trusted.

As a result of early childhood traumas, he still sees the world the same way when a person grows up. In the absence of proper emotional care, fixed relationship patterns make it difficult to adapt to society, the individual's personality may be distorted, and harmful patterns may develop. These include the emotion deprivation scheme, which means that the individual cannot expect an empathic attitude and does not even ask for it after a while. Another such scheme may be low self-esteem, which causes the person to respond to criticism with excessive sensitivity (Bach et al., 2018).

Berentés (2012) developed the complex model of the mature personality. The author is a university lecturer and also practices as a psychotherapist. In the model, she outlined the human qualities necessary for success and happiness. The mature

personality model, supplemented by other significant characteristics identified by other psychologists and researchers, is summarized in Figure 5.

Let us examine each feature in more detail. Mature adults see themselves and the world around them realistically, while immature personalities distort the facts to obtain benefits. Mature individuals form equal relationships, have stable self-esteem, and therefore do not need the praise of others. On the other hand, an immature personality forces success and strives to build excellent relationships. A mature adult accepts other people and is aware that there are many different opinions in the world. As a result of acceptance, the individual does not criticize, qualify, or judge and does not even seek to defeat others (Berentés, 2012).

Figure 5 *Characteristics of a mature personality*



Source: Authors' own research

An individual with a mature personality is credible, taking responsibility for his actions, which is often preceded by a long journey of self-knowledge. One of the essential characteristics of a mature adult is that he does not blame the circumstances for his fate. Nothing is sure that we have built in our lives (Harwood, Beutler & Groth-Marnat, 2021). Everything can collapse, but we must not linger among the ruins for long; we must move on. Only the person who takes it responsibly can rebuild his life from a difficult situation. Self-pity and complaining refer to emotional deficiencies but not positive changes. The individual is stuck at the level where, in his own opinion, he constantly becomes a victim of the situations and events around him. The key is to recognize that, in fact, most of what happens starts from us, but at least we are

responsible for our reactions to the circumstances (de Vries, 2014).

Emotional immaturity, along with many defining events, in most cases comes from childhood, the early period of our development. As a result of the traumas we have experienced, a break in our personality may occur, constantly affecting our human relationships and responses to others as adults. We often suffer from a lack of love, attention, and care. If a child does not get enough positive reinforcement or perhaps receive too much negative feedback, he or she may suffer a lot later from not feeling lovable and good enough. He strives to meet unrealistic expectations without unconditional acceptance (Ita & Grünhut, 2020).

A significant characteristic of a person with a mature personality is controlling his ego. The primary guideline in our human relations must be the heart, and we must approach other human beings with love, humanity and acceptance. It is also a significant feature that emotionally mature individuals often exercise a sense of gratitude. They give thanks for everything given to them every day in the life, from the tiniest thing to the pains they have gone through. Responsibility is also manifested in their communication. They communicate assertively, they are not afraid to honestly express their opinions, but they also draw their limits, which is a measure of the degree of adult relationships. The mature person keeps his promises to others and himself. He avoids lies, which is often the reaction of a child afraid of punishment. Honesty is accompanied by self-acceptance (Williamson, 1992).

Examining the characteristics included in the model, we can conclude that, without exception, all of them play an essential role in managing the situation and effectively curbing the pandemic. Responsible, mature employees take the use of protective equipment seriously. Their behavior is honest, and if they perceive the symptoms of the disease, they go to quarantine. They face the problems caused by the viral situation, and if disagreement develops with any of their colleagues in a stressful situation, full of fear and uncertainty, they try to resolve it in a mature, patient manner. They realistically perceive the situation and evaluate the rules necessary for defense. They treat their immediate co-workers with understanding, acceptance and patience. They do not give control to the ego.

They are not dominated by selfishness, and they put the community's interests first instead of individual interests. Dedicated employees also consider it essential that the organization continues its operation smoothly and that the required number of employees can work at all times. To this end, they seek to curb the spread of the infection and use protective equipment. Last but not least, we must not forget that individuals with mature personalities are grateful for all the good things they have, including their health, which is the most significant value in life, and its importance in the pandemic situation caused by COVID-19 has become even more significant. As the German philosopher Arthur Schopenhauer briefly stated: „Health is not everything, but without health, everything is nothing.”

Pathogens in the workplace, eating, bathing

The discovery of the viruses has named after Russian research biologist Dmitry Ivanovsky. Viruses are only a few hundred nanometers in size, so an electron microscope can detect them. Their structure consists of a protein coat and a hereditary material in terms of their structure. Mapping their properties is addressed by virology

as a discipline (Lomniczi, 2020). Viruses can only multiply as parasites, so plants, animals, and fungi can also have unique viral diseases. Only a robust immune system can protect against them, and vaccination can help the immune system achieve the most effective protection against the virus.

As a branch of microbiological science, bacteriology deals with studying the scientific, primarily physiological, properties of bacteria (Deák et al., 2006). Bacteria belong to prokaryotic organisms. Their size varies between 0.5-20 μm . The fundamental feature that separates them from eukaryotes is that their genetic stock is not membrane-separated from the cytoplasm (Komáromy, 1996). Most bacteria are harmless or beneficial, but there are also pathogenic pathogens. Antibiotics can be used to fight infections caused by pathogenic pathogens.

Viral control, i.e., adherence to hygiene requirements, the importance of disinfection, and daily testing require even more attention thanks to COVID-19 (Song et al., 2021). In addition to heat treatment during a pandemic, irradiation, use of chemical disinfectants, natural antimicrobials, and other antimicrobial procedures, individual health and immune protection can also be included.

