ACTA OECONOMICA

UNIVERSITATIS SELYE

International scientific journal

VOLUME 13. 2024 No. 1 - 2

ACTA OECONOMICA UNIVERSITATIS SELYE

International scientific journal
Volume 13.
No. 1 - 2

J. SELYE UNIVERSITY - FACULTY OF ECONOMICS
AND INFORMATICS

ACTA OECONOMICA UNIVERSITATIS SELYE

International scientific journal

Volume 13.
No. 1 - 2

2024
KOMÁRNO

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ACTA OECONOMICA UNIVERSITATIS SELYE

Acta Oeconomica Universitatis Selye is published twice a year by the J. Selye University, Faculty of Economics and Informatics, Bratislavská cesta 3322, 945 01 Komárno, Slovakia

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MODERN STRATEGIES FOR EMPLOYEE MOTIVATION AND CORPORATE CULTURE

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Received:26. July 2024 Reviewed: 14. September 2024 Accepted: 30. October 2024

Abstract

The paper identifies and evaluates some selected dimensions of corporate culture that contribute to employee motivation and engagement, linking them to happiness management, employee well-being, gender equality, and inclusion. If corporate culture is the space of an organization, then employees are the elements that must function within this space to help the organization achieve its goals. The ideal state is one where corporate culture becomes the culture of each individual, and at the same time, each individual contributes the best part of themselves to it. It reveals that the absence of happiness management in organizations leads to accumulated stress, emotional exhaustion, or psychological issues among employees, potentially resulting in burnout. In this context, artificial intelligence (AI) emerges as an intriguing factor with varying perceptions. From the perspective of progress and employee support, AI can be perceived both as a tool and as a colleague. In today's era of technological advancement, AI presents a new challenge, with ongoing studies attempting to explore its implications. However, rapid technological development continuously brings along new insights. AI is gradually becoming an integral part of every organization and individual. The findings indicate that happiness management, well-being, gender equality, inclusion, and AI are highly relevant topics. Understanding—or at least striving to understand—them is not only beneficial but essential for organizations to achieve their strategic objectives.

Keywords: engagement, management, motivation, corporate culture, artificial intelligence

JEL Classification: M12, C67, L88

A C T A O E C O N O M I C A U N I V E R S I T A T I S S E L Y E 2024, VOL. 13, NO. 1 - 2

Introduction and theoretical background

In the past few decades of the 21st century, there have been significant concerns among companies in the academic and professional world to examine the subjective well-being of citizens (Sanagust in-Fons et al., 2020), as well as happiness at work within organizations (Foncubierta-Rodríguez et al., 2020). The latter concern has become prominent and gained considerable significance after the Covid-19 pandemic, particularly during the 'Great Resignation.' One reason for this phenomenon is the significant number of companies that, in today's globalized society, have unknowingly become toxic and stressful, creating a conflict-ridden environment for their human capital. These and other factors limit the mental health and professional growth of their workforce. This situation is exacerbated when it coexists with leadership styles focused merely on achieving short- and medium-term speculative successes in the age of artificial intelligence (Abell an-Sevilla and Ortiz-de-Urbina-Criado, 2023; Ravina-Ripoll et al., 2024).

Motivation is key for employees. Motivation is the force that enables employees to act toward a specific goal (Johanson et al., 2000; Mura et al,2024). It determines outcomes such as productivity, performance, and perseverance. Arshadia (2010) confirmed the positive influence between motivation and performance in his study. Motivation includes the support of autonomy, meaning that managers in the organization pay attention to every decision that leads to the well-being of employees. Additionally, appropriate regulations are in place to cover the needs of flexible work. Motivation is fundamental in businesses, such as employee competence and relationship building (Arshadia, 2010; Van den Berghe et al., 2014; Paais & Pattiruhu, 2020).

Currently, the importance of happiness management is gaining prominence. At first glance, this may seem like an overestimated factor, but scientific research points to the importance of employee happiness and its relevance and dependence on performance and productivity.

The success of an organization largely depends on the compatibility of its employees with the corporate culture. Any imbalance between these variables can adversely affect productivity and business success. (Corolyn L. Armada, 2024; Dubravska et al,2015).

New literature on happiness management shows that corporations focused only on maximizing the economic benefits for their shareholders do not cultivate happiness at work within their companies (Rando-Cueto et al., 2023). Through this asset, company leadership can implement a philosophy of happiness management as an organizational culture, providing well-being, prosperity, and quality of life for their human capital (Ravina-Ripoll et al., 2024).

Human resources need to be managed professionally to create a balance between the needs of employees, the demands and capabilities of the business, and the importance of quality human resources for the development of the company (Mappamiring et al., 2020; Paais & Pattiruhu, 2020)."

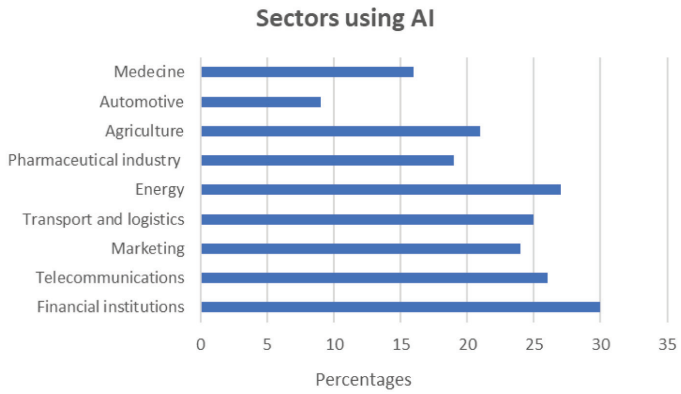
This paper focuses on the analysis of existing literature and research in the field of corporate culture, its impact on employee motivation, and how modern technologies, especially AI, influence the process. How AI affects or changes behavior is being examined in this paper. Based on these insights, it will be possible to raise awareness about AI and formulate recommendations for managers on how to utilize corporate culture to motivate employees effectively, with the goal of improving performance and achieving business objectives.

Material and methods

Official statistics on company culture are usually part of broader research and surveys focusing on the working environment, employment or productivity. These statistics are often published in various surveys conducted by reputable organizations such as Gallup Deloitte. These statistics include data on employee engagement, work culture ratings, perceptions of leadership style, and satisfaction with the work environment. Artificial Intelligence (AI) tools are currently used by 36% of Slovak companies, with another 34% expecting to adopt them in the near future. A third of these companies plan to implement AI within one year, and nearly half within three years. The primary benefits that companies expect from AI include faster data processing, better analysis, and forecasts (71%), higher work productivity (52%), and higher work quality and outputs (31%).

AI is already partially affecting the labor market, as 11% of companies in the survey reported that the implementation of AI led to a reduction in the number of jobs, mostly in manufacturing and administration. On the other hand, 4% of businesses indicated that the number of jobs increased after the introduction of AI tools (Fig.1).

Figure 1 Sectors using AI



Source: own processing using data from the ITAS (2024)

The quantitative research survey was conducted using a questionnaire that allows for the provision of normative information about organizational culture while being less resource-intensive in terms of time and financial resources compared to clinical methods (e.g., interviews) and ethnographic methods (e.g., participant observation). Therefore, a questionnaire survey is the most suitable method for analyzing organizational culture, provided the research focuses on measurable manifestations of culture. The questionnaires were distributed in printed form within the organization due to the nature of the research. The survey consists of two parts. In each part, respondents were provided with instructions on how to respond to statements or answer questions. The collected data were subsequently converted into an electronic format.

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This approach is advantageous because it facilitates systematic data collection and analysis, while the structured nature of the questionnaire ensures consistency in responses. Furthermore, by utilizing quantitative analysis, the research is positioned to offer generalizable insights into organizational culture.

The survey focused on testing the following hypotheses:

- The hypothesis regarding the perception of AI and its impact on employee satisfaction is statistically formulated as follows: We are examining whether there is a statistically significant difference in satisfaction levels between two groups of employees:
  Group A: Employees who perceive AI as a colleague (collaborative approach)
  Group B: Employees who perceive AI as a tool (neutral or mechanical usage)
  To compare the average satisfaction between these two groups, we can use:
  Independent two-sample t-test: This test will determine whether there is a statistically significant difference in average satisfaction between the groups. The test statistic (t) and p-value will help us ascertain whether the observed differences are or not due to random variations in the data. In this analysis, employee satisfaction will be the dependent variable, and the independent variable will be a dichotomous variable (0 = AI as a tool, 1 = AI as a colleague). The significance of the regression coefficient will indicate whether the perception of AI has a significant impact on overall employee satisfaction.
- We hypothesize that a higher rate of AI usage may have either a positive or negative relationship with employee satisfaction. Simple Linear Regression: In this analysis, the independent variable will be the intensity of AI usage (measured on a continuous scale, e.g., the percentage of time spent working with AI), and the dependent variable will be overall employee satisfaction. Testing Statistical Significance: The significance of the regression coefficient will allow us to verify whether there is a significant relationship between the rate of AI usage and satisfaction. If the regression coefficient is positive and significant, it will indicate a positive association; a negative coefficient would suggest a negative impact.
- We hypothesize that work flexibility, the number of training hours completed, and the level of team collaboration may have both individual and cumulative effects on employee satisfaction. Multiple Linear Regression: In this analysis, employee satisfaction will be the dependent variable, and the independent variables will be work flexibility (scaled variable), number of training hours (continuous variable), and team collaboration (scaled variable). Assessment of Significance: Evaluating the significance of individual regression coefficients will show whether any of these factors play a dominant role in explaining satisfaction. If some factors interact (e.g., effective training may enhance the positive impact of team collaboration), we can include interaction terms in the model.

Results and discussion

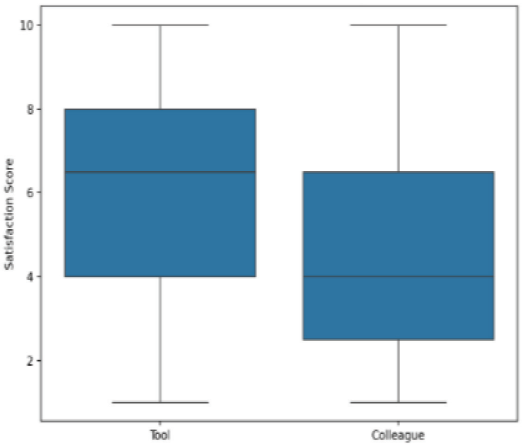
In this section, we will focus on the results of our analysis. From February 2024 to November 2024 we conducted a survey in manufacturing companies within the development and innovation departments. The goal of the survey was to explore modern motivation tools and organizational culture in collaboration with artificial intelligence (AI). In total, 67 completed questionnaires were collected. This research aims to provide insights into the role of AI and other work-related factors in shaping

organizational culture and employee satisfaction. The results could contribute to developing effective strategies for enhancing motivation and well-being in the workplace.

Most employees perceive AI as either a tool (Tool) or a colleague (Colleague). Employee satisfaction ranges from 1 to 10, with an average score of 5.61. The rate of AI usage varies significantly, with an average value of 52.55. Flexibility and training hours also vary, with an average flexibility rating of 5.10 and an average of 9.82 training hours. The average team collaboration rating is 5.84. From this research, we are selecting some findings.

Satisfaction distribution according to AI perception (Fig. 2).

Figure 2 Satisfaction distribution according to AI



Source: own processing

This graph illustrates a significant difference in satisfaction between employees who perceive AI as a tool and those who perceive it as a colleague. Employees who view AI as a tool exhibit higher median satisfaction. The graph also shows a slight negative correlation between the rate of AI usage and satisfaction, suggesting that higher AI usage does not necessarily lead to increased satisfaction. Expanding on this, the data indicates that employees who see AI as a tool may feel more empowered and supported in their tasks, leading to higher satisfaction levels. Conversely, those who perceive AI as a colleague might experience challenges in collaboration or integration, potentially lowering their satisfaction. Additionally, the negative correlation between AI usage and satisfaction could imply that excessive reliance on AI might introduce complexities or reduce the perceived value of human contributions, thereby affecting overall satisfaction.

This nuanced understanding highlights the importance of balancing AI integration with human-centric approaches to maintain and enhance employee satisfaction. There is a statistically significant difference in satisfaction ($p = 0.043 < 0.05$): This indicates that the difference in satisfaction levels between the two groups is statistically significant, meaning it is unlikely to have occurred by chance. Employees perceiving AI as a tool are more satisfied (average 6.18) than those perceiving it as

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a colleague (average 4.78): This suggests that employees who view AI as a tool tend to have higher satisfaction levels compared to those who see it as a colleague. The relationship between the rate of AI usage and satisfaction was presented with the following results, demonstrating a slight negative correlation between the rate of AI usage and satisfaction. This suggests that higher AI usage does not necessarily lead to increased satisfaction.

The analysis reveals the following correlations: Strongest Positive Correlation: Team collaboration (0.20). This indicates that higher levels of team collaboration are associated with increased satisfaction. Slight Negative Correlations: Training hours (-0.14) and AI usage rate (-0.13). These suggest that an increase in training hours and AI usage rate is slightly associated with a decrease in satisfaction. Minimal Impact: Flexibility (-0.01). This shows that flexibility has a negligible effect on satisfaction. These findings highlight the importance of team collaboration in enhancing employee satisfaction, while also suggesting that excessive training and AI usage might have a slightly adverse effect. Flexibility appears to have little to no impact on overall satisfaction. The correlation matrix of all factors shows the correlation coefficients between each pair of factors, indicating the strength and direction of their relationships (Tab.1).

Table 1 The correlation matrix

	Satisfaction_ Score	AI_ Perception	Flexibility Rating	Training_ Hours	Team_ Collabo-ration
Satisfaction_ Score	1.00	-0.13	-0.01	-0.14	0.20
AI_Perception	-0.13	1.00	0.28	0.14	-0.12
Flexibility_ Rating	-0.01	0,28	1.00	-0.11	0.06
Training_ Hours	-0.14	0,14	-0.11	1.00	0.01
Team_ Collaboration	-0.20	-0.12	0.06	0.01	1.00

Source: own processing

Training_Hours has a very high loading on the first factor, indicating that this factor primarily captures information about the amount of training or education. Practically, this means that variability in the number of training hours significantly influences this latent factor. Team_Collaboration has a negative loading on the second factor, which may suggest that this factor is closely related to the nature of team collaboration. Satisfaction_Score and Flexibility_Rating have moderate negative loadings on both factors, signalling that they are dispersed across both latent dimensions. AI_Perception has relatively weak loadings on both factors, which may indicate that this variable does not significantly contribute to explaining the latent structure compared to the other variables. Overall, the analysis suggests that there are two main dimensions or factors that capture the combined effects of the given variables. One factor is primarily dominated by the number of training hours, while the second factor exhibits a strong relationship with the nature of team collaboration.

In this way, we can reduce the complexity of the original model and further explore how these latent factors relate, for example, to overall satisfaction or other business indicators.

The literature analysis has shown that corporate culture and its impact on management and other employees are subjects of extensive research. Among the most frequently addressed topics is the impact on management. Current trends indicate that an essential part of effective management is the implementation of modern motivational tools aimed at fostering a positive mindset, a sense of happiness, and an optimistic outlook, referred to as happiness management. It is stated that a happy manager leads happy employees, and together they form a happy organization that produces better results. The current scientific and technological progress brings about rapid development in technologies, and AI is precisely the technology that advances in every minute of its existence. It has its supporters, who can be called enthusiasts, but it also has its detractors, who are critics and constantly express concerns about where this progress will lead.

Previous scientific studies empirically show that the absence of corporate happiness in companies is synonymous with stress, emotional exhaustion, or psychological problems among their internal employees (Robina-Ramirez et al., 2023a,b). Not only do these elements and many others negatively affect work performance and motivation but they also lead to suboptimal work performance due to ineffective and incorrect decisions from a functional and operational perspective. Under such conditions, it is not surprising that the professional activity of employees is characterized by low productivity and low innovative work behavior (Ravina-Ripoll et al., 2024).

A closer look at this phenomenon shows that to reverse this situation, it is necessary to find a source of happiness at work. A significant chain of academic studies suggests that the dimension of happiness at work plays a crucial role in proactively enhancing creativity skills, intrapreneurship, and digital innovation among all members of organizations (Galiano Coronil et al., 2021). In this line of research, a substantial part of the scientific work recognizes that an attractive philosophy of happiness management represents the foundation of business culture to increase people's happiness at work (Hatami et al., 2023). This appealing social culture allows corporate management to take managerial steps to stimulate customers' internal emotions through creativity, organizational justice, or effective communication. It requires happy leaders who support management within their organizations, prioritizing the generation of ideas from their employees (Ruiz-Rodriguez et al., 2023). In this context, companies can improve their operational and managerial processes. This is a necessary aspect to consider with the advent of artificial intelligence, which brings very drastic changes in the organization of work in corporations in the post-COVID-19 economy (Sanchez-Hernandez et al., 2023; Ravina-Ripoll et al., 2024).

Based on the results of our analysis, we have identified key areas where strategic measures need to be implemented to optimize the use of artificial intelligence (AI) in organizations, to improve team collaboration, and to increase overall employee satisfaction.

- *Supporting the Perception of AI as a Tool:* To ensure that artificial intelligence is not met with resistance but it is perceived as an effective tool for improving work processes, it is essential to implement targeted and continuous communication within organizations. A key element is educating employees through targeted awareness campaigns and training that highlight the practical benefits of AI and demonstrate its real-world applications in everyday work environments.

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- *Tailoring AI Usage:* The survey results indicate that the blanket implementation of AI without considering individual needs and work styles may have limited effectiveness. Therefore, it is important to tailor the level of AI usage to reflect the specific needs of individuals and teams. This may include the flexible adaptation of AI solutions according to work tasks, customized training for individual departments, and the gradual implementation of new tools with an emphasis on their real added value.
- *Enhancing Team Collaboration as a Key Factor of Satisfaction:* The survey results show that team collaboration is one of the most significant factors influencing employee satisfaction. Organizations should actively promote a culture of collaboration, whether through team workshops, joint projects, or the introduction of mentorship among colleagues. At the same time, it is important that technological solutions, including AI, support effective communication and the coordination of teams rather than their isolation.
- *Re-evaluating the Content and Form of Training Programs:* The survey findings suggest that the mere number of training hours may not be a decisive factor for success. It is therefore necessary to analyze the effectiveness of existing educational programs and focus on their quality. Practically oriented training, interactive workshops, and simulations of real work situations may be more effective than passive lectures.
- *Personalized Approaches to AI Utilization:* Different employees and departments may have varying requirements for AI usage. Personalized training and individual counselling will enable employees to understand how AI can help them in their specific work area, thereby increasing the adoption of these technologies while minimizing resistance to change.

Conclusion

The examined scientific studies are based on theoretical foundations and other empirical studies. Based on the analysis of the literature and key studies, we have demonstrated that the correlation between corporate culture and employee motivation, as well as modern motivational tools, is very strong.

The findings from this paper are intended to serve as a tool for managers in establishing modern employee motivation tools. The study should contribute to understanding how companies can effectively utilize corporate culture to support their employees using modern motivational tools such as happiness management, gender equality, wellbeing, and artificial intelligence (AI).

The research should also explore the impact of technological innovations on corporate culture and employee motivation. Taking globalization into account, it is also important to examine cultural differences between regions and countries and their impact on employees in a global context. The aim of this paper was to explore the connection between corporate culture and modern employee motivation tools. Furthermore, it aims to encourage readers to think about the attractive philosophy of happiness management, which is associated with productivity, innovation, competitiveness, and intrapreneurship (Galvan-Vela et al., 2021).

Company managers will thus be able to coexist with the five horsemen of the apocalypse, ensuring the work and satisfaction of their human capital (Robina-Ramirez et al., 2023b). On the other hand, they will be able to design organizational cultures based on creativity, emotional reward, happy leadership, and corporate social

responsibility (Diaz-Garcia et al., 2023). These elements are the foundation for building a more inclusive, equitable, and sustainable economy.

In this approach, this paper seeks to bring the fact to the attention of academic and professional workers that artificial intelligence will bring about many challenges to management, including the introduction of new management models, the success of which will depend on those leaderships where the culture of happiness management is present as the grail of quality of life, corporate wellbeing, and productive excellence (Jimenez-Marin et al., 2020).

In conclusion, we would like to thank the authors of the scientific study for thoroughly processing the contributions of various authors and providing us with a good springboard for opinions in the field of AI, happiness management, and gender equality (Ravina-Ripoll et al., 2023; Ravina-Ripoll et al., 2024).

Current developments indicate that the importance of corporate culture and its impact on employee motivation is becoming increasingly significant, and the use of modern motivational tools is a necessity. Globalization and digitalization create an environment where rapid adaptability and innovation are key. Companies that can effectively leverage their culture to support innovative and strategic decisions will have a competitive advantage. Technological progress allows for better analysis and interpretation of large amounts of data, which can support more informed and faster decision-making. A culture of openness to technology and data-driven approaches will therefore become increasingly important. Moreover, the growing emphasis on sustainability and social responsibility requires companies to integrate these values into their strategies.

Acknowledgments:
This research was supported by the National Research VEGA 1/0109/24.

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TRENDS IN THE INNOVATION ACTIVITY OF ENTERPRISES IN SLOVAKIA: THE IMPACT OF COMPANY SIZE AND SECTORAL STRUCTURE

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Received: 18. April 2024 Reviewed: 27. June 2024 Accepted: 19. August 2024

Abstract

The innovation performance of enterprises and the success of innovation implementation are interconnected and depend on a comprehensive and effectively managed innovation policy. This policy must support not only technological progress, but also the development of human capital and the resolution of regional disparities in order to contribute to the long-term and sustainable economic growth of the country. Slovakia should increase its investments in research and development in order to get closer to the EU average. Improving public and private investment is key to strengthening the country's innovation potential. There is a need to strengthen and expand existing innovation policies and encourage better cooperation between academic institutions and industry. This may include increasing funding for research projects, improving the regulatory environment and providing incentives to support innovation. An effective innovation policy that supports research and development can significantly contribute to improving a country's innovation performance. Targeted political measures to balance regional differences can help ensure that all regions of Slovakia have equal opportunities for development and innovation support.

