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FOREWORD

Following earlier conferences with participants from nearly all over the CEE region as well as from many other countries, the School of Economics and Business in Sarajevo is proud to host the 11th International Conference. This conference aims to bring together academics as well as practitioners to discuss diverse issues in the fields of economics and business with a focus on transition economies. The purpose of this conference is to disseminate high quality research and to promote scientific information interchange between researchers, developers, students, and practitioners.

This conference offers a variety of research perspectives from a number of Central and Eastern European countries. This wide-ranging research context forms the basis for studies in different fields: economic development, international economics, business administration, marketing, information technology, insurance and etc.

As was the case in earlier ICES conference it is our pleasure to inform conference participants that selected papers presented at this conference will be considered for publication in a special issue of the South East European Journal of Economics and Business published by the School of Economics and Business.

Also, we would like to invite you to submit your paper for publication in this journal in the future. We strongly believe that the discussions between prominent and experienced researchers at the conference will serve as a solid bases for improving your paper and enriching your further research focusing on transition countries.

We would like to thank all the authors who prepared and submitted their papers to ICES2018.

A special thank is addressed to keynote speaker, Professor Wim Vanhaverbeke, Antwerp Management School, Belgium, editor-in-chief og Technovation and Professor Slavo Radosevic, University College London, UK. We are certainly aware that it has taken time and effort to take part in this Conference, and this is much appreciated.

We would also like to express our gratitude to all participants for their expertise and for sharing their views and ideas which present the most important contribution to the sucess of this Conference.

It was with great pleasure that my colleagues and I had this opportunity to host such a conference.

Sarajevo, October 2024

Amila Pilav - Velic
Editor

CONTENT

ESG RISKS IN THE BIH BANKING INDUSTRY: NEW OPPORTUNITIES OR THREATS?

─ ABSTRACT ─

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The adoption of the Paris Agreement on climate change and the UN 2030 Agenda for Sustainable Development in 2015 have dramatically changed risk management in financial institutions, especially in banks. Governments are striving to transition towards a low-carbon, more resource efficient and sustainable economies on a global scale. The integration of Environmental, Social, and Governance (ESG) risks has emerged as a pivotal factor in the banking industry worldwide. The main purpose of paper is to explore and analyze the state and perspectives of ESG risks in the banking industry, with a specific focus on how ESG factors are perceived, managed, and integrated into the risk management systems of banks in Bosnia and Herzegovina (BiH). In the paper, key drivers, values, challenges, and opportunities of managing ESG risks, as well as key application areas in the banking industry, were identified. The primary source of data for this research was collected through a structured questionnaire. The target population for the research consisted of all banks operating in the territory of BiH at the end of July 2024. Descriptive and inferential statistical analysis were carried out in the paper. The scientific contribution of this paper is reflected in the fact that it represents one of the pioneering analyses of the state and perspective of ESG risks in BiH banks. By assessing the risks and opportunities associated with ESG in the BiH banking sector, this research aims to contribute to the broader discourse on sustainable finance in emerging markets and offer valuable insights for policymakers, regulators, banks, and their stakeholders. Finally, for further research, it will be useful to consider and analyze how the continued growth and subsequent adoption of ESG risk factors impact consumer satisfaction and overall perceptions of the green economy.

Keywords: *Banking industry, ESG risks, sustainable financing, sustainable investing, BiH*
JEL classification: G2, G21, C83

1 Introduction

A stronger interest, primarily from financial institutions, in managing financial risks emerged after the collapse of the "gold standard" in 1971, the series of oil crises in the 1980s, and the dramatic stock market crash of 1987, all of which led to unprecedented fluctuations in market risk factors. During these market turmoils, on one hand, the development of information technologies and information systems enabled an easier, more efficient, and economical overview of all financial risks, while on the other hand, technological and financial innovations led to the emergence of new participants, new business models and strategies, and new risk management models in the financial systems of countries around the world (Abdić et al., 2024). Simultaneously, the unstopable industrial and infrastructural growth for decades was accompanied by increasing environmental pollution, growing social inequality, and economic growth at the expense of the global socio-ecological system.

However, the adoption of the Paris Agreement on Climate Change and the UN 2030 Agenda for Sustainable Development in 2015, as well as the European Green Deal in 2019, has fundamentally changed risk management for both financial institutions and companies in the real sector of the economy. Namely, to achieve the set sustainable development goals (SDGs), the concepts of a sustainable economy and sustainable finance have become key drivers of change in financial systems, aimed at integrating environmental, social, and governance (ESG) risks into the strategic decision-making processes of all market participants.

At the same time, governments around the world are striving to fulfill their commitments regarding the transition of their economies toward low-carbon, resource-efficient, and circular economies as outlined in the given agreements. This practice not only redefines traditional business models and strategies but also encourages the development of new products/services and financial instruments that promote long-term sustainability and resilience to risks. Therefore, at the core of current economic transformations are the efforts of governments globally to integrate ESG risk factors into the business models of both financial institutions and all entities in the real sector in order to meet the goals of a sustainable economy and sustainable finance.

According to EBA (2022:4): "The financial sector has an important role to play, both in terms of financing the transition towards a low-carbon, more resource efficient and sustainable economy and for managing financial risks stemming from ESG factors. A robust banking sector and overall financial stability will be key conditions in supporting an orderly transition. In this regard, financial institutions have a key role to play in managing risks and raising the funds for sustainable projects given their unique position in intermediating capital flows through their lending, investment, and advisory role. Credit institutions also have the technical expertise that is critical for assessing the risks and opportunities attached to sustainable assets, especially during this transition."

From a practical standpoint, over the past decade since the adoption of global standards for environmental protection and sustainable development, the focus on ESG factors has grown exponentially in the financial systems of countries around the world. Over time, ESG frameworks / standards / guidelines have been developed for managing and / or reporting companies' ESG aspects of their operations. Some of these frameworks / standards were imposed by the laws or regulations of the countries in which companies operate, while others resulted from the expectations of various stakeholders or pressures from social norms due to growing concerns about human rights and environmental protection. According to IIF (2020), as of June 2020, it is estimated that nearly 200 policy and regulatory measures pertaining to ESG disclosure are in place across jurisdictions,

including non-binding guidance, mandatory requirements, and other measures. Since the ESG principle was formally proposed in 2004, it has been actively practiced in Europe, America, and other developed countries. A series of achievements promote the development and maturity of the environmental, social, and governance factors, as well as ESG as a whole, such as the establishment of the ESG evaluation system, the ESG disclosure standards, and the ESG index system (Li et al., 2021).

The primary objective of this paper is to analyze the current state of ESG risks integration into the business models and risk management systems of banks in BiH. The secondary objective is to provide a detailed insight into current ESG risk management practices within the banking industry in BiH. The paper addresses, among other things, the following research questions:

- What are the key drivers of ESG risks in banks in BiH?
- What are the foremost ESG risks for banks in BiH?
- What are the key areas of ESG factor application in banks in BiH?
- What are the biggest challenges of ESG risk integration in banks in BiH?
- What are the greatest benefits / opportunities that ESG risks offer to banks in BiH?

The paper is structured as follows: In the first chapter, the Introduction, the background of the research is explained, and the research questions are defined. The second chapter presents the conceptual framework and provides a review of empirical research (relevant literature), while the third chapter defines ESG risk factors in banks, elaborates on the ESG framework, ESG values and drivers, as well as ESG challenges and opportunities. The fourth chapter pertains to the empirical analysis of ESG risk management in banks in BiH. In the final chapter, the key research findings are highlighted, the limitations of the study are mentioned, and recommendations for further research are provided.

2 The Conceptual Framework and Literature Review

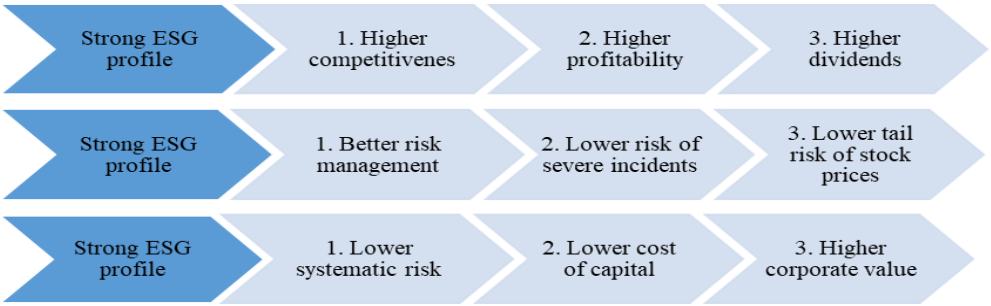
In recent years, the role and importance of sustainable economy and finance concerns have gained substantial attention in both academic research and practical application within the financial system in countries around the world.

From the theoretical aspect, to consider a fundamental conceptual framework how ESG factors affect business entity' financial profiles, we need to rely on traditional corporate finance models in establishing the transmission channels of ESG to the financial system. According to Giese et al., (2019) studies by El Ghoul et al. (2011) and Gregory, Tharyan, and Whittaker (2014) showed that a discounted cash-flow (DCF) model framework can be used to break down the influence of a corporation's ESG profile on equity valuations, including cash flows, risk, and cost of capital. Namely, these authors argue that it is important to differentiate between the systematic and firm-specific risk of equities. Consequently, in a DCF model framework, according to them systematic risk is typically captured through the cost of capital, whereas unsystematic risk is typically captured through the future cash flows. Based on the above, Giese et al., (2019) analyzed the company-specific impact of ESG on risk and performance, and argue that the firm-specific risk profile of companies is transmitted through three transmission channels:

1. *Cash-Flow Channel* which can be broken into two separate channels: the transmission of ESG into future opportunities and therefore into profitability on the one hand, and the transmission to firm-specific downside risk protection on the other.
2. *Idiosyncratic Risk Channel* which is linked to the numerator of the DCF model.
3. *Valuation Channel* which is linked to the denominator of the DCF model.

These three transmission channels can be conceptually presented as follows, respectively:

Figure 1. The Transmission Channels of ESG Factors to Corporate Value



Source: Authors' adaptation based on the work of Giese et al., (2019)

In general, the theoretical finance literature describes risk management as comprehensive process of identifying, measuring, managing and controlling an corporation's exposure to financial risks where financial risks are defined as the variability in cash and market values caused by unpredictable changes in market risk factors (Schröck and Steiner, 2005). From the practical aspect, the relationship between ESG and financial performance was the subject of many studies (Chollet and Sandwidi, 2018; Shakil et al., 2019; Buallay, 2019; La Torre, Leo, and Panetta, 2021). Though the majority of these studies found a positive correlation between ESG performance and financial performance, it is still open how the connection can be explained theoretically (Giese et al., 2019). According to Gaganis et al. (2023) often used theories that can explain ESG corporate's motives are:

1. *The slack resources theory* - Companies that have excess unutilized material as well as intangible resources can take reactive measures in identifying, applying, and managing ESG risk factors, which can improve their financial performance in the long term. Therefore, according to this theory, better financial performance of a company leads to better ESG performance. Revenues are considered as drivers of the company's ESG performance.
2. *Good management theory* - Companies that effectively integrate ESG risk factors into their business models, strategies, and financial policies can take proactive measures in identifying, applying, and managing ESG risk factors, which can improve their financial performance in the short term. Thus, according to this theory, better management of ESG risk factors leads to better financial performance of the company. Managing ESG factors is considered a driver of the overall financial performance of the company.
3. *The stakeholder theory* - Companies should consider the interests of all stakeholders, not just shareholders or company managers during their operations, which can improve not only their financial but also their non-financial performance, such as customer and supplier satisfaction and loyalty, employee satisfaction and engagement, better quality of products or services, strengthening brand and market reputation, and increasing awareness of environmental and social issues. Initiatives from various stakeholders are considered as drivers of the company's ESG performance.
4. *The institutional theory* - Companies are required to adopt ESG values and practices and integrate ESG risk factors into their business models and processes to comply with regulations, industry standards, and/or social norms. Legal regulations, industry

standards, and societal expectations as a whole are considered as drivers of the company's ESG performance.

In the context of banks in BiH, applying this framework can help illustrate the mechanisms through which insufficient ESG integration (such as weak governance practices, exposure to climate-related risks, or lack of social responsibility) may increase credit risk, reputational damage, and regulatory non-compliance. However, given the relatively low level of ESG maturity in BiH's financial sector, the practical transmission of these risks may be less visible or systematically measured. Therefore, adapting the framework to the specific institutional and regulatory conditions in BiH would enhance its relevance and support more effective ESG risk management.

2.1 ESG Risk Management Framework in the Banks

2.1.1 ESG Risks

In the modern business environment, risk management is becoming increasingly complex, and banks, due to the role assigned to them in the current economic transformation, are faced with challenges that extend beyond traditional financial and operational aspects. ESG risks, which relate to environmental (E), social (S), and governance (G) factors, have become crucial in assessing the sustainability and long-term resilience of banks. According to FBA (2023), ESG risks are defined as the likelihood of losses or additional costs, the loss of planned revenues, or damage to reputation for a financial institution due to the negative financial impact of current or future ESG factors on other counterparties and their assets. ESG risks in banks can be divided into three main categories (Kalfaoglou, 2021):

1. Environmental Risks (E) - These refer to the negative impact that banks and their clients can have on the environment. These risks focus on aspects such as energy and resource consumption, contribution to climate change, pollution, and waste management. In the context of banking, environmental risks also include banks' exposure to projects that may cause environmental damage, which can lead to financial losses.
2. Social Risks (S) - These refer to the impact of banks on society and the community. These risks include issues such as labor rights and working conditions within the bank, inclusion and diversity in the workforce, as well as respect for human rights and ethical standards. Banks are responsible not only for their internal practices but also for the impact that their financing has on the development of local communities and social cohesion.
3. Governance Risks (G) - These pertain to risks associated with the internal practices and procedures of banks. This category covers compliance with laws and regulations, transparency and accountability in decision-making, as well as the management of conflicts of interest and corruption. Additionally, corporate governance includes issues such as diversity in management structures, transparency in operations, and the protection of customer data.

In the context of managing ESG risks, the activities of the EBA play a key role in shaping the sustainability strategies of banks and sustainable finance more broadly. These activities can be classified into several main areas (EBA, 2021): a) Transparency and Disclosures; b) Risk Management and Supervision; c) Prudential Treatment of Exposures; d) Stress Testing; e) Standards and Labels; f) Greenwashing; g) Supervisory Reporting; h) ESG Risks and Sustainable Finance Monitoring Framework.

2.1.2 ESG Risk Management Framework

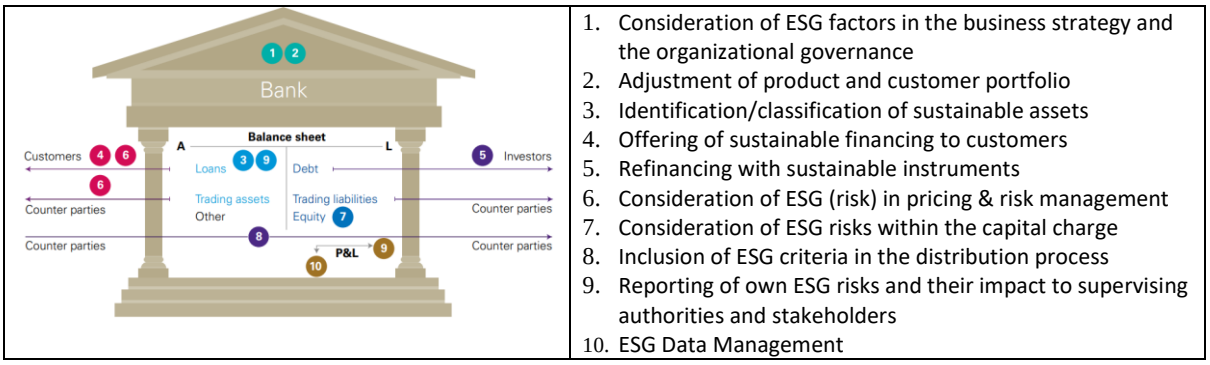
In 2019 through a partnership between the United Nations Environment Programme Finance Initiative (UNEP FI) and founding banks were created UN Principles for Responsible Banking (UN PRB). The Principles for Responsible Banking are representing a unique framework for ensuring that signatory banks' strategy and practice align with the vision society has set out for its future in the SDGs including the Paris Climate Agreement and the UN 2030 Agenda for Sustainable Development. According to EBA (2021) signatory banks commit to embedding 6 principles (Alignment; Impact & Target setting; Clients & Customers; Stakeholders; Governance & Culture; and Transparency & Accountability) across all business areas, at the strategic, portfolio and transactional levels. To fulfil their commitment to the UN PRB, banks are required to undertake the following three steps (UNEPFI, n.d.)[1]:

1. *Impact Analysis:* identifying the most significant impacts of products and services on the societies, economies and environments that the bank operates in.
2. *Target-Setting and Implementation:* setting and achieving measurable targets in a banks' areas of most significant impact.
3. *Public Reporting:* publicly report on progress on implementing the Principles, being transparent about impacts and contributions.

Taking into account the aforementioned principles, the guidelines from the European Central Bank (ECB) and the European Banking Authority (EBA) the management of ESG risks is gradually being integrated into the risk management function throughout the organization through the following segments: a) Risk Identification and Materiality Assessment; b) Business Model and Strategy; c) Risk Appetite and Management; d) Risk Management Framework; e) Reporting.

ESG sustainability factors are expected to affect banks along their entire value chains both from strategic and operational perspectives - and create new opportunities, which can be graphically represented as:

Figure 2. The Impact of ESG Risk Factors on the Entire Value Chains of Banks



1. Consideration of ESG factors in the business strategy and the organizational governance
2. Adjustment of product and customer portfolio
3. Identification/classification of sustainable assets
4. Offering of sustainable financing to customers
5. Refinancing with sustainable instruments
6. Consideration of ESG (risk) in pricing & risk management
7. Consideration of ESG risks within the capital charge
8. Inclusion of ESG criteria in the distribution process
9. Reporting of own ESG risks and their impact to supervising authorities and stakeholders
10. ESG Data Management

Source: KPMG, 2021

Based on the presented information, it can be concluded that the ESG framework entails the integration of ESG risk factors into the business model and risk management system, decision-making processes, and business strategies of banks. The ESG framework enables a more comprehensive approach to understanding and managing risks, as

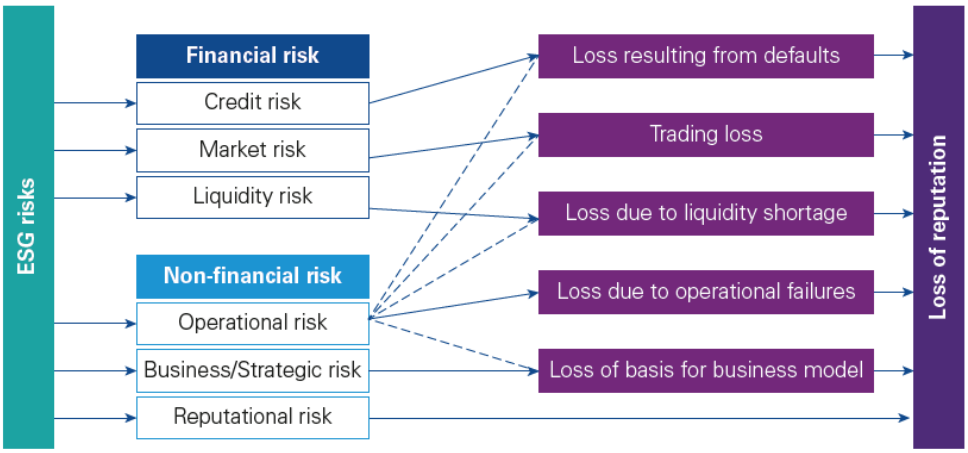
[1] See more at: https://www.unepfi.org/wordpress/wp-content/uploads/2019/07/PrinciplesOverview_Infographic.pdf

traditional financial indicators often do not cover all aspects of risks that ESG factors can generate. According to Kalfaoglou (2021) banks can be exposed to ESG risks in two ways:

1. The direct exposure - arises from the bank's own operations. For example, a bank may face operational risk if a branch is located in a high-risk flood area. Thus, the “E” pillar of the ESG framework is transformed into a familiar risk setting.
2. The indirect exposure - stems from lending and investment activities. For example, a bank may lend to a counterparty that fails to comply with safety regulations, leading to reputational risk and potential loan default, thereby transforming the "S" pillar of the ESG framework into credit risk. Additionally, investing in a counterparty's securities may result in losses due to uncovered fraud, turning the "G" pillar into risks related to profitability, credit, market, and liquidity.

Therefore, due to the dynamic development of ESG risk factors, banks must continuously adapt their risk management framework to meet the demands of the market and regulators. Further, ESG risks affect institutions in different ways, materialize, and ultimately lead to financial impacts.

Figure 3. *The Identification and Materialization of ESG Risks in Banks*

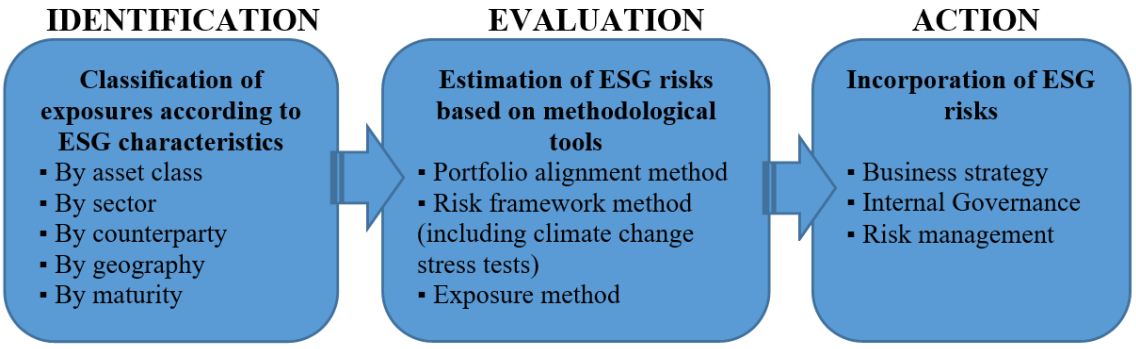


Source: KPMG, 2021

Active ESG risk management is therefore fundamental to ensure that institutions identify such risks in a timely manner, hence being able to respond to them, in particular related to (EBA, 2021): a) risk appetite, risk policies and limits; b) data and methodology; c) risk measurement, monitoring and mitigation; d) testing resilience to ESG risks.