In addition to maintaining personal hygiene, environmental hygiene is also of paramount importance with the emergence of the COVID-19 pandemic. Accordingly, food that does not contain microorganisms (e.g. *Salmonella spp.*, *Escherichia coli*, *Listeria monocytogenes*, *Campylobacter jejuni*), toxins produced by them, or metabolites in quantities that make their consumptions unacceptable to health may serve from the food business premises. However, the catering establishments and self-contained kitchen units where increased compliance and hygiene rules were prioritized before the epidemic.

Factors influencing the activity of microbes, such as temperature, water activity, pH, oxygen demand, also require increased attention during food and food-related operations. The establishment of microbiological criteria guides comprehensive food and food establishments processes.

These criteria, i.e. the revision of critical limits, are carried out through Hazard Analysis and Critical Control Points (HACCP) and other quality assurance systems (GHP (Good Hygiene Practices), ISO (International Organization for Standardization), TQM (Total Quality Management)). Compliance with these rules is strictly monitored by both internal auditors and the authorities when providing workplace meals and stand-alone kitchen units, so the quality products can always be presented to the consumer.

Material and methods

Aim of the research, research questions

Our research aims to examine the individual's responsibility and the organization based on the outlined model. The study was conducted in the region of Western Hungary. Our research questions are the followings:

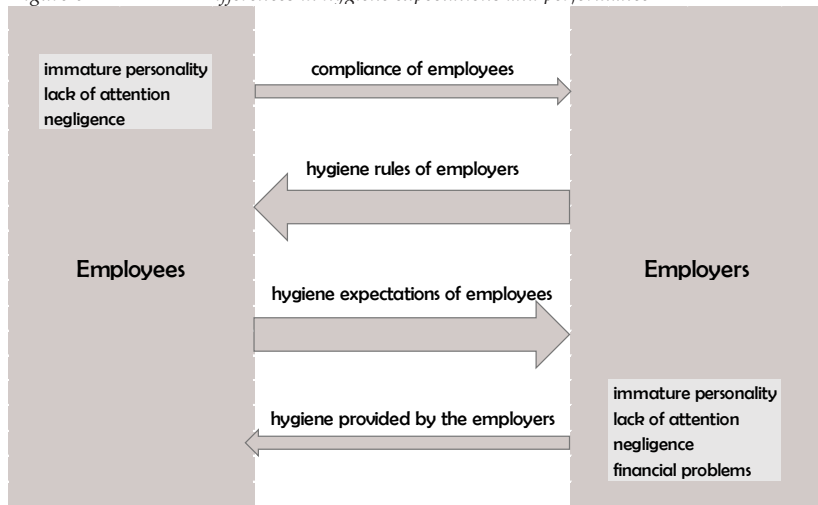
- What hygiene expectations do employees have towards their employer in general and during the pandemic?
- As a mature person, how compliant are the employees? How much do they contribute to preventing the spread of the virus?
- What managerial or subordinate behavior can cause the most significant risk of infection based on the employees' opinion?

Significant differences in hygiene expectations and performance play an essential role in our research (Figure 6). As part of the quantitative study, we performed

computer-assisted data collection. After cleaning and filtering the data, we processed 150 valid responses. Our questionnaire contained only closed questions, and a six-point Likert scale was applied. We used IBM SPSS Statistics 26 and MS Excel programs to process the data.

In addition to the empirical analysis, such as calculating the mean, standard deviation and distribution (Hunyadi and Vita, 2008), we conducted a cross-tabs analysis to explore the correlations (Sajtos & Mitev, 2007). Although our sample cannot be considered representative (Kerékgyártó et al., 2009), our study is exploratory due to the unprocessed nature of the topic, and we consider our conclusions suitable for further research.

Figure 6 Differences in hygiene expectations and performance



Source: Authors' own research

Structure of the questionnaire

In the first part of our questionnaire, we asked about the respondents' demographic data and the essential characteristics of their employers. The following block is about the hygiene of eating circumstances; four cases had to be evaluated with a six-point Likert scale:

- current hygiene
- currently expected hygiene
- pre-pandemic hygiene
- Hygiene required before the pandemic

The third block examines the hygiene of sanitary facilities with a similar structure to the second part but also of great importance. The fourth block was also asked about by Likert scale; we gathered information about the fear and the possibilities of infection in the workplace and management efforts. The fifth section is about assessing

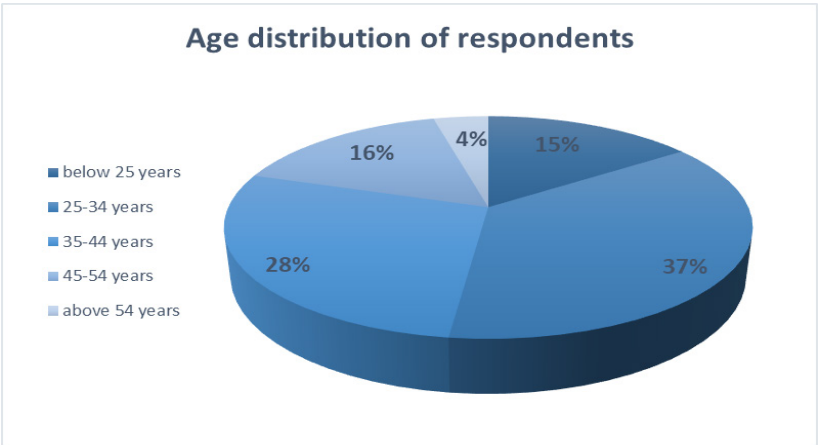
compliance, while the sixth part is about ranking sources of risks.