Keywords: innovations, innovation performance, enterprises with innovative activity, competitiveness, innovation policy

JEL Classification: O10, O31, O38

Introduction and theoretical background

Innovation is the driving force behind regional development and the economic performance of a country's national economy. The private sector and businesses play a key role in creating and implementing innovations. Innovation activities, research, development, knowledge transfer, and the knowledge economy are significant prerequisites for the survival and increased competitiveness of businesses in a fierce market environment (Mura et al., 2021).

The relationship between research, development, and innovation is highly complex. It is essential to recognize that innovation cannot occur without adequate research and development. In academic literature, innovation is generally understood as progress or improvement. Innovations are interpreted as a process in which organizations do something new, introduce new procedures, create new goods or services, or implement new methods of internal organizational relations. Hanáčková et al. (2024) add that innovation should not be confused with the concept of change, as change is typical for most organizations, whereas innovation pertains to the creation and implementation of new processes, products, services, and delivery methods. Typically, innovations lead to improved outputs, efficiency, effectiveness, or quality of goods and services. Innovation involves qualitative and sustainable change. The identification of innovations may also be based on criteria such as novelty or creativity, effectiveness — result-oriented focus, the significance of the problem being addressed, and usability.

Innovation provides businesses with a competitive advantage and compels competitors to advance, whether in developing new products or improving service quality. Recent studies suggest that innovations can indeed bring significant competitive advantages over traditional products, services, and processes. Innovation enables companies to adapt to changing competition and market conditions, offering them opportunities to gain and maintain a competitive edge (O'Reilly & Tushman, 2016). However, innovation carries certain risks that may impact its success. Therefore, it is crucial for businesses, especially small and medium-sized enterprises (SMEs), to carefully manage their innovation activities to maximize their chances of success (Teece, 2020). Innovation is essential for SMEs in terms of survival and growth, not only because it allows them to seize new opportunities but also because it increases their potential for profitability. The creation of innovative products and services can help SMEs overcome challenges and obstacles they face, ensuring their competitiveness and sustainability in the market (Zhao et al., 2020; Arora & Gambardella, 2021). Innovation is a significant factor determining the success of business activities. It enables companies to achieve higher growth, increase efficiency, enhance competitiveness, and create new markets (Christensen & Raynor, 2013; Kraus et al., 2018).

Effective economic and social development based on innovation is a key prerequisite for reducing disparities between poor and wealthy regions. Innovative approaches contribute to balancing spatial disparities and imbalances by fostering national economic development and responding to growing global competition, population mobility, and rapid technological progress. Innovation becomes the foundation for business allocation, leading to the creation of local job opportunities and increased private sector investment. The introduction and dissemination of innovation enhance information flow, strengthen relationships with investors and developers, and promote regional cohesion and trust (Aghion & Howitt, 2024).

Innovation is often considered the domain of the private sector. On the other hand, the public sector also plays a crucial role in the innovation process, even though its approaches and objectives may differ. The private sector remains the primary initiator of innovation due to various factors directly related to its structure, motivations, and market dynamics (Al Nuaimi et al., 2023). Private sector companies face constant competitive pressure, which forces them to invest in research and development to maintain a competitive advantage, increase profitability, and gain a larger market share. This pressure results in a higher rate of innovation, as companies must continuously introduce new or improved products and services to meet changing customer needs and avoid stagnation. Additionally, innovations in the private sector

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often lead to significant revenue growth, further motivating firms to invest in innovative activities (Pisano, 2019; Teece, 2020).

However, the public sector also plays a significant role in supporting innovation, particularly through funding basic research and establishing regulatory frameworks that stimulate innovation activities. Governments can support private sector innovation through grants, tax incentives, and the public procurement of innovative solutions, thereby directly creating demand for new technologies. The public sector often invests in areas that may not be immediately commercially profitable but have long-term societal potential, such as healthcare, education, and green technologies (Mazzucato, 2018; Chesbrough & Bogers, 2020). Overall, however, the private sector innovates more than the public sector. In contrast, the public sector tends to focus on long-term research projects and creating an environment conducive to innovation, complementing the private sector's innovation efforts (OECD, 2021; European Commission, 2021).

Ďurková (2018) states that innovation policy has proven to be a key factor in supporting long-term economic growth in small open economies such as Slovakia. Its effective implementation can significantly enhance the competitiveness of both businesses and the country in global markets. In his article, Beblavý argues that the Slovak innovation policy must reflect the country's social and economic specifics. It is essential for it to focus not only on technological innovations, but also on improving human capital, which is a fundamental pillar of the long-term sustainability of innovation strategies (Beblavý, 2015). Another author, Hudec (2020), asserts that successful innovation policy should be based on coherent collaboration between the government, industry, and academia. In Slovakia, institutional support must be strengthened, and investment in research and development must be increased. Zajacová (2021) highlights regional disparities that hinder the country's innovation capacity, noting that the regional differences in Slovakia's innovation performance are significant and require targeted policy measures. Addressing these disparities is crucial for achieving balanced economic development and enhancing the country's overall innovation performance.

Material and methods

The aim of this paper was to analyze the trends in the innovation activity of enterprises in Slovakia. The specific objective was to assess the share of enterprises with innovative activity based on the size of the enterprise and industry, as well as to examine the revenues of these enterprises. Furthermore, the study focused on the impact of public financial support on enterprises with innovative activity and their cooperation with various institutions, which is crucial for the further development of innovations. Attention was also given to the barriers limiting the activities of innovative enterprises operating in the Slovak conditions, as well as the broader context of innovation support through the implemented innovation policy.

This paper tracked indicators such as the share of enterprises with innovative activity and without innovative activity from the total number of enterprises in %, the share of enterprises with innovative activity with public financial support in %, the share of enterprises with innovative activity by size group from the total number of enterprises in %, the share of revenue of innovating companies from the total revenue of all companies in %, the share of revenues of enterprises with innovative activity by size group from the total revenues of all enterprises in %, and the share of innovating

enterprises collaborating on innovations with the specified type of partner in %, over the period 2001-2022, excluding the years in which these data were unavailable. The data were sourced from the Statistical Office of the Slovak Republic.

Results and discussion

Business innovation represents a key process through which companies improve their products, services, technologies, or business models. These innovations can encompass a wide range of activities, from improving production processes and implementing new technologies to developing innovative ways of interacting with customers.

The main types of innovation outputs include product innovation, which involves the development of new products or the enhancement of existing ones to bring greater value to customers. For instance, launching an entirely new product on the market or improving the functionality or design of an existing product can significantly strengthen a company's market position (O'Reilly & Tushman, 2016).

Process innovations focus on improving internal company processes, leading to higher efficiency, cost reduction, and quality improvement. Examples of such innovations include automation in manufacturing or streamlining logistics (Teece, 2020).

Marketing innovations involve new ways of promoting and distributing products that better reach target audiences. The use of new digital platforms, rebranding, or the introduction of new pricing strategies can help companies adapt to changing consumer preferences (Kotler & Keller, 2021).

Organizational innovations relate to changes in a company's structure and management, leading to greater flexibility and the ability to respond quickly to market changes. This may include the introduction of new project management methods or cultural shifts within an organization that encourage innovative thinking (Christensen, 2019).

Several factors influence business innovations. Investment in research and development is a key prerequisite for supporting innovation, as companies that actively invest in research have a greater potential to bring new products and services to the market (Pisano, 2019). Collaboration between companies, research institutions, and universities opens up new opportunities for access to technologies and expertise, which can accelerate innovation processes (Chesbrough & Bogers, 2020).

The public sector also plays a significant role in supporting business innovations through grants, tax incentives, and other stimuli that help mitigate the financial risks associated with innovation development. Additionally, companies that foster an innovation-friendly culture - an environment where creativity and experimentation are valued - are more likely to succeed in developing innovative solutions. Creating such a culture involves encouraging employees to seek new ideas and rewarding their contributions (Mazzucato, 2018).

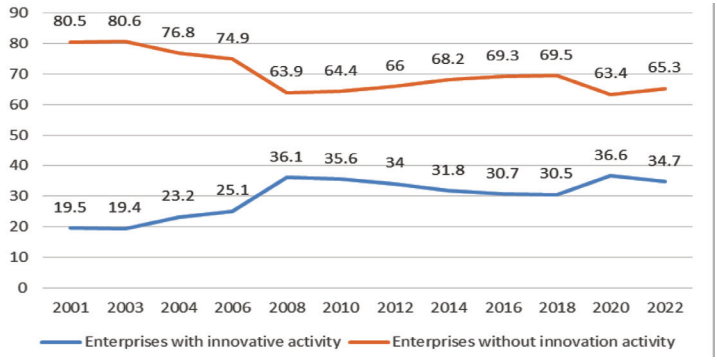
Technological advancements also provide entrepreneurs with new opportunities for innovation. Digitalization, artificial intelligence, and automation are examples of technologies that are transforming the way businesses operate and creating new opportunities for improving productivity and customer experience (Brynjolfsson & McAfee, 2014).

In Slovakia's economic and business landscape, companies without innovation activity still dominate. However, since 2007, their share has been declining,

while the proportion of companies engaged in innovation activities has been growing (Fig. 1). Among businesses with innovation activities, the industrial sector exhibits a higher intensity of innovation, with 41.55% of companies engaging in innovation, primarily in high- and medium-high-technology industries. In the service sector, 31.42% of businesses undertake innovation activities, with knowledge-intensive services accounting for a significant 56.6% share of high-technology innovations.

In terms of types, process and product innovations prevail, whereas non-technological innovations, such as organizational or marketing innovations, are represented only to a limited extent.

Fig. 1 The share of enterprises with innovative activity and without innovative activity from the total number of enterprises in %



Source: Statistical Office of the Slovak Republic, 2024

In the last available year, 2022, the share of resources from public financial support amounted to 27.70% and was the highest since the first statistically reported year in 2001. Most resources flowed from government institutions and from other EU financial support. Other financial resources, however, significantly undersized, were drawn from local or regional public administration bodies and the 7th EU Framework Program for Science and Technology or the Horizon 2020 program for research and innovation (Tab.1).

Tab. 1 The share of enterprises with innovative activity with public financial support in %

	2001	2006	2008	2010	2016	2018	2020	2022
Sources of public financial support together	9.4	14.8	10.7	12.3	13.2	15.9	26.2	27.7
Local or regional state administration bodies	4.0	3.1	0.5	0.3	0.3	2.2	4.0	5.4
Government (or government institutions)	5.6	5.4	3.8	3.5	4.6	3.3	14.4	17.3
European Union	1.2	9.5	6.4	10.0	10.6	.	.	.
EU framework programs for science and technology (6th, 7th)	1.0	1.8	1.0	1.6	.	.	.	.

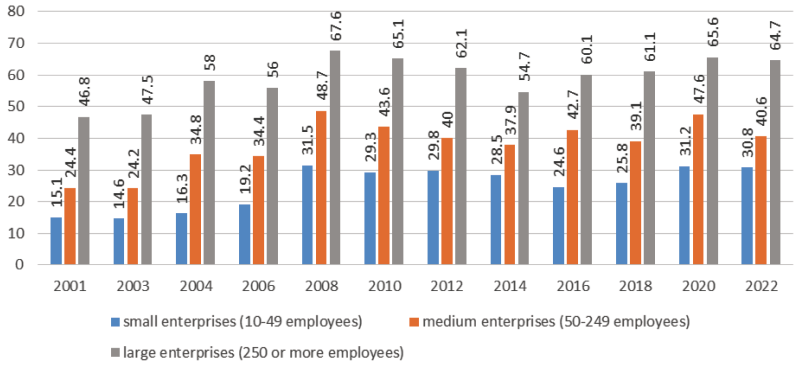
The 7th EU Framework Program for Science and Technology or the Horizon 2020 program for research and innovation	.	.	.	.	2.8	3.8	4.0	3.9
Other financial support from EU institutions	.	.	.	.	.	8.7	8.4	7.9

Source: Statistical Office of the Slovak Republic, 2024

From the point of view of size categorization, the largest share of enterprises with innovative activity from the total number of enterprises in the group of large enterprises is reported, while in the years 2001 to 2003 their representation oscillates around 47%. Since 2004 there has been a more significant increase, while their share ranges from 54,7% to almost 68%. Innovative enterprises are less represented in the category of SMEs (Fig. 2).

Innovative enterprises are primarily in industrial production 41.55% of the total number of enterprises. They are more prominently represented in sectors such as Manufacture of other means of transport 64.14%, Manufacture of leather and leather products 62.47%, Manufacture of paper and paper products 61.88%, Manufacture of computer, electronic and optical products 58.59%, Manufacture of machinery and equipment 55.35%, in the service sector they predominate enterprises with innovative activity in sectors such as Information services 73.83%, Publishing activities 58.40%, Financial and insurance activities 55.86%.

Fig. 2 The share of enterprises with innovative activity by size group from the total number of enterprises in %



Source: Statistical Office of the Slovak Republic, 2024

The share of revenues from enterprises engaged in innovation activities exhibited a fluctuating trend over the observed years. The highest values in this indicator were recorded in 2008 and 2010, when the share of revenues from innovative enterprises exceeded 70% of the total revenues of all businesses (Fig. 3).

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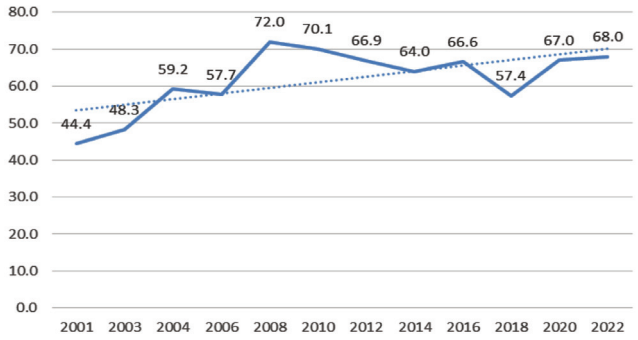
Fig. 3 The share of revenue of innovating companies from the total revenue of all companies in %



Source: Statistical Office of the Slovak Republic, 2024

The largest share of revenues is again recorded by large enterprises, with values exceeding 80% in some years. Small and medium-sized enterprises report significantly lower volumes and proportional representation in the economic indicator of revenues (Fig. 4).

From the perspective of sectoral classification, the highest revenue share is recorded in manufacturing industries such as Coke and refined petroleum products, chemicals, and chemical products production (92.02%), Computer, electronic, and optical products manufacturing (90.92%), Other transport equipment manufacturing (90.59%), Motor vehicles, trailers, and semi-trailers manufacturing (85.82%). In the service sectors, the highest shares are observed in Telecommunications (93.81%), Insurance, reinsurance, and pension funding, except for compulsory social security (91.56%), Scientific research and development (82%), Support activities for financial services and insurance (81.02%), Postal and courier services (72.42%).

Fig. 4 The share of revenues of enterprises with innovative activity by size group from the total revenues of all enterprises in %

Source: Statistical Office of the Slovak Republic, 2024

Innovative enterprises collaborate most significantly with the suppliers of equipment, materials, components, and software, as well as with clients and customers, although the degree and intensity of this cooperation have noticeably decreased over the observed years (Tab. 2).

Tab. 2 The share of innovating enterprises collaborating on innovations with the specified type of partner in %

	2001	2006	2008	2010	2016	2018	2020	2022
Enterprises within a group of enterprises	16.8	14.1	7.7	15.2	14.5	13.4	10.3	11.5
Suppliers of equipment, materials, components and software	43.0	32.4	16.7	25.5	23.4	23.6	20.5	24.0
Clients or customers	35.3	26.3	13.2	21.7	20.2	23.2	18.3	22.5
Competitors and other businesses in the same industry	15.4	22.6	8.9	17.6	6.0	8.0	7.7	11.4
Consultants, commercial laboratories or private VV institutions	15.4	18.4	8.8	11.9	15.1	11.7	10.1	15.8
Universities or other higher education institutions	10.5	14.3	7.5	10.8	8.7	10.3	7.1	10.2
Government or public research institutions	8.0	10.8	5.2	7.1	2.8	3.2	3.3	4.1
Other businesses	.	.	.	.	.	6.8	5.9	9.1
Non-profit organizations	.	.	.	.	.	3.0	2.4	2.9

Source: Statistical Office of the Slovak Republic, 2024

The biggest barriers for both innovative and non-innovative enterprises, as confirmed by data from the Statistical Office of the Slovak Republic, include a lack of financial resources for innovation activities within enterprises, excessively high costs of innovation, and difficulties in obtaining funding through state subsidies or grants. Additionally, a shortage of collaborating partners and qualified employees capable of developing and implementing innovations presents a significant challenge. These barriers are particularly pronounced among small and medium-sized enterprises (SMEs), as they lack the financial and human resources available to large companies. Furthermore, SME innovations tend to be less sustainable and face greater challenges in securing support from institutions and financial mechanisms.

The most commonly cited drivers and strategies for innovation include focusing on meeting the needs of an existing customer base, improving the quality of current products or services, achieving leadership in quality, and acquiring new customers.

The success of business innovation performance is often influenced by the broader context of innovation policy. Innovation policy plays a crucial role in corporate innovation as it provides essential support and a framework that enables companies to develop new products, services, and technologies. By ensuring financing and incentives such as grants and tax relief, innovation policy reduces the costs and

risks associated with innovation, allowing firms to invest in research and development. It also fosters collaboration between businesses, research institutions, and universities, accelerating innovation processes and knowledge sharing. By lowering regulatory barriers and supporting the commercialization of innovations, innovation policy helps overcome obstacles and enhances companies' competitiveness in global markets. Additionally, promoting innovation contributes to economic growth, increased productivity, and improved quality of life, positively impacting the overall economic health of the country. In this way, innovation policy creates favorable conditions for the development and success of corporate innovations.

One of the primary goals of innovation policy is to increase investment in research and development (R&D) to reach a level of 1.2% of GDP, which remains below the EU average. Achieving this goal requires both public and private investments. In Slovakia, R&D investments amount to approximately 0.8% to 1% of GDP. Within this budget, the government allocates around 600 to 700 million euros annually, covering funding for public research institutions and support for innovation projects. Public investment in corporate research is relatively low, ranging between 100 and 200 million euros per year. In contrast, the private sector invests significantly more, with contributions estimated at approximately 300 to 400 million euros annually.

Compared to the EU average, Slovakia lags behind in R&D investment. In the EU, average investments range between 2% and 2.5% of GDP, significantly higher than Slovakia's levels. Government spending on corporate research in EU countries varies but often falls between 0.2% and 0.5% of GDP. Meanwhile, the private sector in many EU countries, such as Germany and Sweden, invests significantly more in R&D, with contributions exceeding 2% of GDP.

According to the European Innovation Scoreboard 2023, Slovakia ranks among the countries with lower innovation performance, indicating challenges in innovation policy and environment. Compared to innovation leaders such as Sweden, Germany, and Finland, Slovakia lags in research and innovation support, collaboration between research institutions and industry, and access to innovation funding.

A key challenge is strengthening cooperation between academia and industry to support the transfer of research-driven technologies into practice. Another crucial goal is supporting startups and SMEs in their innovation and growth efforts. The education system should be more aligned with labor market needs, fostering creativity and innovative thinking.

Several mechanisms support innovation in Slovakia. These include grant programs and funds, such as the Research and Development Support Agency, which finances research projects and innovation initiatives, and European structural and investment funds, such as Horizon 2020 and its successor, Horizon Europe, which support research and innovation at the European level. Tax incentives, such as R&D tax deductions, reduce companies' tax liabilities, while innovation vouchers provide small grants to fund collaboration between businesses and research institutions.

Startup and entrepreneurship support includes initiatives from the Slovak Business Agency, which offers advisory services, mentoring, and funding for startups and innovators. Business incubators and accelerators provide startups with access to resources, mentoring, and networking opportunities to help them grow and bring their innovations to the market. International cooperation and partnerships are also key, with Slovakia actively participating in various international research and innovation programs, facilitating knowledge exchange and access to new technologies.

Technology transfer support is carried out through technology transfer centers, which help move research results from academia to industry and commercial applications.

Several significant programs support innovation and research in Slovakia with substantial budgets. The Research and Innovation Operational Program for the 2014-2020 period had a budget of approximately 1.65 billion euros, focusing on strengthening research, development, and innovation capacities, including support for business innovation and technology development. A significant portion of these funds was allocated to projects aimed at enhancing Slovakia's innovation capacity and technological progress.

For the 2021-2027 period, a new program is planned with an annual budget of approximately 3.5 billion euros, including EU funds and national contributions. This program focuses on supporting innovation activities and research, aiming to strengthen Slovakia's innovation potential and research capabilities.

Another key program is the Recovery and Resilience Plan, financed by the NextGenerationEU fund, providing Slovakia with approximately 6.3 billion euros for various reforms and investments, including research and innovation. These investments target infrastructure modernization, support for digital technologies, and the development of innovations in Slovak companies and institutions.

Through these efforts, innovation policy establishes a supportive framework for corporate innovations, ensuring that companies have access to the necessary resources and conditions to implement their innovation strategies.

Conclusion

The innovation performance of enterprises is a key factor that directly influences their competitiveness at both the national and global levels. Companies that effectively implement innovations can better respond to rapidly changing market conditions, increase their productivity, and create new opportunities for growth. These companies often set the pace of growth in the industries in which they operate and contribute to the overall economic growth of the country.

In Slovakia, the proportion of enterprises with innovation activity is lower than those without it, and between 2008 and 2022, they accounted for 30-36% of all enterprises. Large and medium-sized enterprises innovate significantly more than small enterprises. Innovative companies are mainly represented in industrial manufacturing. Enterprises that introduce innovations, especially large ones, also report higher revenue volumes.