In order to help address the aforementioned challenges, the approach to assessing ESG risks is based on three key aspects of the risk management framework: identification, evaluation, and action, which are relevant for the assessment of ESG risks by institutions and supervisors. This process enables banks to recognize and classify risks arising from ESG factors, evaluate their potential impact using various methodological tools, and integrate them into business strategies and risk management processes. The approach to assessing ESG risks in banks can be illustrated as follows (EBA, 2021):

Figure 4. *The Approach to the Assessment of ESG Risks in Banks*



Source: EBA, 2021

2.2 Literature review

The existing academic and empirical literature related to ESG risks is gaining significance in recent years. However, due to the specific characteristics of the banking system in each country, as well as the natural and demographic characteristics of the country itself, there is no unified perspective on the effects of ESG factors on the banking sector. In this section, it is provided a brief overview of the empirical literature that has analyzed ESG risks in the banking sector. The focus is on the role and significance of ESG factors/risks and their relationship to bank performance.

According to Kalfaoglou (2021), over the past decade, the concepts of sustainable finance, responsible investing, and responsible banking have gained popularity worldwide, and it is necessary to explore the rationales for the shift from finance to sustainable financing, from investments to responsible investing, and from banking to responsible banking. Therefore, the modern concept of sustainability encompasses not only economic issues but also environmental, social, and governance aspects, which are considered equally important, even though some may gain momentum depending on the circumstances. The research highlights that ESG risks represent a new source of risk for the banking sector that needs to be identified, assessed, monitored, and managed (Kalfaoglou, 2021). The focus of the work was on ways to incorporate ESG risks into decision-making.

ESG factors are increasingly analyzed to identify risks and opportunities in modern economies. The banking sector influences the entire economy through the credit channel and balances its stability (Lupu, Hurduzeu, and Lupu, 2022). Misorimaligayo, Ochieng, and Osiolo (2023) presented a systematic literature review on the integration of ESG risks, management, reporting, and related challenges and opportunities in the banking sector. Special attention was given to strategies, assessments, measurements, management, monitoring, reporting, culture, as well as data and technologies in developing markets and some developed countries. The findings of their work revealed the need for further research on ESG issues and policy measures to focus on the scope, scale, and magnitude of related challenges and opportunities. Tashtamirov (2023) emphasizes that for banks, sustainability is not just an ethical issue but could soon become an economic and existential one, generating a new type of risk, namely ESG risks. Furthermore, the paper states that banks must approach ESG risks comprehensively by integrating them into their risk management systems. This process involves adjusting business strategies, risk strategies, and related risk appetite statements, as well as ensuring full transparency. In addition to incorporating ESG into the risk management framework, banks should consider

related issues in product development, pricing formation, and sales decisions. Moreover, properly addressing ESG risks across a broad range of change processes is vital for improving profitability. The paper proposes a holistic approach to managing ESG risks.

La Torre, Leo, and Panetta (2021) analyzed the relationship between ESG factors and financial performance to determine whether banks can find sufficient incentives (higher financial performance) in market reactions to spontaneously adopt ESG behaviours / practices. Using a panel estimation method for a sample of European banks listed in STOXX Europe 600 from 2008 to 2019, they tested the relationship between banks' ESG performance and their financial performance. The main findings support the current approach of banking regulators, focusing more on the ESG risks of banks than on ESG opportunities, in order to "force" banks to adopt a new ESG business model during this early phase of the transition to sustainability.

The FinTech revolution has disrupted the traditional banking industry, creating new opportunities for innovation and growth. Singhvi and Dadhich (2023) state that the integration of FinTech has the potential to drive positive social and environmental impact in the banking industry, contributing to the achievement of sustainability goals at a global level. However, this revolution also presents significant risks, including cyber security threats, data privacy concerns, limited regulatory oversight, restricted access to capital, and the risk of exacerbating inequality.

Di Tommaso and Thornton (2020) examined whether environmental, social, and governance (ESG) scores of European banks affect their risk-taking behaviour and bank value. They found that high ESG scores lead to a modest reduction in risk-taking for both high and low-risk-taking banks, and this effect is conditioned by the characteristics of the executive board. These findings align with the stakeholder perspective on ESG activities. However, high ESG scores are also associated with a decrease in bank value, consistent with the "overinvestment" approach to ESG, where scarce resources are diverted from investments. Furthermore, they noted that the decline in bank value occurs regardless of the positive indirect relationship between ESG scores and bank value through their influence on risk-taking.

Azmi et al. (2021) explored the relationship between ESG activities and bank value. The sample included 251 banks over the period from 2011 to 2017 across 44 developing countries. The authors utilized a GMM system to control for endogeneity. The research results indicate a nonlinear relationship between ESG activities and bank value, suggesting that a low level of ESG activities positively impacts bank value. However, there is a diminishing return on volume. Environmental activities have the most significant effect on bank value. Furthermore, they explored the channels through which ESG activity influences bank value and found a positive connection between ESG activities and cash flows and efficiency. On the other hand, the authors note that ESG activity negatively affects the cost of equity but has no impact on the cost of debt.

In the study by Shakil et al. (2019), the effects of ESG performance on banks' financial performance were examined within the context of emerging market countries. The study utilized data on ESG performance for 93 banks from developing countries over the period from 2015 to 2018. The findings indicate a positive relationship between environmental (E) and social (S) performance of banks and their financial performance; however, governance performance (G) does not have an impact on financial performance.

According to Barjaktarović Rakočević and Benkovic (2023), ESG criteria attract the attention of various stakeholders, including governments, regulators, businesses, financial institutions, and investors. Research showed that proper implementation of ESG can enhance business value. The Western Balkans requires sustainable financing and investments, and the banking sector in the region is beginning to incorporate ESG criteria

into its financing decisions. A SWOT analysis revealed that the banking sector in the Western Balkans has a solid starting point to leverage advantages and opportunities for stronger development of ESG criteria for itself and to support businesses in ESG reporting.

Previous studies have explored the impact of ESG on corporate performance, primarily from the perspective of operational efficiency. Liu (2023) investigated the influence of additional costs and risks arising from investments in ESG and corporate social responsibility on corporate operations. In this study, were employed a panel data model to conduct an empirical estimation of the full sample and subsample, further verifying the differences among the influencing factors. The results indicate that when ESG performance is strong, it can alleviate the financial distress of banks and enhance the stability of business operations.

In the study by Buallay (2019), the relationship between ESG and operational (ROA), financial (ROE), and market performance (Tobin's Q) of banks was investigated. The sample consisted of 235 banks from European Union countries over a ten-year period (2007-2016). The independent variable, ESG disclosure (sustainability reporting), was measured using three indicators: environmental disclosure, social disclosure, and governance disclosure. Furthermore, two types of control variables were used in this study: bank-specific variables and macroeconomic variables. The findings derived from the empirical results indicate a significant positive impact of ESG on the aforementioned performances. However, the relationship between ESG disclosures varies when measured individually. The results show that environmental disclosure positively affects ROA and Tobin's Q, while social responsibility disclosure negatively impacts all three examined models. Conversely, corporate governance disclosure negatively affects ROA and ROE but positively influences Tobin's Q.

Using a systematic literature review protocol Carnevale and Drago (2024) performed keywords search algorithm and selected 41 relevant articles published in peer-reviewed journals. Their empirical research suggests that lenders penalise poor ESG performance with higher loan spread. By contrast, it is more difficult to claim that ESG strengths always create value. However, they findings reveal that all our knowledge on this topic almost exclusively concerns syndicated loans granted to large, listed, and rated companies, but which represent a minority share of bank borrowers. Also, they identify additional significant selection bias, knowledge gaps, and critical aspect that warrant further research.

3 ESG Values, Drivers, Challenges and Opportunities in the Banks

A strong ESG practices / propositions can significantly drive company value creation in several ways (Henisz, Koller, and Nuttall, 2019):

1. Increase in the company's overall sales or income: Companies with a strong ESG focus attract more B2B and B2C customers by offering sustainable products and enjoy better access to resources due to positive relationships with communities and governments. In contrast, a weak ESG focus may lead to lose customers through poor sustainability practices (e.g. human rights, supply chain) or a perception of unsustainable/unsafe products, and restricted access to vital resources.
2. Cost Reductions: Companies with strong ESG practices can lower energy consumption and reducing waste and water intake, which leads to more efficient resource use, reducing overall costs. In contrast, companies with poor ESG practices generate unnecessary waste and pay correspondingly higher waste-disposal costs. Additionally, companies may incur increased expenses in packaging and storing if they do not prioritize cost-effective, sustainable alternatives.

3. Regulatory and legal interventions: Companies with strong ESG initiatives achieve greater strategic freedom through deregulation, enjoy strategic flexibility, including subsidies and government support, while companies with weak ESG practices that fail to meet regulatory standards may face restrictions on advertising and points of sale, as well as incur fines, penalties, and enforcement actions that can hinder their operations and profitability.
4. Productivity Uplift: Companies that prioritize ESG boost employee motivation and attract top talent, as greater social credibility enhances their appeal to individuals seeking purpose-driven organizations. Conversely, companies with poor ESG practices may face a "social stigma" that limits their ability to attract skilled workers, restricting their talent pool. Additionally, a weak commitment to ESG can result in the loss of valuable talent as a result of weak purpose.
5. Investment and Asset Efficiency: By focusing on sustainable investments and ESG practices, companies can enhance investment returns by better allocating capital for the long term (e.g. more sustainable plant and equipment) and avoid projects that may not pay off due to long-term ESG challenges. In contrast, companies that fail to invest in ESG considerations may suffer from stranded assets, resulting in premature write-downs and financial losses. Additionally, failing to invest in energy-efficient technologies can leave companies at a competitive disadvantage.

The growth and development of sustainable banking and the integration of ESG factors into the business models and strategies of banks are simultaneously influenced by multiple external and internal risk drivers. According to the EBA Report (2021), the key drivers promoting the integration of ESG factors in the banking sector include:

1. Environmental factors: a) Physical risks - arise from the physical effects of climate change and environmental degradation. Physical risks can be acute (if they arise from climate and weather-related events and an acute destruction of the environment, such as extreme weather conditions like droughts, fires, or floods) or chronic (if they arise from progressive shifts in climate and weather patterns or a gradual loss of ecosystem services, such as gradual sea-level rise or an increase in global warming). b) Transition risks - refer to the uncertainty related to the timing and speed of the process of adjustment to an environmentally sustainable economy. In the context of sustainable banking, these risks are closely related to changes in policies, technologies, and consumer behaviours. Examples of transition risks include changes in legislation related to CO2 emissions that may affect the business models of bank clients, and/or technological innovations that may change industry standards, which may require adjustment of banks' loan portfolios.
2. Social factors: Risks are related to the rights, well-being and interests of people and communities, and include factors such as (in)equality, health, inclusiveness, labour relations, workplace health and safety, human capital and communities that can affect the bank's reputation, its ability to attract and retain clients, but also to legal obligations. Banks must be attentive to issues such as human rights, working conditions and gender equality.
3. Governance factors: Risks are related to governance practices, including executive leadership, executive pay, audits, internal controls, tax avoidance, board independence, shareholder rights, corruption and bribery, and also the way in which companies or entities include environmental and social factors in their policies and procedures that can lead to financial losses, regulatory sanctions or reputational damage.

Taking into account the mentioned ESG drivers, it can be concluded that the integration of ESG risk factors into the business models, strategies and risk management systems of banks is becoming more and more important in order to ensure their long-term sustainable operations. The aforementioned ESG risks integration can help banks avoid reputational and regulatory risk, increase competitiveness, and identify new opportunities for growth and innovation. However, at this juncture, it is important to emphasize that banks are simultaneously facing numerous challenges in adapting their existing business models and aligning with changing regulations and investor expectations. According to EBA (2021) there are a number of challenges (threats) facing the integration of ESG risks into institutions' management processes and their supervision:

1. Level of uncertainty: the timing and impact of any kind of ESG risks are hard to predict. The same situation is with the timing and effect of economic policies and related regulatory interventions.
2. Insufficient data: the scarcity of relevant, comparable, reliable and user-friendly data, is another major challenge that limits the understanding of the potential impacts of ESG risks on the performance of financial assets.
3. Methodological constraints: most of the risk management models are based on the use of historical data (i.e. historical experience) to estimate current or future risks, but ESG factors are frequently not reflected in these data.
4. Time-horizon: the mismatch between 'traditional' management tools and the timeframe for the materialisation of ESG risks exists. As an example, the full impact of environmental factors often develops over decades.
5. Multi-point impact of ESG risks on institutions: given that ESG risks can impact different financial risk categories (e.g. credit risk, market risk, capital and liquidity adequacy, etc.), they can impact the financial position of institutions in multiple ways.
6. Non-linearity: most ESG risks, especially those related to environmental risks, are non-linear in nature (e.g. ''black swan'' events). Both physical and transition risks can create complex chain reactions and cascade effects, which in turn could generate unpredictable environmental, geopolitical, social and economic dynamics.

However, the integration of ESG risks into the banking industry, while carrying numerous challenges and threats, also opens up a whole spectrum of business opportunities for banks. Through proper management of ESG risks, banks can leverage one or more of the following opportunities:

1. Integration of ESG factors can enhance a bank's reputation and its relationship with clients, investors, and regulators. Banks that demonstrate a commitment to sustainability often attract more loyal customers and gain greater access to favourable financing sources.
2. ESG factors create new market opportunities, particularly in the areas of the green economy and sustainable finance. Financing and investing in renewable energy projects, sustainable transportation, and energy efficiency are becoming increasingly important segments of banking business.
3. ESG risks can serve as a catalyst for innovation. The development of new financial products, such as green bonds, social bonds, and/or ESG funds, allows banks to diversify their portfolios and increase profitability (new sources of revenue) while simultaneously contributing to sustainable development.
4. Proactively incorporating ESG factors into a bank's business strategy and risk management, as well as integrating ESG risks into their business plans, internal control frameworks, and decision-making processes, places the consideration of ESG risks at the forefront (KPMG, 2021).

4 ESG risks in Bosnia and Herzegovina

In recent years, ESG standards have gained increasing importance in the business sector of BiH, primarily as a result of social development and the need to effectively respond to ongoing societal changes. One way the state can respond is through continuous analysis and adjustment of the legal framework in line with international standards. However, reports indicate that the current legal framework in BiH, particularly regarding ESG standards, is not fully aligned with international frameworks. Practical issues have also been noted, such as slow or inadequate responses from relevant institutions, which hinder responsible business conduct. As a result, companies in BiH often implement ESG principles voluntarily, driven by their awareness of the importance of addressing global challenges with local measures (AIRE Center & UNDP BiH, 2023). Nevertheless, the ESG process is gaining momentum, and it is expected to become mandatory once BiH aligns its legislation with EU law, making human rights monitoring a legal obligation.

In BiH, the regulatory framework covering environmental protection, labor laws, and corporate governance is essential for business operations. Environmental laws include those on air protection, waste management, water management, and forestry. In the social segment, key regulations include labor rights, workplace safety, anti-discrimination measures, gender equality, and social protection. These are generally aligned with international conventions and recommendations of the International Labour Organization (ILO), as well as UN acts in the field of economic and social relations, acts of the Council of Europe, including the case law of the European Court of Human Rights, and European Union law. Corporate governance is guided by various laws aimed at aligning practices with international obligations, including the Stabilization and Association Agreement. Companies are encouraged to adopt additional internal regulations, such as corporate governance codes and transparency measures, to enhance responsible business practices (AIRE Center & UNDP BiH, 2023).

Literature on ESG risks specific to the banking industry in BiH is relatively rare, reflecting the early stage of ESG risk integration in the local market. However, insights can be drawn from regional studies and global trends. KPMG (2023) emphasizes the importance of regulatory support and capacity building for the successful adoption of ESG practices in developing markets. These findings are particularly relevant for BiH, where the banking sector is still grappling with the fundamental aspects of ESG integration.

In the second half of 2023, the Banking Agency of the FBiH and the Banking Agency of Republika Srpska adopted Guidelines for Managing Climate Change and Environmental Risks. In accordance with these guidelines, banks are generally expected to timely and systematically undertake activities in managing these risks in the following areas:

a) The bank's business model and strategy,
b) The internal governance system and the bank's risk appetite,
c) The comprehensive risk management framework, including ICAAP and ILAAP,
d) Policies, procedures, and content of disclosures related to climate change and environmental risks,
e) Data and information disclosures.

These jurisdictions are consistently compelled to harmonize their legislative frameworks with the EU legal framework. Additionally, the recently adopted Green Agenda for the Western Balkans, the Carbon Border Adjustment Mechanism (CBAM)[2], and the Corporate Sustainability Reporting Directive will significantly impact business

[2] https://komorabih.ba/upitnik-za-privrednike-o-cbam-u-carbon-border-adjustment-mechanism/

operations in the region. Based on the above, it is evident that the integration of ESG factors into the business strategies and operations of banks is increasingly recognized as a critical component for sustainable growth and effective risk management. This research examines the current state of ESG integration within the banking industry in BiH, highlighting key challenges, opportunities, and the extent to which these factors are embedded in corporate practices.

4.1 Methodology

To assess the current state and future prospects of ESG risk integration in the banking sector of BiH, a quantitative research approach was employed, encompassing both descriptive and inferential analyses. A survey questionnaire was designed to gather insights and opinions from responsible individuals (primarily senior management) within banks regarding their understanding, management, and integration of ESG risks into their business strategies.

4.1.1 Sample and Data Collection

The target population consisted of all banks operating in BiH as of the end of June 2024. The study included all banks except the Razvojna banka FBiH due to its specific organizational structure. The survey questionnaire was distributed electronically via the Google Forms platform throughout August 2024, enabling data collection from various regions in a relatively short timeframe. The electronic format also facilitated data collection and analysis, resulting in a higher response rate. The response rate was 66.7%, representing a significant sample in the context of the total assets of the banks.

4.1.2 Survey Design

The survey questionnaire was structured to capture a broad range of quantitative and qualitative data related to ESG risk management in banks in BiH. It consisted of a total of 41 questions, divided into several key areas: the basic information about the banks, the ESG framework for risk management, the extent of ESG factor integration into the business model, key challenges and opportunities for integrating ESG practices, and understanding the regulatory framework. The questions included dichotomous responses and multiple-choice options, allowing for clearer insights into the current practices within the banks.

4.1.3 Data Analysis

The collected data were analyzed using both descriptive and inferential statistics. Descriptive statistics were employed to summarize the survey results and identify key patterns in the ESG practices of banks. Inferential statistics facilitated a deeper analysis of potential relationships between variables, such as the associations between bank size, location, ownership, and the level of ESG risk integration. The research collected a total of 14 responses from banks, with 71.4% headquartered in the FBiH and 28.6% in the RS. The ownership structure of the surveyed banks was divided, with 57.1% being majority foreign-owned and 42.9% being majority domestically owned. In terms of financial indicators, the majority of banks (64.3%) reported total assets of less than 2 billion KM, while the remaining banks had total assets exceeding that amount.

The integration of ESG factors into business models and/or strategies shows significant room for improvement. The findings indicate that only 14.3% of banks have fully incorporated ESG risks into all their business processes. In contrast, ESG risks are integrated into key business processes in 35.7% of the surveyed banks, while another 35.7% report a partial integration. Alarmingly, a small proportion of banks (14.3%) have yet to integrate ESG risks into their business models or strategies. This data highlights a pressing need for further enhancements in this area.

According to the survey results, the integration of ESG risks into a comprehensive risk management framework varies significantly among banks. Specifically, more than one-third of the surveyed banks (35.7%) reported that ESG risks are fully integrated, while 21.4% indicated partial integration, and 35.7% consider them to be only somewhat integrated. At the same time, 7.1% of banks stated that ESG risks are not integrated into their risk management framework at all. In 35.7% of banks, ESG risks are fully integrated into the risk appetite. In 50% of banks, ESG risks are partially integrated into the risk appetite, while 14.3% of the surveyed banks have not integrated ESG factors into their risk appetite framework at all. Similarly, internal and external reporting on ESG risks is present in over two-thirds of banks, with one-third having fully integrated these risks into their internal and/or external reporting systems. However, a quarter of banks have yet to incorporate ESG risks into this reporting segment.

In terms of organizational culture, slightly more than a quarter of the surveyed banks (28.3%) reported that ESG risks are fully integrated into their organizational culture and daily operations. Meanwhile, 42.9% indicated that ESG risks are partially integrated into their culture, although further improvements are required. Conversely, 28.6% of banks acknowledged that ESG risks are either not integrated at all or only marginally present within their organizational values and daily operations. Furthermore, according to the survey results, banks have different priorities regarding categories of ESG risks. While 35.7% of banks consider all categories equally important, including environmental, social, and governance risks, 50% of banks emphasize the significance of environmental risks such as climate change and environmental degradation. On the other hand, 7.1% of banks regard social risks, such as working conditions, human rights, and social inequality, as the most important for their operations, while the remaining 7.1% prioritize governance risks, such as corporate governance and transparency.

Regarding ESG risk management responsibilities within the three lines of defense model, the findings indicate notable differences between banks. Specifically, 28.6% have clearly defined responsibilities at all levels, with precisely determined roles, while 35.7% have defined responsibilities and roles but believe that the existing definitions require improvements in certain segments of the organization. At the same time, 14.3% of banks report having vaguely defined responsibilities and roles, which complicates effective management of these risks, and nearly a quarter of the surveyed banks (21.4%) still do not have formally defined responsibilities.

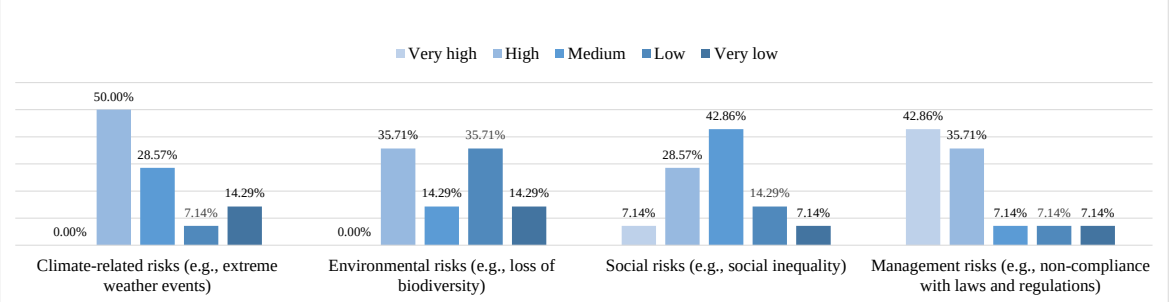
When it comes to assessing ESG risks, unfortunately, more than a quarter of the surveyed banks (28.6%) do not engage in the quantification of ESG risks. A total of 57.1% of banks rely on a combination of qualitative and quantitative approaches, while 14.3% use exclusively qualitative assessments. Notably, no bank solely employs a qualitative approach, highlighting the need for the development of more sophisticated assessment methods to quantify ESG risks and better integrate them into business processes. When it comes to the methods for assessing ESG risks, exposure methods are utilized in 35.7% of cases, while portfolio alignment methods, risk framework methods, or other approaches are used in 14.3% of cases each. Additionally, in 21.4% of cases, no method for assessing ESG risks is employed.