Demographic and organizational composition of the sample

During the quantitative survey, we received 150 evaluable responses. There were 91 women and 59 men who helped us. Regarding the age distribution (Figure 7), the majority of respondents (37%) are between 25 and 34 years old, while a significant group (28%) are between 35 and 44 years old. The proportion of people under 25 years and between 45 and 54 years, is almost the same, 15% and 16%. The proportion of the respondents over 54 is 4%, but as employment was a condition for completing the questionnaire, we could not expect too many older respondents.

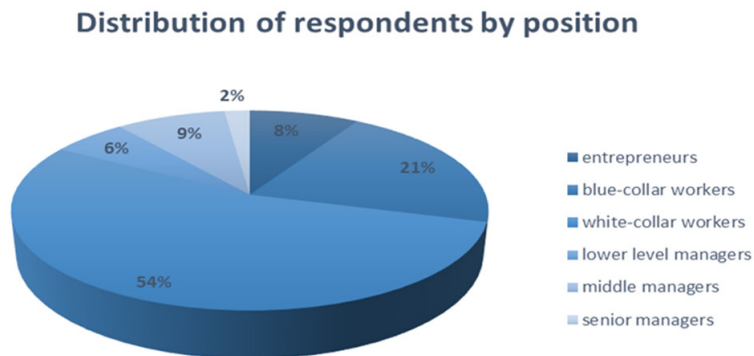
The distribution of respondents by position is characterized by the predominance of white-collar workers (54%). Blue-collar workers are represented by 21%, while the proportion of entrepreneurs and different levels of management remained below 10% (Figure 8). Most respondents could not classify their company's activities in any category (44 people).

Figure 7 Age distribution of respondents



Source: Authors' own research

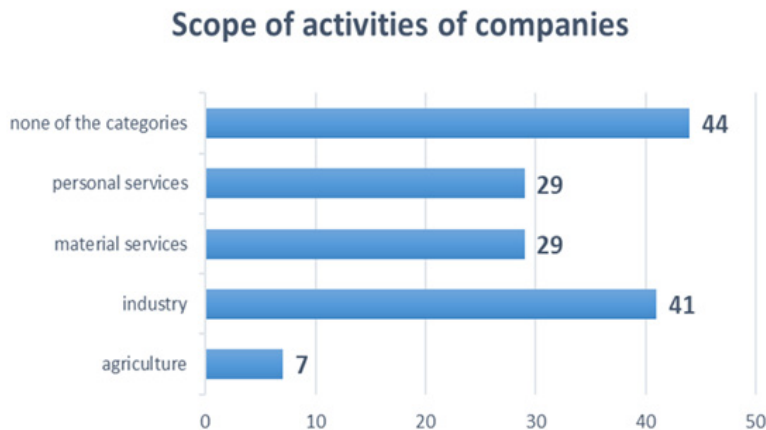
Figure 8 *Distribution of respondents by position*



Source: Authors' own research

Forty-one people work in the industry, seven people in agriculture. Employees working in personal and material services were included in the sample with 29 people (Figure 9). Forty-one respondents work for large companies and 40 for medium-sized enterprises. Thirty people are employees of small businesses, 29 work for micro-enterprises, and ten are self-employed (Figure 10).

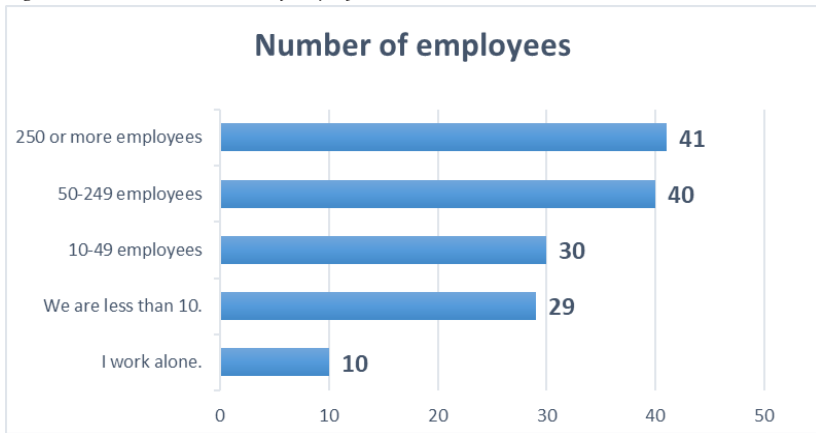
Figure 9 *Main scope of activities of companies*



Source: Authors' own research

Figure 10

Number of employees



Source: Authors' own research

Results and discussion

Empirical analysis

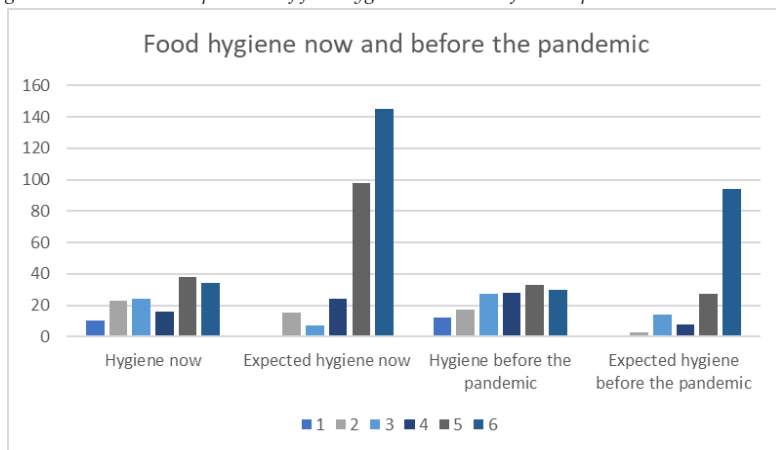
We measured the importance of food and sanitary hygiene on a six-point Likert scale. In both cases, we formed four categories:

- current real hygiene
- currently expected hygiene
- actual hygiene before the pandemic
- regular hygiene before the pandemic.