However, the success of innovation implementation within companies does not depend solely on their internal capacities but also on the broader innovation environment created by the state through innovation policy. This policy aims to establish a favorable environment for research, development, and technological progress. Government support through strategic frameworks, financial incentives, and legislative measures is essential for companies to fully utilize their innovation potential.

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STARTUPS IN THE ENVIRONMENTAL CONTEXT: A PRISMA-BASED ANALYSIS

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Received: 02. June 2024 Reviewed: 25. July 2024 Accepted: 18. October 2024

Abstract

Startups are key drivers of environmental innovation, yet research on their role in sustainability remains fragmented. This study aims to identify areas where the link between startups and the environment can be explored, with further discussion and outlook on future research opportunities. PRISMA analysis was used to achieve the aim of the study, with data from the Web of Science (SSCI), focusing on peer-reviewed articles (2015–2024) in management, business, and economics from Q1-Q2 journals and with combination of the keywords "startup" and "environment". The findings reveal three primary research areas: technological innovation and business models, sustainability and societal impact, and policy, regulation and financing of environmental innovation. Despite growing interest, several research gaps remain and future research should focus on the long-term impact of environmental regulations on startups, the effectiveness of government support programs for startups and the long-term impact of AI on environmental sustainability. A major limitation is the low number of scientific studies that emerged from the PRISMA analysis conducted. Future research could broaden the scope by incorporating more databases, deepening insights into startups and the environment. The results can serve as a basis for further studies and practical applications in the development of sustainable business environments, especially in the area of supporting startups focused on environmental innovation.

Keywords: startup, environment, sustainability

JEL Classification: M13, Q01, Q56,

Introduction and theoretical background

In recent decades, startups have become a key driver of innovation, with an increasing emphasis on environmental sustainability. This shift reflects the broader concept of the Triple Bottom Line (TBL), which emphasizes that entrepreneurial activities should be evaluated not only in terms of financial performance, but also in terms of their impact on society and the environment (Elkington, 1997). Within this paradigm, startups play an important role in developing and implementing technologies that reduce negative environmental impact and support the transition to a more sustainable economy.

This study focuses specifically on the environmental dimension of TBL, i.e. the 'planet', which reflects environmental challenges through innovation, technological advances and sustainable business models. The environmental pillar requires special attention given the increasing pressure of regulations, changing investment preferences and increasing consumer demands for environmentally responsible solutions.

Startups are emerging and dynamic businesses seeking to establish themselves in the market through innovative business models. Despite high levels of risk, successful startups can deliver significant economic impact (De Bernadi and Azucar, 2020). Nowadays, environmental challenges are becoming an integral part of the business environment, and startups are increasingly responding to these challenges by implementing eco-innovations (Sheoran and Kumar, 2020). Eco-innovations play a key role in the social transformation of startups, thus contributing to their sustainability and social engagement (Ghezali and Sekkal, 2024).

Financial resources play a vital role in the implementation of eco-innovations, influencing the green processes and products of startups. While patents do not show a mediating effect, financial mechanisms are essential to promote sustainable development and stimulate green innovation in European startups (Sahili and Barrales-Molina, 2024). In the context of broader economic and social transformation, startups are seen as modern innovation vehicles that promote sustainable development (Kofanov and Zozul'ov, 2018). Moreover, environmental sustainability can provide startups with a competitive advantage when raising capital, as investors increasingly favour businesses with a strong environmental impact (Voß, et al. 2024).

The paper is a part of the project SK-PL-23-0065 Implication of TBL concept in the context of green startups management realized under the frame the Slovak research and development agency.

Material and methods

Aim: The aim of this paper is to identify areas where the link between startups and the environment can be explored, with further discussion and a view on future research opportunities. In line with the stated aim of the paper, the wording of the research question is as follows:

RQ1: What are the key research areas where startups contribute to environmental sustainability and innovation?

RQ2: What are the key research gaps that hinder a deeper understanding of the role of startups in advancing environmental sustainability?

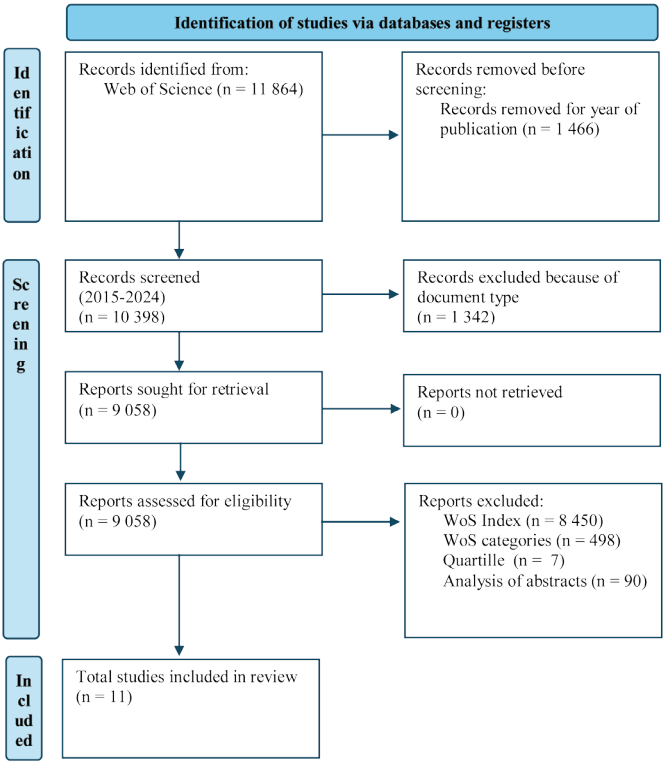
To meet the objective, we used the PRISMA four-phase flowchart, drawing on the Web of Science database. The PRISMA analysis was conducted in 2025 in the month of January. The search was based on a combination of the keywords

"startup" and "environment". After obtaining an initial set of results, we proceeded through several stages of filtering based on predetermined criteria:

- Time period - only studies published between 2015 and 2024 were included, a choice motivated by the desire to capture the latest trends and developments in the field.
- Document type - only scientific articles were included in the analysis, thus removing other types of publications such as conference papers and books.
- Subject categorization - only articles categorized as management, business and economics were included.
- Journal quality - only articles published in Q1 and Q2 journals according to Journal Citation Reports were analysed.

Furthermore, we used analysis, which allowed us to examine the issue at hand in detail, synthesis, through which we formulated conclusions from previous research, and comparison, whereby we compared different approaches and research findings in the field of startups and the environment.

Table 1 PRISMA diagram



Source:author's processing

Based on the selected keywords "startup" and "environment", an initial set of 11,864 scientific studies was identified through the Web of Science database. To ensure the relevance and quality of the included research, a multi-stage selection process was conducted, applying predefined inclusion and exclusion criteria.

The first filtering step involved limiting the timeframe to studies published between 2015 and 2024, leading to the exclusion of 1,466 publications that fell outside this period. This time range was chosen to capture the most recent developments in the intersection of startups and environmental concerns, reflecting current trends and emerging research directions.

Next, a refinement based on document type was applied, where only peer-reviewed journal articles were included. This step resulted in the exclusion of 1,342 publications, such as conference papers, book chapters, and reviews, to ensure that the study focused on rigorous, high-quality academic research.

To further enhance the relevance of the dataset, only articles classified under the management, business, and economics categories within Web of Science were retained. This decision was made to align the selection with the research objective, which explores the relationship between startups and environmental aspects from an economic and managerial perspective. As a result, 498 studies from unrelated disciplines, such as engineering, environmental science, or policy studies, were excluded.

Additionally, a quality filter was applied, where only articles published in Q1 and Q2 journals (according to the Journal Citation Reports) were considered. This step ensured that the selected studies met high academic standards and were published in well-regarded journals. Consequently, 7 articles from lower-ranked journals (Q3 and Q4) were excluded from the final dataset.

After an in-depth analysis of the abstracts, 90 studies were excluded, leaving the 11 most relevant articles which were identified as the most relevant and were selected for in-depth analysis. These studies form the foundation of the research, providing insights into the existing literature on the intersection of startups and the environment while also highlighting potential research gaps.

Although the selection process was carefully designed to ensure the quality and relevance of the included studies, there are some limitations that may have influenced the results of the research. This study drew data exclusively from the Web of Science database, specifically the Social Sciences Citation Index (SSCI). Although Web of Science is one of the most reputable academic databases, there is a possibility that relevant studies published in other databases such as Scopus, Research Gate or Google Scholar were not included. This may lead to some limitation in the breadth of research coverage.

Future studies could expand the analysis to include additional databases, a broader range of documents, and interdisciplinary linkages, thereby enhancing the comprehensiveness and depth of research on startups and environmental aspects.

Results and discussion

In this section, we focus on the findings presented in the authors' table of findings. These findings are based on various studies that have focused on the issue of startups, with a specific emphasis on environmental aspects and innovation processes in this area. Next, we will answer what areas the authors have addressed within the studied issue, while also focusing on identifying research gaps in the current literature and areas that require further investigation.

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The following table shows the authors' findings that emerged from the PRISMA analysis conducted. The table presents the key findings that were obtained from the selected and reviewed studies.

Table 2 *Results of authors*

Authors	Results of authors
Jorzik, et al., 2024	Identified five main forms of AI-driven business model innovation and three archetypal patterns of their interconnection that enable green technology startups to maximize their positive environmental impact.
Noailly, et al., 2024	Higher values of the Environmental Policy Index are associated with more venture capital for cleantech startups, a decline in stock returns for high-emitting firms, and an increase in renewable energy investment according to the VAR model.
Christodoulou, et al., 2024	Identified resilience, adaptability and collaborative approach to decision making as key factors that enable sustainability-focused startups to achieve long-term value creation and maintain competitive advantage.
Lehmann, et al., 2024	The growing emphasis on ESG factors has led to the emergence of academic spin-offs focused on impact entrepreneurship, and governments can support this process by funding programmes such as the German EXIST programme.
Lago, et al., 2023	The positive impact of entrepreneurial leadership, team size, team motivation, agility, collaboration, technology orientation, and sustainability orientation on startup innovativeness.
Verma, et al., 2023	Co-created customer capital mediates the relationship between green intellectual capital and social sustainability, becoming a key organizational asset, especially for service sector startups.
Oliveira-Dias, et al., 2022	Dynamic capabilities are key drivers of innovation for sustainable business models of startups in the logistics sector.
Oliva, et al., 2022	Success factors in internationalizing startups are identified, the importance of environmental strategies is highlighted, and a model for achieving sustainable goals is proposed.
Jensen, et al., 2020	Startups that focus on environmental innovation have, on average, higher technological capabilities than other startups.
Doblinger, et al., 2019	Government organisations are promoting environmental innovation in cleantech startups, increasing the number of patents by 73.7% and private investment by 155%.
Giudici, et al., 2019	The emergence of cleantech startups is strongly influenced by the availability of scientific and technological knowledge and the environmental awareness of local governments and communities.

Source: author's processing

Authors Noailly, et al. (2024) created a unique index of U.S. environmental and climate policy based on a textual analysis of news reports from ten leading newspapers for the period 1981 to 2019. This index accurately reflects the evolution of environmental regulations and their impact on clean technology investment. Research has shown that higher index values are associated with a greater likelihood of venture capital for cleantech startups, while high-emitting firms that are more exposed to environmental regulations experience a decline in stock returns. At the macroeconomic level, VAR models show that an increase in media attention on renewable energy is associated with a higher number of investment agreements in the clean energy sector and growth in assets under management by renewable-oriented investment funds. Another important trend is the link between startups and academia, as shown by Lehmann, et al. (2024). Authors Lehmann, et al. (2024) found that the growing emphasis on ESG factors is influencing entrepreneurial universities to adapt their technologies and spin-offs (new ventures) to social impact-focused entrepreneurship. Governments can support this transition by funding programs that favor startups that leverage academic innovation with an ESG orientation, as the German EXIST program demonstrates. This approach has important implications for technology transfer policy and support for academic spin-offs.

The authors Jorzik, et al. (2024) identify five main ways in which AI startups innovate their business models to improve environmental sustainability. Based on the analysis of case studies, they established archetypal patterns of relationships between the different elements of the business model. In addition, they defined three broad categories of linkages between the businesses studied that reflect different approaches to integrating AI into green technologies. The results of the study provide new insights into how startups can effectively use AI to maximize their positive environmental impact. They also highlight the importance of AI in shaping innovative business models that can contribute to long-term environmental sustainability. At the same time, the authors Oliveira-Dias, et al. (2022) find that dynamic capabilities are key intrinsic factors that stimulate innovation in sustainable business models of startups in the Brazilian logistics sector. These capabilities support processes from design to change and diffusion of innovation. Research has revealed different types of innovation in sustainable business models and different activities associated with the three dynamic capabilities studied (Oliveira-Dias, et al. 2022).

Authors Christodoulou, et al. (2024) examined the key factors in the business models of sustainability-focused startups that support long-term value creation. Based on a literature review, they identified resilience as a key element of sustainable decision-making, with its effectiveness enhanced by adaptability and customer convenience. Startups that emphasize resilience and flexibility are able to maintain a competitive advantage while meeting environmental and social goals. The authors also propose a collaborative approach to decision-making that promotes long-term value through sustainable strategies.

Authors Doblinger, et al. (2019) find that government organizations play an important role in fostering innovation in cleantech startups, particularly in the technology sector. Each additional collaboration with the government increases the number of startup patents by 73.7%. Government partnerships also help cleantech startups attract more private investment, with the number of licenses obtained from the government increasing investment by 155%.

These findings show that governments are a key partner in fostering environmental innovation and developing the cleantech sector. Cleantech startups have also been studied by Jensen, et al. (2020), who found that those that focus on

environmental innovation have on average higher technological capabilities than other startups. These startups often focus on combining existing technologies in new ways, leading to innovations that provide environmental benefits. According to Giudici, et al. (2019), the emergence of cleantech startups in a particular geographic area is influenced by two key factors: the availability of scientific and technological knowledge and environmental awareness. These factors are crucial for promoting cleantech entrepreneurship. The results show that these factors are important in the formation of cleantech startups and may be key for policies that want to promote this type of entrepreneurship (Giudici, et al., 2019).

Lago, et al. (2023) confirmed the positive impact of entrepreneurial leadership, team size, team motivation, agility, collaboration, technology orientation, and sustainability orientation on the innovativeness of startups. Oliva, et al. (2022) examined the internationalization strategies of Brazilian startups, focusing on their social, environmental, and economic impacts, and analyzed Asel-Tech, a technology startup that specializes in pipeline leak detection. The study identified the risks and critical success factors in the internationalisation of 'born global' startups and proposed a model to analyse these factors. The authors' findings highlight the importance of environmentally responsible strategies in digital manufacturing and show how the institutional environment influences startups' strategic decisions (Oliva, et al., 2022). This approach, focused on innovation and sustainability, can also be supported by the use of green intellectual capital, which, as shown by Verma, et al. (2023), plays a key role in transforming environmental goals into concrete social actions. Green intellectual capital has a significant impact on social sustainability through co-created customer capital. The components of green intellectual capital (human, relational and structural capital) contribute to positive societal outcomes, provided there is active customer participation, knowledge sharing and engagement in value co-creation. Thus, co-created customer capital serves as a mediator that transforms green intellectual capital into sustainable social actions, becoming a key organisational asset, especially for start-ups and small firms in the service sector (Verma, et al., 2023).

Based on the analysis of the scientific studies and the authors' findings, we can answer research question RQ1: What are the key research areas where startups contribute to environmental sustainability and innovation?

The areas of research where the link between startups and the environment can be observed are as follows:

- Technological innovation and business models
- Sustainability and societal impact
- Policy, regulation and financing of environmental innovation

Based on the above, one can answer RQ2: What are the key research gaps that hinder a deeper understanding of the role of startups in advancing environmental sustainability?

We have identified several research gaps and suggest the following implications for further research:

- Long-term impact of environmental regulations on startups - Noailly, et al. (2024) have shown a link between environmental policy and startup funding, but a deeper analysis of the long-term impact of regulations on the survival, growth and adaptability of cleantech startups is lacking.

- Effectiveness of government support programs for startups - Doblinger, et al. (2019) and Lehmann, et al. (2024) have highlighted the importance of government support, and there is insufficient research on which policy and financing instruments are most effective in supporting environmental startups in different regions.
- Long-term impact of AI on environmental sustainability - as Jorzik, et al. (2024) suggest, AI-driven innovation models can contribute significantly to improving the environmental performance of startups, but research in this area has mainly focused on technological aspects, while the environmental implications of the long-term impact of AI on startups have not yet been sufficiently explored.

Conclusion

Startups play an important role in fostering environmental innovation, and the results of this literature search point to three main areas of research: technological innovation and business models, sustainability and societal impact, and policy, regulation and financing of environmental innovation. The findings of the studies highlighted the key role of factors such as dynamic capabilities, technology orientation, environmental strategies and collaboration with government institutions in promoting innovative solutions and the environmental sustainability of startups.

On the other hand, the search identified several research gaps, such as a lack of understanding of the long-term impact of environmental regulations on startups, the effectiveness of government support programs, and the role of artificial intelligence in sustainability. These gaps represent an important challenge for future research that could contribute to a deeper understanding of this issue and to support effective environmental innovation strategies.

Finally, startups offer significant potential for addressing environmental challenges through innovative technologies and sustainable business models. However, their success depends on their ability to use available resources efficiently and engage with governments, academic institutions and communities. In this way, start-ups can play a key role in the transition to a sustainable economy and contribute to solving global environmental problems.

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BEHAVIORAL ECONOMY APPLICATIONS IN LIFESTYLE FOOD E-COMMERCE

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Received: 25. September 2024 Reviewed: 06. November 2024 Accepted: 20. December 2024

Abstract

This article examines the application of behavioral economics principles, focusing on the impact of selected psychological factors influencing consumer decision making processes. It explores the impact of various behavioral tools and theories on online food purchases and their implications for marketing strategies. The article discusses core behavioral economics concepts like bounded rationality, heuristics, and cognitive biases, contrasting them with traditional economic models. It emphasizes the growing importance of behavioral economics in e-commerce, where consumer behavior is influenced by factors beyond rational thinking. Primary data were collected by an online questionnaire survey of 255 consumers with prior online shopping experience. The questionnaire investigates factors influencing Slovak consumers with an active lifestyle and interest in health and nutrition when purchasing food online. The key findings revealed that "free delivery" and "discounted prices" are the most influential promotional offers, while social proof, especially "customer reviews", is the strongest motivator. Purchase triggers are primarily "running low on supplies" and "costs reduction", varying slightly across age and gender. Moreover, younger consumers prefer "receiving a newsletter" and "website registration", while older consumers favour "product samples".

Keywords: Behavioral Economics, Lifestyle Food E-Commerce, Consumer Behavior

JEL Classification: D91, M31, L81

Introduction and theoretical background

Behavioral economics is a field that focuses on studying how psychological factors influence individuals' economic decision-making. In recent years, it has become an important part of consumer behavior analysis, especially in e-commerce, where purchasing decisions are not only the result of rational thinking but also cognitive biases and emotional influences. This article focuses on the applications of behavioral economics in the online food sales sector, particularly in the lifestyle area, where consumer behavior is influenced by various marketing tools and factors. The goal of the article is to explore which behavioral tools and theories influence consumers' decisions when purchasing food online and what impact they have on marketing strategies in this area.

Behavioral economics fundamentals

Behavioral economics draws from multiple disciplines, including psychology, sociology, and cognitive science, to enhance the standard economic model by incorporating the underlying psychology of human behavior (Thaler, 2016). This approach challenges the traditional assumption of rational decision-making, recognizing that individuals often exhibit systematic deviations from the ideals of utility maximization (Saha, 2020). One key aspect of behavioral economics is the concept of bounded rationality, introduced by Herbert Simon, which suggests that individuals have limited cognitive resources and are unable to fully process all the available information when making decisions. This can lead to the use of heuristics, or mental shortcuts, which can sometimes result in biases and suboptimal choices. Historically, the foundations of behavioral economics can be traced back to the seminal works of influential thinkers such as Adam Smith, who recognized the role of psychological factors, such as loss aversion and self-control, in economic decision-making (Thaler, 2016). However, it was not until the 1980s that the modern version of behavioral economics emerged, challenging the traditional assumption of perfectly rational economic agents (Thaler, 2016). Scholars within this field have sought to address the limitations of the standard economic model by exploring the ways in which cognitive biases, emotions, and social influences shape the decision-making process (Camerer, 1999).

Behavioral Economics in E-Commerce

Rapid technology development, and the strict restriction in activities due to pandemic situations have caused the increase of online shopping trends (Joseph & Balqiah, 2022). A growing number of time-constrained consumers are embracing the convenience of online shopping. This includes 24/7 availability, the ability to shop from home, competitive pricing, access to global markets, and the flexibility to use any internet-enabled device (Khosrow-Pour, 2015). In the context of e-commerce, psychological and cognitive factors can have a significant impact on the purchasing decisions of consumers. For example, factors such as loss aversion, overconfidence, and self-control can influence the way consumers navigate the online shopping process, leading to behaviors like shopping cart abandonment or impulsive purchasing. Researchers have explored various frameworks and theories to understand the motivational and affective factors that underlie consumer behavior in the e-commerce setting. These include considering the sequential processes involved in

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online shopping, the organization and research of products within the shopping cart, and the role of emotional and cognitive processing in shaping the overall shopping experience (Bell et al., 2020). In the rapidly evolving landscape of e-commerce, the interplay between consumer behavior and economic decision-making has become a captivating area of study. Behavioral economics, a field that integrates insights from psychology and economics, has emerged as a powerful lens through which to understand the complex factors that shape online purchasing decisions. The foundational work of scholars highlighted the significance of psychological factors, such as loss aversion and overconfidence, in economic behavior (Thaler, 2016). However, it was not until the 1980s that the modern field of behavioral economics gained traction, challenging the traditional assumptions of the neoclassical model (Thaler, 2016). As the digital realm has become increasingly central to consumer experiences, researchers have turned their attention to the ways in which psychological and social factors influence online purchasing behavior (Cetină et al., 2012).