Regarding the integration of ESG factors into investment decisions and project financing, the results show diverse approaches among banks. ESG factors are a key and decisive criterion in all investments and/or financing for 28.6% of banks, reflecting a high level of commitment to sustainable practices within these institutions. An additional 21.4% of banks consider ESG factors, but they are not always decisive, suggesting that other criteria are also taken into account alongside ESG aspects. Furthermore, 28.6% of banks selectively include ESG factors only in selected investments and/or projects, focusing on specific initiatives with the potential for a positive impact. On the other hand, 21.4% of banks still do not take ESG factors into consideration when investing in and/or financing projects, indicating a need for increased awareness and training on the importance of sustainable practices.

Additionally, regarding the organizational management of ESG risks, various approaches are applied among banks. In half of the banks (50%), ESG risks are managed through a dedicated department or function responsible for ESG, which allows for specialization and focus on managing these issues. In 7.1% of banks, the responsibility for ESG risks is assigned to a single board member, facilitating coordination and ensuring that ESG aspects are considered in strategic decision-making. Conversely, in 14.3% of banks, ESG risks are managed at the overall management level, implying broader responsibility but potentially leading to fewer resources dedicated to specific analysis. Finally, more than a quarter of banks (28.6%) reported that ESG risk management is not organizationally established, which could pose a significant barrier to implementing sustainable practices and managing risks in the future.

The priorities of ESG risks for banks in BiH are assessed and highlighted differently (Figure 5). According to the survey, 50.0% of banks rate climate-related risks as high, while 28.6% consider them to be medium-high. Environmental risks are also significant, with 35.7% of banks rating their level as high. Regarding social risks, 7.1% of banks perceive these risks as very high, 28.6% view them as high, and 42.9% consider them to be medium-high. Surprisingly, the largest number of banks (78.6%) believe governance risks are either very high or high. Governance risks are prioritized over climate-related risks because they have a more immediate and tangible impact on a company's operations, financial performance, and regulatory compliance. Furthermore, governance risks are seen as factors within the company's control, and there is a longer history of regulatory frameworks emphasizing strong governance. While climate-related risks are becoming more prominent and pressing, it is expected that companies will increasingly integrate these risks into their risk management strategies in the future. However, at present, governance risks still take precedence. These assessments show that most banks recognize the importance of ESG risks, but there is variability in the perception of their impact on business, highlighting the need for further research and awareness on this issue.

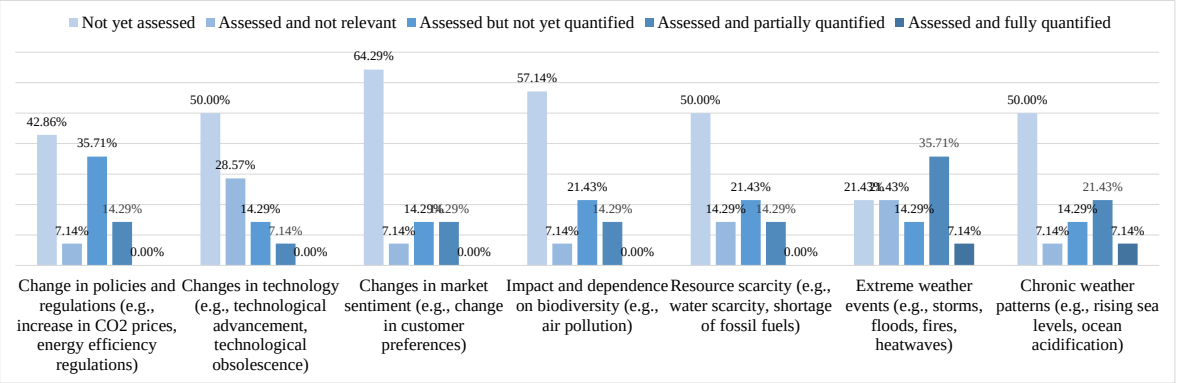
Figure 5. Assessment of ESG Risk Priorities



Source: author's calculation

Analysis of the assessment of ESG risk drivers in the portfolio reveals that a significant number of banks have not yet fully assessed these risks. Specifically, 42.9% of banks did not assess changes in policy and regulation, 50% of banks did not assess changes in technology, while 64.3% of banks did not assess changes in market sentiment. Also, 57.1% of banks did not assess the impact and dependence on biodiversity, and 50% of banks did not assess the lack of resources. Assessment of extreme weather events is slightly better, with 21.4% of banks not yet assessing this risk, while 50% of banks have not assessed chronic weather patterns. Figure 6 provides additional results.

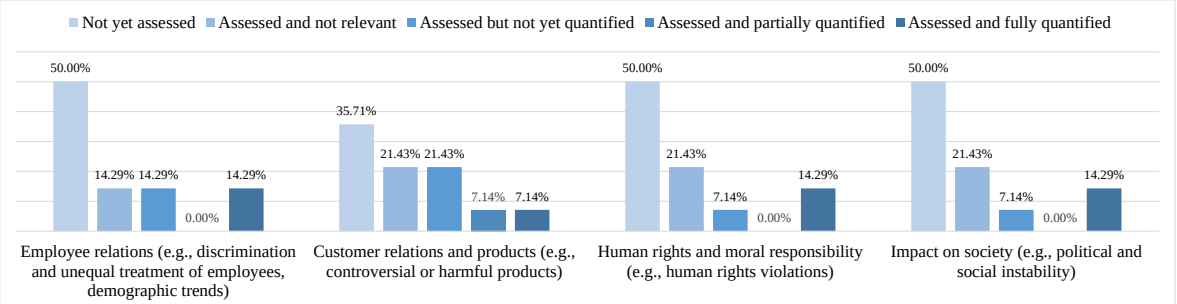
Figure 6. Assessment of Environmental Risk Drivers



Source: author's calculation

In a survey on the assessment of ESG risk drivers in the portfolio, the results show that 50% of banks still assessed employee relations, while 14.3% of banks rated it as not relevant. Regarding relations with customers and products, 35.7% of banks have not yet assessed the risks, while 21.4% of banks considered that the assessments are not relevant. Regarding human rights and moral responsibility, 50% of banks have not yet assessed these risks, while 14.3% have fully quantified the risks. Also, 50% of banks indicated the impact on society, and 14.3% quantified this risk. Additional findings are illustrated in Figure 7.

Figure 7. Assessment of Social Risk Drivers

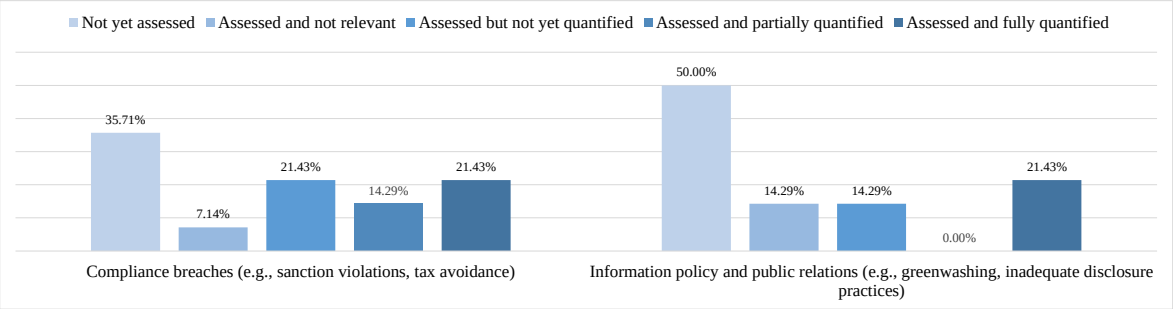


Source: author's calculation

Furthermore, the results show that 35.7% of banks have still assessed the risk of compliance violations, while 7.1% of banks consider the assessment not relevant. In addition, 21.4% of banks have assessed the risks, but have not yet quantified them, while 14.3% have partially quantified the risk, and 21.4% have fully quantified it. Regarding information policy and public relations (Figure 8), 50% of banks have not yet assessed the

risk, while 14.3% assessed it as not relevant. Also, 14.3% of banks have assessed the risk, but have not yet quantified it, while 21.4% have fully quantified this risk.

Figure 8. Assessment of Governance Risk Drivers



Source: author's calculation

These results indicate that most banks in BiH have not yet fully assessed or quantified ESG risks, suggesting there is considerable area for improvement in their analysis and risk management. This highlights the need for further efforts in education and the development of strategies to enhance the understanding and integration of ESG factors into business processes. According to the survey results conducted among banks in BiH, three key reasons for focusing on ESG risks were identified, excluding regulatory frameworks. First, portfolio risk management (78.6%) is highlighted as an essential factor, as banks recognize ESG aspects as fundamental to reducing overall risk exposure in their portfolios. This enables banks to more accurately assess risks associated with environmental, social, and governance factors, which is vital for long-term stability and business success. Second, reputation (57.1%) and the environment care (57.1%) are becoming increasingly significant, as active engagement in ESG issues helps banks build trust with clients and other stakeholders, thereby enhancing their competitiveness in the market. Finally, the community care (50%) and responsibility (25%) are perceived as opportunities to create additional value, as banks support projects that contribute to sustainable development and yield long-term economic benefits.

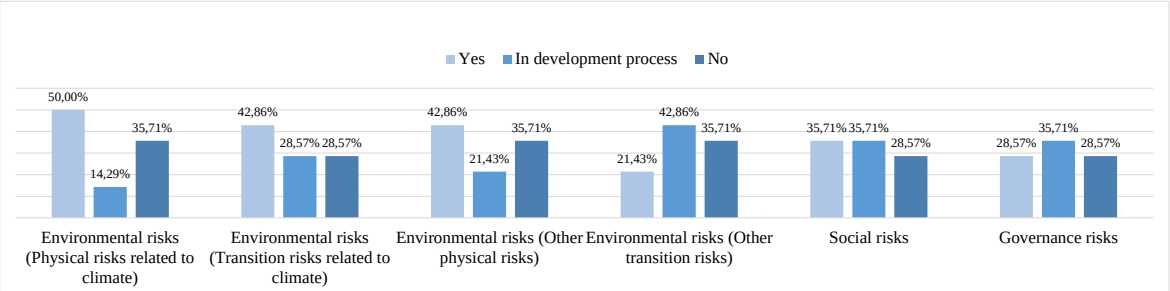
The current level of understanding regarding the impact of ESG risks on the business environment also varies among banks. While 21.4% of banks consider their understanding of the impact of ESG risks to be very high, a larger percentage, including 28.6% of banks, rate their understanding as high or medium. Surprisingly, half of the banks (50.0%) assess their understanding of the impact of ESG risks as low or very low. In the context of self-imposed net-zero targets, more than a third of banks (35.7%) stated that they have set quantitative targets and a roadmap for alignment, while more than half of the banks (57.14%) do not have or plan to establish quantitative and/or qualitative goals, indicating room for further improvement and the development of sustainability strategies.

When we look at the approaches of banks in BiH regarding the integration of ESG risks into their product or service pricing models, we notice significant differences. Specifically, 14.3% of banks stated that they already consider ESG risks when forming prices, while another 14.3% plan to consider their integration in the coming year. An additional 21.4% of banks are contemplating the possibility of incorporating ESG risks in the medium term, while 50% plan to implement this practice in the long term. These results suggest that, although there is a certain number of banks actively integrating ESG risks, a larger portion has not yet started this practice, representing an opportunity for the development of sustainable strategies.

Furthermore, the level of consideration of ESG risks in the credit approval process varies among banks. Less than half of the banks (42.9%) believe that ESG risks are significantly taken into account throughout all stages of the process, while 7.1% assess that these factors are present but not sufficiently integrated. Additionally, 35.7% of banks acknowledge that ESG risks are minimally considered, and 14.3% indicate that these risks are very poorly integrated into the credit approval process. Regarding market risk management, the level of compliance in monitoring the impact of ESG factors and developing stress tests has been assessed differently. About a quarter of the banks (28.6%) believe that the level of compliance is high, while 14.3% rate it as medium, reflecting awareness of the importance of ESG factors. However, more than half of the banks (57.14%) consider the level of compliance to be low or very low, indicating a significant need for further improvement in this area. When it comes to liquidity risk, the current level of compliance has been assessed similarly. Specifically, 28.6% of banks report that their compliance level is high, while 21.4% rate it as medium. However, a significant percentage of banks consider their compliance level to be low (28.6%) or very low (21.4%), highlighting the need to develop strategies that better manage liquidity risks through the integration of ESG factors.

In the context of operational risk, more than a quarter of banks (28.6%) assess their compliance level as high, while 35.7% consider it to be medium. On the other hand, 21.4% of banks rate their compliance level as low, and 14.3% believe it to be very low. These results indicate an opportunity to enhance policies and procedures regarding the integration of ESG factors into operational risk management. When it comes to the ESG challenges faced by banks in BiH regarding ESG data, the majority of banks (78.6%) identify data quality as a key challenge, while 64.3% emphasize the availability and coverage of data. Data standardization is a challenge for 50% of banks, highlighting the need for better systems for collecting and processing information. Regarding the methodology for identifying ESG risks, banks face various challenges (Figure 9). Many banks are in the process of developing risk management methodologies, but a significant number still lack developed methods for all types of risks. Environmental risks and social risks are the most commonly recognized, while governance risks continue to pose a challenge.

Figure 9. The Methodology for Identifying ESG Risks



Source: author's calculation

The insufficient internal knowledge about ESG risks and uncertainties regarding new regulatory requirements pose key challenges for 57.1% of banks. Additionally, the lack of staff and inadequate data have been highlighted as significant issues for 50.0% of banks. In the context of opportunities, 57.1% of banks believe that the integration of ESG practices reduces regulatory and legal interventions, while 50% see the potential for increasing company value. Additionally, 35.7% of banks emphasize that ESG integration helps attract and retain quality employees, and 28.6% highlight that it enables superior

growth and expansion in the markets. In conclusion, 64.3% of banks monitor and adjust their operations to comply with all relevant legislative and regulatory requirements, indicating a high level of awareness about the need for regulatory compliance. However, there is area for improvement regarding transparency, risk definition, and the development of methodologies for identifying ESG risks. The majority of banks (85.71%) are fully aware of the Guidelines for managing risks related to climate change and environmental risks, while the results regarding the Corporate Sustainability Reporting Directive (CSRD) are less optimistic, with only 28.57% of banks being fully aware.

Regulatory gaps hindering ESG adoption in BiH include the absence of comprehensive ESG legislation, unclear and inconsistent reporting guidelines, lack of mandatory regulations for managing ESG risks, weak enforcement mechanisms, limited awareness and education on ESG issues, and inadequate support for businesses transitioning to sustainable practices. These gaps contribute to the slower integration of ESG principles, impeding both private sector progress and alignment with international standards. While there is growing recognition of ESG risks in BiH, the pace and depth of ESG adoption lag behind that of the EU, driven by differences in regulatory frameworks, institutional capacities, investor pressures, and public awareness. However, with increasing international focus on ESG practices and potential future regulatory alignment with the EU, BiH is likely to gradually catch up with EU standards.

To examine the relationship between bank size (measured by total assets) and the level of ESG integration, a Pearson χ^2 test of independence was initially conducted. However, given the small sample size of only 14 banks and the fact that some expected cell frequencies were below the recommended threshold of 5, the validity of the χ^2 test could be compromised. Therefore, Fisher's exact test was also employed. The results of both tests indicate no statistically significant association between bank size and the level of ESG integration (Pearson χ^2 test: $(\chi^2(3) = 3.11,\ p = 0.375$; Fisher's exact test: $p = 0.867$), suggesting that the level of ESG integration does not depend on the size of the bank.

Similarly, the relationship between the bank's headquarters and the level of ESG integration was examined. The results of the conducted test also indicate that there is no statistically significant association between the bank's headquarters and the level of ESG integration ($\chi^2(3)=6.16;\ p=0.104$), suggesting that the level of ESG integration does not depend on the bank's headquarters either. The Fisher's exact test ($p=0.221$) also supports this conclusion. Finally, the relationship between bank ownership (domestic versus foreign) and ESG integration was assessed. Contrary to expectations, the research findings indicated that there is no statistically significant association between the type of bank ownership and ESG integration ($\chi^2(3)=2.16;\ p\text{–}value=0.540$), suggesting that ownership type is not related to the level of ESG integration in the banking sector. The Fisher's exact test ($p=0.600$) further confirms this conclusion. Previous findings indicate that factors such as size, headquarters, and ownership do not play a significant role in the ESG integration process among banks in BiH.

The varying levels of ESG integration among banks reflect a complex interplay of factors, including market demands, leadership, and access to expertise and technology. Understanding these factors can help explain why some banks are ahead in ESG integration and why others are lagging behind. Each bank's approach to ESG is shaped by its unique combination of internal and external conditions.

4.1.4 Discussion and Limitations

Although the subject research provides valuable insight into ESG risks in the banking industry in BiH, it is important to mention several potential limitations of the work. The

sample size of 14 banks, although representative, may not have captured the full diversity of the banking industry. In addition, relying on respondents' self-assessment data via an electronic survey may lead to bias, as respondents may overestimate their understanding or management of ESG risks. Furthermore, the cross-sectional nature of the study prevents an in-depth analysis of long-term trends or changes in ESG practices. Future research could take these limitations into account and expand the sample and use additional data collection methods, such as interviews or case studies, which could offer deeper insights into the practical application of ESG strategies

The results of the survey indicate significant progress in the understanding and management of ESG risks among banks in BiH, but also the need for further improvement of methodologies, increased transparency and integration of sustainable practices into business strategies. More than half of the banks highlight a lack of internal knowledge and uncertainty regarding new regulations, which is consistent with previous study (Kalfaoglou, 2021). Additionally, the issue of data deficiencies is mentioned in other works as well (Carnevale & Drago, 2024). By strengthening internal knowledge and cooperation with external sources of information, banks can improve their risk management and achieve a competitive advantage on the market. Regarding opportunities, more than half of the banks view ESG integration as an opportunity to reduce legal risks and enhance value, which is supported by the study (Barjaktarović Rakočević & Benković, 2023). Finally, the results of the survey indicate significant challenges and opportunities for banks in BiH in relation to the integration of ESG risks. There is an awareness of the importance of ESG factors, but the variability in approaches and levels of integration indicates the need for further work to improve these practices. In this sense, education, policy development and improvement of data management represent key steps towards strengthening the sustainability and resilience of the banking sector.

Conclusion

The research emphasizes that the banking sector in BiH is going through an early stage of ESG risk integration, facing challenges such as a lack of homogeneous data, high costs of ESG framework implementation and limited availability of ESG products. Although banks are aware of the importance of ESG risks, the results indicate the need for further education and training regarding ESG practices, in order to improve the understanding and integration of these factors into organizational culture and business models. The integration of ESG factors into key business processes, such as the development of new products and investment strategies, is still at an early stage, which opens up space for further improvements and the creation of additional value. A proactive approach to ESG integration can help banks mitigate risks, create opportunities for innovation and develop sustainable products.

Despite the heterogeneous level of ESG risk integration among banks in BiH, the research indicates that company size, headquarters and ownership do not play a significant role in this process, which suggests that internal capabilities and strategies are key to successful ESG implementation. Regulatory requirements, risk management and investment opportunities are the main drivers of the integration of ESG factors into the banking sector, which provides an opportunity to contribute to sustainable economic development and improve business performance. Increasing transparency, improving communication and involving interest groups are important steps to ensure the trust of clients and strengthen the reputation of banks. Adopting a proactive approach to ESG risks enables banks to gain a competitive advantage, attract investments and achieve long-term

sustainability on the market, which will ultimately contribute to greater resilience and stability of the banking sector in BiH.

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EVALUATING RESEARCH WORK THROUGH A SYSTEM OF IMPACT INDICATORS

─ ABSTRACT ─

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It is well recognized that research evaluation systems implemented at different levels – national, institutional, department, or by scientific branches – are expected to employ a complex approach to the assessment of research practices and outputs as well as the outcomes of research funding. The main challenge facing the research evaluation processes is the design and justification of a system of indicators for research impacts. The paper examines the key function of such indicators to provide feedback about the expected effects of scientific outcomes – actual or potential. The paper suggests an overview of the requirements for constituting such indicators, taking into account the strategic aspects of the realization of research outputs and the need to ensure appropriate information provision. It is argued that the construction of such a system of impact indicators should take into account not only the specific situation and circumstances of the field of research (often interdisciplinary) but also the conditions for flexible adaptation of such a system, taking into consideration the requirements of funding institutions in national, European, and international contexts.

Keywords: research impact, research output evaluation, impact indicators.
JEL classification: I28, O30.

1. Introduction

Since the late 20th century, research and development worldwide has become a prerequisite for the accelerated and sustainable development of organizations, states and supranational communities. Product and technological innovation in today's dynamic world is based on both applied and fundamental research. Moreover, research is identified as a vital investment without which organizations and countries would lose their competitiveness in the global marketplace.

In the process of market transformation of the centrally planned economies in the countries of Central and Eastern Europe, the role of science in supporting technological and social development has grown considerably. This has also led to an increased expectation of systematic research contributions to the solution of current real-world problem situations as well as significant societal issues. Thus, science, technology and innovation policies, implemented through the activities of specialized research funds and agencies (private or public), complement and reinforce countries' long-term social and economic development strategies.

The traditional (or narrow) understanding of "academic" impact of research is associated with the effect that a study (through its published results) has on academia, including the preconditions it provides for future research. Typical indicators of "scientific impact" are measured through various bibliographic metrics based on tracking citation

counts and other quantitative indicators of researchers' publication activity. The relevance of the research problem stems from the fact that at the current stage of research development worldwide, it is accepted that **scientific achievements should have the potential to improve various aspects of socio-economic life.** This is considered to be achieved primarily on the basis of the generation of new knowledge and its implementation through specific innovation activity. Such sectors globally are mainly the digital technologies, health, security, transport (in particular aerospace and aviation), energy, tourism, cultural industries, etc. (Penfield et al., 2014; Bornmann, 2013).

The current study emphasizes on the necessity of constituting a flexible system of indicators that adequately reflect the multidimensional impacts of research activity and its results. It supports the view that traditional indicators of "scientific impact" alone are not a sufficient measurement source for proving the quality and added value of research. Thus it can be assumed that the concept of "research impact" should be linked in a new, original way to the achievement of positive effects of research activities on various aspects of the social development: economic, environmental, social, cultural, etc.