In our analysis of hygiene expectations, we must also consider that the gender ratio in the workplace has changed. Typically, the working hours of male workers decreased, women remained at home due to layoffs or family coercion (Eurofound, 2021).

During a pandemic, the expected level of food hygiene is higher (Figure 11). The average values calculated on a scale of 1 to 6 are 5.125 and 5. Expectations are strikingly higher than the actual level of hygiene (5.125 and 4.625).

Figure 11 *Importance of food hygiene now and before the pandemic*

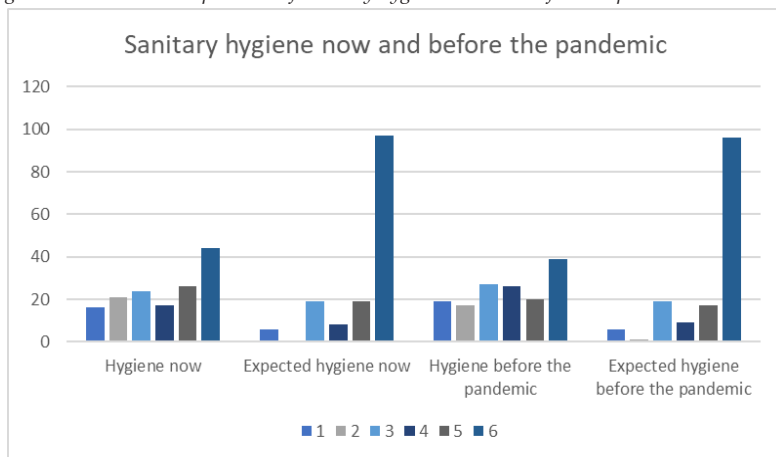


Source: Authors' own research

Based on Figure 12, we found similar correlations concerning sanitary hygiene. (Average value of basic hygiene during a pandemic: 4.625; the average value of expected hygiene during the pandemic: 5, the average value of the actual hygiene before a pandemic: 4.25, the average value of the expected hygiene before a pandemic: 4.875).

In the case of extreme opinions, intense fear or the lack of it is observed, and the attitude focused on the workplace is stronger. However, in the case of moderate fear or caution, life outside the workplace is a more significant source of danger (Figure 13).

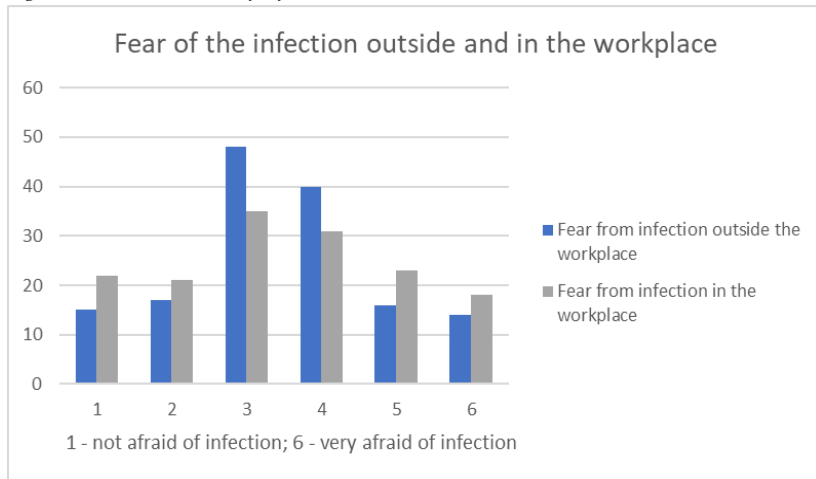
Figure 12 *Importance of sanitary hygiene now and before the pandemic*



Source: Authors' own research

Figure 13

Fear of infection



Source: Authors' own research

Conclusion

We found the following significant outcomes in our study:

- based on the respondent's position, the expected food hygiene in the workplace is different, and we experienced higher demand for white-collar workers ($p < 0.001$),
- based on the respondent's position, the expected sanitary hygiene in the workplace is different, and there is a higher demand for white-collar workers ($p < 0.001$),
- based on the respondent's position, we found differences in the change of clothes in the workplace, and blue-collar workers changed their clothes frequently even before the pandemic, there is a minimal change during the crisis ($p = 0.001$),
- based on the respondent's position, the degree of observance of hygiene rules is different in the workplace. There is a high level of compliance with the rules among senior managers and entrepreneurs ($p < 0.001$),
- based on the number of employees, toilet hygiene is different in the workplace during the pandemic à individual workers are in a better position, worse hygienic conditions can be observed in large companies ($p = 0.015$),
- the efforts of the management are considered to be more significant, and the workers wash their hands more often ($p = 0.001$),
- as a result of the managers' efforts, the value of cleaning increased or cleanliness had a high value in the past ($p = 0.001$),
- the activity of colleagues is a different source of danger based on the age of the respondents. The middle age group considers colleagues' behavior hazardous ($p = 0.031$).

There are physical causes of workplace infections (Figure 14). These reasons are lack of protective equipment, distance or hygiene.

Figure 14

Hazards of occupational hygiene according to respondent



Source: Authors' own research

However, there are also so-called background reasons that create physical causes. We examined them based on employee opinions. The order of the hazards and the average value are the followings:

1. inattention (average: 3.125),
2. behavior of colleagues (average: 3),
3. lack of leadership, attention (average: 2.75),
4. work activity (2.625).