The rise of e-commerce in the food industry has ushered in a new era of consumer behavior that warrants careful examination through the lens of behavioral economics. As consumers become increasingly accustomed to the convenience and personalization offered by online platforms, e-commerce businesses in the lifestyle food sector must adapt their strategies to cater to the evolving preferences and decision-making processes of their target audience (Dijksterhuis et al., 2005; Nazarov, 2020). Hence a primary objective of each enterprise should be to meet and even exceed the requirements of their customers, what allows them to build a long-term relationship between them and their customers (Knop, 2019).

Behavioral Tools in E-Commerce

One key aspect of behavioral economics in the e-commerce context is the role of cognitive biases and heuristics. Individuals often rely on mental shortcuts and rules of thumb when making decisions, which can lead to systematic deviations from the rational, utility-maximizing behavior assumed by the classical economic theory. For instance, the "anchoring effect" can cause consumers to be disproportionately influenced by the initial price they encounter, making them reluctant to deviate from that anchor point, even if subsequent options present a better value (Saha, 2020). The field of behavioral economics has shed light on the profound influence that social factors can have on individual decision-making processes, particularly when it comes to consumer behavior. One such social phenomenon that has garnered significant attention is the concept of social proof, which describes how people often look at the actions and opinions of others as a guide for their own behavior, especially in situations involving uncertainty or ambiguity (Salihu Ibrahim, 2023). In the context of online shopping, the impact of social proof can be particularly pronounced, as consumers are often faced with a vast array of product options and limited physical interaction with the items they are considering purchasing. In the absence of the ability to physically examine products or receive recommendations from sales representatives, online shoppers frequently turn to the experiences and opinions of other consumers, as expressed through online reviews and ratings, to help inform their purchasing decisions. Research has suggested that the presence of positive online reviews and high ratings can significantly increase the likelihood of a consumer making a purchase, as these forms of social proof provide a sense of reassurance and confidence in the quality and reliability of a product or service. Conversely, negative

online reviews and low ratings can have the opposite effect, serving to deter potential customers and eroding their trust in the brand or product (Putri et al., 2022). In addition to social proof, recommendation systems are crucial for managing the overwhelming amount of information that are available today to combat the news fatigue of consumers (Fernandes et al., 2024). Personalized newsletters offer readers control over their content consumption. They create relationships with companies and increase brand loyalty. Despite predictions, newsletters are experiencing continuous popularity and serve as a valuable tool for subscriber acquisition. Subscribers receive various offers, such as discounts or advantages, which are many times not available through any other channels. Moreover, this helps companies to easily create and use databases for segmentation. (Molinillo et al., 2021). Businesses also use many pricing tools to influence customer purchasing behavior and increase sales by shaping the perception of prices and product value. The most used ones are attractive prices comparable to different suppliers, discounts or often even no delivery costs (Abbad et al., 2011; Anvari & Norouzi, 2016). This leads to a mutually beneficial situation, where costumers reduce costs and time by no need for additional measures. Last-Mile Delivery describes the final and one of the most important and sensitive phases of the purchasing process - the shipping of products (Lazarević & Dobrodolac, 2020). Some e-commerce companies deliver orders by themselves, while others contract a third party (Švadlenka et al., 2023). One of the common issues is collaboration with external business partners, because the quality of their services also influence future customer purchasing behavior.

The rise of e-commerce has transformed the landscape of consumer behavior, ushering in a new era where businesses must navigate the complex interplay between technology, psychology, and consumer decision-making. Understanding the factors that influence online consumer behavior has become a crucial area of research for companies operating in the digital marketplace (Svobodová & Rajchlová, 2020; Vengatesh & Archana, 2023). One of the key factors shaping online consumer behavior is the impact of digital marketing strategies. Online companies must be proactive in developing unique selling propositions and conducting A/B testing to gauge the effectiveness of their digital tools (Nazarov, 2020). The slightest changes to a website, link, or any other digital element can have unpredictable results, underscoring the importance of a well-designed and user-friendly online platform (Nazarov, 2020). Moreover, the emergence of e-commerce has led to the modification of traditional factors that influence consumer behavior. Research suggests that the online shopping experience can trigger changes in mental processes, leading to shifts in consumer attitudes, beliefs, and perceptions towards products and brands (Cetină et al., 2012). Psychological and social factors, such as social status, fashion, and reference groups, have become increasingly relevant in the digital landscape, as they shape the decision-making process of online consumers (Cetină et al., 2012). Therefore, e-commerce businesses must consider these behavioral factors when crafting their strategies to remain competitive in the evolving online marketplace.

Material and methods

The results of primary data collection can contribute to identifying factors that influence consumer decision-making when shopping in e-commerce. The following variables were selected for the research: gender, age category, preferences for online shopping, the impact of discounted purchases and promotions on customer decisions, preferred delivery and payment methods, interest in registering on websites

and subscribing to newsletters, preferences for product sorting, the use of filters when purchasing muesli bars, the selection of cost-effective products, and interest in product samples at a fraction of the price. The research also tested hypotheses aimed at identifying differences in respondent preferences based on gender, age, and shopping habits.

The data collection process took place continuously from January 2023 to March 2023. The target sample included all consumers who had prior experience with shopping through e-shops. The sampling method used was convenience sampling. Our respondents completed questionnaires via Google Forms. The survey questions were tailored to a specific e-commerce store of a Slovak lifestyle food manufacturer. Methodologically, we focused on addressing respondents' psychological barriers to completing content- and technology-intensive questionnaires. Based on this, we designed an optimal questionnaire with a reasonable number of questions, ensuring simplicity. When formulating the questionnaire items, we emphasized their mutual coherence. Pilot testing was conducted on a small sample of respondents to gather feedback on the clarity of the questionnaire. After minor adjustments, the final version consisted of 2 sociodemographic and 17 specialized questions related to the research problem.

A total of 255 respondents participated in the survey, with the majority being women (75%), while men accounted for 25%. In terms of age structure, the largest group consisted of respondents under 25 years of age, comprising 58% of the sample. The second-largest group included individuals aged 26–35, representing 20% of respondents. Those aged 36–45 accounted for 10%, while the smallest group, respondents over 45 years old, made up 12%. Regarding respondents' online shopping behavior, 93% reported that they regularly shop online. The frequency of online shopping varied among respondents – approximately two-thirds shop online occasionally, about once or twice a month, 19% shop frequently, at least once a week, and 14% use online shopping exclusively during sales. These results highlight the importance of e-shops and their marketing strategies tailored to the preferences of individual customer segments. The structure of the sample is illustrated in Table 1.

Table 1 *Structure of the sample selection*

Survey item	Answers	absolute numbers	relative numbers
gender	male	71	27,84%
	female	184	72,16%
age	12 - 18	22	8,63%
	19 - 25	125	49,02%
	26 - 45	79	30,98%
	46 - 64	17	6,67%
	65 and more	12	4,71%
shopping experience in an e-shop	yes	238	93,33%
	no, i don't plan to try it	10	3,92%
	no, i plan to try it	7	2,75%

regularity of purchases in the e-shop	always	8	3,14%
	often	46	18,04%
	only when there are discounts	33	12,94%
	rarely	151	59,22%
	without an answer	17	6,67%

Source: Own processing based on data from the survey

The dataset from the questionnaire survey was evaluated using appropriate statistical tests. The statistical analysis was performed using SPSS 22 and R. The validity of the stated hypotheses is assessed using suitable statistical tests based on the calculated p-values, which represent the probability of making an error if the null hypothesis is rejected. The significance level for all tests was set at 5%.

We use a comparative analysis of three statistical techniques commonly employed in such cases - Friedman's test, the Sign test with Bonferroni correction, and Binary logistic regression. Friedman's test is a non-parametric alternative to repeated-measures ANOVA, designed to identify differences among multiple methods or conditions across repeated measurements. It is particularly advantageous when the assumptions of parametric tests, such as normality and homogeneity of variance, are violated. The test operates by ranking observations within each block (e.g., subject or unit) and comparing the average ranks across the groups or conditions. The Sign test with Bonferroni correction is another non-parametric method for comparing two or more groups or conditions. Unlike Friedman's test, the Sign test does not involve ranking data but instead evaluates the frequency of positive and negative differences between paired observations. To control the error rate when conducting multiple comparisons, the Bonferroni correction adjusts the p-values (Pereira et al., 2015). We use the Plackett-Luce model to examine preferences for different delivery methods. The Plackett-Luce model can handle more than two alternatives, making it well-suited for analyzing preferences among a wider range of delivery options. The model estimates a set of "worth" parameters that represent the relative preference for each delivery method, with the most preferred option having the highest worth parameter (Turner et al., 2020).

Results and discussion

Online stores usually use various types of special offers; hence respondents were asked to rate six of them using a three-point ordinal scale. Figure number 1 shows that "free delivery" has the greatest impact on respondents (completely influencing 49%), along with a "discounted price" (completely influencing 47%). On the contrary, the least important for consumers was "the fact whether they receive some kind of gift when the value of purchased goods exceed a set value". The Friedman test was used to test whether there is a statistical difference in the degree of influence for each of the purchase incentive options. The null hypothesis was rejected (χ^2 (5) = 200; $p < 0.001$); therefore, we have confirmed that there is a difference between variables, with a small effect (W = 0.17). The Sign test with Bonferroni correction showed that "free delivery" and a "discounted price" had the greatest impact and do not differ from each other. The statistically lowest impact was confirmed for "a gift with purchases over a certain amount". In addition, the "buy one, get one free" promotion had a statistically greater impact than "discounted product bundles" ($p = 0.004$).

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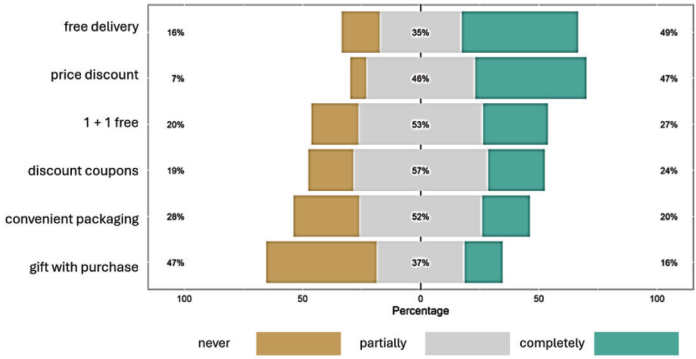
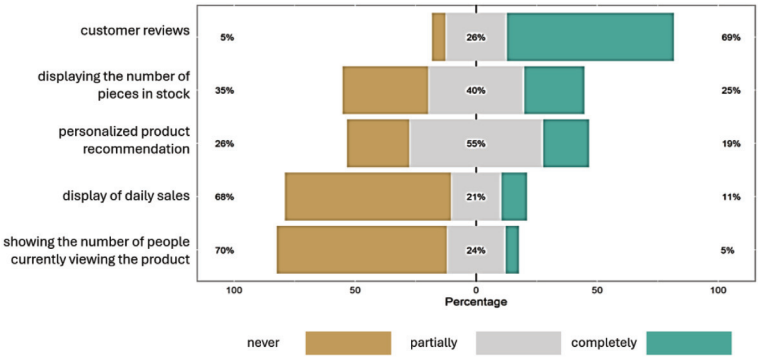
Figure 1 Influence of purchase incentive options



Source: Own processing based on data from the survey

Social proof can be considered as the most powerful practice of e-shops, since "reviews from other customers" influenced 69% of respondents "completely" (Figure number 2). The factors "displaying the number of items sold that day" and "the number of people currently viewing the product" motivated only 11% and 5%, respectively. A Friedman test was used to test the hypothesis of the equal motivational effects of these factors, and it was rejected (χ^2 (4) = 426; $p < 0.001$), with a medium effect (W=0.48). A post-hoc test with Bonferroni correction was used to compare all pairs of factors. "Customer reviews" were statistically the strongest motivational factor, while "displaying the number of items sold that day" and "the number of people currently viewing the product" are statistically the least motivating. The remaining two factors ("products recommended directly to the shopping person" and "the number of products in stock") do not differ statistically from each other (p=0.668).

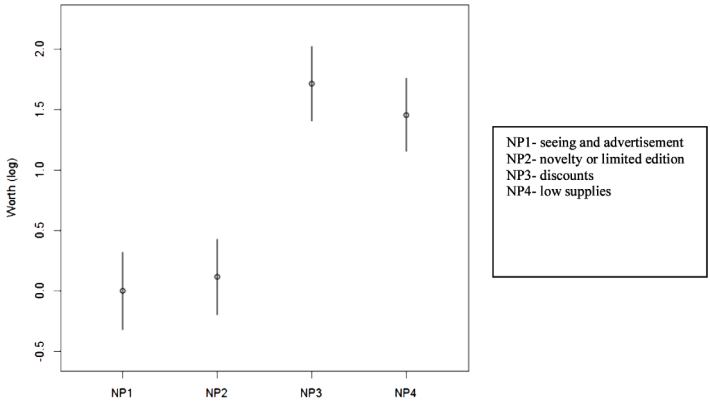
Figure 2 Impact of social proof factors on respondent's decision-making process



Source: Own processing based on data from the survey

When analyzing customer purchasing behavior, we used "seeing an advertisement" (NP1) as a reference category. Four situations can be divided into two equally sized groups (Figure number 3). Respondents were the most frequently motivated to make a purchase when "there are discounts" (NP3) or when "their supplies are running low" (NP4). These two situations did not differ statistically. On the other hand, "seeing an advertisement" (NP1) and "a new product" (NP2) were significantly less important than the aforementioned two categories.

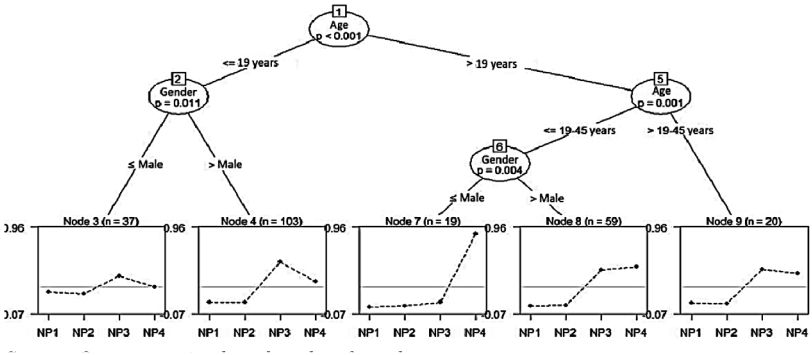
Figure 3 Strength of motivational parameters



Source: Own processing based on data from the survey

However, this preference was not maintained if the gender and age of respondents were taken in to account and these variables created five differently behaving groups (Figure number 4).

Figure 4 Strength of motivational parameters with age and gender taken into account



Source: Own processing based on data from the survey

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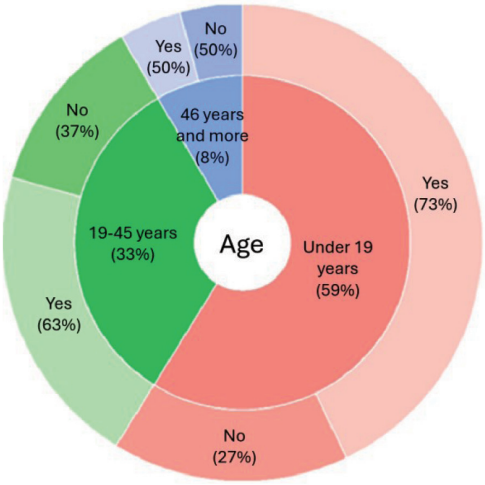
The largest group (43%) consisted of 110 women under the age of 19, for whom "discounts" and "running out of stock" were the dominant reasons for online shopping. Women aged from 19 to 45, as the second largest cohort (25%), were driven mainly by "discounts" and "running out of stock". The third largest group (men under 19 years old) were motivated by all factors equally, with a slight dominance of "purchasing due to discounts". "Running out of stock" was clearly the most common reason for making a purchase for men under 45. This reason was the most important for the last group, with a relatively small share (8%), of consumers over the age of 45, as well. Therefore, we can conclude that almost all created groups were driven primarily by feeling the lack from insufficient supplies and not by not marketing stimuli promoting products as a novelty, limited edition or for discounted price.

In the next part of the questionnaire, respondents were asked about their attitude to giving consent to receiving newsletters. A positive attitude was marked by a third of respondents (33%). The greatest interest in this service was among younger generations, since more than a third of respondents (36%) under the age of 19 used it on regular basis. Among respondents in the age category "from 19 to 45 years old" the interest was at the level of 27%, and in the oldest age category 30% declared interest.

The question concerning the website registration option was answered positively by more than two thirds of respondents (68%). The greatest interest (Figure number 5) in this service was among younger respondents, i.e. in the category "up to 19 years of age", where almost three quarters of them (73%) used it. Among respondents in the age category "from 19 to 45 years", the interest was at the level of 63%. Advantages of this service were used only by a half of the oldest respondents.

Furthermore, 69% of respondents expressed a willingness to order a sample of selected products with their order. The greatest interest (80%) was detected in the oldest age category. The youngest respondents "up to 19 years of age" would appreciate a sample of product in 70% of cases and the lowest interest (65%) was observed in the middle/age category.

Figure 5 Strength of motivational parameters with age and gender taken into account



Source: Own processing based on data from the survey

Binary logistic regression was used to determine the relation between respondent´s age and answering the following questions:

- ***newsletter subscription***
  - increasing the age category by one level resulted in a 19 % chance of decrease in the likelihood of subscribing for a newsletter, but this decrease was not statistically significant (p=0.575),
- ***registration option on the website***
  - increasing the age category by one level resulted in a 50 % chance of a decreasing interest in registering on websites. This decrease was statistically significant (p=0.042).
- ***willingness to order a sample of selected products***
  - increasing the age category by one level resulted in a 50 % chance of an increase in the odds of ordering a sample, but this increase was not statistically significant (p=0.351).

When shopping, respondents mostly (70%) preferred high quality, but they were also looking for the lowest possible price. 20% of respondents focused primarily on the quality of products and 10% were likely to make a purchase with the lowest possible costs. It turns out that the preference for high quality over low price increased with age.

As for the question related to assessing price and quality a multinomial regression model was used, where the results showed that increasing the age category by one level caused:

- a 9% decrease (p=0.918) in the chance of choosing the product based on the fact, that it is limited edition in comparison with the product with reduced price,
- a 48% decrease (p=0.524) in the chance of choosing the product based on the fact that it is a newly introduced product in comparison with the product with reduced price,
- a 62% decrease (p=0.380) in the chance of choosing the product based on the lowest price in comparison with the product with reduced price.

Customers usually remember the end of an experience most vividly. That is why e-shops try to make the last stage of delivery as pleasant as possible for customers. They provide tailor-made delivery options, to suit all segments, such as courier delivery, delivery points by Packeta, delivery boxes open 24/7, post offices or personal pickup at selected stores. The last question analyzed the preferences regarding these delivery methods. The Plackett-Luce model was used to test the strength of preference (Figure 6) for individual methods of delivery. Delivering by courier service was used as the reference item. This answer and delivery points by Packeta were the most preferred options by respondents. The third most frequent answer was "delivery boxes" and the least used were delivery by the Slovak post office and personal collection at stores.

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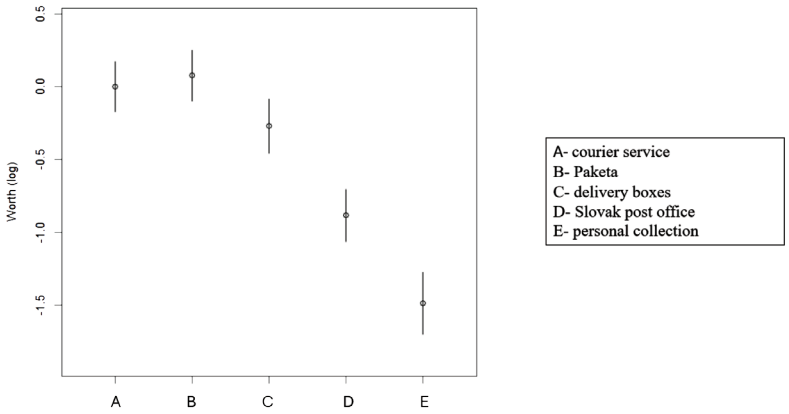
Figure 6 Strength of delivery options

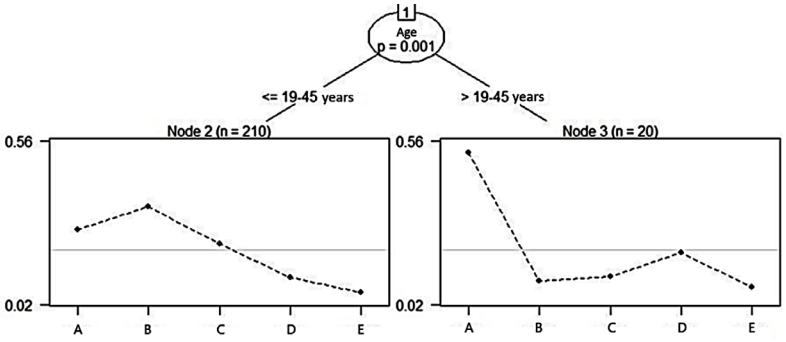


Source: Own processing based on data from the survey

Furthermore, the effect of the respondents' gender and age had also been analyzed. Results (Figure 7) show that a statistically significant factor is only the age of respondents when choosing a delivery option. Two groups with different preferences were identified:

- respondents under 45 years of age with a preference of delivery via Packeta delivery points,
- respondents older than 45 years of age with a preference for courier delivery.