The focus of this paper is put on a **conceptual framework for designing and justification of a system of indicators that reflects the "public impact" of scientific activity, manifested in different benefits**. It is argued that the achievement of benefits related to a societal impact of scientific activities can be purposefully stimulated by the introduction of appropriate indicators to measure and evaluate research results. A system of impact indicators for evaluating research activities in different organizations needs to involve a complex of measures capturing not only the narrow (scientific) and academic impact but also the public impact of research work.

2. Research impact: review of evaluation approaches

The British Research Excellence Framework defines the scientific impact as the effect achieved for economy, public services and policy, culture, health, standard of living, etc. (including change or benefit). These effects have been identified by evaluation beyond academia – the research impact on the economy or society can be measured by a variety of means reflecting the extent to which the results of research can be beneficial for different aspects of human life and societal development (Pinar & Unlu, 2020). Such aspects of the scientific rationale are for example making informed policy decisions (policy impact); achievements that directly or indirectly contribute to improving the quality of life (human impact); benefits that contribute to enhancing sustainable economic growth, including green added value (economic impact).

Various authors pay attention to the multifaceted nature of evaluating academic research that induces the importance of a holistic approach. It transcends the traditional metrics, advocating for an assessment framework which incorporates diverse indicators of research quality and impact. The inclusion of qualitative assessments and the consideration of research's societal and economic impacts highlights the limitations of citation counts and journal impact factors as sole indicators of research excellence. This approach points out that the traditional metrics can incentivize quantity over quality and may overlook significant research that does not conform to mainstream trends (Vutsova et al, 2023).

De Rijcke et al (2016) provide a comprehensive analysis of the international literature on evaluation systems, practices, and the impact of indicator use in research evaluation. These authors underline both the heterogeneity of the literature and the diversity of approaches to research assessment highlighting the variation in evidence regarding the effects of evaluation exercises. The analysis utilizes empirical materials that shed light on the potential effects of evaluation exercises and the strategic responses by scientific communities and other stakeholders to the demands of research assessments.

Special attention is put on the phenomenon of “gaming indicators” where individuals or institutions manipulate data or activities to produce favorable evaluation outcomes, often at the expense of genuine research quality and integrity. This emerges as a key risk factor for the operation of a system of research evaluation indicators. Another potential risk relates to how scientific communities adapt and respond to the pressures of evaluation requirements, which can lead to strategic behavior that may not align with the original intent of research evaluation.

Another potential approach to research assessment emphasizes on a comprehensive analysis of Key Performance Indicators (KPIs) tailored for academic researchers at various career stages, including PhD candidates, post-doctoral scholars, and research supervisors (Aithal & Aithal, 2023). On the basis of exploratory research that systematically identifies, compares, and evaluates KPIs, this study emphasizes the importance of such indicators in guiding and assessing research efforts, ensuring accountability, and improving the quality and impact of academic work. The authors introduce a structured approach to measuring and enhancing research productivity, impact, and collaboration, which appears crucial for the progression of knowledge and the academic community's enrichment. The identified KPIs are analyzed using the ABCD analysis framework (advantages, benefits, constraints, and disadvantages) providing a novel perspective on academic performance measurement. The KPIs can serve as guiding policies for academic researchers, potentially leading to enhanced research productivity in higher education and research institutions.

Ortiz-Núñez et al (2023) provide scientific literature review on indicators used to evaluate science, technology, and innovation activities utilizing bibliographic databases e.g. Web of Science, Scopus, and Google Scholar. The authors apply the SysteRe-HSS methodology to select 96 publications that contributed to a descriptive model of indicators for evaluation of science, technology, and innovation. The model is justified by the dominance of indicators focused on innovation activities, human and financial resources, and measures related to bibliometrics and scientometrics. However, it underscores the challenges of social innovation indicators that should integrate insights from existing measurement approaches with the unique aspects of social innovation. This way an assessment of the impact of science and technology on social appropriation practices may become possible. Furthermore, the analysis discusses the need for next-generation metrics, responsible evaluation methods for open science, as well as alternative indicators to gauge the social impact of research in the context of Web 2.0 (Ortiz-Núñez et al, 2023).

Issues of developing a Management Information System (MIS) for implementing performance indicators emerges as an alternative approach to research evaluation applied in higher education institutions. The study of Mewengkang et al (2024) is based on a MIS adapted for Indonesian universities outlining the use of the Extreme Programming Method for the development of the system. It includes phases of planning, design, coding, and testing that enable the university to report on the accomplishment of each study program, aligning with the performance targets set by the government. The system emphasizes on four key areas: planning, organizing, implementing, and controlling the achievement of main performance indicators oriented to the enhancing of effectiveness of overall operations, research and education.

Particularly for the planning area, MIS provides essential information for the goals, strategies, and action plans to be communicated. In respect of the organizing, it reflects the flow of data, tasks, and restraints among the main actors, including students, administrators, study programs, and the governance. The implementation area benefits from the system by offering suitable access for actors to enter, verify, and view data on the achievements of major performance indicators. In addition, the MIS plays a crucial role in controlling the attainment on these indicators by providing access, regulation, and required

data for evaluating the success of educational policies and programs, including research. This way MIS proves to be an important instrument for enabling a structured approach to achieving and monitoring key performance indicators (Mewengkang et al, 2024).

Cao et al (2023) also relate the assessment of research to the higher education system performance suggesting a novel approach to evaluating the degree of excellence and sustainability of higher education systems. These authors develop a Quality-Sustainability Model (QSM) using principal component analysis (PCA) and entropy weighting method (EWM) to investigate thirteen indicators across nine countries with developed higher education systems. PCA was utilized to reduce the dimensionality of these indicators and extract factor coefficient score matrices, identifying four principal components used for next step analysis. Each sub-indicator within these components was weighted using EWM to create a quantifiable QSM. The study covers a range of metrics that encompass academic performance, research quality, faculty qualifications, financial health, student services, internationalization, technological infrastructure, governance, ethical practices, etc. Although these indicators are chosen to provide a comprehensive view of the higher education system's strengths and weaknesses, the design of a system for research evaluation may extract QSM sub-indicators (research capacity and research value) that reflect different aspects of research quality.

Another approach reveals controversies of the interrelation between research evaluation and global university rankings. For example, Kochetkov (2024) provides a comprehensive analysis of the role of these rankings within the realm of research evaluation and policy-making. Initially conceptualized as tools for marketing and benchmarking, these rankings have become integral to research assessment and the implementation of excellence initiatives worldwide. The study systematically reviews literature from various sources particularly focusing on “5top100 policy project” which underscores the significance of rankings for research assessment. The consensus in academia that university rankings are not suitable for research assessment is identified, due to several technical and methodological flaws – these include biases of different nature, such as a predisposition towards research output in the evaluation of universities and individual researchers, conflicts of interest, and potential risks to national identity.

The review by Kochetkov (2024) highlights that governments globally are concerned about the low rankings of their national universities and have launched numerous initiatives aimed at elevating higher education standards. However, the effectiveness of rankings as a measure of research quality seems questionable and a critical examination of the use of university rankings in research evaluation becomes necessary, requiring a caution against their uncritical adoption in policy decisions. Furthermore, while university rankings have gained prominence in research evaluation and policy initiatives, their reliability and validity as tools for assessment are heavily contested. This confirms once more the need of alternative methods for evaluation that ensure a fair and accurate assessment of research quality.

When assessing research results, the motivation of researchers to publish in high-quality journals seems to act as a key driver for researchers to enhance their academic performance. Lambovska & Yordanov (2020) suggest a detailed overview of the factors for publishing in prestigious journals applying a structured approach, content analysis, and descriptive statistics to synthesize their findings. The study identifies fourteen motivational drivers, out of which collaboration, research fund raising, financial assets, and contributions to society being the most cited reasons for researchers' endeavors. The analysis highlights the importance of high-quality publications for researchers' prestige, contribution to career progression, and the overall performance evaluation of academic institutions. However, it addresses the lack of consensus on the definition of research

quality outlining gaps in the existing literature and proposes avenues for future research. Emphasizing the crucial role of motivation in achieving the goals of various stakeholders, including researchers, universities, and society at large, the understanding of these motivational factors is identified as a key to enhancing the research output quality and, by extension, the global knowledge economy.

Kodama et al (2013) consider the approach to competency-based assessment of academic interdisciplinary research and respective implication to university management. Employing a co-citation analysis (a bibliometric approach focusing on the citing-cited relationship of publications) the study articulates research competence and interdisciplinary features as key elements of an evaluation system. Through case studies of stem cell-related research at four universities, the analysis identifies research competence by synthesized clusters of publications. KPIs are proposed and introduced to assess research, revealing that a mix of interdisciplinarity and internal collaboration can lead to high research productivity. The study also applies a portfolio management framework from the business field to academic research, highlighting differences in research activities among the universities and showing that such management methods are suitable for academic research. This way the proposed assessment approach can significantly support strategic management for interdisciplinary research at cutting-edge academic institutions.

The key performance indicators proposed by Kodama et al (2013) appear to be crucial for evaluating the effectiveness and productivity of interdisciplinary research within academic institutions. These KPIs are designed to measure the degree of interdisciplinarity and internal collaboration, which are posited to have a direct correlation with research productivity. Specifically, the KPIs include synthesized clusters of publications, which represent the research competence of the academic entity. In addition to clusters, the KPIs include metrics such as the number of cross-departmental collaborations, the variety and disparity of research topics, and the extent of integration of different disciplines within research projects. These indicators help in assessing the breadth and depth of interdisciplinary efforts and their alignment with strategic objectives.

Evidence about the research impact is provided by Nielsen (2022) considering the significant role which university research plays in contributing to societal and economic development. The study emphasizes the importance of **universities' third mission** which extends beyond teaching and research to include the **application of knowledge for societal benefit**. A framework for assessing the impact of university research is outlined stressing on the need for clear evidence to support claims of research benefits. The challenges of quantifying impact, particularly in terms of broader societal and economic contributions, is discussed. The author suggests a methodological approach in order to capture the multidimensional nature of research impact, considering both direct and indirect effects. The inclusion of diverse metrics and narratives that provide a comprehensive picture of how university research translates into practical applications is examined. Moreover, the role of academic work for achieving the UN Sustainable Development Goals is reflected, suggesting that research outputs should align with these global objectives to maximize impact.

Overall, this study provides a thoughtful analysis of the mechanisms through which university research can demonstrate its value to society, encouraging a more diverse consideration of the term “impact” in the academic context. Indeed, it has a profound and diverse impact on society, ranging from cultural advancements to technological breakthroughs. Nielsen (2022) provides different examples about research impacts. For example, Oxford University's research has led to significant cultural, business, and policy impacts, including educational initiatives like the Silk Roads Project with Katie Melua, which involved original musical performances by students. Research impact also manifests

in environmental and health improvements, such as the work by the Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences which found that targeting blood vessels could be key to controlling fibrotic disease. Another example is the influence of university research on policy making and legislative developent. The University of York describes research impact as contributions that benefit society, culture, the environment, and the economy, with their research influencing health, wellbeing, and policy change. Technological developments also originate from university research, with a classic case being radio-astronomy research by CSIRO and Macquarie University leading to the creation of Wi-Fi technology. There is no doubt that university research can have instrumental impact, such as shaping legislation and changing behavior, conceptual impact by contributing to the understanding of policy issues, and capacity building through skill development (Nielsen, 2022).

Some adverse effects related to research evaluation are discussed in Lambovska (2023) where a structured conceptual framework to mitigate these effects is proposed. The "dark side" to research evaluation is characterized by negative consequences that can arise within the evaluation process. These adverse effects can manifest in various forms, impacting not only the individual researchers but also the institutions and the broader academic community. One such effect is the pressure on researchers to publish in high-impact journals, which can lead to a "publish or perish" culture, often at the expense of research quality and integrity. This pressure can also discourage innovative and risky research, as the focus shifts to producing results that are more likely to be published. Another dark effect is the potential for bias in the evaluation process, where certain fields or methodologies are favored over others, leading to an uneven playing field. Additionally, the emphasis on quantitative metrics, such as citation counts, can overshadow the actual impact and relevance of the research to society. To address this, the study introduces a generic model that summarizes "dark effects" and suggests remedies to counteract them. The analysis implements a methodological approach that includes a structured literature review, expert judgment, and review of 35 articles. It raises four research questions focusing on the nature of these adverse effects, their prominence in specialized literature, and the feasibility of creating a robust model to alleviate them. The proposed framework offers possible practical applications for university and government research evaluation systems oriented to improving academic governance (Lambovska, 2023).

All issues discussed above reveal the need of a holistic and balanced approach to implementing particular indicators for research evaluation. However, a variety of obstacles and challenges are identified regarding the design, justification, and implementation of research evaluation systems that reflects the multifaceted aspects of research impact. Principles and functions of such a system should incorporate flexibility, transparency, and fairness of evaluation criteria especially for assessing interdisciplinary research outputs. Indicators in the system need to mirror the context of different scientific disciplines, balancing the direct and indirect effects as well as qualitative and quantitative measurement. Last but not least, the design and implementation of relevant indicators require engagement by major stakeholders which can ensure the assessment process to be inclusive and reflective towards a broader society needs.

3. An Approach to Modeling of a System for Research Impact Evaluation

It is generally recognized that defining indicators for evaluation of research impacts should be implemented in a framework with particular design that acknowledges the degree to which a research outcome contributes to generating benefits for one or more stakeholders.

A wide range of variables can be identified that can reflect the achievements of the targeted impacts. They can be deployed during the goals setting and planning of expected results of research work as well as for monitoring and control focused on assessing whether these planned impacts have been achieved. The modeling of a system for research impact evaluation assumes a definition of a set of indicators that can contribute to the measurement of particular outcomes and the identification of causal relations which assist the evaluation of research impacts.

Typically, research results are distinguished in three major categories: output, outcomes, and impacts (Bornmann, 2013). Results perceived as "outputs" are immediate products of research work, e.g. new data or information generated, new insights achieved by investigating a research topic, answers to key research question, and the respective transmission of findings via communication channels: publications, media communications, and other dissemination forms. "Outcomes" usually refer to new products or processes designs, including suggested prototypes, patents, new policy tools and recommendations, strategies defined and justified, etc. There is a variety of versions regarding the "impacts" concept, however, they naturally refer to particular effects (typically medium to long term) of actual implementations of research outcomes in economic or societal activities of organizations. Some authors note that long-term effects can be positive or negative in relation of different interventions, directly or indirectly (Picciotto, 2018).

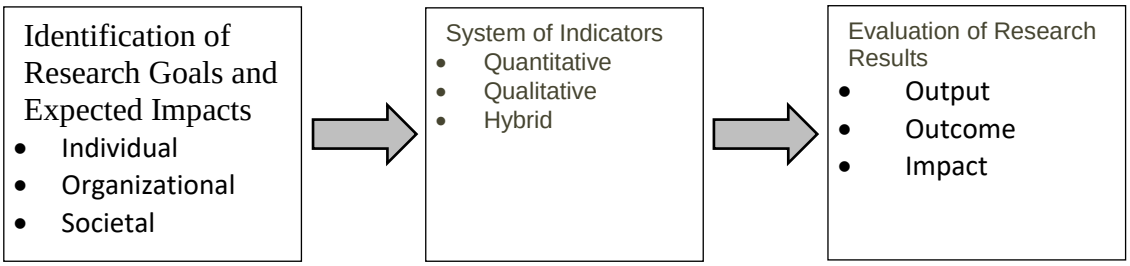

Figure 1. A model for designing a system for research impact evaluation

The design of such a system for research impact evaluation has the goal for issuing an evaluation sentence for the impact by identification and systematization of appropriate indicators. This should make possible the tracking of the causal relationship between results and goals of research, putting an emphasis on a possible (or desired) change in the studied object (fig.1). This way evidence can be generated in favor of the assertion that the planned studies were satisfactory in order to generate impact, taking into account the potential risks and limitations. Moreover, this may justify the need for such studies and their potential benefits event if the economic and/or social environment of research work is unfavorable. This approach can be utilized *ex ante* (when the impacts are planned) as well as *ex post* (when a matching of the planned and achieved is performed). Furthermore, impact models can be developed in several major areas reflecting different types of research benefits, like for example: generation of new knowledge; capacity building (through research outputs & outcomes); development of new or improved products and/or processes; benefits to the research sector; long-term economic and financial benefits.

The model presented above allows the identification of the steps necessary to be passed – from the planning of research activities to the generation of research results, being they intermediate, short-term influences, or final benefits targeted by the research work. For each of these steps appropriate indicators should be identified that can allow the

measurement of the progress of the respective research work, including the targeted outcomes. These indicators can be categorized in three major types:

a) quantitative – traditional indices reflecting the quantifiable facets of research results; in the narrow sense, such indicators cover the scientometric measures e.g. number of published documents and number of citations (total and per author);

b) qualitative – indicators that capture non-metric aspects of research results; the methodology for their measurement assumes implementation of qualitative evaluation scales, expert assessment, blind peer review, etc.

c) hybrid – combination of two or more indicators of different nature; targeted in the evaluation of specific traits of research work and its results which cannot be reflected by any of the previous types in an acceptable way.

In this respect, Nielsen (2022) suggests that universities can measure research impact through a combination of quantitative and qualitative methods. Quantitative measures often include citation counts, the h-index, and journal impact factors, which provide data on the scholarly influence of research outputs. Qualitative assessments however may involve peer reviews and case studies that describe any effects of research results on society, culture, economy, and environment. An example for this is the UK Research Excellence Framework that offers a model for assessing impact by considering effects on, changes to, or benefits for the above mentioned areas beyond academia. Additionally, altmetrics that track the online attention which research receives, can offer valuable insights into the societal engagement and dissemination of research findings.

Table 1. Principles of responsible research

	Principles	Description
Principle 1	Service to Society	Development of knowledge that benefits business and the society, locally and globally, for the critical goal of creating a better world.
Principle 2	Valuing Both Basic and Applied Contributions	Contributions in both the theoretical domain to create fundamental knowledge and in applied domains to address pressing and current issues.
Principle 3	Valuing Plurality and Multidisciplinary Collaboration	Diversity in research topics, methodologies, types of scholarship, forms of inquiry, and interdisciplinary cooperation to reflect the variety and complexity of business and societal problems.
Principle 4	Sound Methodology	Research that implements sound scientific methods and processes in both quantitative and qualitative or both theoretical and empirical domains.
Principle 5	Stakeholder Involvement	Research that engages different stakeholders in the research process, without compromising the independence of inquiry.
Principle 6	Impact on Stakeholders	Research that has an impact on diverse stakeholders, especially research that contributes to better business and a better world.
Principle 7	Broad Dissemination	Diverse channels for knowledge dissemination that jointly advance fundamental knowledge and practice.

Source: Responsible Research for Business and Management Network (RRBM, 2024)

In regard to the impact identifications some research actors suggest a formulation of key principles of responsible research (Table 1). For example, research units, schools,

and universities leadership, scholars, editorial boards, management executives, accreditation bodies, donor organizations, and the general society are identified as major stakeholders of responsible research impacts. The principles can be implemented by support and reward for any recognition of specific results achieved (RRBM, 2024).

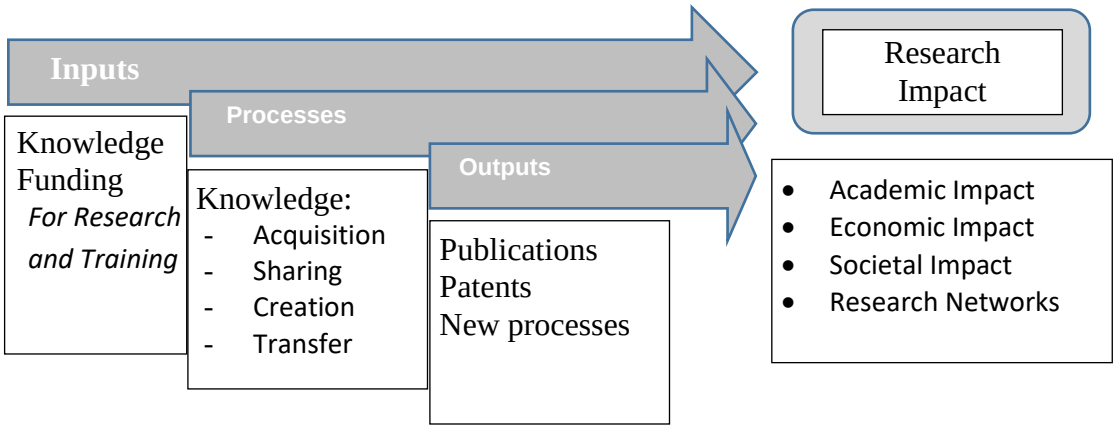

Figure 2. Theoretical framework for research evaluation
Source: De Pinho & Da Rosa (2017).

The design of a system for research evaluation requires also establishment of links to the various stakeholders, beneficiaries, and direct users of research results. In this respect, the assessment of inputs, processes, and outputs can be simultaneously related to various dimensions of research impacts. A theoretical framework proposed by De Pinho & Da Rosa (2017) is based on a knowledge management approach which emphasizes on the core knowledge processes that link inputs and outputs (fig.2). The evaluation process passes consecutively via the knowledge acquisition, knowledge sharing, knowledge creation and knowledge transfer. It is essential here to provide reliable information basis about potential or actual impacts of the research work. The framework counts on a holistic approach to the perception for the whole research cycle which has to be communicated in order to reflect the respective research impacts by different stakeholders (De Pinho & Da Rosa, 2017).

A particular exploration carried out at the EC Directorate-General for Research & Innovation (DG R&I) reveals the complex approach to the monitoring, control and evaluation of R&D projects within Horizon Europe Programme (EC, 2022). A potential avenue for the management of the Framework Programme is to link more closely the evaluation of the performance of funded projects to the continuous monitoring and control of that performance. Emphasis should be placed on the identification of specific alternative impact and result indicators to be directly integrated in the development of interim and final reports. It should be noted here that the EU methodologies are standardized mainly for application to the so-called *ex ante* project evaluation aimed at selecting the best project proposals. With regard to interim and *ex post* project and programme evaluations, there is a lack of standardisation and significant differences between the methodologies used (Smismans, 2015).

Another case relates to the Organisation for Economic Co-operation and Development (OECD) applying a system that includes 5 evaluation criteria used to monitor and evaluate the performance of OECD-funded programmes and projects (Chianca, 2008; Beck, 2006):

(1) relevance /degree to which the activity corresponds to the priorities for the target group and/or and the donor/;

(2) effectiveness /degree to which the objectives were achieved/;

(3) efficiency /relationship between results achieved and resources invested/;

(4) impact /positive or negative changes achieved as a result of the implementation of the programme or project, including direct or indirect intervention, intended or accidental event/;

(5) sustainability /determining the extent to which the benefits of the activities implemented will continue to be available after the termination of the project operation/.