Limitations and future research

Each constraint is also a chance to continue the research. The analysis was performed in Hungary, but data collection in Slovakia is already underway for comparison, considering Hofstede's cultural dimensions if possible. We only collected employee opinions, but there is the opportunity to examine employer views. Our research took place during the third wave of the pandemic, and sometimes we also asked respondents about the times before the crisis. It would be advisable to conduct a study covering the whole period to follow the changes.

The global labor market will change as a result of the Covid-19 pandemic. We can state that occupational hygiene can become a goal of human resource management (Cotofan et al., 2021). Cleanliness of the work environment is part of employee well-being.

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Correspondence address:

Prof. Dr. József Poór, DSc., Department of Management, Faculty of Economics and Informatics, J. Selye University, Bratislavská cesta 3322, SK-94501 Komárno, email: poorj@ujss.sk

Szilvia Módosné Szalai, Ph.D. student, Faculty of Economics and Informatics, J. Selye University, Bratislavská cesta 3322, SK-94501 Komárno, email: mszalaiszilvia@citromail.hu

Szonja Jenei, Ph.D. student, Faculty of Economics and Informatics, J. Selye University, Bratislavská cesta 3322, SK-94501 Komárno, email: jenei.szonja@gmail.com

PRESENCE OF PRICE CLUSTERING AND PSYCHOLOGICAL BARRIERS IN BITCOIN MARKET

Jakub SIEBER

Department of Corporate Financial Management, Faculty of Business Economy, the
University of Economics in Bratislava

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Abstract

In the last year, the market of Bitcoin experienced one of the most turbulent times of its existence. In the last year, there were bull markets, bear markets, and sideways markets. This paper deals with the most apparent virtual currency, Bitcoin and the evidence of price clustering and the presence of psychological barriers of investors. The primary objective of this paper is to find out if the last digit and last two digits of the maximum (or minimum) price of Bitcoin tend to cluster around digit nine (or zero). Paper uses price clustering to determine if the theory of behavioural finance also implies conditions of the Bitcoin market, namely if investors in Bitcoin tend to see the resistance line when the maximum price ends with digit nine and if the minimum price with last digit 0 signals the support line. Results of the 2191 observations showed robust results in terms of support line, however not so unambiguously in the case of resistance line. The paper suggests that Bitcoin is changing its reputation as a solely speculative asset and transforming into a long-term investment strategy.

Keywords: price clustering, bitcoin, psychological barriers, behavioural finance, financial markets

JEL Classification: G41, G10

Introduction and theoretical background

Market practitioners and journalists frequently mention the existence of psychological obstacles in stock markets. Many investors feel that round numbers act as barriers and that prices will struggle to overcome them. Furthermore, technical analysis assumes that traders will continue in the given trend of buying or selling once the price breaks up or break down through a "psychologically important" level, im-

plying that crossing one of these barriers may push prices up (down) more than is otherwise warranted. Frequently used terminology like “support level” and “resistance level,” implying that price rises and declines may be limited until a significant barrier is breached. The presence and effects of such phenomenon were researched well in the past, mainly on stock markets and indices (Donaldson and Kim, 1993; Garzarelli et al., 2014). Later, also applied to modern financial instruments such as exchange-traded funds (ETFs) (Fonesca et al., 2021), or in a more complex way, when analysing discrepancy among territorial market structures, indices, and financial behaviour in different regions (Lobão and Pereira, 2017; Lobão and Couto, 2019). The origin of price clustering theory was significantly developed by Ball et al. (1985) as they argue that when trading, counterparties face costs associated with continued negotiations. To mitigate the costs of further negotiations, the counterparties will settle on round prices. To the extent that enough market participants behave in such a way, observed prices will cluster on round prices. From the most recent literature contributing to the topic, Baig et al. (2019) developed the theory of the relation between economic freedom and price clustering, as they claim the lack of economic freedom and policy uncertainty will contribute to the magnitude of the negotiation costs since uncertainty makes it difficult to know true, or actual equilibrium prices. Concerning the findings from cryptocurrency markets presented in Binance (2021) and Chainalysis (2021), the adoption of cryptocurrencies is also done in countries with lower levels of economic freedom and relatively high levels of economic freedom. Baig et al. (2019b) found evidence that Bitcoin shows signs of unusual price clustering and is also related to investor sentiment, claiming a causal and positive relation between investor sentiment and the clustering of equity prices and suggesting that the microstructure patterns of price clustering in Bitcoin are to some extent similar to the equity markets.

The use of round numbers as a foundation is significant because it has high explanatory power for several characteristics usually associated with financial markets. The anchoring effect, a well-known behavioural bias initially described by Tversky and Kahneman (1974), is the primary reason for psychological barriers in financial markets. Individuals tend to fixate (‘anchor’) on a prominent number while completing an estimation in an unclear scenario, even if that number is unimportant to the calculation. The existence of psychological barriers runs counter to the efficient market hypothesis since it implies that stock markets are predictable, leading to extraordinary risk-adjusted returns. Subsequently, it is possible to define behavioural financial economics as the study of behavioural economics, including how market decisions are made and the mechanisms that drive public choice (Zeiler and Teitelbaum, 2018). As a result, empirical proof for psychological barriers is essential to practitioners seeking successful tactics and the literature on market efficiency and market oddities. When applying the theory of psychological barriers to cryptocurrency, this paper deals with the claim of Ajzen (2020) as perceived behavioural control might be referred to consumers’ subjective probability of inhibiting or facilitating their evaluations of a controlling factor (i.e., money, Bitcoin price in this study) in each situation or period.