Figure 7 Strength of delivery options with age taken into account



Source: Own processing based on data from the survey

Conclusion

In conclusion, this study revealed key insights into online consumer behavior. Promotional offers like free delivery and discounted prices exerted the strongest influence on purchasing decisions, while on the other hand, gifts with purchases had the lowest impact. Social proof, particularly in the form of customer reviews, emerged as the most powerful motivator, significantly outweighing factors like displaying the number of items sold or how many people are currently viewing the same product. Purchase triggers were primarily driven by perceived scarcity ("running low on supplies") and discounts, although these preferences varied slightly across age and gender. While younger consumers showed greater interest in newsletters and website registration, older consumers were more inclined to ordering product samples. However, the relationship between age and newsletter subscriptions or sample orders was not statistically significant. Only the link between age and website registration was statistically proven, with older respondents less likely to register. These findings offer valuable information for online retailers to tailor their promotional strategies, website design, and marketing efforts to effectively target different consumer segments and optimize sales. The research is limited by the method used to construct the sample and its focus on a specific online store. Due to the sampling method, the findings may not be universally applicable to all e-commerce platforms, as consumer behavior can vary across different retailers. Additionally, by concentrating on a particular e-shop, the study's conclusions might be influenced by the unique marketing strategies and consumer dynamics of that platform, which could limit the generalizability of the results to other online food retailers. These constraints should be taken into account when interpreting the findings and applying them in broader contexts.

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SEASONALITY PATTERNS OF THE TRAVEL AND TOURISM PERFORMANCE IN THE SLOVAK REPUBLIC

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Received: 27. August 2024 Reviewed: 28. October 2024 Accepted: 20. December 2024

Abstract

This study examines the seasonality patterns of tourism in Slovakia, focusing on two key indicators: the Average Length of Stay and the Number of Visitors across various accommodation types. The analysis reveals distinct seasonal trends, with clear peaks in the summer months (July and August) and a secondary peak in winter, particularly in February, likely influenced by domestic tourism during school holidays. The Average Length of Stay is the longest in July and August, with tourist accommodations showing the highest stays, while luxury hotels record shorter stays, primarily due to business travelers. The Number of Visitors also peaks in August, with the highest numbers recorded in high-tier hotels and other hotels, while private accommodations attract fewer visitors. The study highlights the challenges posed by the off-peak season (late autumn and early spring), emphasizing the need for strategies to diversify attractions and stabilize demand throughout the year. The findings suggest that higher-tier accommodations exhibit greater resilience to seasonal fluctuations, while other accommodation types, such as boarding houses and tourist accommodations, are more dependent on summer traffic. This research provides valuable insights for tourism management, offering recommendations for optimizing the sector's performance across different seasons.

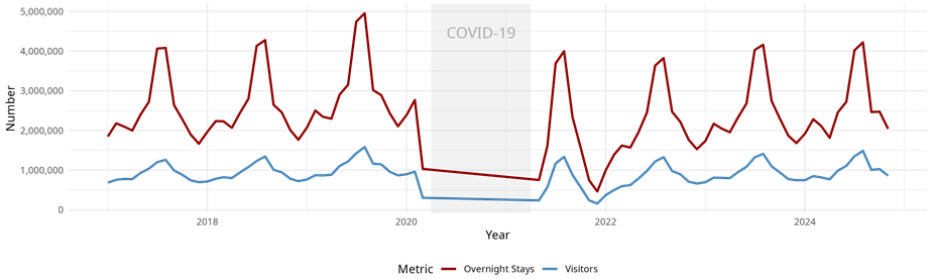
Keywords: seasonality, travel and tourism, average length of stay, visitors

JEL Classification: C34, C67, L88

Introduction and theoretical background

The primary global topic in tourism recently has been the recovery from the COVID-19 pandemic. While most countries have already reached or exceeded pre-pandemic performance levels, surpassing figures from 2018 or 2019 (Kumar & Ekka, 2023; Tang et al., 2025), Slovakia has yet to fully recover in terms of overnight stays and visitor numbers, based on data from November 2024. In terms of visitor numbers, performance in 2024 is nearly comparable to pre-pandemic levels; however, the summer of 2019 recorded 4.23 million visitors, compared to 3.94 million in 2024—a decline of approximately 6.7%. Notably, luxury hotels demonstrated the highest resilience in recovering their performance. Regarding overnight stays, the summer of 2024 saw figures 14.7% lower than those of 2019 (12.85 million vs. 10.96 million). Remarkably, luxury hotels (4- and 5-star categories) even experienced a growth of 0.6%. Figure 1 illustrates performance trends over recent years, excluding the period from April 2020 to April 2021 due to data inconsistencies. A strategic objective derived from Slovakia's national tourism strategies is to increase the average number of overnight stays and mitigate the impacts of seasonality. This paper focuses on these issues, particularly on the dynamics of tourism seasonality.

Figure 1 Number overnight stays and visitors in Slovakia



Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

Seasonality in tourism demand and supply is a fundamental factor that significantly affects the industry. This phenomenon impacts performance, employment, and revenue, creating imbalances that present some of the most complex challenges for tourism management. Destinations often oscillate between under-tourism during off-peak seasons and overtourism during peak periods. Seasonality is the subject of numerous studies, many of which analyze patterns at the level of seasons or months. However, some research delves deeper into the phenomenon using advanced methodologies that demonstrate their validity (Rosselló & Sansó, 2017). Seasonality has socio-economic and environmental implications, with varying impacts and characteristics across countries and destinations (Krabokoukis & Polyzos, 2023). This variability gives rise to destination segments with similar seasonal characteristics, where geographical location often plays a crucial role (Ferrante et al., 2018). Seasonality is largely considered undesirable and represents a negative effect of the supply-demand imbalance, causing significant issues in other sectors as well (Pollice & Mariani, 2025).

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One critical area impacted by seasonality is human resources, where pronounced fluctuations in demand exacerbate labor shortages in the tourism services sector (Jolliffe & Farnsworth, 2003). This issue has been amplified by the pandemic's effects on workforce availability. Additionally, sharp disparities in visitor numbers create challenges in waste management, raising the environmental impact of seasonality and making its mitigation essential for achieving Sustainable Development Goals (SDGs). Therefore, recognizing and responsibly managing seasonality is increasingly important (Caponi, 2022; Zeng et al., 2022). One of the key strategies for addressing seasonality is accurate forecasting of future tourism performance (Nagar et al., 2024). Research frequently employs methods such as the Gini index, entropy, and others to analyze these trends. Studies emphasize the importance of targeted marketing, which should focus not only on low-demand seasons but also on attracting travelers less sensitive to seasonality (Fernández-Morales et al., 2016).

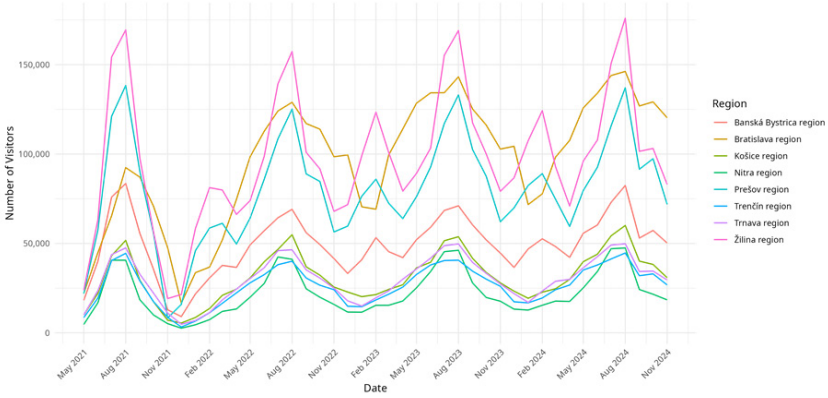
At the micro level, research has revealed that higher-rated hotels demonstrate greater resilience to seasonal fluctuations (Wang et al., 2019). Despite the wealth of studies on this topic, Slovakia is often overlooked in European research. Given this gap and in line with the strategic goals of Slovakia's tourism development documents, this paper aims to assess the dynamics and factors of tourism seasonality from the demand perspective.

Material and methods

To achieve the objective outlined in the previous section, we will primarily employ graphical and analytical research methods, commonly utilized in other studies (Krabokoukis & Polyzos, 2023; Tang et al., 2025). This study relies on open data obtained from the DataCube database of the Statistical Office of the Slovak Republic (Statistical Office of the Slovak Republic, 2025). The dataset covers the period from January 2017 to November 2024.

For this analysis, we excluded data from April 2020 to April 2021 (inclusive) due to the unavailability of reliable data and the significant impact of the COVID-19 pandemic. The remaining months, despite the ongoing pandemic, were included in the analysis. It is worth noting; however, that the winter seasons of 2021 and 2022 may still reflect the lingering effects of the pandemic. As shown in Figure 2, weaker performance during winter months persists even in the post-pandemic period. This suggests that seasonal demand challenges in winter tourism have not fully recovered, necessitating further exploration into the factors driving this continued underperformance.

Figure 2 Number of Visitors by Region



Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

The regional patterns highlight how seasonal variation affects different parts of Slovakia. Žilina and Prešov regions experience the highest peaks in the summer, which suggests a strong influence of tourism or outdoor activities, likely due to the natural beauty and attractions in the areas, such as the High Tatras and historic sites. In contrast, Bratislava region shows more consistent numbers throughout the year, reflecting its status as the capital and economic hub, where activity is driven by a steady flow of residents, business professionals, and tourists, regardless of the season. Banská Bystrica region, with its moderate seasonal variation, likely sees an increase in winter for skiing and other cold-weather activities, while still maintaining activity in the warmer months for hiking and sightseeing. Trnava, Trenčín, and Nitra regions exhibit lower overall numbers, which may be attributed to these areas being less tourist-focused or economically driven by seasonal changes than the other regions. Overall, all regions show clear seasonal patterns, which points to the importance of seasonality in factors like tourism, weather, and possibly even agricultural cycles across Slovakia.

In this study, we will describe the characteristics of seasonality using two key indicators: Average Length of Stay (in days) and Number of Visitors (in absolute values of persons). These indicators will be analyzed based on different types of accommodation. By examining these metrics, we aim to uncover patterns and trends specific to various accommodation categories, providing a comprehensive understanding of seasonality in Slovak tourism.

Results and discussion

In this section, we will focus on the results of the seasonality analysis in Slovakia and discuss the possible causes of these patterns. Figure 3 presents the Average Length of Stay in a month-by-month comparison. This analysis highlights variations in visitors' length of stay across different months, providing insights into the impact of seasonal demand on tourism dynamics.

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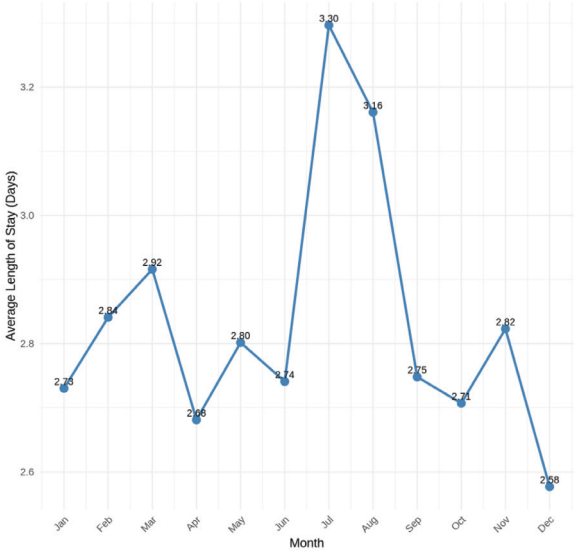
For the Average Length of Stay indicator, a clear peak is observed during the summer months, with visitors spending the longest holidays or visits in Slovakia during July (3.3 days) and August (3.16 days). Conversely, the months with the shortest stays are December (2.58 days) and April (2.68 days). Similarly, short stays are evident in October, June, September, and January.

Figure 3 Monthly Average Length of Stay



Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

To provide a more detailed perspective, Table 1 presents descriptive statistical indicators of the Average Length of Stay segmented by selected accommodation types. This analysis reveals notable differences in visitor behaviour across accommodation categories, highlighting the varying roles they play in the dynamics of Slovak tourism.

Table 1 Descriptive statistics of Average Length of Stay

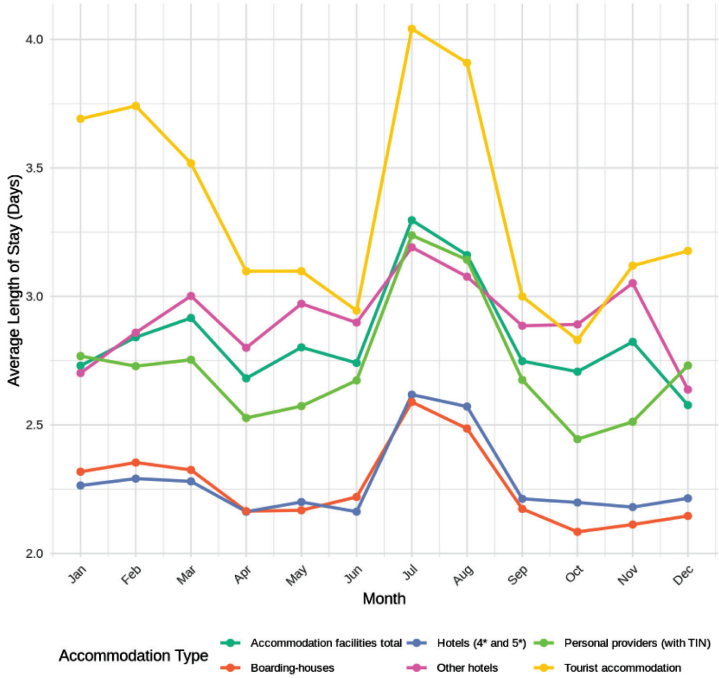
Accommodation_Type	Mean_ Stay	Max_ Stay	Min_ Stay	Peak_ Month	Low_ Month
Tourist accommodation	3.35	4.04	2.83	7.00	10.00
Other hotels	2.91	3.19	2.64	7.00	12.00
Accommod. facilities total	2.84	3.30	2.58	7.00	12.00
Personal providers	2.73	3.24	2.45	7.00	10.00
Hotels (4* and 5*)	2.28	2.62	2.16	7.00	4.00
Boarding-houses	2.26	2.59	2.08	7.00	10.00

Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

The highest average length of stay was observed in Tourist accommodations, which are characterized by lower levels of "comfort and luxury" but are more affordable. This finding highlights the price sensitivity of the demand side and indicates that the typical tourist, compared to other groups, tends to stay for more nights in these types of accommodation. In contrast, the shortest stays were recorded in higher-end hotels and boarding houses, which frequently cater to business clientele, whose stays are typically shorter.

July stands out as the strongest month across all accommodation types for the average length of stay. Conversely, the shortest stays are observed in April for high-end hotels and in October and December for other types of accommodation. Figure 4 illustrates the average length of stay segmented by accommodation type, showcasing the variations across these categories. This analysis underscores the importance of understanding the preferences and behaviour of different visitor segments to better tailor strategies for optimizing stays in various types of lodging.

Figure 4 Average Length of Stay Monthly by Accommodation Type



Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

Based on the referenced graph, several noteworthy patterns can be observed. High-end hotels exhibit an almost identical average length of stay to that of boarding houses, which is likely driven by their significant use by business travelers, who

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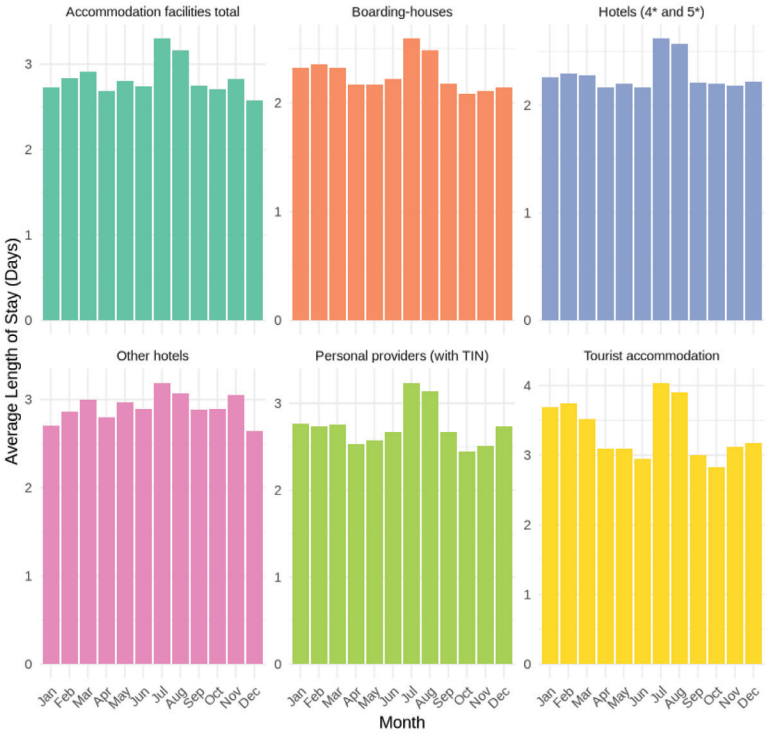
typically have shorter stays. In contrast, tourist accommodations show the highest average values, which remain relatively high even during the winter months. This can be attributed, in part, to their location in mountainous areas, which are appealing not only in the summer but also in the winter and are more affordable for a broader segment of clientele. A similar trend can be observed with personal providers (with Tax Identification Numbers), who often offer accommodations such as cabins or chalets, appealing to visitors seeking affordable and extended stays in nature-centric locations. Figure 5 further highlights the distribution of the Average Length of Stay across each accommodation category individually, providing deeper insights into the unique seasonal and visitor-driven dynamics of each segment.

Figure 5 Average monthly Length of Stay by Accommodation Type

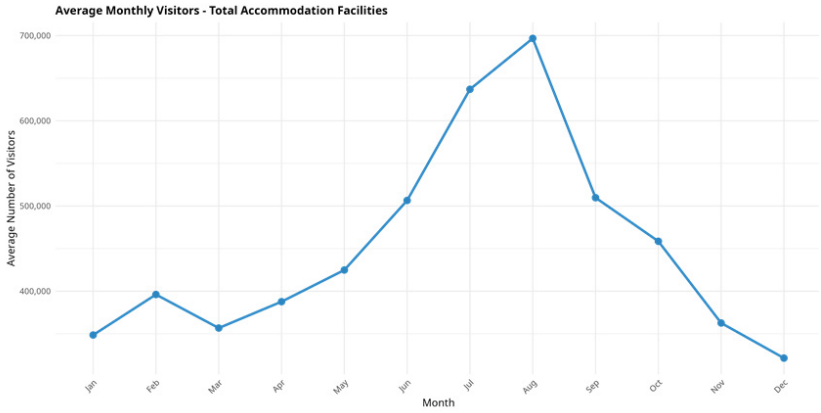


Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

This graph is primarily used to compare variability and patterns of seasonality without distortion from the X-axis, as seen in Figure 3. The most consistent average length of stay is observed in lower-tier hotels (other hotels), where the weakest month of the year is December, which does not apply to other types of accommodation establishments. It seems very likely that these lower-tier hotels are responsible for lowering the overall average of all accommodations in December. In the case of other

types of accommodation, we observe similar patterns of seasonality for the indicator of average length of stay. In the following Figure 6, we present the development of the indicator 'Number of Visitors'—the average value for the monitored years every month.

Figure 6 Average monthly Number of Visitors



Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

The seasonality of the number of visitors in Slovakia does not exhibit as many peaks as the average length of stay. Only two peaks can be observed—one in August and one in February (which may be influenced by domestic tourism, as there are spring school holidays in Slovakia during this period). The lowest average number of visitors is recorded in December (321,507), while the number more than doubles in August (696,676). Even several fairly strong weeks at the turn of December and January do not increase the average attendance numbers of accommodation establishments. In Table 2, we present the descriptive statistics for the 'Number of Visitors' indicator by accommodation type.

Table 2 Descriptive statistics of Number of Visitors

Accommodation_Type	Mean_ Visit	Max_ Visit	Min_ Visit	Peak_ Month	Low_ Month
Hotels (4* and 5*)	34231	214689	583	8	12
Other hotels	29542	216093	746	8	12
Boarding-houses	13320	116574	634	8	12
Tourist accommodation	6254	59758	87	8	2
Personal providers	2591	30946	53	8	12

Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

The lowest average attendance was recorded for private accommodation providers. On the other hand, the highest attendance was recorded for the highest-tier hotels and other hotels. This group may have a significant impact on increasing

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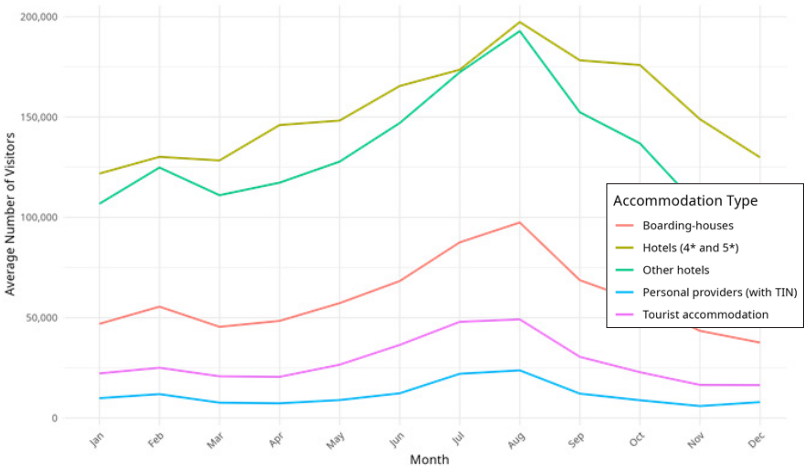
the average length of stay. The highest number of visitors was recorded across all accommodation types in August. Figure 7 shows the average number of visitors for each month of the year in the defined period.