Nevertheless, monitoring and control based on impact assessment requires a systematic analysis of the different types of impacts induced by potential interventions, justified by the research results. This requires the assessment of the degree of impact associated with the change achieved from the perspective of stakeholders (Milat et al., 2015). Impact assessment should be undertaken prior to an intervention (*ex ante*) in order to assess the potential for expected impact. Evaluation after an intervention has taken place (*ex post*) provides concrete evidence of the extent to which outcomes have been effective and changes implemented (Morton, 2015).

4. Implications and Challenges of Research Evaluation

In the process of designing and justification of a system of research impact indicators one should take into account the complex dynamics at play in the realm of research evaluation. Such a system should avoid the use of indicators and metrics questioning the effectiveness and potential for their misuse. The indicators in this system need to take into account the context and to be cautionary towards any potential adverse effects that can lead to suboptimal outcomes for research quality. There are concerns, for example, that currently the evaluation practice influences research behavior and the production of knowledge. This appear to be also a major challenge for research monitoring and control processes.

The formation of a system of impact indicators is challenged by the necessity of providing feedback on the achievement of expected effects (potential or actual). The requirement for these indicators is to be oriented towards strategic aspects of the implementation of research outcomes. They should also not only be sensitive to the aspects to be reflected but also subject to timely and realistic information provision. The design of such a system of impact indicators should take into account both the specific situation and circumstances of the research field – that is often interdisciplinary – and the conditions for flexible adaptation of such a system (Pfeifer et al, 2024). Moreover, it needs to take into account any defined requirements of funding institutions in national, European, and international contexts.

Another key issue emerges in relation to the role of peer review in research assessment in the search for complementary evaluation methods, albeit the dispute on subjectivity and potential biases from its implementation. In this respect, Vutsova et al (2023) recommend the use of case studies and narrative statements to capture the nuances of research contributions that formal metrics may miss. This originates from the general character of research assessment to be multifaceted and stemming from the need to balance objectivity with the recognition of diverse research outputs. The authors emphasize on the major challenge of over-reliance on quantitative metrics, such as citation counts and journal impact factors, which leads to a narrow view of research quality and can overlook significant contributions that may not be widely cited. The metric-focused approach is criticized as often undervaluing interdisciplinary research and its potentially novel findings that challenge existing paradigms. Cases of research results that have significant societal impacts but do not attract immediate academic attention are also under spotlight.

Nielsen (2022) notes that one of the primary difficulties for research impacts assessment is the time lag between the generation of research outcomes and the realization of their impacts, which can vary greatly and may span for years or even decades. This

delay complicates the attribution of specific impacts to particular research activities. Another significant challenge is the attribution problem, which involves identifying the direct effects of research amidst a myriad of contributing factors – it is often difficult to pinpoint the exact influence of the outcomes from particular research project on broader societal changes. In the same line of reasoning, another specific hurdle is the gathering of robust evidence for an impact – this includes both quantitative data (such as economic benefits) and qualitative outcomes (like changes in public behavior or policies). The evidence must be credible and convincing to demonstrate the value of research beyond academic circles. Additionally, the perception that impact varies across disciplines can lead to challenges in creating standardized assessment criteria. And generally, any such evaluations strive to identify causality which is often hard to be accomplished (Nielsen, 2022).

Balancing quantity and quality in academic KPIs seems to be a nuanced task – a solution can be to establish a set of KPIs that incentivizes both prolific output and high-impact contributions (Aithal & Aithal, 2023). Researchers can focus on collaborative projects that not only increase publication count but also enhance the quality of research through diverse expertise and implementation perspectives. Incorporating peer reviews and feedback into the KPI framework can also help maintain quality, as it provides an external validation of the significance and rigor of research results. Encouraging interdisciplinary research seems also beneficial, potentially leading to innovative findings that can not only be published in high-impact journals but also to satisfy particular qualitative indicators. By carefully selecting and balancing such a KPIs system, research organizations can strive for a harmonious blend of productivity and excellence in their academic endeavors.

Mewengkang et al (2024) also recommend a multifaceted approach to improving KPIs for higher education institutions emphasizing on the importance of strategic planning, that should include detailed action plans and timelines for achieving the set goals. This analysis also highlights the need for continuous evaluation and adjustment of formerly set strategies – such an iterative process must ensure that these strategies remain relevant and effective in the face of changing circumstances. In addition to these strategic recommendations, these authors underscore the importance of communication and engagement with all stakeholders involved in the academic processes, i.e. faculty, students, administrative staff, and external partners. Effective communication ensures that everyone is aware of the goals and understands their role in achieving them, which requires stakeholders to be actively involved in the process of enhancing the institutional performance outside the academic scope itself.

Various challenges are discussed by De Rijcke et al (2016) emphasizing on the importance of recognizing the heterogeneity and complexity inherent to research evaluation systems and practices. The authors advocate for a nuanced approach to the use of indicators and metrics, warning against their misuse and the potential for "gaming" (e.g. if data or activities could be manipulated to produce favorable outcomes). Formal indicators should not be the sole basis for evaluation, as this can lead to strategic individual behavior that undermines the integrity and quality of research. Additionally, a need for documentation and analysis of how evaluation interacts with knowledge production is revealed, as this area seems not fully understood yet – understanding these interactions is crucial for developing more effective evaluation practices that truly reflect the quality of research. Transparency in evaluation practices proves to be a challenge but it is highly valuable and can help the mitigation of the risks associated with indicators use and can foster an environment where genuine research quality is valued over strategic responses to ranking requirements. The idea of balanced approach to research evaluation recognizes the limitations of formal indicators and advocates for evaluation measures that support the

integrity and quality of scientific endeavors, encouraging innovation and the production of knowledge (De Rijcke et al, 2016).

5. National research evaluation system: The case of Bulgaria

A relevant regulation for deriving an overall quantitative assessment of research achievements at organizational level has been introduced in Bulgaria in 2015, revised in December 2024 (MoES, 2024). The Regulation for Monitoring and Evaluating Research Activities Conducted by HEIs, Scientific Organizations, and National Scientific Research Fund introduces a national evaluation system that implements annual assessment of scientific research activities of Bulgarian organizations based on measurable indicators adopted by similar evaluation systems in scientifically developed countries (Article 12). Evaluation is based on specific results obtained within three main areas: (1) research outputs and their impact; (2) academic staff reproduction and development; (3) social and economic impact of research outputs (Figure 3). For each evaluated organization an Assessment Commission at the Ministry of Education and Science generates a separate numerical score by each of the three criteria, accompanied by an overall summary score calculated in two versions: gross (summary points for the organization) and organizational effectiveness score (gross score divided by the total number of researchers in the organization).

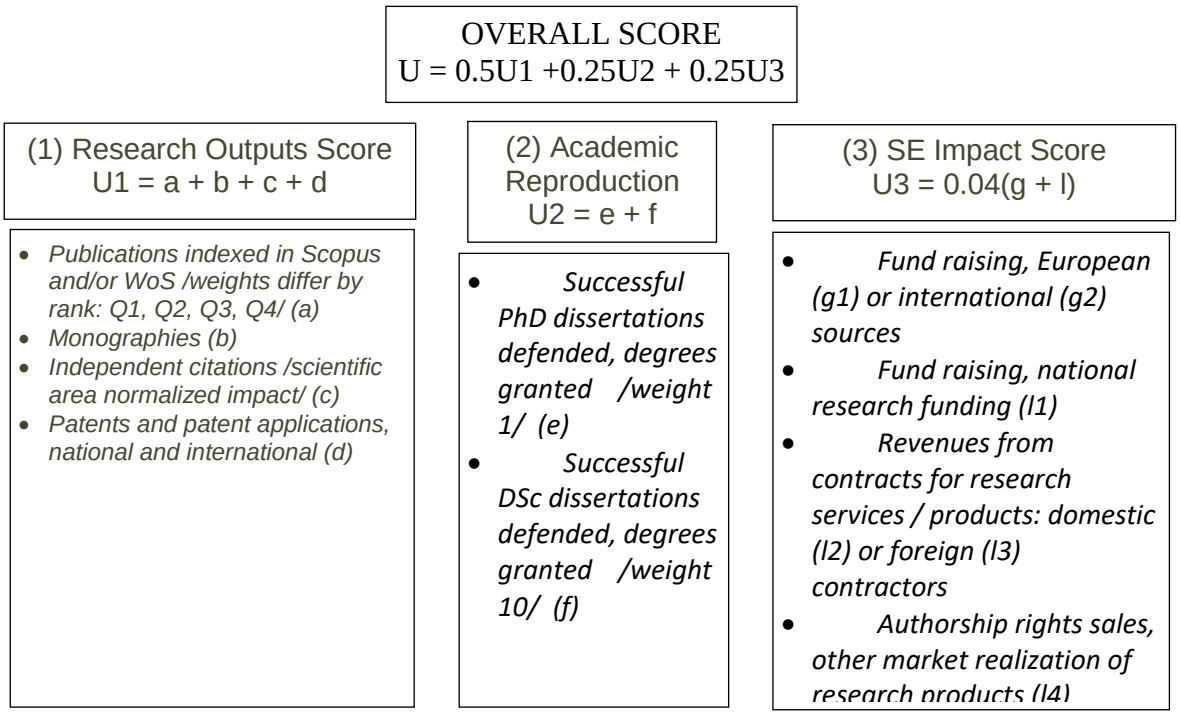

Figure 3. Main areas for evaluation of research outcomes and related indicator groups
Source: MoES (2024).

Using the set of quantitative scores the Commission summarizes the results for each HEI, the Bulgarian Academy of Sciences, and Bulgarian Agricultural Academy by preparing an analytical report of the research activities and outputs of each organization during the reporting period (previous year). This report considers the correspondence between the mission, strategy, and capacity of the organization (associated academic staff

and available scientific infrastructure), on the one hand, and the scientific results achieved. The availability and use of appropriate scientific equipment, the strengths and weaknesses of the organization, and the opportunities and threats for its development in the next period (SWOT analysis) is also discusses. The contextual analysis provides an assessment of the national and international recognition and significance of the HEI; the quality, scope, and significance of its results in terms of: (a) the scientific development at the national and international level; (b) the contribution to the search of solutions of important social problems and issues of the country's economic development. Finally, the Overall Report of the Commission is structured by scientific fields where each HEI is presented separately using the assessments by the three criteria, its overall score, and its respective efficiency rating. These reports serve as a basis for funding policy setting in respect of research ratings of the evaluated HEIs.

6. Limitations

The approach to modeling of an indicators system for research impact evaluation presented above provides a general framework within which such goals can be achieved. This approach may take specific realization by different applications, in a particular context of evaluation, monitoring, and control by a more specific methodology. Crucial here is the identification of relevant information sources that can enable the measurement (quantitative, qualitative, or hybrid) of appropriate indicators. This way such indicators can support the comparison and judgement of the achievements of research work in a wider context of the benefits attained and the socio-economic impacts realized. This paper "joins the voices" advocating for the development of evaluation systems that are sensitive to the diverse needs of research communities in various scientific areas, and in the same time promoting integrity and quality in scientific endeavors (Vutsova et al, 2023).

In this respect, the current study is subjected to some limitations that need to be mentioned. First, it should be noted that the approach to the assessment of societal impacts of research is limited by the measurement problem, stated generally. Many aspects of these impacts are indeed recognized as critical features that need to be evaluated when considering the relevance and effectiveness of research outcomes. However, their quantitative measurement or other kind of objective reflection is seriously hindered in practice. Moreover, the qualitative approaches to their evaluation still vary substantially which may produce incompatible results. In relation to this, another limitation of the study derives from the emphasis on a selection of principles recognized as core guides of the assessment process that take into account the multidimensional liaisons between societal benefits and research outcomes. A common agreement on the scope and details of developing a comprehensive research evaluation system is not yet clearly achieved.

7. Conclusions

Nowadays practices show that the currently deployed indicators provide useful information for *ex post* evaluation by external experts and are a source for reflecting the sustainability of research results. At the same time, it is questionable whether they can indicate the potential societal impact of research and facilitate the identification of both the direct and indirect impact of its results. In most cases, reports on the implementation of research projects appear as narrative (descriptive) of the results of the evaluated project, but do not demonstrate in an explicit form what their potential socio-economic impact is. In this respect, some international organizations develop their own criteria systems for evaluating, monitoring and controlling applied research programs and projects.

There are no doubts that measuring research impact is definitely complex due to the diverse nature of research outcomes and their varying timescales for realization. In this respect, universities should consider the broader socio-economic impacts which seems challenging to quantify – these may include the development of new technologies, influence on policy, improvements in health and quality of life, particularly contributions to solving global challenges aligned with the SDGs (Nielsen, 2022). In order to capture such a multifaceted impact, universities must be encouraged to develop and adopt a mix of indicators and narratives to reflect the range of these influences.

Indeed, while it is commonly accepted that there is no "one-size-fits-all" method for evaluating research impacts, universities can employ a system of assessment metrics to capture the broad scope of diverse influences of their research work (De Rijcke et al, 2016). It is definitely important for research communities to find proper channels for communicating their research outcomes and the way they translate into impacts, e.g. new products, processes, and particular added value to society. Such a comprehensive evaluation can contribute to the demonstration of the value of university research to stakeholders and society at large.

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EFFECTS OF THE VIRUS ON THE CULTURAL TOURISM SECTOR DURING THE COVID 19 PANDEMIC IN THE REPUBLIC OF KOSOVO

─ ABSTRACT ─

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As of March 13, 2020, the Government of Kosovo has taken the first measures at the country level to curb the spread of the COVID19 pandemic. The measures taken include the restriction of movement and meetings, the suspension of work in schools and universities, the suspension of the vast majority of cultural, sports and recreational activities, etc.

The COVID19 pandemic has deeply affected all sectors of society, but the Cultural Tourism Sector is one of the most sensitive and one of the most damaged. All planned festivals, exhibitions, theatrical and cultural events have been cancelled, and cinemas, museums, ballet, film screenings and other cultural events have been closed, so artists and cultural workers have found it extremely difficult to survive. Many countries have responded quickly to this very disturbing phenomenon by approving measures to preserve the jobs of those who make a living from work in the cultural sector, in order to help this sector from the consequences which may be irreparable. , for a long time!

Keywords: Cultural tourism, the effects of the pandemic, the development of cultural tourism.

SYSTEMATIC LITERATURE REVIEW ON ENVIRONMENTAL CONSCIOUSNESS IN MARKETING LITERATURE

- ABSTRACT –

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Environmental consciousness has become an increasingly significant factor in marketing strategies as businesses and consumers alike recognise the importance of sustainability. Most importantly, due to consumers' heightened interest in eco-friendly purchases, marketing practitioners are looking for the best ways to incorporate sustainable practices in marketing strategies and communicate these aspects to consumers. Environmental consciousness represents one of the measures for the level of consumer environmental concern. Representing one of the most powerful underlying drivers of consumer behaviour regarding sustainable products, the concept of environmental consciousness among consumers seems to be an evolving phenomenon. This systematic literature review aims to explore the integration of environmental consciousness within the marketing literature, identifying key themes, trends, and gaps. The study relies on co-citation and co-occurrence analysis, as well as subsequent categorisation of emerging themes and topics. By analysing peer-reviewed articles, conference papers, and relevant literature from the past few decades, this review synthesises findings on what determines consumer environmental consciousness and how it influences consumer behavior, branding, advertising, and overall marketing strategies. The review focuses on the evolution of the phenomenon and the investigation of its antecedents and consequences. Additionally, it identifies emerging research trends and potential literature gaps, recommending the direction of future research endeavours.

Keywords: environmental consciousness, green marketing, sustainability, green consumers
JEL classification: M31, Q50, Q56, D12

STRATEGY OF SUSTAINABILITY AS A TOOL FOR POSITIONING CAR MANUFACTURERS

─ ABSTRACT ─

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The European Union has implemented increasingly stringent environmental regulations, requiring all new cars and vans to achieve zero emissions by 2035. This shift presents both challenges and opportunities for automakers worldwide. This study applies the three-dimensional (3D) strategic matrix developed in 2010 to assess how sustainability policies impact corporate positioning. The model evaluates three key factors: ecological sustainability (Z-axis), brand value (Y-axis), and financial performance (X-axis). The second goal of this research is to show how the financial results, brand positions, and environmental behaviors of more than 10 global car manufacturers: BMW, Mercedes, VW, Tesla, Toyota, Stellantis, BYD, and FORD, have behaved over a 10-year period and to conclude who has gained or lost the most as environmental regulations have become increasingly stringent.
Additionally, a survey conducted in Serbia, Bosnia and Herzegovina, and Montenegro highlights regional skepticism toward EV adoption due to infrastructure limitations. The findings emphasize the need for targeted policy interventions and infrastructure investment to support the EV transition. This study concludes that sustainability is not just an environmental obligation but a key factor in market positioning and long-term financial success.

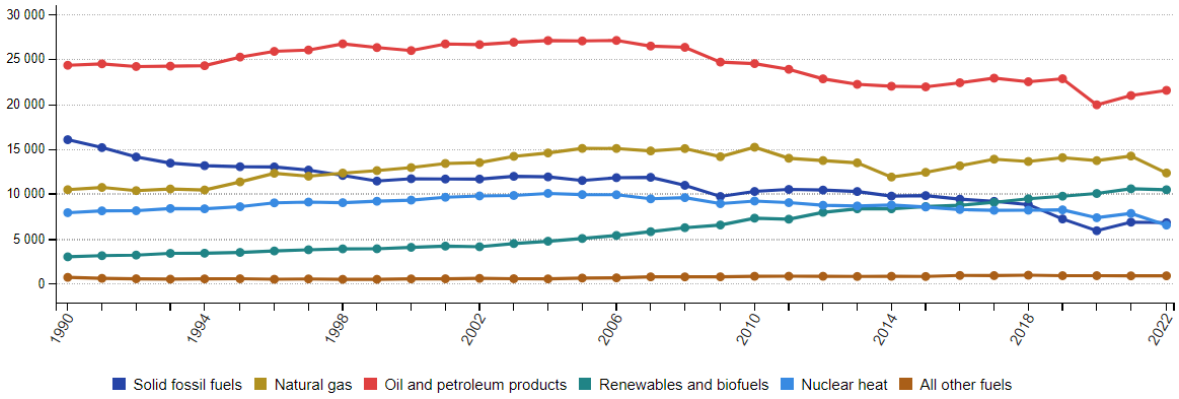
Keywords: *strategic three-dimensional matrix, brand value, financial result, sustainability index, car electrification, Balkan and EV*

JEL classification: Q56

1. Introduction

For years, the European Union has been trying to reduce its dependence on oil and gas (successfully and unsuccessfully), which Graph 1 clearly indicates until 2020, and later the consumption of fossil fuels increased somewhat after the Coronavirus pandemic in 2019. The European Union continues to pressure car manufacturers with the zero carbon emissions plan as a policy and goal for cars by 2035, as well as similar policies for buses and trucks. Specifically, the European Commission adopted the amended Regulation (EU) 2019/631 No. 2023/851, according to which all new cars and vans registered in Europe must have zero emissions by 2035. As a transitional step towards achieving zero emissions, the average emissions of new cars must be reduced by 55%, and new vans by 50% by 2030.

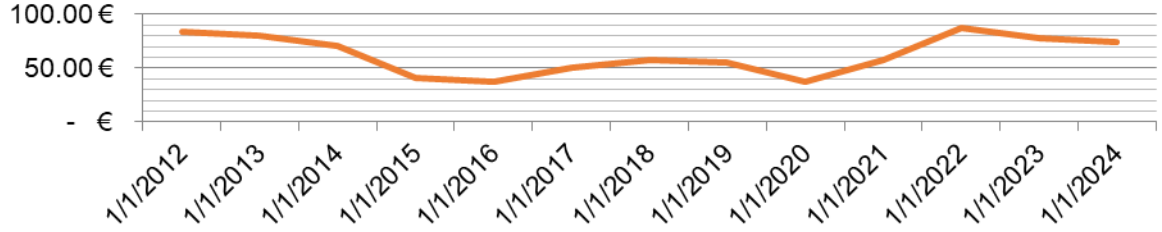
Figure 1. Gross available energy, EU, 1990-2022,



Source: Eurostat (2024) https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview

These regulations have not only environmental implications but also profound strategic consequences for automakers. Compliance with sustainability mandates has become a key factor in competitive differentiation, as brands that successfully integrate sustainability into their corporate strategy strengthen their market positioning. For example, Tesla and BYD have leveraged sustainability leadership to create strong brand equity and attract sustainability-conscious consumers. On the other hand, legacy automakers such as Toyota and Volkswagen must balance the transition to electrification with their existing hybrid and internal combustion portfolios, affecting their competitive agility. This study utilizes the 3D strategic matrix to systematically evaluate how sustainability-driven policies influence the financial and branding strategies of global automakers.

Figure 2. Price of oil, OPEC, 2012-2024,



Source: Authors based on data OPEC (2024)

There is no doubt that the European Commission is trying to ensure the achievement of the goal of climate neutrality of the EU by 2050 by draconian measures and reduce the demand and dependence on imported fossil fuels while increasing the production of energy from renewable sources. Why? Because the prices of fossil fuels have risen dramatically as shown in Graphic 2. This implies that there should be as many electric family vehicles, buses, trucks, and delivery vehicles on European roads as possible. The following table shows data on how the number of electric cars in the EU grew from 2010 to 2022.

Table 1. New registrations of electric cars, EU-27

Year	Battery electric cars	Plug-in electric cars	Total cars	Share of electric cars
2010	591		11128785	
2011	7179		10498868	0.10%
2012	13730	6225	9369664	0.10%
2013	21454	31079	9573937	0.50%
2014	31197	60370	10075476	0.90%
2015	46857	84115	11150601	1.20%
2016	54065	65011	12027051	1.00%
2017	83491	88334	12574590	1.40%
2018	132377	106502	12753440	1.90%
2019	242966	137632	12991283	2.90%
2020	536186	525311	9924123	10.70%
2021	876527	852440	9695706	17.80%
2022	1126682	873042	9252358	21.60%

Source: European Environment Agency (EEA) (2024)

2. Polarization of Europe as a union and continent with regard to EV

At first glance, it may seem that everything is wonderful within the EU and across the European continent, but this is not the case. There are significant differences between the regions and countries themselves, both within the EU as a union and across Europe as a continent. The data in Table 2 provides information on total car sales and electric car sales across various European countries for the years 2022 and 2023. It also includes percentages of electric car sales relative to total car sales, as well as GDP per capita in the same countries according to the IMF.