When it comes to psychological barriers at financial markets, the two most common terms are usually mentioned: resistance line and support line. Garzarelli et al. (2014) and Menkhoff (2010) argued that the technical analysis definition of support and resistance is rather qualitative than quantitative. So-called “support line” is a price level, a local minimum of the price, where the price will bounce on other occasions afterwards, whereas resistance is a price level, a local maximum of the price, where the price will bounce on other occasions afterwards. When a high number of investors see a support or resistance level, it is anticipated that the likelihood of the price bouncing off the support or resistance level to be greater than the probability of the price crossing the support or resistance level. This paper focuses on the presence of mentioned psychological barriers such as support and resistance lines in the virtual (crypto) currency

market and its most dominant representative – Bitcoin.

The cryptocurrency market or Bitcoin itself is described as a vision to establish a new financial system (Nakamoto, 2008). Behind the basic technology setup for Bitcoin (or any other virtual currency) is the idea that the classical financial system is greedy in many ways, and even though there is more and more wealth in the world, a large part of the population has no chance of achieving it. This gap between poverty and wealth is still growing. Establishing a new decentralised ecosystem of currency should help re-establish an environment where there will be far better and fairer supervision of projects, transactions, or individual participants of evidence. Despite its novel status, research about trading Bitcoin was conducted. Blau (2018), Cheah and Fry (2015) investigated the speculative behaviour of investors in the Bitcoin market. Glaser et al. (2014) argued that there are strong indications, especially if considering uninformed users approaching digital currencies, who are not primarily interested in an alternative transaction system but seek to participate in an alternative investment asset. According to a recent study by Baur and Dimpfl (2021), Bitcoin displays value characteristics over long periods. According to a study by Binance Research (2021), virtual currency owners have almost unanimous trust in the asset (97%). More than half (52%) do not consider investing in the virtual (crypto) currency as a hobby but as a means of income; 15% of virtual currency owners consider them their primary source of income. Another result of conducted survey has shown the top three reasons to invest in virtual currencies (e.g., Bitcoin) are: own cryptocurrencies as part of a long-term investment strategy (55%), disbelief in the current financial system (38%), short-term business opportunities (31%). In line with a conducted survey of Binance Research (2021), it is possible to argue that more than half of cryptocurrency owners are using cryptocurrency as an asset for long-term holdings.

During and after the COVID-19 pandemic, consumers may need to immediately accept and use cryptocurrency as money for financial transactions at home to reduce physical interactions with others (Cheema et al., 2020). According to mentioned finding, Kim (2021) claimed that consumers' intention to accept and use Bitcoin should be studied, focusing more on the psychological aspect of money rather than its perceived technological aspects. The cryptocurrency markets are experiencing breakthroughs by implementing crypto assets into conventional financial instruments, such as ETFs. As stated by Hull (2021) and Chainalysis (2021), there is evidence of large institutional investors investing and diversifying their funds into cryptocurrency assets (e.g., Tesla, Inc., Microsoft, Inc.) In connection with the claim about the entry of large institutional investors into the world of virtual currencies, the approval of the first hybrid ETF index, based on investing in Bitcoin's cryptocurrency futures. As La Monica (2021) stated, recently launched ETF ProShares is the first ETF fund to invest in Bitcoin futures, and in addition to ProShares, several investment firms have asked the US Securities and Exchange Commission (SEC) to launch Bitcoin ETFs.

Material and methods

This paper aims to examine if there is evidence of such phenomena as psychological barriers in the most significant cryptocurrency market nowadays – Bitcoin. This paper analyses psychological barriers by observing the last digit and last two digits of maximum (minimum) prices of Bitcoin in 240 minutes intervals. To examine the existence of any psychological barriers at the resistance or support price level, it is necessary to look for evidence of price clustering. Therefore, the first hypothesis of this paper is:

H1: The existence of price clustering in the last digit of Bitcoin price is present.

The mentioned hypothesis could be rejected if it is not possible to reject the null hypothesis; thus, the last digit of Bitcoin price would be equally distributed in intervals from 0 to 9. To support *H1*, there are formulated sub hypotheses 1.1 - 1.4:

H1.1: Existence of price clustering of the last digit in a maximum price of Bitcoin.

H1.2.: Existence of price clustering of the last digit in the minimum price of Bitcoin.

H1.3: Existence of price clustering of last two digits in maximum price of Bitcoin.

H1.4: Existence of price clustering of last two digits in minimum price of Bitcoin.

If there is evidence of price clustering in last digit and last two digits, thus it would be possible to test the second hypothesis:

H2: Existence of psychological barriers in prices of Bitcoin is present.

The second hypothesis deals with the presence of clustering maximum (minimum) prices in terms of being used as a resistance (support) line for investors, as defined in behavioural finance theory (Statman and Caldwell, 1987; Garzarelli et al., 2014). Thus, the maximum prices will cluster around values close to 8, 9 or 98, 99, and minimum prices should have been a tendency to cluster around lower values like 0, 1 or 01, 11. Similarly, as the first hypothesis also second is formulated in sub hypotheses 2.1 - 2.4:

H2.1: Presence of resistance line regarding the last digit of Bitcoin price.

H2.2: Presence of resistance line in terms of last two digits of Bitcoin price.

H2.3: Presence of support line regarding the last digit of Bitcoin price.

H2.4: Presence of support line in terms of last two digits of Bitcoin price.

Data used to analyse price clustering, and psychological barriers were obtained from the world's longest-running cryptocurrency exchange, Bitstamp, through trading platform TradingView. The whole dataset covers the period from November 1st, 2020, 00:00 UTC to November 1st, 2021, 00:00 UTC. To better capture price volatility and investor reaction, every trading day is divided into six time periods, which gives a total of 2191 records at 240 minutes intervals. In each price series in the examined period are observed variables: the opening price, maximum price, minimum price and closing price of Bitcoin.