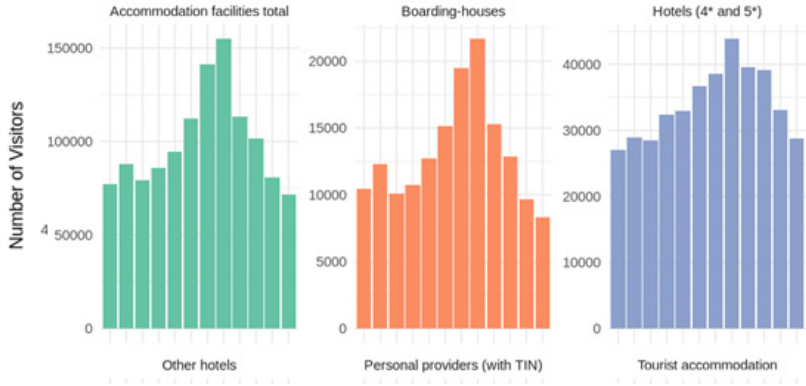
Figure 7 Average monthly Number of Visitors by Accommodation Type

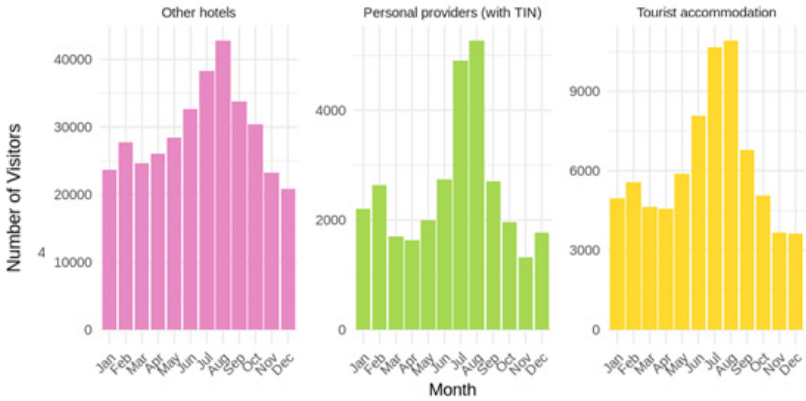


Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

The pattern of seasonality is very similar for tourist accommodation, personal providers, and boarding-houses. A distinctly sharper trend is present for both higher-tier and lower-tier hotels. Visitor accommodation in hotels increases significantly during the summer months. In Figure 8, we can observe the distribution of the number of visitors for each group separately.

Figure 8 Average Number of Visitors by Accommodation Type





Source: own processing using data from the Statistical Office of the Slovak Republic (2025)

Based on the analysis of the graph, it can be seen that, except in higher-tier hotels, where this pattern is less pronounced, a significant second peak is noticeable in the winter period, specifically in February. Slovakia's tourism industry demonstrates clear seasonal patterns, with summer emerging as the dominant period for all accommodations. July and August consistently see the highest visitor numbers, driven by favourable weather, school holidays, and the appeal of Slovakia's outdoor attractions, such as hiking, national parks, and water activities. This peak period reflects the strong reliance on summer leisure travel across the sector. Conversely, winter tourism is significant but more selective, with higher-end hotels and overall accommodations benefiting from a meaningful rise in December and January. This increase is tied to the popularity of ski resorts, festive celebrations, and winter sports, catering to a mix of domestic and international visitors.

However, the off-peak season (late autumn and early spring) poses challenges across most accommodation categories. These periods see the lowest visitor numbers, reflecting the limited tourism activities available during these months. This gap presents an opportunity for growth by promoting off-season attractions, such as cultural festivals, wellness retreats, or city tourism. Accommodation-specific trends further reveal that luxury hotels and overall facilities show greater resilience to seasonal fluctuations, likely due to their ability to attract business travelers and high-value tourists year-round. In contrast, boarding houses and tourist accommodations experience more pronounced seasonality, relying heavily on summer traffic and struggling during the winter and shoulder seasons. Addressing these disparities could help balance demand and stabilize the tourism sector throughout the year.

Conclusion

This analysis of seasonality in Slovakia's tourism sector reveals significant trends in both the Average Length of Stay and the Number of Visitors. Overall, summer months, especially July and August, emerge as the peak periods for both metrics, while winter months, particularly December and February, show notable variations depending on the type of accommodation.

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The Average Length of Stay is the longest in July and August across all accommodation types, driven largely by the appeal of Slovakia's outdoor activities, such as hiking and national park visits. The highest average stays are seen in tourist accommodations, which are more affordable and cater to longer stays, while luxury hotels exhibit shorter stays, largely due to business travelers. This trend highlights the importance of pricing and accommodation type in influencing tourist behavior, with more affordable options encouraging extended stays. In contrast, the Number of Visitors shows a more concentrated peak in August, with a smaller secondary peak in February, likely influenced by domestic tourism during spring school holidays. Lower-tier accommodations (e.g., private providers) recorded the lowest visitor numbers, while high-end hotels attracted the most visitors. Despite strong winter tourism in December and January, particularly in ski resorts, the overall number of visitors remains lower in the off-season months, posing a challenge for many accommodation types. The seasonality observed in the data underscores the significance of the summer period for the Slovak tourism sector, while also highlighting the resilience of higher-tier hotels and luxury facilities to seasonal fluctuations. These establishments benefit from year-round demand, often driven by business travelers, while other types of accommodations, like boarding houses and tourist accommodations, are more dependent on summer stays. The off-peak seasons (late autumn and early spring) represent a challenge, with lower numbers of visitors due to fewer activities and attractions during these months. This gap offers an opportunity to diversify tourism supply, potentially through promoting cultural events, wellness tourism, or city-based experiences, to maintain more stable demand throughout the year.

Overall, understanding the seasonal patterns and accommodation-specific trends is essential for optimizing marketing strategies, enhancing tourist experience, and developing targeted initiatives to boost tourism during the off-peak seasons.

Acknowledgements
This research was supported by the project KEGA 020EU-4/2024 "Game-based learning (GBL) - innovation in teaching and training of tourism students".

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BENCHMARKING THE MARKETING MIX OF LEADING ENERGY DRINK BRANDS

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Received: 09. October 2024 Reviewed:18. November 2024 Accepted: 05. December 2024

Abstract

This research examines the market positioning of five energy drink brands - Tiger, Monster, Big Shock, Semtex, and Rockstar, produced by Maspex Czech s.r.o., Coca-Cola s.r.o., Big Shock s.r.o., Kofola a.s., and PepsiCo s.r.o., respectively, in the Czech Republic. Utilizing a survey-based benchmarking approach, the study evaluates their marketing mix components: product, price, distribution, and promotion. The results reveal Tiger as the market leader, excelling in promotion and pricing, followed closely by Monster, known for its strong branding, diverse portfolio and extensive market reach. Big Shock ranked third, leveraging its distribution network but lagging in product variety. Semtex excelled in pricing, while Rockstar ranked lowest due to weaknesses in distribution and promotion. The findings emphasize how distinct strategies influence market positioning and underscore the need for innovation and enhanced promotional efforts. Limitations include the focus on a single market, reliance on survey-based data, and exclusion of sustainability factors and digital trends.

Key words: Energy drinks, Czech Republic, Marketing, Beverages

JEL Classification: M31, L66, D22

Introduction and theoretical background

Not only did the COVID-19 pandemic disrupt global markets, it also altered consumer behavior significantly, creating a critical need for industries, including energy drink brands, to reevaluate and optimize their marketing strategies in response to the shifting dynamics of demand and engagement (Solej, 2024). The marketing mix is currently a key marketing tool for every company to remain competitive in the marketplace. The demand for improving the marketing mix is constantly increasing. Marketing capabilities play a significant role in the complex competitive environment due to the growing interest of companies in achieving better performance and differentiating themselves in the market (Matte et al., 2020, Pollák et al., 2021). Marketing strategy is a challenging task in a competitive market: it involves planning, techniques and mechanisms to achieve the most effective results under given circumstances and determine ideal outcomes (Abedian et al., 2021, Saruc NT et al., 2013). Marketing in the market has become increasingly volatile and demands resilience and the ability to adapt and thrive despite disruptions and adverse changes (Golgeci & Kuivalainen, 2020). The barriers to effective marketing include insufficient market focus, misunderstanding of customer needs, inadequate competition mapping, poor customer relationships, missed opportunities, insufficient marketing planning, inadequate emphasis on production methods, weak brand-building efforts, poor organizational structure and the underutilization of technology. Through the marketing mix, several marketing features can be identified that lead to the formulation of problems. Marketing mix patterns measure the effectiveness of various activities, such as television advertising (Chen et al., 2021, Pollák, F., & Markovič, P., 2021). It is assumed that the fundamental elements of the marketing mix are product, price, place, and promotion, collectively known as the 4Ps. Despite its popularity, the 4P model has faced criticism over time as marketing science has evolved, leading researchers to redefine the original model by expanding it with additional Ps to improve the marketing mix (Lahtinen, Dietrich, & Rundle, 2020). Marketing has also been criticized, especially for rising costs, negative social impact, and undesirable ecological effects. If management placed greater emphasis on what could be sold rather than on what would be sold, many marketing shortcomings could be addressed. Researchers have been studying the development of marketing strategies for a long time; however, this development has become outdated in recent years due to a complete change in consumer behavior (Laburtseva et al., 2021, Straková et al., 2021), which will continue to evolve.

The importance of the marketing mix, comprising product, price, place and promotion has grown as companies seek to differentiate themselves in increasingly saturated markets. While fundamental, the 4P framework requires adaptation to address modern challenges such as digital transformation and sustainability. Despite its established role, there is limited research comparing the marketing mix of competing energy drink brands to identify best practices and gaps. This research addresses this gap by using a benchmarking approach to evaluate the marketing mix strategies of five leading energy drink brands in the Czech Republic. By systematically comparing these strategies, the study provides insights into how different marketing efforts influence consumer preferences and market positioning. Furthermore, this research examines the impact of digitalisation and sustainability on the 4P model and provides recommendations for future marketing strategies.

The novelty of this study lies in its focused benchmarking methodology, which quantifies and compares marketing performance across brands using a mix of consumer surveys and weighted criteria. This approach provides a nuanced

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understanding of how each brand uses its marketing mix to achieve competitive advantage.

The paper is structured as follows: Section 2 presents the theoretical framework, including a review of the benchmarking literature and the development of the 4P model. Section 3 outlines the methodology, highlighting the rationale behind the chosen approach and data collection methods. Section 4 discusses the findings, providing a critical analysis in the context of existing research. Section 5 concludes the paper with key findings, limitations and implications for future research.

The research will involve comparing the marketing mix within the energy drinks sector across these companies. To achieve this, a key research question has been established:

RQ: What is the market position of individual companies in the energy drinks sector?

Literature review

Benchmarking as a tool for evaluating marketing strategies is widely recognized for its ability to identify best practices and areas for improvement. Hammer and Champy (1993) defined benchmarking as a systematic approach to evaluating performance by comparing practices across organizations. Francis and Holloway (2007) emphasized the importance of using benchmarking to measure and improve marketing effectiveness, particularly in competitive industries such as beverages. Moriarty and Smallman (2009) extended this perspective by advocating a balanced approach that integrates quantitative and qualitative measures in marketing evaluation. This study applies these principles to benchmark the marketing mix strategies of leading energy drink brands, providing actionable insights into their market positioning.

Benchmarking in the Czech context with its competitive energy drink market, provides a valuable case study for benchmarking the marketing mix. Studies by Pollák et al. (2021) have highlighted the critical role of digital customer communities in influencing brand perceptions during periods of market disruption, such as the COVID-19 pandemic. Similarly, Straková et al. (2021) analysed sustainable development practices in Czech companies, highlighting the importance of aligning marketing strategies with sustainability goals to meet evolving consumer expectations. These studies underscore the need for localised strategies that address the unique preferences of Czech consumers, such as health and environmental awareness.

The marketing mix of beverage companies in the energy drinks industry is a multifaceted topic that encompasses product, price, place, and promotion strategies tailored to attract a specific demographic, primarily young adults and athletes. This analysis synthesizes various studies to elucidate how these strategies are employed by leading brands in the energy drink sector.

Product Strategy: Energy drinks are marketed as functional beverages that enhance physical and cognitive performance. Leading brands like Red Bull and Monster emphasize high caffeine content and additional ingredients such as taurine and guarana, which are claimed to improve alertness and reduce fatigue (Curran & Marczinski, 2017). A systematic review by Nadeem et al. highlights that energy drink consumption is frequently associated with insomnia and other adverse health outcomes, reflecting the dual nature of product marketing that promotes performance while potentially neglecting health risks (Nadeem et al., 2020). Furthermore, the packaging and branding often reflect an adventurous lifestyle, appealing to the interests of their target audience (Roscoe et al., 2023). The introduction of sugar-free and organic variants also caters to

health-conscious consumers, as seen in the growing market for herbal energy drinks (Ali, 2023).

Pricing Strategy: The pricing of energy drinks is generally positioned at a premium compared to traditional soft drinks, which reflects their marketed benefits and production costs (Peterson, 2013). This premium pricing is often justified by the perceived value among consumers who associate higher prices with better quality and efficacy in enhancing performance (Alsunni, 2015). For example, Al-Waalan and Khamees note that energy drinks are commonly consumed during sports activities and social events, indicating a willingness among consumers to pay more for perceived benefits (Al-Waalan & Khamees, 2021). Additionally, promotional pricing strategies, such as discounts during sporting events or bundled offers, are common to stimulate trial and increase market penetration (Hammond & Reid, 2017).

Place Strategy: Distribution channels for energy drinks are strategically chosen to maximize visibility among the target demographic. Energy drinks are widely available in convenience stores, gyms, and online platforms, ensuring accessibility for young consumers who are often on-the-go (Wiggers et al., 2019; Yang et al., 2022). The placement of these products in environments frequented by young adults, such as college campuses and sporting events, further reinforces their market presence (Larson et al., 2014).

Promotion Strategy: The promotional tactics employed by energy drink companies are particularly aggressive. Sponsorship of extreme sports events and athletes is a hallmark of energy drink marketing, which enhances brand visibility and aligns the product with high-energy lifestyles (Higgins et al., 2018). For instance, Doggett et al. found that energy drinks are often marketed alongside alcohol, particularly among youth, which raises concerns about the health implications of such marketing strategies (Doggett et al., 2019). Digital marketing plays a crucial role, with brands leveraging social media platforms to engage with consumers through interactive content that resonates with their aspirations (Abetkoff et al., 2015). This approach is particularly effective in shaping positive attitudes towards energy drinks among young adults, as studies indicate that exposure to such marketing correlates with increased consumption (Wiggers et al., 2019).

Moreover, the marketing messages often highlight the benefits of energy drinks, such as improved performance and enhanced mood, which appeal to the aspirations of young consumers (Buchanan et al., 2018; Kim et al., 2015). However, there are growing concerns regarding the health implications of these beverages, particularly among adolescents, prompting calls for more responsible marketing practices (Peker, 2023; Alsunni, 2015).

Integrating AI and sustainability into the marketing mix is a critical area of innovation for energy drink brands. AI-driven tools enable personalized consumer experiences, from targeted advertising to chatbots that improve customer service. Sustainability, meanwhile, is driving companies to adopt environmentally friendly practices, such as reducing carbon footprint and using biodegradable packaging. As the energy drink industry evolves, the 4P model will need to incorporate these dimensions to remain relevant. For example, promotional strategies may need to be aligned with sustainability goals to maintain consumer trust and brand loyalty. Similarly, AI can increase the efficiency of marketing efforts and provide a competitive edge in data-driven decision making (Golgeci, I., & Kuivalainen, O. 2020).

In conclusion, the marketing mix of energy drink companies is designed to attract and retain a youthful consumer base through targeted product offerings, strategic pricing, accessible distribution, and aggressive promotional campaigns. As

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the industry continues to evolve, it remains essential for companies to balance marketing strategies with consumer health considerations to maintain trust and brand loyalty.

Material and methods

The primary goal of this research is to compare and critically evaluate the marketing mix strategies of five key companies operating within the energy drinks sector in the Czech Republic – Coca-Cola s.r.o., PepsiCo s.r.o., Kofola a.s., Maspex Czech s.r.o., and Big Shock s.r.o. – through their respective products, Tiger, Monster, Big Shock, Semtex, and Rockstar. By employing a benchmarking methodology, the study seeks to analyze the competitive market positioning of these brands and pinpoint weaknesses in their marketing mix strategies. The findings aim to offer actionable recommendations for improving their marketing efforts, strengthening their market presence and fostering stronger relationships with both customers and the broader market environment. The study utilizes both primary and secondary data sources to ensure a comprehensive evaluation. The data collection methods include the following methodologies:

Benchmarking: Benchmarking is a proven approach to comparing and evaluating organisational performance and strategy, particularly in competitive industries. It enables researchers to identify best practice by evaluating the components of the marketing mix (product, price, place and promotion) against pre-defined criteria. The rationale for using this approach lies in its ability to provide quantitative and qualitative insights into how brands achieve competitive advantage in a dynamic marketplace. Benchmarking has been used effectively in similar studies to assess marketing effectiveness and consumer engagement (Hammer & Champy, 1993; Francis & Holloway, 2007). Each component of the marketing mix is evaluated using pre-determined criteria:

Survey design and scoring:
The survey was designed to measure the effectiveness of each brand's marketing mix by assigning scores to four components:

Product: Scored on taste, product portfolio, design and logo.
Price: Scored on fairness, promotional discounts and competitive pricing.
Place (distribution): Judged on product availability, delivery efficiency and customer service.
Promotion: Analysed through advertising reach, website presence and promotional contests.

Each component was given a total weight of 25 points, distributed across sub-criteria based on their relative importance. Respondents rated each criterion on a scale of 1 to 9, with higher scores indicating better performance. The total score for each brand was calculated by summing the weighted scores of the four components.

Data analysis
The data collected was processed using Microsoft Excel to produce tables and graphs visualising the comparative performance of the five brands. Statistical methods, including weighted averages, were used to ensure an accurate representation of the marketing mix effectiveness.

Results and discussion

The results and discussion section presents a detailed analysis of the marketing mix strategies employed by key players in the energy drinks industry, evaluated through a survey-based benchmarking approach. By examining product attributes, pricing strategies, distribution efficiency, and promotional efforts, this chapter aims to assess the market positioning of Monster, Tiger, Big Shock, Semtex, and Rockstar, offering insights into their competitive strengths and areas for improvement.

The comparison of the marketing mix is presented in Table 1, which organizes all collected data and ranks companies based on their strength in the energy drinks industry. The table records the respective scores derived from the evaluation of the survey responses. In the product evaluation category, Monster energy drink achieved the highest score, with a total of 6.04. It was followed by Tiger, scoring 5.12, and Rockstar with 4,04. Semtex ranked second to last with a score of 2.80, while Big Shock, with a score of 2.56, was identified as having the weakest market position in terms of product evaluation. In the pricing category, Semtex emerged as the strongest product, with the highest score of 7.32, closely followed by Tiger with a total score of 7.04. Big Shock secured third place with 6.44, while Monster scored 6. Rockstar, with a score of 5.72, ranked as the weakest in terms of pricing. In the distribution component of the marketing mix, Big Shock dominated with a score of 8.36, followed by Monster with a score of 7.08. Tiger achieved a score of 6.68, securing the third position. Semtex ranked fourth with a recalculated score of 6.40, and Rockstar was evaluated as the weakest product in distribution, with a score of 5.04. Finally, in the promotion category, Tiger ranked first with the highest score of 7.52. Monster followed with a score of 6.64, closely trailed by Big Shock, which achieved a score of 6.6. Semtex ranked second to last with a score of 5.64, and Rockstar, with a score of 4.72, was identified as the weakest in terms of promotional activities.

Table 1 Comparison of the marketing mix

		Allocation of weights to each criterion		Monster		Rockstar		Semtex		Tiger		Big Shock	
	Score:	Point	Weight	Point	Weight	Point	Weight	Point	Weight	Point	Weight	Point	Weight
	Criteria:												
Product	Taste	5	0,2	5	1	1	0,2	3	0,6	4	0,8	2	0,4
	Portfolio	5	0,2	4	0,8	3	0,6	2	0,4	5	1	2	0,4
	Design	8	0,32	8	2,56	4	1,28	3	0,96	6	1,92	2	0,64
	Logo	7	0,28	6	1,68	7	1,96	3	0,84	5	1,4	4	1,12
	Final evaluation	25	1		**6,04**		**4,04**		**2,8**		**5,12**		**2,56**
Price	Reasonableness of price	8	0,32	4	1,28	6	1,92	8	2,56	7	2,24	5	1,6
	Discount promotions	8	0,32	8	2,56	4	1,28	7	2,24	6	1,92	5	1,6
	Price comparison	9	0,36	6	2,16	7	2,52	7	2,52	8	2,88	9	3,24
	Final evaluation	25	1		**6**		**5,72**		**7,32**		**7,04**		**6,44**

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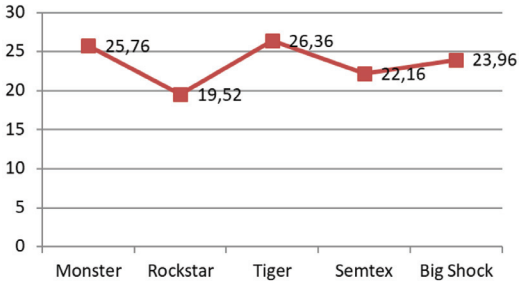
Place	Product availability	9	0,36	9	3,24	6	2,16	8	2,88	7	2,52	9	3,24
	Product delivery	8	0,32	5	1,6	4	1,28	6	1,92	7	2,24	8	2,56
	Customer service	8	0,32	7	2,24	5	1,6	5	1,6	6	1,92	8	2,56
	Final evaluation	25	1		**7,08**		**5,04**		**6,4**		**6,68**		**8,36**
Promotion	Advertisement	9	0,36	5	1,8	4	1,44	6	2,16	8	2,88	9	3,24
	Website	7	0,28	7	1,96	4	1,12	6	1,68	5	1,4	3	0,84
	Competition	9	0,36	8	2,88	6	2,16	5	1,8	9	3,24	7	2,52
	Final evaluation	25	1		**6,64**		**4,72**		**5,64**		**7,52**		**6,6**

Source: own elaboration

Based on Table 1, which illustrates the market positioning of energy drinks, a comprehensive evaluation was conducted by summing the total weighted scores of each brand across the marketing mix criteria. The results indicate that the energy drink Tiger achieved the highest overall score of 26.36, reflecting its strong performance across multiple dimensions, including product quality, price competitiveness, effective distribution and impactful promotion strategies. This positions Tiger as the leader in the evaluated market. Following closely, the energy drink Monster secured second place with a total score of 25.76. Monster's consistent performance can be attributed to its strong branding, diverse product portfolio and wide market reach, though it slightly lags Tiger in certain areas like promotional effectiveness. In third place is the energy drink Big Shock, with an overall score of 23.96. Big Shock's notable strengths lie in its robust distribution network and targeted marketing strategies, particularly within its niche market of athletes and fitness enthusiasts. However, its narrower product range and moderate pricing slightly diminish its overall competitive standing. The energy drink Semtex follows in fourth place with a total score of 22.16. Semtex performs strongly in the price category, offering competitive pricing and value-based promotions but it underperforms in areas such as product innovation and market presence. Finally, Rockstar ranks last with a total score of 19.52, indicating significant weaknesses in its marketing mix. While Rockstar demonstrates potential in certain aspects of promotion and product innovation, its lower scores in pricing and distribution reflect areas where improvements are needed to enhance its market positioning. These results highlight the diverse strategies employed by each brand and their respective strengths and weaknesses. Tiger's strong overall performance emphasizes its dominance in the energy drink market, while Monster remains a close competitor. Brands like Big Shock and Semtex hold niche positions with specific strengths, whereas Rockstar faces challenges that require strategic adjustments to improve its competitive edge.