Table 2. Passenger cars, by type of motor energy and % of EV cars and GDP

Year	2022	2022	% electric in total car	2023	2023	% electric in total car	% change of electric	GDP per capita, current prices Purchasing power parity; $ per capita (IMF)
Country	Total car	Electric car		Total car	Electric car			
European Union-27 country	252612228	3015595	1,2%	256538568	4479451	1,7%	149%	52180
Belgium	5955127	89811	1,5%	6047551	181447	3,0%	202%	68080

Bulgaria	2896777	6293	0,2%	3006215	11472	0,4%	182%	35960
Czechia	6305934	14195	0,2%	6512774	22441	0,3%	158%	50470
Denmark	2801076	112674	4,0%	2827864	200109	7,1%	178%	77640
Germany	48763836	1013009	2,1%	49098685	1408681	2,9%	139%	67240
Estonia	849294	3461	0,4%	865773	5796	0,7%	167%	45120
Ireland	2335130	36970	1,6%	2418947	58633	2,4%	159%	133900
Greece	5726012	6306	0,1%	5877759	12315	0,2%	195%	41190
Spain	26605478	95617	0,4%	26778142	150282	0,6%	157%	52010
France	38856492	595797	1,5%	39511536	916082	2,3%	154%	60340
Croatia	*1840767*	*4801*	*0,3%*	*1910131*	*7058*	*0,4%*	*147%*	*45700*
Italy	40213061	158131	0,4%	40915229	219548	0,5%	139%	56910
Cyprus	601131	830	0,1%	621116	1253	0,2%	151%	58730
Latvia	769723	3832	0,5%	781696	6369	0,8%	166%	41730
Lithuania	1650384	7305	0,4%	1700524	11424	0,7%	156%	50600
Luxembourg	444818	13909	3,1%	453614	23267	5,1%	167%	143740
Hungary	4094129	29836	0,7%	4168651	41212	1,0%	138%	45690
Malta	317234	2883	0,9%	323852	4364	1,3%	151%	67680
Netherlands	8917107	330113	3,7%	8932846	442489	5,0%	134%	74160
Austria	5150890	110225	2,1%	5185806	155409	3,0%	141%	69460
Poland	21458101	38841	0,2%	21992881	51211	0,2%	132%	49060
Portugal	5778584	67347	1,2%	5931722	111002	1,9%	165%	47070
Romania	7865186	24691	0,3%	8106570	39271	0,5%	159%	43180
Slovenia	1207755	7977	0,7%	1230565	12743	1,0%	160%	53290
Slovakia	2555491	4528	0,2%	2644361	7896	0,3%	174%	44080
Finland	3673750	46584	1,3%	3718278	86011	2,3%	185%	60850
Sweden	4979761	197789	4,0%	4976366	291673	5,9%	147%	69180
Iceland	287368	11160	3,9%	256000	28408	11,1%	255%	73780
Liechtenstein	30659	950	3,1%	38964	1387	3,6%	146%	no data
Norway	3018728	607516	20,1%	2886795	689169	23,9%	113%	82830
Switzerland	4812896	110788	2,3%	4861544	155556	3,2%	140%	91930
United Kingdom	32169932	620632	1,9%				0%	58880
Bosnia and Herzegovina	*1006142*	*138*	*0,0%*	*1044950*	*331*	*0,0%*	*240%*	*20620*
Montenegro	*227716*		*0,0%*	*242599*		*0,0%*		*29700*
Moldova	745970	1553	0,2%	788586	2554	0,3%	164%	17900
North Macedonia	*483482*	*190*	*0,0%*				*0%*	*25590*
Georgia	1333012	3147	0,2%	1438585	4893	0,3%	155%	25250
Albania	639379	7245	1,1%	699337	2891	0,4%	40%	20630
Serbia	*2337498*		*0,0%*	*2389185*		*0,0%*		*27980*
Türkiye	14269352	14552	0,1%	15221134	80043	0,5%	550%	43920
Kosovo*	*339131*		*0,0%*	*368818*		*0,0%*		*16780*

Source: Eurostat (2024) & IMF (2024)

The disparity in EV adoption rates, which we can analyze at the regional level (Table no. 3), between Northern, Southern, and Central Europe, as well as in the Balkans and Eastern Europe, reflects broader socioeconomic and policy differences. Northern Europe's success in EV adoption can serve as a model for other parts of Europe, which may need to accelerate policy initiatives and infrastructure development to foster electric vehicle sales.

Table 3. Europe region differences by using electric cars

Country/Year	2022 Y	2023 Y	Country/Year	2022 Y	2023 Y
Northern Europe:			**Southern Europe**		
Norway	20,12%	23,87%	Italy	0,39%	0,54%
Sweden	3,97%	5,86%	Greece	0,11%	0,21%
Denmark	4,02%	7,08%	Spain	0,36%	0,56%
Iceland	3,88%	11,10%	Portugal	1,17%	1,87%
Central Europe			Cyprus	0,14%	0,20%
Luxembourg	3,13%	5,13%	**Balkan not EU**		
Netherlands	3,70%	4,95%	BiH	0,01%	0,03%
France	1,53%	2,32%	Montenegro	no data	no data
Switzerland	2,30%	3,20%	North Macedonia	0,04%	no data
Germany	2,08%	2,87%	Albania	1,13%	0,41%
Eastern Europe			Türkiye	0,10%	0,53%
Estonia	0,41%	0,67%	Serbia	no data	no data
Latvia	0,50%	0,81%	**North-east Europe**		
Czechia	0,23%	0,34%	Finland	1,27%	2,31%
Lithuania	0,44%	0,67%	Latvia	0,50%	0,81%
Slovakia	0,18%	0,30%	Lithuania	0,44%	0,67%

Source: Authors on data: Eurostat (2024)

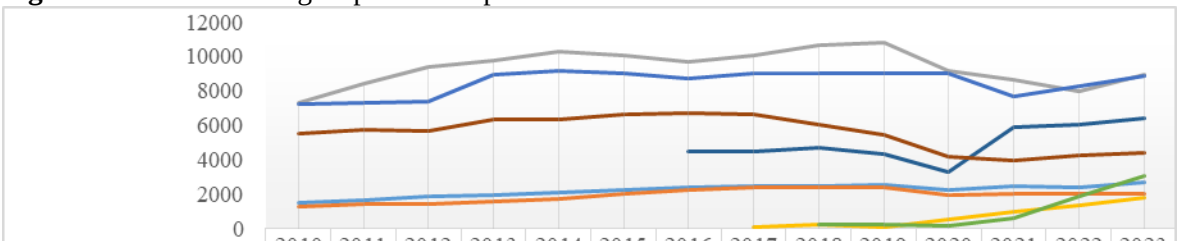
The comparison of electric vehicle (EV) adoption across different European regions further illustrates significant disparities. Northern Europe, leading in EV adoption, contrasts sharply with the Balkan regions where infrastructure and public acceptance lag behind. Several key factors contribute to this slower adoption: 1) Government incentives and policies – Unlike Norway and Germany, where substantial government subsidies and tax exemptions encourage EV purchases, many Balkan countries lack comprehensive incentive programs. In Serbia, for instance, subsidies exist but are limited in scale and do not fully offset the higher initial cost of EVs. In Montenegro and Bosnia and Herzegovina, no direct purchase incentives are available, making EV adoption financially challenging for consumers. 2) Charging infrastructure – A major barrier to EV expansion in the Balkans is the underdeveloped charging network. While Western European countries have thousands of fast-charging stations, cities like Novi Pazar, Kraljevo, and Tuzla face critical shortages, with only a handful of available chargers (figure 4). This lack of infrastructure discourages potential EV buyers who fear range anxiety. 3) Energy costs and GDP per capita – The financial feasibility of EV ownership is also influenced by electricity prices and overall economic conditions. Countries with lower GDP per capita, such as Bosnia and Herzegovina ($20,620), Serbia ($27,980), and Montenegro ($29,700), struggle with affordability when compared to wealthier European nations. Additionally, electricity price fluctuations and grid limitations pose further obstacles to widespread EV adoption. 4) Cultural and market preferences – The dominance of used German cars in the region plays a significant role in shaping consumer preferences. Many drivers in the Balkans opt for second-hand diesel and petrol vehicles due to their affordability, familiarity, and ease of maintenance. This entrenched car culture slows down the shift toward electrification.

Addressing these barriers requires a combination of government action, infrastructure investment, and financial incentives to make EVs a viable choice for a broader segment of the population. Without these efforts, the Balkans will continue to lag behind Western and Northern Europe in sustainable mobility adoption.

2.1. Financial, sale, ESG, and EV results of eight car producer

For these reasons, car manufacturers also have to analyze parameters such as habits, not just money, when it comes to their strategy towards the EV market. One of the most famous manufacturers of electric vehicles is certainly Tesla from the USA, which was founded by Elon Musk. The company was supposed to deliver the first electric trucks with an aerodynamic design in 2019, but it delivered them only in December 2022 to PepsiCo. There is no official data on how many electric trucks Tesla has produced since then. When it comes to cars, we analyzed the entire year 2023. Figure 2 shows us how the year 2023 ended.

Figure 2. Total sale of eight specific car producers in 1.000 cars



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BMW	1461	1669	1845	1964	2118	2258	2352	2469	2483	2564	2256	2461	2382	2662
Mercedes-benz	1277	1381	1452	1566	1723	2001	2198	2374	2383	2385	1944	2041	2041	2044
VW	7278	8361	9345	9728	10217	10010	9635	10039	10601	10732	9145	8611	7957	8901
Tesla								101	245	112	500	936	1314	1809
Toyota	7237	7308	7352	8871	9116	8972	8681	8971	8964	8977	8958	7646	8230	8822
BYD									248	230	190	604	1863	3024
Stellantis							4482	4423	4655	4272	3254	5836	6003	6393
FORD	5524	5695	5668	6330	6323	6635	6651	6607	5982	5386	4187	3942	4231	4413

Source: Authors on annual reports of these eight specific car producers

This graph presents data on the car sales of eight automotive manufacturers—BMW, Mercedes-Benz, VW, Tesla, Toyota, Stellantis, BYD, and Ford—over a 14-year period from 2010 to 2024. The selection of these manufacturers was based on their market presence, EV adoption rate, and financial impact within the industry. Additionally, Table 3 includes financial data for these manufacturers, showcasing key ratios such as the Investment in R&D (IR) ratio, ratio of total sales, and ratio of EV cars in total production.

As noted by Rakićević et al. (2023), the Covid-19 crisis led to a significant decline in sales for most car producers due to falling demand, as reflected in the data for 2020 in Table 4. This downturn also affected the financial results of these companies during that year. However, in other years within this 14-year period, it is evident that companies investing heavily in R&D, adopting sustainable development practices, and maintaining a high ratio of EV cars in their production lines have achieved significantly better results compared to those that did not prioritize sustainability.

Table 4: IR ratio, Ratio of sale, ratio of EV car, of eight specific car producer in 1.000 of car

Producer	Ratio	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BMW	Ratio of IR in total		4,4	4,6	0,6	5,5	5,2	4,6	5,0	7,1	6,2	0,6	5,7	4,6	4,8
Mercedes		5,0	5,3	4,9	4,7	4,4	4,4	4,9	5,3	5,4	5,6	7,5	6,4	6,1	4,1
VW		5,4	4,5	4,6	5,2	5,7	5,6	5,3	5,0	5,8	5,7	5,4	5,1	5,1	**6,8**

Tesla		79,7	102,3	66,3	11,5	14,5	17,7	11,9	11,7	6,8	5,5	4,7	4,8	3,8	4,1
Toyota		3,8	3,8	4,2	3,7	3,5	3,7	3,7	3,8	8,5	6,2	6,9	8,3	9,1	2,9
Stellantis											3,3	3,4	3,1	2,9	3,0
BYD		3,0	3,0	2,6	2,6	3,4	2,6	3,2	3,6	3,8	4,4	4,8	3,7	4,4	**6,6**
FORD			1,7	1,7	0,9	1,1	1,3	1,2	0,4	0,3	0,4	1,0	0,8	2,0	2,2
BMW	Ratio of EV in total sales					0,8	1,3	2,6	4,2	5,7	5,7	8,5	13,3	18,2	**21,3**
Mercedes												14,0	16,3	16,3	**19,7**
VW												4,5	8,6	9,9	11,0
Tesla									100	100	100	100	100	100	**100**
Toyota														0,2	0,4
Stellantis															5,5
BYD										45,5	67,1	73,1	54,0	49,1	**52,3**
FORD														1,5	1,6
BMW	Ratio of profit before taxes in revenues	4,1	4,1	4,2	3,6	3,5	4,1	4,0	4,0	3,9	4,1	4,4	4,5	6,0	5,8
Mercedes		6,8	7,9	7,1	8,6	7,8	8,5	8,2	8,5	6,3	2,5	5,4	21,7	13,6	**12,8**
VW		5,7	11,9	13,2	6,3	7,3	-0,6	3,4	6,0	6,6	7,3	5,2	8,0	7,9	7,2
Tesla		-116	-115	-88	3,0	3,6	-5,3	5,3	0,8	7,8	8,5	13,7	11,8	21,4	**14,0**
Toyota		1,5	3,0	2,3	6,4	9,5	10,6	10,5	7,9	8,2	8,2	8,2	8,1	9,5	**12,3**
Stellantis								2,8	5,6	3,7	3,7	1,6	10,1	10,9	11,7
BYD		6,7	3,7	0,7	1,7	1,6	4,9	6,6	5,5	3,4	1,9	4,4	2,1	5,0	6,2
FORD			11,4	10,6	15,1	10,2	14,9	9,6	8,6	7,2	5,8	2,4	7,7	8,1	6,8

Source: Bajramovic et al. (2024)

When it comes to the automotive industry, R&D will be the most important issue in the coming years, and that is why investment in R&D needs to be analyzed in this industry in particular. This is the reason why Chinese companies took a big piece of the cake which was the core of the European industry (Volvo is now Chinese-owned) and a company like BYD is coming with much innovation. Mercedes-Benz has successfully navigated the transition to electric mobility while maintaining strong financial performance. Unlike other manufacturers that have required significant increases in R&D spending to adapt, Mercedes-Benz has managed to grow its profit before taxes from 6.8% in 2010 to 21.7% in 2021, stabilizing at 12.8% in 2023. At the same time, its EV share in total sales reached 19.7% in 2023, positioning it as a leading premium brand in the EV space.

In contrast to Mercedes-Benz, Volkswagen is now making substantial R&D investments to catch up in the EV race. The company has been slower in shifting away from traditional internal combustion engines, leading to a need for increased funding to scale EV production. Volkswagen experienced a decline in total vehicle sales, dropping from 10.97 million units in 2019 to 8.26 million in 2023, marking a 24.7% decrease over four years. This downturn has pressured the company to accelerate its electrification strategy. To remain competitive, VW has significantly increased its R&D spending to 6.8% of total revenue in 2023, up from an average of 5.3% in the previous decade. This aggressive investment aims to develop new EV platforms, improve battery efficiency, and expand production capacity to recover lost market share and meet tightening EU emissions regulations.

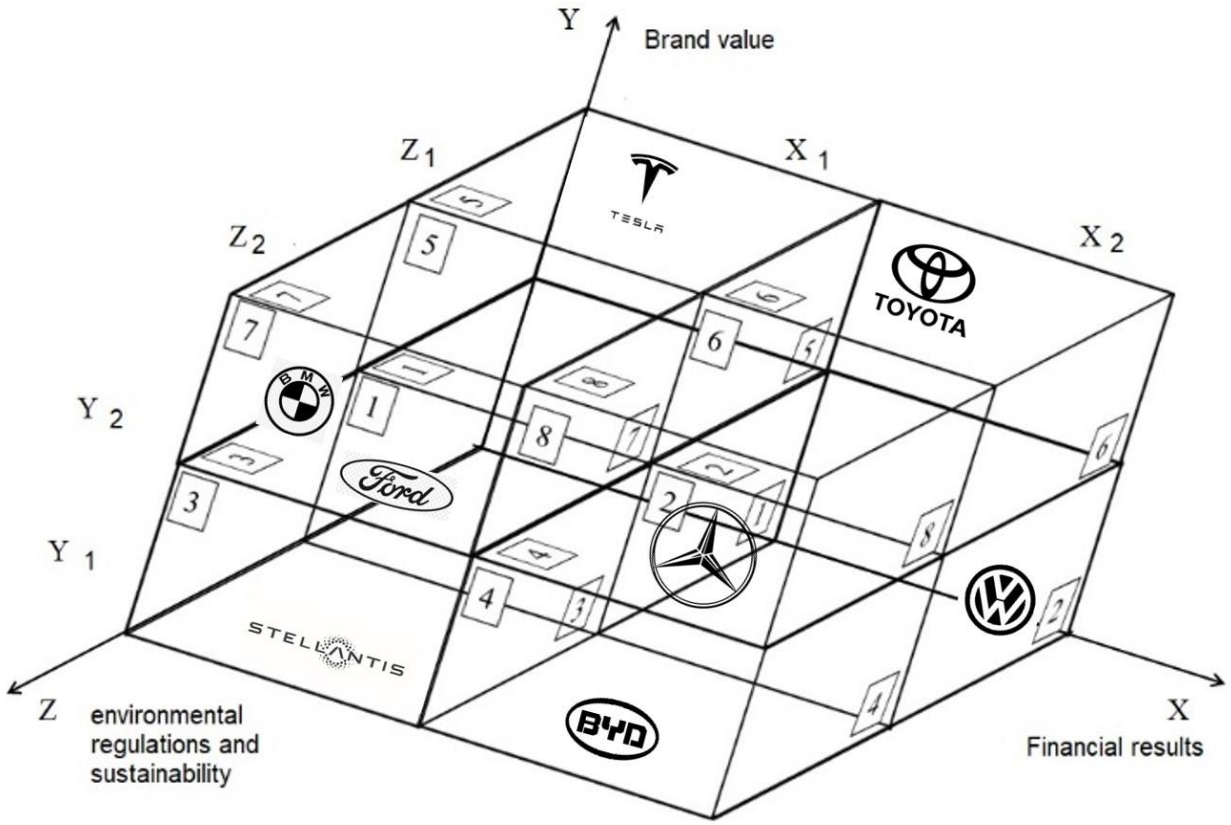
3. The three-dimensional (3d) matrix: An Integrated Approach to Corporate Positioning

The three-dimensional (3D) strategic matrix, originally developed in 2010, is a comprehensive framework for evaluating corporate performance through a holistic approach. It examines how sustainability strategies influence financial outcomes and brand positioning in the automotive sector.

The model assesses three core dimensions:

- Z-axis: Ecological Sustainability Strategy – Measures CO_2 reduction targets, EV production goals, and ESG compliance,
- Y-axis: Brand Value – Evaluates consumer perception, brand loyalty, and competitive positioning,
- X-axis: Financial Performance – Analyzes profitability, revenue growth, and investment in innovation.

Figure 3. To Three-dimensional (3D) matrix: strategy of sustainability, brand value and financial results



Source: Bajramović (2010)

Explanation of eight boxes in the strategic tridimensional 3D matrix:

- Box 1: low brand value (Y1), low financial results (X1) and low investment in IR and sustainability (Z1),
- Box 2: low brand value (Y1), good financial results (X2) and low investment in IR and sustainability (Z1),
- Box 3: low brand value (Y1), low financial results (X1) and high investment in IR and sustainability (Z2),
- Box 4: low brand value (Y1), good financial results (X2) and high investment in IR and sustainability (Z2),
- Box 5: high brand value (Y2), low financial results (X1) and low investment in IR and sustainability (Z1),
- Box 6: high brand value (Y2), good financial results (X2) and low investment in IR and sustainability (Z1),
- Box 7: high brand value (Y2), low financial results (X1) and high investment in IR and sustainability (Z2),

- Box 8: high brand value (Y2), good financial results (X2) and high investment in IR and sustainability (Z2). Bajramović (2011)

For more information about this matrix, see Bajramovic et al (2024) “Application of the strategic three-dimensional 3d matrix in the automotive industry”.

The chosen metrics reflect the strategic positioning of companies regarding sustainability and financial resilience. The IR ratio was selected as a key indicator of innovation capacity, while the EV ratio indicates the level of commitment to electrification. Financial ratios such as profitability margins, return on investment, and revenue growth were included to assess financial sustainability. These indicators provide a comprehensive view of how sustainability efforts correlate with financial success. All financial and ESG data were sourced from official corporate reports, including annual reports from BMW, Mercedes, Tesla, Toyota, Stellantis, BYD, and Ford, as well as industry databases such as Yahoo finance ESG stats. These sources ensure the reliability and comparability of data across manufacturers. However, it is acknowledged that variations in corporate reporting standards may introduce some discrepancies, which were mitigated through data normalization methods.

Unlike traditional strategic models, which focus on single dimensions of corporate success, the 3D matrix integrates sustainability directly into financial and brand evaluations. The increasing relevance of sustainability regulations in global markets makes this a more dynamic and adaptable framework compared to classical models. Comparison with Alternative Strategic Models:

- Porter’s Competitive Advantage Model – Focuses on financial performance and market competitiveness but does not directly incorporate sustainability factors,
- SWOT Analysis – Identifies strengths, weaknesses, opportunities, and threats but lacks a quantitative assessment of sustainability and financial trade-offs,
- ESG Frameworks – Primarily focus on sustainability and corporate responsibility, yet do not quantitatively link sustainability efforts with financial performance.