Methods used to test whether the price is clustering around the last digit (or last two digits) in the opening, maximum and minimum price was Chi-Square statistics:

$$\chi^2 = \sum_{i=1}^n \frac{(x_i - m_i)^2}{m_i} \sim \chi^{2^{k-1}}$$

where \sum stands for the sum of observed price digit, is represented by frequency table expected value. When accessing the result of regarding its significance and p-value, the test for distribution right-tailed is used with degrees of freedom used. In this case, when examining the last digit, the number of categories k will be 10; when examining the last two digits, the number of categories k will be 100. As another proof of price clustering evidence and psychological barriers presence, the Kolmogorov-Smirnov test is used, as the further proof of the statistical significance, similarly to Garzarelli et al. (2014):

$$F_n(x) = \frac{1}{n} \sum_{i=1}^n Ix_i \leq x$$

$$D_n = \sup_x |F_n(x) - F(x)| * \sqrt{n} \sim e^{-(D_n^2)}$$

where F_n stands for empirical distribution function for n independent equally distributed random variables. I represents indicator function gaining value 1 if $x \leq x_i$, and if otherwise, it is equal to 0. Afterwards, Kolmogorov-Smirnov statistics stand as mentioned, where symbol \sup stands for supremum.

Results and discussion

Descriptive statistics of data

Table 1 contains the descriptive statistics of Bitcoin prices in the 4-hour range at exchange Bitstamp over one year. Regarding descriptive statistics and minimum and maximum values in Table 1, it is possible to state that in the selected period, Bitcoin experienced relatively significant movements in its price. It is a welcoming sign for further analysis of price clustering and psychological barriers of investors, as all three phases – bull market, bear market, and sideways market – will be incorporated in the analysis. As shown in Table 1, the values for asymmetry, skewness between -0.8 and 0.8, and kurtosis between -2 and +2, in this case, values can be considered acceptable to prove normal univariate distribution (George and Mallery, 2010).

Table 1 Descriptive statistics of the sample. Bitcoin prices in the 4-hour range at exchange Bitstamp between November 1st, 2020 and November 1st, 2021. All prices are denominated in US dollars

	N	Min	Max	Mean	St. Dev.	Skewness	Kurtosis
Opening	2191	13396.35	66893.03	41403.17	13382.69	-.331	-.796
Max.	2191	13458.96	67016.50	41943.3	13500.50	-.351	-.779
Min.	2191	13220.31	66140.00	40802.09	13240.61	-.309	-.816
Closing	2191	13402.31	66882.12	41423.91	13375.42	-.331	-.795

Source: Authors processing. Data: Trading View (2021)

Testing for price clustering

Table 2 displays the frequency of individual digits (0 – 9) in the last place of price. From the first sight, it is visible that if the last digit is 0, then there is confirmation of price clustering around this digit. As mentioned earlier, the price level represented

by a local minimum is a support line, where investors are anticipating the pullback or reverse of the trend the price is pointing. In this sample of the four-hour window during the trading day, the price ending with 0 is clustering significantly at the minimum price; it was 447 times. On the contrary, when speaking about resistance, a price level of a local maximum of the price, it is possible to see clustering at digit 9 in terms of maximum price during a four-hour trading window, particularly 262 times what is more than 213.2 expected. To confirm mentioned evidence there is performed Chi-squared test and Kolmogorov-Smirnov test (K-S test).

Table 2 *Frequency table of the last digit*

Last Digit	Open	Max	Min	Close	Expected
0	257	351	447	241	213.2
1	223	206	193	227	213.2
2	209	183	197	227	213.2
3	215	171	191	174	213.2
4	207	192	166	228	213.2
5	205	197	230	218	213.2
6	198	196	186	189	213.2
7	208	188	174	190	213.2
8	188	186	154	209	213.2
9	222	262	194	229	213.2
SUM	2132	2132	2132	2132	2132

Source: Authors processing. Data: Trading View (2021)

After completing the Chi-squared test () and K-S test computation, the significance of obtained statistics must be affirmed. In Table 3, the p-value is associated with a distribution with 10 degrees of freedom. The significance level is set to alpha $\alpha = 0.05$. If the p-value is less than 0.05, the null hypothesis of independence can be rejected. In terms of the maximum and minimum price of Bitcoin, it is possible to see both the test and K-S test rejecting the null hypothesis. Prices ending with 0 are usually clustered at the minimum price, which might lead to the assumption that there is a presence of a support line. Therefore, it is possible to claim the existence of price clustering.

Similarly, it is possible to claim that maximum prices are usually clustered when the last digit is 9. After confirming hypotheses H1.1 and H1.2, the same procedure for prices with the last two digits is performed to test if there is a presence of price clustering. Results are displayed in Table 4.