Chart 1 Evaluation of total score



Source: own elaboration

This chart represents the evaluation of the total scores, which summarize the market position of the five energy drink brands based on their performance across the marketing mix components. The total scores reflect the cumulative effectiveness of each brand's strategies in product development, pricing, distribution, and promotion.

The results show a clear need for brands to adapt their marketing strategies to the emerging trends in AI and sustainability. AI-driven tools, such as personalised advertising and data analytics, offer opportunities to improve advertising effectiveness and consumer targeting. For example, Monster could use AI to develop tailored campaigns that resonate with specific demographic segments in the Czech market. As consumer preferences shift towards environmentally friendly products, brands must innovate to incorporate sustainability into their marketing mix. Tiger and Semtex, for example, could introduce recyclable packaging or organic product variants to align with this trend and improve their competitive positioning. As consumer preferences shift towards eco-friendly products, brands must innovate to incorporate sustainability into their marketing mix. Tiger and Semtex, for example, could introduce recyclable packaging or organic product variants to meet this trend and improve their competitive positioning.

These findings are consistent with trends observed in other studies of energy drink marketing. For example, the success of Tiger's promotional efforts is consistent with the findings of Higgins et al. (2018), while the challenges faced by Semtex and Rockstar reflect the observations of Golgeci and Kuivalainen (2020) on the importance of aligning marketing strategies with consumer expectations. However, the study's focus on the Czech market highlights unique insights into localised strategies that may not be apparent in global analyses.

Conclusion

The primary goal of this research was to evaluate and compare the market position of five energy drink brands - Tiger, Monster, Big Shock, Semtex, and Rockstar - produced by Maspex Czech s.r.o., Coca-Cola s.r.o., Big Shock s.r.o., Kofola a.s., and PepsiCo s.r.o., respectively. Through an in-depth analysis of their marketing mix components - product, price, distribution, and promotion, the study sought to identify

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the strengths and weaknesses of each brand and provide insights into their competitive positioning within the energy drinks market.

By employing a survey-based benchmarking approach, this research addressed the question: What is the market position of individual companies in the energy drinks sector?

The results revealed significant differences in market positioning among the five brands. Tiger (Maspex Czech s.r.o.) achieved the highest overall score, excelling across all aspects of the marketing mix, particularly in promotion and pricing, positioning it as the market leader. Monster (Coca-Cola s.r.o.) ranked second, leveraging globally recognized branding a diverse product portfolio and effective distribution channels although its pricing strategy slightly hindered its competitiveness compared to Tiger. Big Shock (Big Shock s.r.o.) secured third place, demonstrating strength in distribution and its niche focus on athletes, but its limited product diversity and moderate promotional efforts weakened its overall market position. Semtex (Kofola a.s.) performed well in pricing, offering competitive value to consumers, but underperformed in other areas, particularly product innovation and distribution. Finally, Rockstar (PepsiCo s.r.o.) ranked lowest, indicating significant challenges in multiple aspects of its marketing mix, such as distribution and promotion, which require substantial improvement to remain competitive. These results directly answer the research question by highlighting each company's strengths and weaknesses in the energy drinks sector. Tiger's balanced approach emphasizes its dominance in the Czech market while Monster's branding and market reach position it as a strong competitor. Big Shock's success in niche markets demonstrates the value of targeted distribution while Semtex and Rockstar underscore the importance of innovation and promotional effectiveness in achieving stronger market positions. The study also provided broader insights into how different marketing strategies shape consumer perceptions and market positioning. Tiger's success underscores the importance of a well-rounded and targeted marketing approach, while Monster and Big Shock emphasize the value of strong branding and distribution capabilities. In contrast, the underperformance of Semtex and Rockstar highlights the need for enhancements in product innovation, pricing strategies and impactful promotional campaigns. Based on the findings, the following recommendations are proposed:

Tiger: Maintain its strong promotional strategies while investing in product innovation, particularly in healthier and more sustainable options.

Monster: Increase localised marketing efforts and explore event and influencer partnerships to strengthen its presence in the Czech market.

Big Shock: Expand its product portfolio and refine its promotional strategies to appeal to a wider audience.

Semtex: Leverage its competitive price advantage to target cost-sensitive segments while improving product innovation and promotional efforts.

Rockstar: Focus on strengthening its distribution channels and launching high-impact marketing campaigns to rebuild brand awareness and market share.

Despite these contributions the research is subject to certain limitations. First, it focused exclusively on the Czech market, which may not fully reflect the global positioning of these brands due to regional differences in consumer behavior and market dynamics. Second, the reliance on survey responses introduces the possibility of subjective biases and limits the findings. Lastly, the analysis was restricted to specific criteria within the marketing mix, excluding important factors such as sustainability

practices, digital transformation strategies or long-term market trends. Future research could address these limitations by including a broader geographic scope, incorporating additional data sources, and examining emerging trends in the energy drinks industry. This study provides a solid foundation for understanding the competitive landscape of energy drink brands in the Czech Republic and offers actionable insights for enhancing their marketing strategies.

Acknowledgement: This article is one of the partial outputs of the currently implemented research grant Scientific Grant Agency of the Ministry of Education and Science of the Slovak Republic and the Slovak Academy of Sciences (VEGA) 1/0110/24.

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THE EMOTIONAL INTELLIGENCE OF UNIVERSITY STUDENTS IN THREE DIMENSIONS: THE TRAIT META MOOD SCALE 24

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Received:30. September 2024 Reviewed: 17. November 2024 Accepted: 22. December 2024

Abstract

Emotional intelligence is the ability of individuals to recognize their own emotions and the emotions of others, to distinguish between different feelings and label them appropriately, to adjust and manage emotions in order to achieve goals. Emotional intelligence is considered an important factor in shaping the behaviour of individuals. The perception of the importance of emotional intelligence was the main reason for choosing the topic. The main objective of the presented paper is to analyse and determine the dependence between the individual components of emotional intelligence and gender, the studied faculty or study programme and the year of study. Two faculties were examined, namely the Faculty of Management and Economics and the Faculty of Humanities of Tomas Bata University in Zlin. The years compared were the first and the fifth. The author set a total of nine hypotheses, which were divided into three groups according to the degree of emotional attention, emotional clarity and emotional repair. A total of 771 students from the above-mentioned faculties participated in the research. The research was conducted from April to October 2024. The research results show evidence of dependencies between individual components of emotional intelligence and the factors examined - gender, faculty, and year of study.

Keywords: emotional intelligence, emotional attention, emotional clarity, emotional repair, TMMS 24

JEL Classification: M10, M12, M14

Introduction and theoretical background

Emotional Intelligence

The importance of social and emotional intelligence is currently gaining importance, not only among working people but especially among the population preparing for their next career. The concept of emotional intelligence has been the subject of much research over the past 25 years (Thomas, 2020). Goleman (1998) argues in his publication that emotional intelligence is a subset of social intelligence, and it includes the ability to monitor one's own and others' feelings and emotions. Another

dimension, according to Goleman, is the ability to distinguish between them and use this information to guide thinking and action. This is a basic prerequisite for successful preparation for the next career of university students. The concept of emotional intelligence and its application in everyday life is a relatively recent behavioral model that came to the fore thanks to Daniel Goleman's 1995 book entitled "Emotional Intelligence" (Birajdar, 2016). Mayer and Salovey (1995) also address this issue in their publication and argue that emotional intelligence is a set of skills that explain the use of emotions for more effective thinking by providing a unified understanding of cognitive and emotional abilities. They further argue (1990) that emotional intelligence is also the mental ability of individuals to perceive, understand and assess their own and others' emotions, as well as to manage, regulate and apply them. Pumaluegue (2021) also explores the issue of emotional intelligence, arguing that it is essential for socialization and adaptation to the environment. Emotional intelligence helps people understand how to influence the emotions of others and themselves in an adaptive and intelligent way.

Alshebami (2020) explains that emotional intelligence can be used by both employees working in organizations and students in educational institutions, in various aspects of life. It provides a solid emotional foundation for students, essential for choosing their educational profile or desired university, ensuring a better future for them and thus enabling them to achieve their goals. This idea is also supported by Hrivnák (2021), who argues that intellectual capital is a critical role of human capital and education. According to Kalia (2020), EI also includes the idea that people have the ability to perceive, evaluate and express emotions. Chuahan (2020) further adds to this idea the ability to identify, understand, manage and use emotions in positive ways to relieve stress, mitigate conflicts, communicate effectively, empathize with others and overcome challenges.

Emotional intelligence also has potential health benefits, both physical and mental (Llamas-Diaz et al., 2022). From a mental health perspective, it is essential to consider the relationship between emotional intelligence and other psychological variables, not only negative ones but also those that indicate positive mental health. It is precisely this aspect that emotional intelligence can help regulate and control emotions, experience more positive emotions, cope better with problems and relationships, and thus have a more positive self-esteem (Moafian and Ghanizadeh, 2009). People with high emotional intelligence control their emotions and behavior. Consequently, their stress levels are naturally lower (Puri, 2016).

An integral part of adaptive management of cognitive, emotional and self-relevant decisions (Hoge 2021; Wing et al. 2008) is also self-regulation, which results in the alignment of mental states and behavior of management subjects with goals. Emotional intelligence, according to Kozáková and Saliger (2024), includes the ability to correctly identify emotions in oneself and others, understand emotions and their language, manage emotions in oneself and others, and use emotions to support cognitive activities and motivate adaptive behavior.

Machera (2017) argues that emotional intelligence skills and techniques can be developed throughout a person's life as part of lifelong learning and form the basis for a balanced lifestyle. In the educational process, therefore, according to Wang (2018), teachers and students transfer not only cognitive information, but also emotional information exchange. Employment is also an important part of an adult's life, and Hajduová (2021) comes up with the idea that focusing on human resources is considered a priority that organizational management has the obligation to embed in its long-term strategy. This idea is also supported by Gonos (2021), who argues

that identifying employee needs increases the efficiency of internal processes. He sees employee engagement and motivation as a key factor. One possible result is that emotion regulation enables individuals to manage their emotional changes. This ability helps people effectively perform cognitive activities like reasoning, problem-solving, and decision-making (Papadogiannis et al., 2009).

University Studies

Emotional intelligence is a set of learned skills and competencies that predict positive outcomes at home with family, at school and at work. Goleman (1995) explained that people who have the above mentioned skills and competencies are healthier, less depressed and have better relationships. Emotional intelligence, which has the potential to protect mental health, has received increased attention in recent years (Mancini et al., 2022). The positive impact of emotional intelligence on education has also received widespread attention from experts around the world (Parker et al., 2006; Pishghadam et al., 2022). With a significant increase in stress and other emotional disorders among students, it is necessary to determine whether high emotional intelligence could help better manage stress (Sen, 2020). The connection between emotions, interpersonal skills and stress in university students is also addressed by Birajdar (2016). The idea of emotional intelligence as a critical factor in predicting academic success, personal well-being, and interpersonal relationships among college students is also supported by Durlak et al. (2011). Emotional intelligence thus refers to the ability to recognize, understand, and manage one's own and others' emotions (Salovey & Mayer, 1995). The importance of emotional intelligence, according to Salim (2018), is undeniable in determining a person's success in all aspects of life, especially among college students and universities. Novotná (2023) points out the importance of higher education and formulates recommendations for colleges, especially in the area of entrepreneurship education, which she considers very important. Barna (2022) also supports a similar idea, highlighting the importance of constructive feedback that will lead to increased performance and thus motivation. Perceived emotional intelligence, according to Lopes (2024), is the ability to understand emotions, which is essential in an academic environment.

Motivation is a necessary factor for university students (Daniels et al., 2021) to be interested and actively involved in their learning. Tang (2023) also addresses the same issue and also points out the significant influence between emotional intelligence and motivation to learn. Colleges and universities are important stages for shaping and developing students' thinking ideology, as well as an important period for improving students' emotional intelligence (Lin, 2015). Motivation to learn is very critical for students as a key predictor of learning success (Pelikan et al., 2021). For this reason, it is an interesting question to find out what the protective factors of university students' study motivation are. Students with high emotional intelligence are more likely to have good academic experiences (Tang, 2023), which positively affect their academic motivation. Student engagement is a key predictor of academic performance, persistence, and retention in higher education (Maguire, 2016). According to Tapia (2001), emotional intelligence positively impacts students' ability to manage their emotions, recognize others' emotions, maintain a good state of mind, and take appropriate action.

Dimensions of Emotional Intelligence

This chapter focuses on three essential dimensions of emotional intelligence – emotional attention, emotional clarity, and emotional repair – and their importance for college students. By developing these dimensions, students can improve their academic performance, mental health, and interpersonal relationships. The underlying factor for these three dimensions is emotional intelligence, which is the ability to recognize and manage one's own feelings and emotions.

Emotional intelligence is a set of abilities that enable an individual to effectively perceive, understand, manage, and express emotions, both one's own and those of others (Mayer & Salovey, 1995). In the context of the college environment, where students face a variety of academic and social challenges, EI plays a key role in their adaptation, success, and mental health.

The Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) is a self-report model of abilities composed of three dimensions that are organized hierarchically. First comes the attention process, followed by the clarity process, and finally the emotion correction process (Câmara, 2023). Clarity corresponds to the ability to recognize and understand one's own emotions identified in the previous process. Recognizing and understanding emotions leads to the final process: correction. This process allows one to control both positive and negative emotions and use them to achieve the most appropriate emotional level and intensity for each situation.

Emotional attention refers to the ability to perceive and focus on emotions, both one's own and those of others (Barrera, 2023). For university students, recognizing signals about their own emotional state and their classmates' reactions is important. This awareness helps them establish social connections and collaborate more effectively in academic and work groups. This ability is essential for effective communication, empathy, and building strong relationships with peers and instructors. Emotional mindfulness is positively associated with academic performance, as students who can accurately perceive their emotions can better regulate their learning strategies (Quílez-Robres et al., 2023).

Emotional clarity is the ability to clearly identify and differentiate between different emotions (Mayer, Salovey, 1995). For students, this dimension is essential for understanding their own feelings and motivations, which helps them in personal development and achieving academic goals. The university environment, which is often full of stress and uncertainty, requires students to be able to correctly interpret their emotions and respond to them in an adequate manner (Schoeps, 2020). College students with high emotional clarity can understand their emotional experiences and identify the causes of their emotions (Tang, 2023). This ability is essential for effective decision-making, problem-solving, and stress management. Emotional clarity is positively associated with mental health and well-being, as students who can understand their emotions are better equipped to manage stress and prevent burnout (Mergal, 2019). Higher emotional clarity, which is the ability to clearly identify, label, and describe one's own emotions, is linked to many positive intrapersonal factors. However, its relationship to interpersonal factors has not been explored. Eckland (2018) hypothesized that emotional clarity would be related to cognitive empathy (i.e., perceiving the emotions of others) and to an accurate understanding of negative affect, but not positive affect, in the context of a stressful situation.

The final dimension, emotional repair, addresses the ability to regulate emotions in a way that minimizes negative emotional states and maximizes positive ones (Goleman, 1995). For university students, this ability is crucial for problem solving,

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adapting to new situations, and maintaining mental health. The ability to effectively cope with negative emotions and maintain a positive mood can have a direct impact on students' academic success and quality of life (Pishghadam, 2022). College students with high emotional repair can use appropriate strategies to regulate their emotions and respond adaptively to emotionally charged situations (Tang, 2023). This ability is essential for maintaining positive relationships, overcoming academic challenges, and achieving personal goals. Emotion repair is also strongly related to personality traits, predisposition to anxiety and depression (Potthoff et al. 2016), and the ability to cope with adversity, daily stressors, and problems (Cabral, 2020). However, as Alegre and Benson (2010) report, the three dimensions of emotional intelligence appear to be differentially related to psychological adjustment. Although understanding and mood regulation (emotion repair) generally predict psychosocial adjustment levels (Fernandez-Berrocal and Extremera 2007; Wong et al. 2007; Berking et al. 2008), the relationship between attention (perception) and clarity problems is unclear. Conflicting results suggest that attention to feelings may play a different role than understanding and mood repair. Therefore, it can be stated and agreed with Alegre and Benson (2010) that the components of emotional intelligence need to be studied separately (Linares, 2018). In conclusion, emotional intelligence is understood as a protective factor in situations that generate negative mood states and therefore would be associated with better mental health. In general, individuals with better psychological adaptation show medium to low scores in emotional attention and high scores in the other two dimensions of the TMMS (clarity and repair) (Delhom, 2024).

Material and methods

This paper aims to investigate the level of emotional intelligence of university students through three dimensions measured by the Trait Meta-Mood Scale 24 (TMMS-24). Specifically, it focuses on the analysis of the attention, clarity and repair of emotions among students of the Faculty of Management and Economics and the Faculty of Humanities, Tomas Bata University in Zlin. The result will be to identify key factors influencing their emotional intelligence and to propose recommendations for improving their emotional health and academic performance. The choice of topic is conditioned by the importance of emotional intelligence, not only in the period of preparation for a future profession. Investigating the emotional intelligence of university students is scientifically important for several reasons:

1. Academic performance: Emotional intelligence can significantly affect students' academic success. Students with higher emotional intelligence have a better ability to cope with stress, communicate more effectively and cooperate, which can lead to better academic results.
2. Mental Health: College students often face high levels of stress and emotional strain. Exploring their emotional intelligence can help identify strategies that support their mental health and well-being.
3. Social Skills: Emotional intelligence is key to developing social skills, which are important not only in the academic environment but also in their future professional lives. Better understanding and regulating emotions can lead to better interpersonal relationships and teamwork.
4. Personal Development: Studying emotional intelligence can help students better understand themselves, which is important for their personal growth and

development. This can include improving self-awareness, empathy, and the ability to manage their own emotions.

5. Interventions and Support: Research in this area can lead to the development of effective interventions and support programs aimed at improving students' emotional intelligence. This can include workshops, training, and other educational activities that promote emotional and social skills.

The selected university is located in Zlin Region, and for this reason, key macroeconomic indicators were selected to approximate the macroeconomic situation in Zlin Region, which are compared with indicators in the Czech Republic.

Table 1 Macroeconomics Indicators

	Zlin region	Czech Republic
Population (total)	579 046	10 879 069
Unemployment rate	2,20%	3,84%
Average gross monthly wage (CZK)	40 898 CZK	45 854 CZK

Source: Czech Statistics Office

Quantitative research was conducted among university students of the Faculty of Management and Economics and the Faculty of Humanities. A total of 771 respondents participated in the quantitative research. The two faculties were selected according to the graduate profile. The TMMS-24 questionnaire contains 24 items divided into three dimensions. The three dimensions – attention, clarity and emotion repair – were the main components of the questionnaire survey. The distribution of the questionnaires took place online, which ensured the anonymity of respondents and thus increased the honesty of the answers.

Table 2 Respondents Statistical Information

	Number of respondents	Gender of Respondents	Number of respondents	Number of respondents (%)
Faculty of Management and Economics	639 (83%)	Male	231	36,2%
		Female	408	63,8%
Faculty of Humanities	132 (17%)	Male	47	35,6%
		Female	85	64,4%

Source: own source

The age distribution of respondents corresponds to the year studied. The age distribution of respondents in the first year of study is mostly in the 18-20 category. The number of respondents is 446 in the research in this category and 217 respondents participated in the 21-25 age category. There were none in the 26 and over age category. An overview of the age distribution of respondents is given in Table 3 and Figure 1, including a percentage representation.