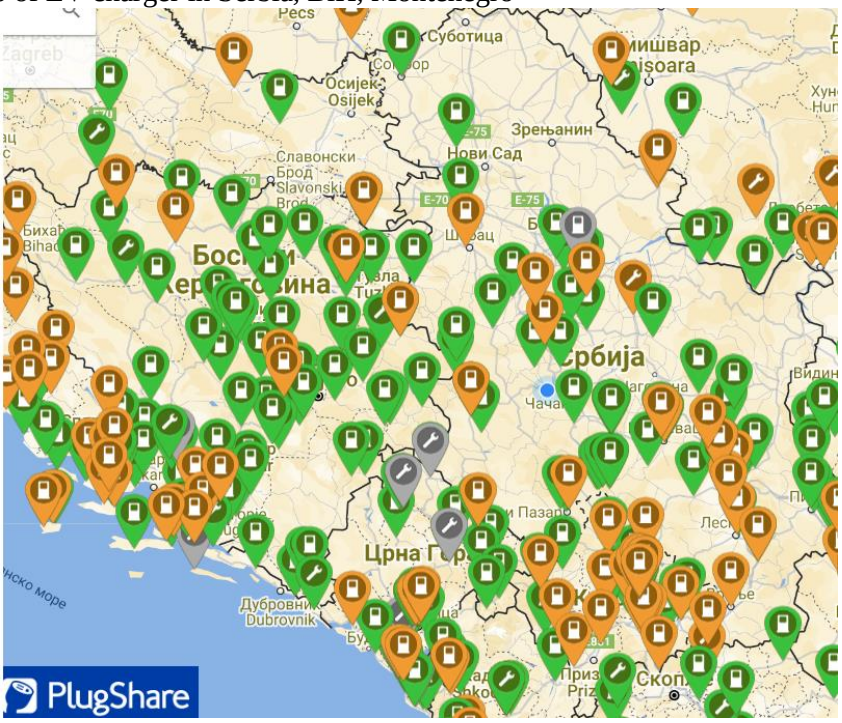
Compared to traditional strategic frameworks such as Porter’s Competitive Advantage model (Grant, 1991), which primarily focuses on financial and competitive market positioning, the 3D matrix uniquely integrates sustainability as a core dimension. Additionally, while ESG frameworks offer qualitative assessments of sustainability, they often lack a direct link to financial and brand performance. The 3D matrix addresses this gap by quantitatively linking sustainability investments with both market and financial outcomes, making it a robust tool for evaluating corporate strategy in a regulated and rapidly evolving industry. The 3D matrix bridges this gap by offering a quantifiable approach to measuring how sustainability investments correlate with financial growth and brand positioning. When first introduced in 2010, the 3D strategic matrix was published in an academic journal during a period of limited online accessibility of scientific research. This paper reassesses its applicability in modern automotive challenges, such as the EU’s 2035 zero-emission targets and the accelerated global transition to EVs.

3. Opportunities for the growth of the EV segment in Serbia, BiH and Montenegro

In addition to addressing battery issues, the widespread adoption of electric trucks will require the installation of tens of thousands of superchargers specifically designed for heavy trucks. A significant ongoing challenge in this field is the "supercharger war," with

Round 1 in the USA being won by Tesla, as other companies have agreed to use Tesla's superchargers to charge their vehicles. Tesla has already installed over 50,000 superchargers worldwide, including 10,000 in the European Union. A study by GridX recorded a total of 137,258 charging stations across 28 countries (25 EU countries, plus Norway, Great Britain, and Switzerland). Of these stations, 46% have two chargers, followed by stations with four chargers (19%). Stations with one or three chargers make up 10% each, while only 14% of stations have five or more chargers. Notably, only 1% of stations are equipped to serve 20 or more vehicles simultaneously. (Ahmatović et al, 2024)

Figure 4. Map of EV charger in Serbia, BiH, Montenegro



Source: plugshare

In Serbia, Bosnia and Herzegovina, Montenegro the development of charging infrastructure lags significantly behind. While areas along highways and the biggest cities have superchargers, cities like Novi Pazar, Kraljevo, and Tuzla are facing a critical situation with only a few chargers available, none of which are accessible to trucks. The situation is especially concerning in cities like Rožaje (Montenegro), Tutin and Sjenica (Serbia), and Bosanska Krupa (Bosnia and Herzegovina), which do not have any chargers for EVs according to “PlugShare”.

3.1. Survey: attitude research EV segment in Serbia, BiH and Montenegro

Big changes have taken place in the field of electric cars and electric vehicles in general. Chinese companies are taking over the primacy. However, as we could see, Europe and America have taken drastic measures regarding customs duties on the import of electric vehicles. Thus, the most drastic steps in this regard were taken by the USA by introducing a tariff of 102.5 % from 24.may 2024. (Executive Office of the President USA). Following this situation, the EU has also introduced customs duties ranging from 17,4 % to 37,6 % depending on the materials that are installed in the cars. “The individual duties applying to the three sampled Chinese producers are: BYD: 17.4%; Geely: 19.9%; SAIC: 37.6%. Other BEV producers in China, which cooperated in the investigation but

were not sampled, are subject to the 20.8% weighted average duty. The duty for other non-cooperating companies is 37.6%." (European Commission 2024) However, as shown in Table 3, different regions and their populations have adopted and accepted the EV trend in various ways so far. Eurostat data also shows that the data for Bosnia and Herzegovina, Serbia, Montenegro, North Macedonia, Kosovo*, and Albania is highly accurate. This is why we decided to conduct surveys on the population's attitudes toward EVs in Serbia, Montenegro, Bosnia and Herzegovina, and the city of Novi Pazar for the purposes of this work. We did not extend the survey to the wider areas of Kosovo, Albania, and North Macedonia due to language barriers. As seen in Table 5, the total number of respondents is approximately 600 across the entire area, with the majority from the Republic of Serbia, where the response rate was highest, reaching 253 within the first two days of the survey. Montenegro, as the smallest country among the respondents, with slightly more than 500,000 inhabitants, was the last to complete the survey.

Table 4: Research sample

	Serbia	**Novi Pazar city**	**Montenegro**	**BiH**
Sample N	250	111	103	156
Total sample N: 620				
mode of collecting data	Online surway	Online surway	Online surway	Online surway
Link	https://forms.gle/Ce67fDiowGqawbo78	https://forms.gle/D6SYyfEcnoTEkJvr7	https://forms.gle/drSkwETcRf3HgeCG7	https://forms.gle/mWkNtdcLs33D1ooe8
Promoted	free promotion	Facebook/ Instagram	Facebook/ Instagram	Facebook/ Instagram
Date	27.08-29.08.2024	27.08-29.08.2024	27.08-31.08.2024	27.08-30.08.2024

Source: Authors

The survey covered four regions: Serbia (250 respondents), Bosnia and Herzegovina (156 respondents), Montenegro (103 respondents), and Novi Pazar (111 respondents), with a total sample size of 620. The sample included respondents aged 18–65, representing diverse education levels (secondary school, undergraduate, postgraduate) and income brackets (low, middle, high-income groups). The demographic structure was designed to capture a broad representation of opinions regarding EV adoption. The survey was conducted via online platforms (Facebook, Instagram), which introduces potential sampling bias, as social media users may not be fully representative of the entire population. Age representation varies across regions, ensuring a diverse perspective. Young respondents (<30 years) make up 37.2% in Bosnia, 33% in Montenegro, 26.1% in Novi Pazar, and 45.2% in Serbia, capturing early EV adopters. Middle-aged respondents (30-50 years) form the largest group, ranging from 51% to 66.6%, representing key decision-makers in EV purchases. Older respondents (50+ years) account for 7.7% to 12.3%, ensuring insights from traditional consumers. This well-distributed sample enhances the study's reliability in assessing regional EV adoption attitudes without significant age-related bias.

The idea was to conduct an almost identical survey in all the above-mentioned areas and in the area of the city of Novi Pazar. Why the city of Novi Pazar? Because Novi

Pazar is the city with the youngest population in Europe but also with the highest unemployment rate of around 50% - 23,265 people are listed as unemployed (there are no official data but newspaper articles, because unemployment is calculated at the level of the region to which the cities of Rashka and Kraljevo belong in which unemployment is less than 10%, which gives a distorted picture that unemployment in this region is only around 11%). The second reason is because the city of Novi Pazar is a trading center for the cities of Tutin, Sjenica, Priboj, Nova Varoš (in Serbia) and Rozaje, Berane, Plav and Gusinje (in Montenegro). At the same time, Novi Pazar is also the University center where a large number of students from these areas gravitate (the region we locally call Sandzak - an area that extends to the north of Montenegro and the south-west of the Republic of Serbia). Another reason is reflected in the fact that it is measured whether the fact that this area has the smallest number of chargers in the entire region additionally affects that there is a lack of trust in EV vehicles. In this region, Novi Pazar is the only city that has a couple of ordinary chargers of 11 kw and 22 kw, but also only one super fast charger of 120 kwh, which is of course insufficient for the mass use of EVs, but it is much better compared to the cities in the Tutin region. Sjenica, Rozaje, which do not have a single ordinary (11 kw) let alone a super fast charger (according to: www.plugshare.com). Since the market (Kujović & Meta 2021), through the levers of supply and demand, finds a point of market equilibrium and satisfies the missing supply, the assumption is that the use of EVs in this region would be higher if the infrastructure were better organized. For these reasons, it was important to measure the views of the citizens of this area with the views of the citizens of the rest of Serbia and the regions of Bosnia and Herzegovina and Montenegro.

The hypothesis that is set as H0: *that there are no drastic differences between the attitudes of the citizens of Serbia, Bosnia and Herzegovina and Montenegro regarding the application of EVs as future traffic, but that these attitudes are even more drastic in regions like Novi Pazar where there is not enough infrastructure for EVs.*

From the Chi-Square test results, we can analyze regional differences in the perception of the long-term sustainability of electric vehicles:

Table 5: Case Processing Summary

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
City or State * Question: 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	620	100,0%	0	0,0%	620	100,0%

Source: Authors data of survey throw SPSS

Table 6: City or State * 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years? Cross-tabulation

			18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?			Total
			a. Yes	b. No	c. Not sure	
City or State	BIH	Count	25	91	40	156
		% within City Or State	16,0%	58,3%	25,6%	100,0%
		% within 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	13,7%	33,5%	24,1%	25,2%
		% of Total	4,0%	14,7%	6,5%	25,2%
	Montenegro	Count	32	39	32	103
		% within City Or State	31,1%	37,9%	31,1%	100,0%
		% within 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	17,6%	14,3%	19,3%	16,6%
		% of Total	5,2%	6,3%	5,2%	16,6%
	Novi Pazar	Count	44	33	34	111
		% within City Or State	39,6%	29,7%	30,6%	100,0%
		% within 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	24,2%	12,1%	20,5%	17,9%
		% of Total	7,1%	5,3%	5,5%	17,9%
	Serbia	Count	81	109	60	250
		% within City Or State	32,4%	43,6%	24,0%	100,0%
		% within 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	44,5%	40,1%	36,1%	40,3%
		% of Total	13,1%	17,6%	9,7%	40,3%
Total		Count	182	272	166	620
		% within City Or State	29,4%	43,9%	26,8%	100,0%
		% within 18. Do you think that electric cars are a viable option for your region/country in the next 5-10 years?	100,0%	100,0%	100,0%	100,0%
		% of Total	29,4%	43,9%	26,8%	100,0%

Source: Authors data of survey throw SPSS

Table 7: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29,802[a]	6	,000
Likelihood Ratio	31,211	6	,000
Linear-by-Linear Association	5,828	1	,016
N of Valid Cases	620		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 27,58.

Source: Authors data of survey throw SPSS

Interpretation of Results Chi-Square test results: Pearson Chi-Square Value: Value: 29.802, Degrees of Freedom (df): 6, Asymptotic Significance (p-value): 0.000. Conclusion: Since the p-value is less than 0.05, we reject the null hypothesis (H0) that there are no statistically significant differences in attitudes between the regions (Serbia, Bosnia and Herzegovina, Montenegro, Novi Pazar).

This means that there are significant differences in attitudes toward the sustainability of electric vehicles (EVs) across these regions. Likelihood Ratio Test: Value: 31.211. Asymptotic Significance (p-value): 0.000 Conclusion: This result also confirms that there are significant differences between the regions in their perceptions of EV sustainability.

Percentages in the Crosstabs Table: Serbia: The highest percentage of respondents from Serbia (32.4%) believe that electric vehicles are a viable option in the next 5-10 years.
Novi Pazar: 29.7% of respondents from Novi Pazar believe that EVs are not a viable option, which may indicate lower confidence in EV sustainability due to insufficient infrastructure.
In Bosnia, 58.3% of respondents stated that EVs are not a viable option, while in Montenegro, 37.9% gave the same response.

Table 8: Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
14. Do you know where the electric car charging stations are located in your city? * CityOrState	620	100,0%	0	0,0%	620	100,0%

Source: Authors data of survey throw SPSS

Table 9: Cross-tabulation

14. Do you know where the electric car charging stations are located in your city/region/country? * CityOrState

			City or State			Total
		BIH	Montenegro	Novi Pazar	Serbia	
14. Do you know where the electric car charging stations are located in your ...	a. Yes	Count	104	52	50	158	364
		Expected Count	91,6	60,5	65,2	146,8	364,0
		% within 14. Do you know where the EV charging stations are located in your city?	28,6%	14,3%	13,7%	43,4%	100,0%
		% within City or State	66,7%	50,5%	45,0%	63,2%	58,7%
		% of Total	16,8%	8,4%	8,1%	25,5%	58,7%
	b. No	Count	31	31	45	56	163
		Expected Count	41,0	27,1	29,2	65,7	163,0

		% within 14. Do you know where the EV charging stations are located in your city?	19,0%	19,0%	27,6%	34,4%	100,0%
		% within City or State	19,9%	30,1%	40,5%	22,4%	26,3%
		% of Total	5,0%	5,0%	7,3%	9,0%	26,3%
	c. I'm not sure they exist	Count	21	20	16	36	93
		Expected Count	23,4	15,5	16,7	37,5	93,0
		% within 14. Do you know where the EV charging stations are located in your city?	22,6%	21,5%	17,2%	38,7%	100,0%
		% within City or State	13,5%	19,4%	14,4%	14,4%	15,0%
		% of Total	3,4%	3,2%	2,6%	5,8%	15,0%
Total		Count	156	103	111	250	620
		Expected Count	156,0	103,0	111,0	250,0	620,0
		% within 14. Do you know where the EV charging stations are located in your city?	25,2%	16,6%	17,9%	40,3%	100,0%
		% within City or State	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	25,2%	16,6%	17,9%	40,3%	100,0%

Source: Authors data of survey throw SPSS

Table 10: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21,955[a]	6	,001
Likelihood Ratio	21,177	6	,002
Linear-by-Linear Association	,029	1	,864
N of Valid Cases	620		

a. 0 cells (0,0%) have an expected count less than 5. The minimum expected count is 15,45.

Source: Authors data of survey through SPSS

Interpretation of the Results:

Crosstabulation Summary: Regions (City or State): Bosnia and Herzegovina, Montenegro, Novi Pazar, and Serbia. Responses: a. Yes, b. No, c. Not sure if they exist. Key Observations: Yes: The highest awareness of charging stations is in Serbia (43.4%), followed by BIH (28.6%). Montenegro and Novi Pazar have lower awareness (14.3% and 13.7%, respectively). No: Novi Pazar has a relatively high percentage of respondents who are not aware of charging stations (27.6%). Montenegro and BIH also show considerable unawareness (19% each). Not Sure if They Exist: The lowest percentage of uncertainty is in Serbia (14.4%), whereas BIH, Montenegro, and Novi Pazar are closer to each other (22.6%, 21.5%, 17.2%, respectively).

Chi-Square Test Results: Pearson Chi-Square Value: 21.955, with a significance level (p-value) of 0.001. Since the p-value is less than 0.05, this indicates that there is a statistically significant difference in awareness of charging stations among the different regions. So we can conclude that the Chi-Square test suggests that there are significant differences in awareness of electric vehicle charging stations across the surveyed regions. Specifically, Serbia shows higher awareness, while Montenegro, Novi Pazar, and BIH have lower awareness. This could imply that infrastructure development or public information campaigns regarding EV charging stations might be more effective or advanced in Serbia compared to the other regions.

Also, one of the questions was about price and we did a test of frequencies on question 15. Attitudes and Perception: To what extent do you agree with the following statements about electric cars? (Likert scale from 1 to 5: 1 - Strongly disagree, 2 - Disagree, 3 - Undecided, 4 - Agree, 5 - Strongly agree) 5.3. [Buying an electric car is too expensive.]

Table 9: Cross-tabulation

Statistics

		City Novi Pazar	Serbia	Montenegro	Bosnia and Herzegovina
N	Valid	111	250	103	156
	Total	620	620	620	620
Median		3,00	3,00	4,00	4,00
Mode		3	3	4	4

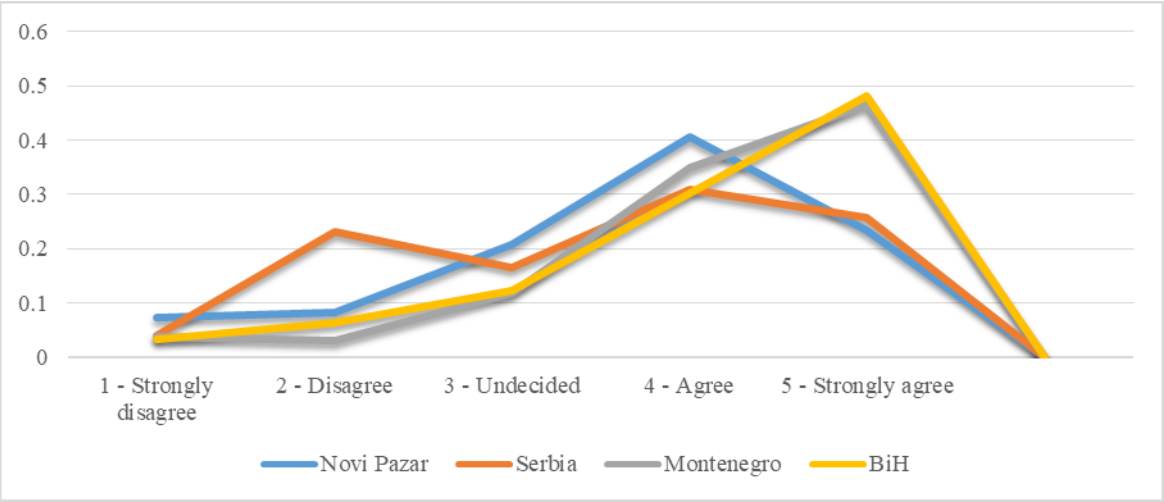
Source: Authors data of survey throw SPSS

Valid Number of Responses (N): The number of valid responses for each location. For example, Novi Pazar has 111 valid responses. Median: The middle value of the response set. This indicates the central tendency of agreement with the statement. For example, in Novi Pazar and Serbia, the median is 3 (Undecided), whereas in Montenegro and Bosnia and Herzegovina, the median is 4 (Agree). Mode: The most frequently occurring response. This shows which response was most common. For example, in Novi Pazar and Serbia, the mode is 3 (Disagree), while in Montenegro and Bosnia and Herzegovina, the mode is 4 (Agree). Interpretation:

- Novi Pazar and Serbia: The median and mode are 3 (Undecided or Disagree), which may suggest that most people believe that the price of electric cars is not too high, or they are uncertain about their opinion.
- Montenegro and Bosnia and Herzegovina: The median and mode are 4 (Agree), indicating that most people in these regions believe that the price of electric cars is too high.

These differences are illustrated in Figure 4, which clearly indicates that in Novi Pazar and Serbia, more people are undecided about the price of EVs, but in BiH and Montenegro most are agree that price of EVs is too high. Even in Serbia a significant portion of the sample disagrees that the price is too high, which is largely a result discussed in the next chapter as confirmed that “exploitative innovation significantly influences the innovation performance of SMEs in small emerging economies” (Pilav – Velic et al 2024) and we need much more innovation in EV segment.

Figure 4. Median of answer is buying an electric car too expensive NP, Serbia, Montenegro and BiH



Source: Authors data of survey

5. Regional law differences

By amending the law on planning, the Republic of Serbia introduces the obligation to predict charging points for electric vehicles. The situation in the Republic of Serbia regarding the infrastructure for electric vehicles (especially trucks) is not at an adequate level and we are lagging behind the rest of the world. This is especially illustrated by the picture showing the map of super-chargers in Serbia. The map clearly shows that the supercharger bases are located on the route from Hungary or Croatia to the exit towards Bulgaria and Macedonia. In table 11 is a structured summary of the information provided regarding the legal acts, obligations for electric chargers, customs rates, and subventions in Serbia, Montenegro, and Bosnia and Herzegovina.

Table 11: Regional law differences

Country/ entity		Legal act	It mentions the obligation of electric chargers for electric vehicles	Customs rate	Subvention
Serbia		Law on planning and construction ('Sl. glasnik RS', 62/2023)	**prescribes an obligation**	Gradual abolition of 4.5% for china	5.000 eur and tax exemptions
Montenegro		Law on space planning and building construction ("Sl. list CG", 82/2020)	does not prescribe an obligation	no data	5.000 eur
Bosnia i Hercegovi	**Federation BiH**	Law on spatial planning and land use at the level of the Federation of Bosnia and Herzegovina ("Službene novine Federacije BiH", broj	does not prescribe an obligation	Abolition by the end of 2024	10.000 km (about 5.000 eur)

		92/21)		(was 5%)	
	RS	Law on space development and construction ("Sl. glasnik RS", br. 40/2013, 2/2015 – decision US, 106/2015 i 3/2016 - ispr., 104/2018 - odluka US i 84/2019)	does not prescribe an obligation		
	District Brchko	Law on spatial planning and construction (Assembly of the Brčko District of Bosnia and Herzegovina at the 70th regular session held on June 25, 2008)	does not prescribe an obligation		

Source: Authors with law data of this country

This table provides a clear overview of the obligations, customs rates, and subventions related to electric vehicle and chargers in these regions. So it is clear that Serbia's law is better in a way that new buildings must provide new stations for EVs as an obligation for building permits so this obligation is a possible answer to different ways of seeing the future of EVs in this region. In the EU, EV incentives vary widely, including purchase subsidies, tax benefits, and non-monetary perks. France offers up to €6,000, while Germany's former €9,000 subsidy ended in 2023, causing a sales drop. The Netherlands and Italy provide tax exemptions, and some countries grant free parking and bus lane access. While Western Europe scales back subsidies as adoption rises, emerging markets like the Balkans struggle with high costs and poor infrastructure, highlighting the need for targeted policies to boost EV adoption.

6. Conclusion

The automotive industry's adaptation to stringent environmental regulations, particularly within the European Union, highlights the sector's shift towards sustainability as a strategic imperative. The zero-emission targets set for 2035, alongside the phased reductions leading up to that year, underscore the EU's commitment to climate neutrality by 2050. The analysis using the three-dimensional (3D) strategic matrix reveals a clear trend: car manufacturers that have prioritized ecological sustainability, alongside maintaining strong brand value and financial performance, have better navigated the challenges posed by these regulations. The comparison of electric vehicle (EV) adoption across different European regions further illustrates significant disparities. Northern Europe, leading in EV adoption, contrasts sharply with the Balkan regions where infrastructure and public acceptance lag behind. This disparity emphasizes the need for targeted policy interventions and infrastructure development to promote wider adoption of EVs in less developed areas. Survey data from Serbia, Bosnia and Herzegovina, and Montenegro reveal regional differences in public attitudes toward EVs, with infrastructure inadequacies playing a critical role in shaping these perceptions. The findings suggest that while there is potential for growth in EV adoption in these regions, achieving this will require concerted efforts to improve charging infrastructure and public awareness.