Table 3 *Chi-squared test and Kolmogorov-Smirnov test for price clustering for the last digit*

	Open	Max.	Min	Close
Chi-squared	14.5947	124.2852	302.4653	20.2795

p-value	0.1027	0.0000	0.0000	0.0163
K-S test	1.1608	2.9844	5.0635	1.1999
p-value	0.2599	0.001	0.0000	0.2370

Source: Authors processing. Data: Trading View (2021)

Table 4 Chi-squared test and Kolmogorov-Smirnov test for price clustering for the last two digits

	Open	Max.	Min	Close
Chi-squared	153.3633	495.4902	995.9922	171.3462
p-value	0.0004	0.0001	0.0000	0.0002
K-S test	0.82443	2.0120	3.1356	1.1301
p-value	0.5068	0.0175	0.0001	0.2788

Source: Authors processing. Data: Trading View (2021)

Testing for psychological barriers

Table 5 Testing for psychological barriers – resistance and support line – last digit

	Chi-squared	K-S test
Resistance	58.4873	2.0358
p-value	0.0000	0.0159
Support	175.0059	4.1149
p-value	0.0000	0.0000

Source: Authors processing. Data: Trading View (2021)

Table 6 Testing for psychological barriers – resistance and support line – last two digits

	Chi-squared	K-S test
Resistance	320.1359	1.3673
p-value	0.0000	0.1542
Support	479.5996	2.5423
p-value	0.0000	0.0016

Source: Authors processing. Data: Trading View (2021)

After testing for the evidence of price clustering, which was confirmed by and the K-S test in both situations – minimum prices ending with digits 0, 01, and 00, also maximum prices ending with 9, 99, and 98. Tables 5 and 6 illustrate results of

testing for psychological barriers. In the case of the support line, it is possible to state that there is a support line in both cases when analysing the last digit or last two digits, as the *p-value* is less than 0.05 for both performed tests. However, in the case of the resistance line, the psychological barriers are not as explicit as in the support line. In table 6, it is possible to observe that the *p-value* of the K-S test for the resistance line is significantly higher than 0.05. Thus, the results from Table 6 are not robust, so there is not enough evidence to reject the null hypothesis to *H2.2*.

Conclusion

In this paper, the testing for price clustering of minimal and maximal prices was done in the concrete at the market of virtual currency Bitcoin. Based on results in Tables 3 and 4, it is possible to claim that the existence of price clustering in the last digit(s) of Bitcoin price is present. Thus, the statement might be that the minimum price tends to cluster around the last digit 0 or the last two digits 00 and 01. However, it might be stated that the maximum price tends to cluster around the last digit nine or the last two digits 99 and 98. All null sub hypotheses for *H1.1*, *H1.2*, *H1.3* and *H1.4* were successfully rejected. The presented results are in line with the research done by Narayan (2022), who investigated price clustering at the oil market during COVID-19 pandemics. It can be stated that COVID-19 has not changed the occurrence of price clustering in the cryptocurrency market of Bitcoin as well as other more conventional financial markets. Thus, the presented results are in line with the research of Kim (2021), as Bitcoin fulfil similar signs as stocks or money when it comes to price clustering or the psychological behaviour of possessors.

Well-functioning markets are essential for ensuring that prices reach their equilibrium points. The prevalence of price clustering in many asset markets, particularly in the Bitcoin market, indicates that there might be some frictions preventing the formulation of equilibrium pricing. According to our study, one of these frictions might be due to people's fondness for round numbers. Other conflicts are undoubtedly possible. However, the structure of price clustering might be in question.

From the presented results, a question for future research arises: *How is the structure of price clustering changing in the Bitcoin market?* To analyse changes in the price clustering structure of Bitcoin assets, it would be interesting to apply the methodology to a larger sample, especially at more actual data depicting the rise of ETFs backed by Bitcoin futures contracts and Bitcoin slump in December 2021 and January 2022. Das and Kadapakkam (2018) provided evidence that algorithm trading has adverse effects on price clustering, as the clusters are weakening and diminishing when studying their presence at conventional financial assets as backed by ETFs. Comparison of the cryptocurrency market and other stock markets using ETFs for a longer time might be interesting if there is also the relationship between bitcoin-based ETFs to weaken the occurrence of price clustering.

According to the results, it might be stated that there is the presence of psychological barriers, particularly at the level of the support line. The Chi-squared test and Kolmogorov-Smirnov test showed robust results (Table 5 and 6) when testing for support lines. However, the results for the resistance line were not robust. The chi-squared test claimed statistical significance in both situations regarding the price last digit and last two digits. On the other hand, the Kolmogorov-Smirnov test

is not statistically significant for the resistance level at two digits. Therefore, it is not possible to reject the null hypothesis of *H2.2*. It cannot be unambiguously claimed there is a psychological barrier at the last two digits of the maximum price of Bitcoin – therefore no evident presence of a resistance line as described by the theory of behavioural finance.

Presented results support evidence that Bitcoin is not only a solely speculative financial asset. Based on results, that resistance line is not so significant according to behavioural finance theory; it is in line with claims that Bitcoin is growing into a long-term investment strategy asset. Missing evidence of a significant resistance line might be interpreted as investors seeing the price rising; they are not selling their assets (Bitcoins); they are holding it as a part of their long-term strategic investment in the belief that the value of Bitcoin will be rising in the future. On the other hand, evidence of support line is quite evident. That can be interpreted as price decrease at a certain level; investors tend to buy more assets because they believe in value growth in future.

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Correspondence address:

Ing. Jakub Sieber, Department of Corporate Financial Management, Faculty of Business Economy with seat in Košice, the University of Economics in Bratislava, Tajovského 13, 041 30, Slovak Republic, email: jakub.sieber@euba.sk

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© Jaroslav GONOS - Katarína ČULKOVÁ - Eva KALINOVÁ - Jakub HORÁK - Eliška PEŠKOVÁ - Roman LACKO - Zuzana HAJDUOVÁ - Ebipanipre Gabriel MIESEIGHA - Joel Adeniyi OKEWALE - Ladislav MURA - Danijela PANTOVIĆ - Marija LAKIČEVIĆ - Tijana PETROVIĆ - József POÓR - Szilvia MÓDOSNÉ SZALAI - Szonja JENEI - Judit MOLNÁR - Jakub SIEBER

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