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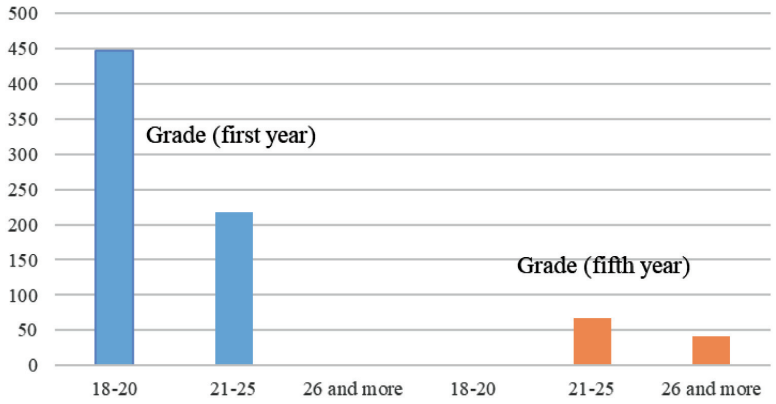
Table 3 Respondents Statistical Information – Age of Respondents

	Number of respondents	Age	Number of respondents	number of respondents (%)
Grade (first year)	663 (86%)	18-20	446	67,3%
		21-25	217	32,7%
		26 and more	0	0%
Grade (fifth year)	108 (14%)	18-20	0	0%
		21-25	67	62,0%
		26 and more	41	38,0%

Source: own source

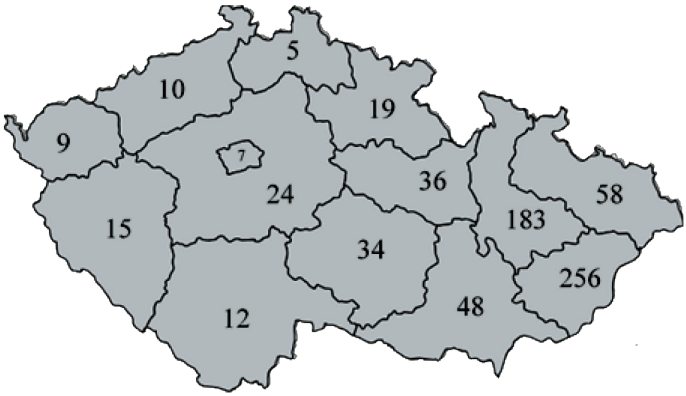
In the fifth year of study, respondents in the 21–25 age category predominated, with 67 respondents participating. There were 41 respondents in the 26 and over age category, and there were no respondents in the 18-20 age category.

Figure 1 Respondents Statistical Information – Age of Respondents



The survey included respondents from all regions of the Czech Republic, including respondents from the Slovak Republic or other nationalities. The largest number of respondents came from Zlin Region (256) and Olomouc Region (183). The other regions were represented as follows: Capital City of Prague: 7, South Bohemian Region: 12, South Moravian Region: 48, Karlovy Vary Region: 9, Vysocina Region: 34, Hradec Kralove Region: 19, Liberec Region: 5, Moravian-Silesian Region: 58, Pardubice Region: 36, Pilsen Region: 15, Central Bohemian Region: 24, Usti nad Labem Region: 11, the Slovak Republic, other nationality: 55. The representation by individual regions can be seen in Figure 2.

Figure 2 Respondents Statistical Information – regions



Source: own source and mapaceskerepubliky.cz

Respondents were informed about the purpose of the research before filling out the questionnaire. The questionnaire survey was conducted in April–May 2024 at the Faculty of Humanities, and in September–October 2024 at the Faculty of Management and Economics. The results of the questionnaire survey were used to test the hypotheses. The verification of research hypotheses was performed using the Pearson's chi-square test method. SPSS statistical software was used for evaluation. Based on the theoretical survey, nine main hypotheses were determined:

H1: There is no statistically significant relationship between emotional attention and the gender of respondents.

H2: There is no statistically significant relationship between emotional clarity and the gender of respondents.

H3: There is no statistically significant relationship between emotional repair and the gender of respondents.

H4: There is no statistically significant relationship between emotional attention and the faculty studied.

H5: There is no statistically significant relationship between emotional clarity and the faculty studied.

H6: There is no statistically significant relationship between emotional repair and the faculty studied.

H7: There is no statistically significant relationship between emotional attention and grade.

H8: There is no statistically significant relationship between emotional clarity and grade.

H9: There is no statistically significant relationship between emotional repair and grade.

The aim of this article is to investigate the level of emotional intelligence of university students using three dimensions measured by the Trait Meta-Mood Scale 24 (TMMS-24). Specifically, it focuses on:

- Attention of emotions – how students perceive and recognize their own emotions.
- Clarity of emotions – how students understand and analyze their emotions.
- Repair of emotions – how students manage and regulate their emotions.

Attention of emotions is made up of:
- I pay a lot of attention to my feelings.
- I am usually very conscious of what I feel.
- I usually spend time thinking about my emotions.
- I think my emotions and state of mind deserve to be paid attention to.
- I allow my feelings to affect my thoughts.
- I constantly think about my state of mind.
- I often think about my feelings.
- I pay a lot of attention to the way I feel.

Clarity of emotions is made up of:
- My feelings are clear to me.
- I can usually define my feelings.
- I nearly always know how I feel.
- I usually know how I feel about people.
- I often become aware of my feelings in different situations.
- I can always say how I feel.
- I can sometimes say which emotions I am experiencing.
- I can manage to understand my feelings.

Repair of emotions is made up of:
- I usually have an optimistic outlook, although I sometimes feel sad.
- Even when I feel sad, I try to think about pleasant things.
- When I am sad, I think about all life´s pleasures.
- I try to have positive thoughts even when I feel bad.
- If I think about things too much and end up complicating them, I try to calm myself down.
- I am concerned about having a good state of mind.
- I have a lot of energy when I feel happy.
- When I am angry, I try to change my state of mind.

Results and discussion

The main objective of the presented paper is to determine the current state of emotional intelligence among students of the Faculty of Management and Economics and the Faculty of Humanities in three basic dimensions, namely emotional attention, clarity and repair. The author of the paper focused on determining the dependence between the examined dimensions and gender, the studied faculty and the year of study.

Research hypothesis: There is a statistically significant dependence between emotional intelligence and the gender of the respondents.

H1: There is no statistically significant relationship between emotional attention and the gender of respondents.

H1A: There is statistically significant relationship between emotional attention and the gender of respondents.

H2: There is no statistically significant relationship between emotional clarity and the gender of respondents.

H2A: There is statistically significant relationship between emotional clarity and the gender of respondents.

H3: There is no statistically significant relationship between emotional repair and the gender of respondents.

H3A: There is statistically significant relationship between emotional repair and the gender of respondents.

Table 4 Verification of H1, H2 and H3 hypothesis - gender of respondents

	Chi-Square	df	p-value
Emotional Attention	104,909	4	,000
Emotional Clarity	34,444	4	,000
Emotional Repair	14,619a	4	,006

Source: own source

Based on the statistical results for the given factors, we can say that since the p-value is less than 0.05 for all three dimensions, hypotheses H1, H2, and H3 are rejected.

Thus, the hypothesis: There is no statistically significant relationship between emotional attention/emotional clarity and emotional repair and the gender of respondents we reject the alternative hypothesis of H1A/H2A and H3A.

The result of confirming the given hypotheses is that there is a relationship between emotional attention, emotional clarity and emotional repair, and the gender of the respondents. In other words, it can be said that there is a proven dependence between the gender of the respondents and the perception of all three components of emotional intelligence, which are emotional attention, emotional clarity and emotional repair.

The second group of research hypotheses examines the relationship between the individual components of emotional intelligence and the studied faculty.

H4: There is no statistically significant relationship between emotion attention and the faculty studied.

H4A: There is statistically significant relationship between emotion attention and the faculty studied.

H5: There is no statistically significant relationship between emotion clarity and the faculty studied.

H5A: There is statistically significant relationship between emotion clarity and the faculty studied.

H6: There is no statistically significant relationship between emotion repair and the faculty studied.

H6A: There is statistically significant relationship between emotion repair and the faculty studied.

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Table 5 Verification of H4, H5 and H6 hypothesis - faculty studied

	Chi-Square	df	p-value
Emotional Attention	20,770	4	,000
Emotional Clarity	12,427	4	,014
Emotional Repair	121,721	4	,000

Source: own source

The p-value for hypotheses H4, H5 and H6 is also less than 0.05. We therefore reject hypotheses H4, H5 and H6 in favor of alternative hypotheses H4a, H5a and H6A. We therefore confirm the alternative hypotheses:

H4A: There is statistically significant relationship between emotion attention and the faculty studied.

H5A: There is statistically significant relationship between emotion clarity and the faculty studied.

H6A: There is statistically significant relationship between emotion repair and the faculty studied.

In other words, even in the area of emotional clarity we find a dependence between a given factor and the faculty studied.

The third group of investigated dependencies focuses on individual components of emotional intelligence and the year studied – i.e. the first or fifth year of study.

H7: There is no statistically significant relationship between emotion attention and grade.

H7A: There is statistically significant relationship between emotion attention and grade.

H8: There is no statistically significant relationship between emotion clarity and grade.

H8A: There is statistically significant relationship between emotion clarity and grade.

H9: There is no statistically significant relationship between emotion repair and grade.

H9A: There is statistically significant relationship between emotion repair and grade.

Table 6 Verification of H7, H8 and H9 hypothesis – grade

	Chi-Square	df	p-value
Emotional Attention	73,829	4	,000
Emotional Clarity	19,554	4	,001
Emotional Repair	16,736	4	,002

Source: own source

The statistical evaluation again shows a p-value of less than 0.05, therefore we reject this group of hypotheses in favor of alternative hypotheses H7A, H8A and H9A – i.e. there is a statistical dependence between emotional repair and the year

of study. According to the research results, it can be said that there is a direct connection between the individual components of emotional intelligence and the year of study – i.e. the first and fifth years of study.

All null hypotheses were rejected in favor of alternative hypotheses. It can therefore be said that there is a dependence between the individual components of emotional intelligence and gender, the faculty studied and the year of study. From the perspective of students, the individual components of emotional intelligence are perceived very sensitively. Therefore, it is important to pay attention to the importance of emotional intelligence in the education of not only university students.

Halimi (2021) supports this idea, stating that further studies should focus on integrating emotional intelligence into academic curricula and qualification frameworks. Additionally, research should address barriers to developing emotional intelligence skills in higher education and propose corresponding solutions. He further states that it would be interesting to see educators' self-perceptions vs. students' perceptions and to include multiple assessments of emotional intelligence. To this end, these areas of study could offer a more comprehensive understanding by integrating theories and methods of emotional intelligence from various disciplines. This integration would encompass social, personality, and psychological traits within higher education. Adequate emotional intelligence and resilience will therefore enable students, according to Pumalegue (2021), to master skills such as interpersonal and intrapersonal intelligence, adaptability, perseverance and self-confidence when faced with situations of change in their environment. López-López (2025) also addresse this topic and state that the results revealed significant strengths in areas such as emotional autonomy and social competence, along with areas for improving emotional awareness and emotional regulation, highlighting significant correlations between emotional competence and key components of emotional intelligence. The strong relationship between emotional competence and clarity indicates that higher emotional understanding is associated with better management of emotional states. Furthermore, positive correlations between emotional competence, attention, and correction suggest that individuals with higher emotional competence also exhibit better emotional regulation and correction abilities. These findings underscore the importance of integrating emotional competence into university curricula, as its development can positively influence overall emotional intelligence.

A study by Salim (2018) shows that a person's success is closely related to elements in emotional intelligence such as motivation, self-confidence, the ability to focus, excellence, having strong motivation to learn and work in groups, and communication skills. The importance of working with emotional intelligence is also highlighted by Mergal (2019), where the results of the study showed that respondents often felt stressed and nervous during their first year of university studies. The results of the study by Schoeps (2020) also showed that a third of college students had positive affect and life satisfaction. This could indicate that they were happier, more satisfied with life, and had higher levels of positive affect. Research findings (Garavito-Checalla, 2025) show that socio-emotional competencies, such as emotional intelligence, empathy, and emotional self-regulation, significantly enhance academic performance and act as protective factors against academic stress. In addition, these skills promote emotional well-being and facilitate better adaptation to university life.

Emotional clarity, according to Eckland (2018), is empirically associated with several important intrapersonal outcomes, but its connections with interpersonal outcomes are largely unexplored. To understand the utility of higher emotional clarity in supporting interpersonal relationships, we examined the relationship between

emotional clarity and affective and cognitive empathy using a multi-method approach. Encernación (2024) also suggests that empathy and emotional intelligence are essential competencies in the curriculum of health science students. Both components play an important role in teamwork relationships and patient care. Fernández-Lasarte (2019) conducted similar research, showing that emotional remediation is positively associated with academic achievement. Students who can regulate their emotions are more likely to engage in effective learning strategies and persist despite obstacles. According to Mamani (2022), these three subscales are significantly correlated, with mindfulness and emotional clarity being the factors with the highest correlation. Câmara (2023) argues that in terms of correlation between factors, clarity and repair showed the highest correlation, followed by attention with clarity and attention with repair.

Conclusion

This study focused on examining the impact of emotional intelligence on university students using the TMMS 24 questionnaire. Students with higher levels of emotional intelligence show a higher level of personal well-being and have better social relationships. An important finding is that the development of emotional intelligence can have a positive impact on the overall academic and personal success of students. Therefore, programs focused on the development of emotional intelligence should be integrated into university educational programs. These programs could include training focused on improving self-awareness, emotion regulation, and social skills. Recommendations for improving emotional health for students are in the area of self-knowledge and self-awareness, especially regular self-reflection and awareness of one's emotions. Stress management using various methods is equally important. In the area of social relationships, it is important to maintain strong relationships with family and friends and not be afraid to ask for help through support services at the university. An integral part is also a recommendation for improving the planning and organization of one's personal and student life. This should include creating a study plan and effectively dividing time between study and free time. Group discussions, projects, and practicing effective reading, note-taking, and writing techniques can also help improve academic performance.

Future research should examine the long-term effects of emotional intelligence on students' academic and personal lives. It would also be useful to analyze how different methods of developing emotional intelligence affect its level and what approaches are most effective. Another area of research could be to examine differences in emotional intelligence among students from different disciplines and cultural contexts, which could provide a deeper understanding of how emotional intelligence affects students in different settings.

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REVIEW OF AN UNIVERSITY TEXTBOOK CORPORATE FINANCE

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Received:11. November 2024 Reviewed: 20. December 2024 Accepted: 30. December 2024

The presented publication contains solved and unsolved examples in the field of corporate finance. It is based on the theory of corporate finance, while taking into account current legal regulations and the knowledge of both the domestic and international environments. This university textbook focuses on the basic categories of the financial management of companies, providing readers with a systematic and practically oriented view of corporate finance. The main thematic areas of the book include the financial and capital structure of the company, obtaining financial resources and their effective allocation, determining the value of the company, financial analysis and financial planning, as well as the financial aspects of business combinations. The advantage of this publication is its combination of theoretical knowledge with practical tasks, which allows readers not only to understand individual concepts but also to apply them in real-life situations.

In addition, the book offers a detailed examination of various methods for evaluating investment projects, including an analysis of risks and uncertainties that may influence managerial decision-making. It provides readers with tools for effective working capital management, optimization of capital structure, and strategic financial planning. The publication also emphasizes the importance of international financial markets and their impact on corporate finance, helping readers gain a better understanding of the global context of financial management. An important part of the book consists of solved and unsolved examples that provide an opportunity to apply the acquired knowledge in practice. These tasks are designed to support analytical thinking and develop the ability to apply financial tools in the decision-making processes of a company. For students of the University of Economics in Bratislava, the publication is a significant educational aid, but its content is equally beneficial for the broader professional public, managers, and entrepreneurs dealing with financial management.

The book offers a detailed look at the key aspects of corporate finance and provides readers with valuable tools for solving practical financial problems. It is written in a clear and professional style that is also accessible to readers who are just getting acquainted with the topic of corporate finance. The authors ensured that the publication is up-to-date and reflects current trends and challenges in the field of financial management of companies. The publication is divided into several thematic sections, which allow for the gradual acquisition of individual areas of corporate finance. It focuses on the importance of effective management of financial flows within a company, reflecting legislative and market changes that affect corporate financial decision-making. Thus, the book provides a valuable overview of the current state

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of corporate finance and offers specific solutions for optimizing financial management. One of the greatest advantages of the publication is its practical orientation. Students can use the solved examples to reinforce their knowledge and better understand individual economic models and methods. Managers and practitioners can find useful materials in the publication for their decision-making and strategy in the field of corporate finance. Given its wide coverage of thematic areas, this publication is suitable not only for students but also for anyone interested in corporate finance and looking to gain practical experience in this field.

Additionally, the book delves into the intricacies of financial forecasting and budgeting, providing readers with the tools to create accurate financial projections. It also addresses the impact of global economic trends on corporate finance, helping readers understand the broader economic context. The publication includes case studies that illustrate real-world applications of financial theories, making the content more relatable and easier to grasp. Furthermore, it offers insights into the latest technological advancements in financial management, such as the use of financial software and data analytics. Lastly, the book emphasizes the importance of ethical considerations in financial decision-making, ensuring that readers are aware of the moral implications of their financial choices. Overall, it can be stated that Corporate Finance: Collection of Solved and Unsolved Examples is a significant contribution to education in the field of corporate finance. It provides not only a theoretical foundation but also a multitude of practical tasks that allow for the application of the acquired knowledge in practice. Thanks to this publication, students, educators, and professionals can gain valuable insights that will help them address financial issues in corporate practice.

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REVIEW OF A UNIVERSITY TEXTBOOK SPA AND WELLNESS

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Received: 09. July 2024 Reviewed: 22. August 2024 Accepted: 03. September 2024

We live hectic, busy lives with high workloads and constant exposure to stress. Therefore, it is not surprising that a growing number of people seek opportunities to relax, unwind, and rejuvenate both physically and mentally. Many turn to places specifically designed to alleviate stress. The tourism sector offers numerous such opportunities. In response to these modern lifestyle challenges, spa tourism and wellness services have gained importance in recent years. Training future professionals who are knowledgeable and practice-oriented requires incorporating the key areas of tourism into their education. One such area is undoubtedly spa and wellness tourism. In Slovakia, there are only a limited number of institutions dedicated to the training professionals for the spa and wellness sector. One of the leading institutions in this field is the Department of Tourism at the Faculty of Commerce, University of Economics in Bratislava.

As part of the study programme Entrepreneurship in Tourism and Services at the 1st level of study, students are also educated and professionally trained in the subject of Spa and Wellness Tourism. This is a compulsory course in which students acquire valuable theoretical knowledge, and also practical skills. The teaching team, consisting of Ing. Anna Veszprémi Sirotková, PhD., prof. Ing. Viera Kubičková, PhD., and Ing. Mária Halenárová, has prepared a university textbook not only for students at their home institution but also for students from other universities studying the spa industry, as well as for entrepreneurs, spa professionals, and other interested individuals. The peer-reviewed university textbook were also published as a response to the increased general interest in spa treatment, spas, relaxation, post-treatment or wellness stays in Slovak facilities providing the above services.

The reviewed university textbook reflects the increased need for training new professionals for the spa tourism and wellness services. The texts are organized into a total of thirteen thematic units, which correspond to the thirteen-week semester at colleges and universities. Each topic is designed for one week in the semester. The theoretical analysis in the texts is complemented by a rich array of graphical illustrations, namely ten tables, two graphs, a figure, and two diagrams. The graphical elements help to visualize the material, contribute to its memorability and better understanding. The theoretical interpretation of the material is based on a total of 160 literary sources, which are very varied and include books, monographs, journals, works in proceedings, web portals and legal regulations. All sources are properly and correctly cited, identified in the reference list with complete data. The sources are not only Slovak, but also numerous foreign literary sources have been used.

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Thematically, college textbook cover a wide range of topics that are important to address. These are thematic units, the mastery of which is important from the point of view of preparation for business in the spa and wellness sector. In addition to the thematic chapters themselves, the textbook also contains an introduction through which the tutors introduce the readers to the topic. The textbooks have a slight overlap into the healthcare industry, with the economic and business aspects of spa and wellness services dominating. A significant portion of the text is also dedicated to managerial and marketing aspects, such as service design, management specifics, etc. The authors' team has also presented the legal background of operating businesses in the spa and wellness sector.

Among the important topics, the authors have included a subtopic on the historical use of water for healing purposes (first civilizations, western civilizations), spas in Slovakia and their history, new world spa cultures, body health medicine and spa rehabilitation. The second chapter focuses on defining the basic conceptual framework in the field of spa and wellness. The professional interpretation continues with the legal aspects of business in spa and wellness services in the Slovak Republic. The following chapters deal directly with healing resources and procedures. The typology of natural resources is anchored in the fourth chapter and spa and wellness procedures in the fifth chapter. In addition to the classification of spa and wellness treatments, the authors also present the health indications and contraindications for such treatments and services, the knowledge of which is essential. The sixth chapter provides an in-depth look at the field of wellness and wellness economics, followed by a discussion on the quality of life. The detailed eight chapter is devoted to the European beauty industry. The ninth chapter introduces students and other interested individuals to partnerships and national and international organizations operating in the spa and wellness sector, not only in Slovakia but also across Europe and worldwide. In this way, the authors have been able to reflect on a wider and geographical context. The tenth chapter focuses on popular thermal baths, water parks, and thermal parks, covering the subtopic of SPA wellness. The eleventh and twelfth chapters introduce readers to marketing and management in the spa and wellness sector, analysing service design in the spa industry and the unique aspects of process organization in managing spa and wellness entities. The final chapter explores the phenomenon of sustainability and the development of wellness and spa. At the end of each chapter, the didactic aspect of the teaching texts is reinforced through exercises or questions.

In conclusion, this work can be regarded as a valuable contribution to the literature in this field and is recommended for students, professionals, and the general public.

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Name of the publication: **ACTA OECONOMICA UNIVERSITATIS SELYE**
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Year: 2024
Volume 13.
No. 1 - 2
The Journal is published twice a year.
This issue was published in December 2024.
Publisher: J. Selye University, Faculty of Economics and Informatics, Bratislavská cesta 3322, 945 01 Komárno, www.ujs.sk, IČO: 37961632

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