Overall, this study demonstrates that sustainability is not just an environmental goal but a strategic tool that significantly influences the market positioning and success of car manufacturers in an increasingly competitive global market. The classification of "winners" and "losers" in sustainability adaptation was based on two key criteria: (1) the ability to successfully transition a strong brand identity into the EV era while maintaining high total vehicle sales and (2) sustained financial growth, particularly measured by profitability ratios before taxation. Mercedes-Benz stands out as a prime example of a "winner" in this transition. The company has managed to transfer its strong luxury brand equity into the EV sector while maintaining a high sales volume across both electric and internal combustion vehicles. Furthermore, Mercedes-Benz has achieved the highest pre-tax profit ratio in total revenue among the analyzed manufacturers, demonstrating that financial resilience and strategic adaptability in sustainability efforts can go hand in hand. This case underscores that success in sustainability adaptation is not solely dependent on the percentage of EVs sold but also on the ability to maintain brand strength and financial stability during the industry's shift toward electrification. Also governments must make significant efforts regarding the question of building supercharger stations soon as possible. To accelerate EV adoption, governments should amend construction laws to mandate the installation of electric vehicle (EV) charging stations in newly built hotels, shopping centers, government buildings, and large private facilities. This regulation would ensure that future infrastructure supports sustainable mobility, reducing range anxiety and encouraging broader EV usage.

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SUSTAINABLE DEVELOPMENT OF SPELEOTOURISM IN BOSNIA AND HERZEGOVINA: CURRENT STATE AND DEVELOPMENT PERSPECTIVES

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Abstract

Speleotourism represents a selective form of tourism based on the valorization of the most attractive underground karst formations, such as caves and pits. The geological structure and relief characteristics of Bosnia and Herzegovina (BiH) have led to the emergence of a large number of speleological objects in the holokarst areas of the external Dinarides, as well as in the zone of the internal Dinarides. Although numerous caves and pits have been the subject of various speleological, paleontological, and archaeological research for over a century, efforts to prepare them for tourist visits only began in the mid-20th century. The aim of this research is to analyze the potential of caves for tourist exploitation, as well as the possibilities for improving the current state of speleotourism in BiH. Through the analysis of the most significant tourist caves, their potential for the development of sustainable tourism is highlighted, along with the challenges they face, including lack of infrastructure, promotion, and education about the importance of preserving these natural sites. By surveying domestic visitors, the attitudes and perceptions regarding speleotourism have been explored, including motivations for visits and their experiences. The results of the survey show that the majority of visitors recognize the importance of cave preservation and express interest in additional educational tourist content and activities. This paper provides a foundation for future research and the development of strategies for enhancing speleotourism in BiH, taking into account sustainability and the preservation of natural heritage.

Keywords: caves, speleology, sustainable tourism, Bosnia and Herzegovina.

JEL code: Z320 Tourism and Development

Introduction

The Dinaric karst region holds significant importance for BiH, as well as for the neighboring countries it spans. The values of the Dinaric karst are manifold: natural, scientific, economic, cultural, educational, recreational, etc. (Mulaomerović & Osmanković, 2010). This naturally formed entity should leverage its uniqueness through the process of tourism valorization. Despite the fact that the Dinaric karst is rich in underground karst features, until 2006, BiH had no database on them. The first cadaster of speleological sites in BiH, published in 2006, lists 4,033 speleological sites, with the note that this number is not final. More recently, the Regulation on the conditions and methods for Establishing and maintaining the cadaster of speleological sites in the Federation of BiH from 2021 defines the method for acquiring, linking, and utilizing data on speleological sites, and defines a cave as a speleological site in which geomorphological properties determine the horizontal extension of channels, with an average channel gradient of less than 45 degrees.

Karst terrains in BiH are generally perceived as depopulated and economically underdeveloped, so in this context, the tourism valorization of caves and the development of speleotourism can be discussed as one way to economically revitalize these traditionally passive areas. Caves, due to their internal morphological characteristics, cultural-historical values, and/or aesthetic values, are significant and unique natural entities that can provide additional tourist value to existing destinations or represent standalone tourist destinations. The valorization of the attractive properties of caves is conditioned by the possibilities for presentation to visitors, the manner of presentation, and the accessibility of the cave (Maksin-Mićić, 2007; Kadušić et al., 2018). However, the development of speleotourism and the tourist arrangement of caves require high initial investments, so it is necessary to demonstrate the profitability of the investment, while primarily ensuring the protection and carrying capacity of these sensitive ecosystems (Tičar et al., 2018). Additionally, the tourist use of caves necessitates the implementation of safety measures.

The aim of this research is to provide an overview of the current state of tourist caves and to explore the potential for sustainable development of speleotourism in BiH. The research also represents one of the first attempts to analyze the attitudes, perceptions, and motivations of domestic visitors for visiting caves in BiH.

Literature review

Development of speleological research and speleotourism in BiH

Although speleological research in BiH began in 15th century, significant progress only started with the arrival of Austria-Hungary, whose Military Geographical Institute based in Vienna began exploring the natural features of the entire state territory, including karst forms. The first research on karst phenomena was published in 1884 in the Journal of the Speleological Section of the Austrian Tourist Club (Sivac, 2023). At the end of the 19th century, the National Museum was established in Sarajevo, initiating significant field research on caves to study their morphological features for military and economic purposes, analyzing cave fauna, and discovering archaeological sites, etc. Members of the Sarajevo Tourist Society "Friends of Nature" also made a significant contribution to cave research, engaging in the exploration and protection of caves and organizing visits to sites like Megara and Bijambare for their members (Mulaomerović & Osmanković, 2010). With the establishment of speleological societies, karst research intensified in Yugoslavia,

resulting in a significant number of scientific papers and presentations at speleologist congresses. Mulaomerović (2000) notes that after the war (1992–1995), active speleologists and their associations emerged in Sarajevo, Banja Luka, Zavidovići, etc.

The valorization of tourist potential began quite late, even though it is evident from the previous discussion that their potential was recognized much earlier. Mulaomerović (2009) states that although BiH recorded its first visits to caves in the 16th century by explorers and travel writers from various countries, the initial development of speleotourism in BiH is considered to have started at the end of the 19th century.

The first significant papers on speleotourism in BiH discuss the tourist potential of the Vjetrenica and Bijambare caves. Gujić (1942) highlights the tourist significance of Vjetrenica in Herzegovina, pointing out poor accessibility due to inadequate road infrastructure as an obstacle to better visitation. Fukarek & Ržehak (1956) were among the first to address the issue of adequate protection and valorization of caves, providing one of the first classifications of caves as tourist sites. They identify Vjetrenica, Bijambare, Megara, and Hrustovača as the most significant caves for tourism development (under supervision). Ržehak (1965; 1975) emphasizes that the tourist valorization of caves should be planned and in accordance with the local community.

Avdagić (1979) notes that due to an increase in the number of visitors, especially organized tourist groups, work began on arranging the interior of Vjetrenica at the end of the 1970s. During this period, the potential of Hrustovača cave for tourist development was also explored (Lajovic & Malečkar, 1983). Svoboda (1980) points out the favorable tourist-geographic position of Vjetrenica (the hinterland of Dubrovnik and proximity to Mostar) and the Ledenica cave (close to the then highly visited Tito's cave). Bokan (1983) investigates the tourist valorization of Vjetrenica and its inclusion in the tourist offer of Herzegovina. Avdagić et al. (1985) prepared one of the first reports on the tourist valorization of Orlovača cave. In former Yugoslavia, speleotourism particularly developed in Slovenia, followed by Croatia and Serbia, fostering similar efforts in BiH. In this regard, the Bijambare and Vjetrenica caves were recognized as primary destinations for the development of speleotourism, managed by local organizations lacking sufficient personnel and financial resources for their more intensive development (Mulaomerović & Osmanković, 2010).

The war in BiH (1992–1995) led to the destruction of tourist infrastructure in the caves, as well as the cave decorations. After the war, caves and speleotourism became the subject of research by only a few authors, including notable works by Mulaomerović (2000; 2001; 2009), Drešković (2002), Mulaomerović et al. (2012), Osmanković et al. (2006), Osmanković & Mulaomerović (2007), and Spahić (2015), among others. From this, it is evident that various scientists have made significant contributions to the research of speleotourism, emphasizing that through the tourist valorization of caves, their protection and continuous monitoring can be ensured.

The opening of caves for tourist visits was recorded only after 2005. Tito's cave reopened for visits in 2006. After the Bijambare area was declared a protected landscape in 2003, research on speleological sites began, as well as the construction of new paths and an information center, and in 2007, this area was opened for tourist visits. However, due to unprofessional restoration of the area and a lack of adequate staff, the cave was soon closed to visitors. The infrastructure in Vjetrenica cave was renovated in 2003, when the project for its valorization and nomination for inclusion on the UNESCO World Heritage List also began.

Current state of speleotourism in BiH

In BiH, there is a significant number of caves, but not all are suitable for tourism valorization. Favorable traffic location, dimensions, richness of cave formations, history of tourist visits, and the presence of aesthetic or cultural value are some of the criteria that must be met for a particular speleological site to be considered a tourist resource. The Tourism Development Strategy of the Federation of BiH for the period 2022-2027 mentions only five caves within the tourism resource base, without proposals for their tourist exploitation and development. In contrast, the Tourism Development Strategy of the Republika Srpska for the period 2021-2027 recognizes the tourist significance of caves more clearly and provides recommendations for the development and protection of certain caves. Important studies and reports, such as the Management Plan for the Protected Landscape of Bijambare 2021-2030 and the Draft Management Plan for the Protected Landscape of Vjetrenica – Popovo polje, recognize speleotourism as an important component of the protection and sustainable development of these caves.

Currently, only a few caves in BiH are developed and open for tourist visits, equipped with certain tourist infrastructure and charge for entrance: Vjetrenica, Bijambare cave, Tito's cave, and Ravlića cave. Rastuša cave near Teslić has been opened for tourist visits despite previous neglect, while Orlovača cave has not been open to visitors since 2022 due to ongoing renovations.

The statistics related to the Protected Landscape of Bijambare (PL Bijambare) show visitor data for the entire area and the Middle Bijambare cave, which is prepared for visits (Table 1). Entrance to the Upper Bijambare cave is free of charge. According to ticket sales records from 2010 to 2019, the number of visits to the protected area shows a trend of growth. In 2020, the number of visits to the PL Bijambare declined due to the COVID-19 pandemic; however, the number of visits to the cave did not experience a significant drop. It is important to note that visits that were free of charge are not included in the records.

Table 1. Number of visitors to PL Bijambare and Middle Bijambare cave

Year	Number of visitors to PL Bijambare	Number of visits to the Middle Bijambare Cave
2010.	14.356	2.970
2011.	24.497	7.201
2012.	33.740	12.058
2013.	40.508	13.052
2014.	38.425	10.441
2015.	53.025	18.456
2016.	63.981	22.866
2017.	68.354	25.126
2018.	64.645	21.656
2019.	68.789	24.236
2020.	34.376	23.892
2021.	52.591	/
2022.	57.710	18.723
2023.	60.258	21.899

Source: Management Plan for the PL Bijambare 2021-2030

According to data held by the management of Vjetrenica cave, the number of visits has been increasing over the years. In 2016, they recorded 8,753 visits, while in 2024, they expect over 20,000 visits. The visitor structure continues to be dominated by guests from

BiH, with the rest mainly coming from the region (Croatia, Serbia, and Montenegro). Additionally, a significant number of visitors come from the Czech Republic, Poland, Germany, and Scandinavian countries. In 2024, Vjetrenica was added to the UNESCO World Heritage List, which is expected to contribute to its increased visitation and better promotion in the future.

Research methodology

The analysis of available data on the most significant tourist caves, as well as the development of speleology and speleotourism in BiH, included a review of relevant scientific literature, strategic and spatial planning documents, and available tourism statistics. For the purposes of the research, a quantitative method was used.

A survey was conducted among domestic visitors, focusing on (1) motivations for visiting caves, (2) tourist experiences, and (3) suggestions for improving the tourist offerings of the caves. The survey questionnaire was prepared in local language and distributed directly to visitors on-site, as well as via social networks (Facebook, Instagram, and LinkedIn). The research was carried out from June to September 2023, during the peak tourist season for caves. Since the study pertains to visitor satisfaction with tourist caves, an initial screening question was posed at the start of the online survey: Have you ever visited any caves in BiH? The questionnaire was developed by authors based on existing literature and contained a total of 17 questions, with the first group related to the socio-economic characteristics of the respondents, the second addressing motivations for visiting, modes of transportation, and sources of information about the caves, and the third covering satisfaction with the visit, suggestions for improving the tourist offerings, and potential future visits to tourist caves in BiH.

To determine the potential of individual caves for tourism development, field research assessed their accessibility and availability (internal accessibility, trail slope, and access), as well as aesthetic value, following the methodology proposed by Buzjak (2008). This methodological procedure involves field research to evaluate the condition of the caves within the context of appropriate infrastructure (access roads, parking, walking paths) and access to the entrance, including lighting, guiding services, promotional materials, and adequate management services for the caves. This process results in the identification of several caves with significant tourist value.

Results and discussion

Sample characteristics

This survey comprised 604 respondents. The gender structure of respondents is equally distributed by women (50,7%) and 49,3% (men). Age group 18-25 is the most numerous with 32,7%, followed by the group 26-35 (26,4%). More than half of the respondents are employed (52.8%), while the rest of the respondents are unemployed, students, retired or run their own business. Also, 36,1 % stated that their household income is higher between 1.501-2.000 BAM and only 0,8 % have income less than 500 BAM. Higher income than 2.500 BAM have 8,8% of the respondents (Table 2).

Table 2. Sociodemographic characteristics of respondents

SAMPLE CHARACTERISTICS		**N**	**%**
Gender	Men	298	49,3
	Women	306	50,7
Age	18-25	198	32,7
	26-35	160	26,4
	36-45	125	20,7
	46-55	108	17,8
	56-65	6	0,9
	65+	7	1,1
Level of education	Primary school	2	0,3
	High school	303	50,2
	College or university	284	47,0
	Master's or PhD	15	2,5
Employment	Employed	319	52,8
	Unemployed	48	7,9
	I run my own business	43	7,1
	Student	180	29,8
	Retired	12	2,0
Household income (BAM)	< 500	5	0,8
	500 - 1.000	103	17,1
	1.001 - 1.500	107	17,7
	1.501 -2.000	218	36,1
	2.001 - 2.500	118	19,5
	> 2.500	53	8,8

Source: *Primary data*

An important research question related to whether the respondents had visited any of the caves in BiH, which influences their experience and opinion on the quality of the tourist offer. The largest number of respondents, 274 of them (45,4%), had visited the Bijambare cave, while 38,1% respondents (230) had visited Vjetrenica, which is expected given that these are the most attractive tourist caves. Tito's cave was visited by 7,9% (48 respondents), while only 4,6% respondents (28) visited the Ravlića cave. However, considering the fact that Ravlića cave was opened in 2020, in the midst of the COVID-19 pandemic, it is expected that its tourist recognition will take place in the coming period.

As many as 43,9% of respondents (265) informed themselves about caves through the internet and social media, while a significant number (25,8%, or 156 respondents) stated that they received information in school or university. Only 11,4% of respondents (69) gathered information through tourist promotional activities. In this regard, it is not surprising that 74,3% of respondents (449) reported that they did not receive any tourist promotional material during their visit, nor did they have the opportunity to purchase souvenirs.

Regarding means of transportation, 57,3% of respondents indicated that they mostly traveled by their own car, while 32,5% used organized transportation, mostly by bus. Additionally, 70% of respondents stated that they traveled independently, while 30% traveled as part of an organized tourist visit.

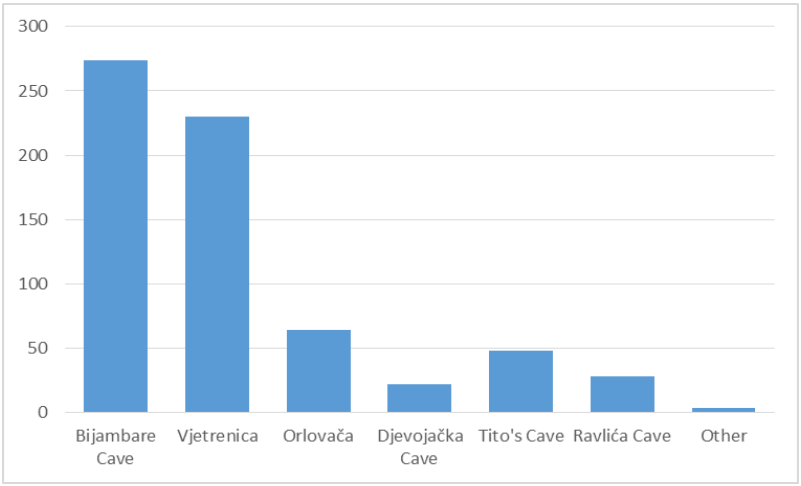

Figure. 1. Caves visited by the respondents
Source: *Primary data*

Main motivation and reasons for visiting caves

Rest and relaxation are cited as important motives for visiting cave destinations, as confirmed by research conducted by Dela Cruz et al. (2019) and Telbisz et al. (2023). The motivations for visiting are equally represented by enjoyment of nature (23,3%) and learning about caves and karst (22,4%) (Table 3).

Table 3. Respondents' main motivation for visit

Main motivation for visit	N	%
Rest and relaxation	149	24,7
Enjoy the nature	141	23,3
Learn more about caves and karst areas	135	22,4
New experiences and adventures	91	15,1
Exploring Cultural and Historical Landmarks	101	16,7
Enjoyment	31	5,1
Engaging in sports	9	1,5
Manifestations	4	0,7
Work	3	0,5
Adrenaline Sports	6	1,0

Source: Primary data

The most significant reason for visiting caves is "easily accessible," cited by 33,8% of respondents, indicating that geographical location and proximity to transportation routes are important factors when selecting cave destinations. This is not surprising, considering that Bijambare cave is among the most visited and is located next to the main road, which significantly facilitates access. The ease of organizing a visit is also an important reason for 18,0% of respondents, which correlates with the previous point. "Recommendations from

family and friends" are important reasons for 20,2% of respondents, while "previous experience with the destination" is important for 17,1%, suggesting that word of mouth influences their travel choices and that they value familiarity and positive past experiences (Table 4).

Table 4. Respondents' reasons for choosing the cave(s) visited

Reasons for choosing the caves visited	N	%
Easily accessible	204	33,8
Recommendations from family and friends	122	20,2
Simplicity of travel organization	109	18,0
Previous experience with the destination	103	17,1
Tourist attractions nearby	101	16,7
Visiting a destination that many people consider a must-see	93	15,4
Attractiveness/Image of the cave	86	14,2
Online promotion of speleotourism	59	9,8
Good price	58	9,6
Package deals from travel agencies	13	2,2
Field/study trip	2	0,3

Source: Primary data

Satisfaction with the tourist offer of the visited caves

Respondents were asked to rate the level of their satisfaction and tourist experience from 1 to 5 (Figure 2). The high percentage of positive ratings (55,5% rated their experience as a 4 and 26,2% as a 5) indicates that the cave experience is likely meeting visitors' expectations, which may correlate with the previous findings about respondents' motivation and reasons for choosing destination.

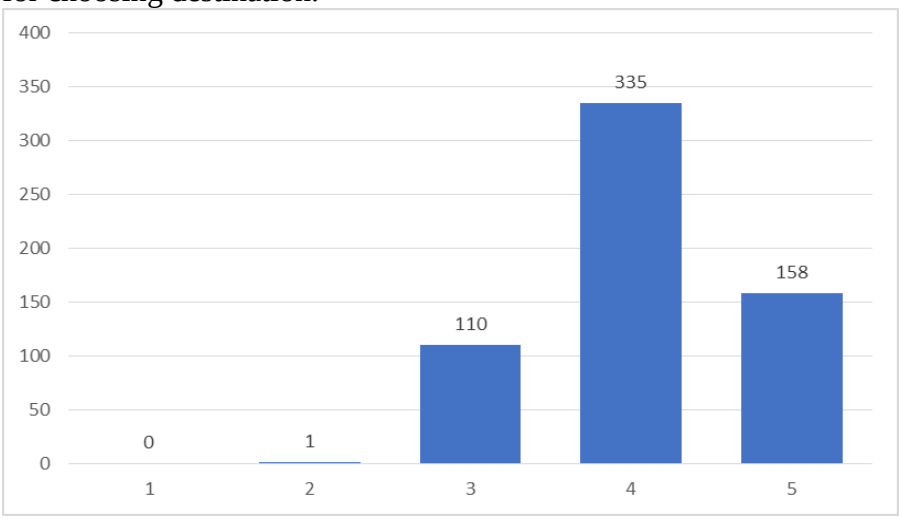

Figure. 2. Level of satisfaction with the visited cave

Source: Primary data

Table 5. Suggested improvements for cave tourist offer

Suggested improvements for cave tourist offer	N	%
Better-maintained paths	168	27,8
Better tourist signalization	134	22,2
Information about the culture and history of the area	103	17,1
More hospitality establishments	101	16,7
Bicycle and sports equipment rental options	97	16,1
More parking spaces	74	12,3
Detailed tourist maps	68	11,3
Tourist promotional materials	63	10,4
Information about the natural features of the area	47	7,8

Source: Primary data

Respondents were also asked to express their opinion on what is missing from the tourists' offerings of the caves they visited. The most common suggestion for improvement referred to tourist paths (27,8%) and tourist signalization (22,2%), which indicates that most visitors prioritize safety as well as easy access (Table 5). Respondents also expressed a desire for more information about the culture and history of the area (17,1%), which suggests that visitors are interested in learning more about the caves which correlate with one their main motive for visiting (Learn more about caves and karst areas). Although a large percentage of respondents stated that they did not receive tourist promotional materials during their visit to the cave, the low percentages related to 'detailed tourist maps' (11,3%) and 'tourist promotional materials' (10,4%) suggest that these are not of great importance to tourists, considering the availability of information online.

When asked about their future intentions, 95,7% of respondents stated that they intend to visit another cave in BiH. A possible reason could be an interest in karst phenomena, a desire to explore new cave destinations, or the positive experience they had during their previous visit. Additionally, for previously mentioned reasons, the proximity and accessibility of caves to their place of residence, as well as recommendations from friends and family, contribute to the high percentage.

After conducting field research, several caves have been identified as having certain tourist value. In addition to the already established caves of Vjetrenica, Bijambare, Ravlića, and Tito's cave, as well as Orlovača, the following caves stand out: Djevojačka cave (Kladanj), Vaganska cave (Šipovo), Rastuša (Teslić), and the Source of Mokranjska Miljacka (Pale) (Figure 3).

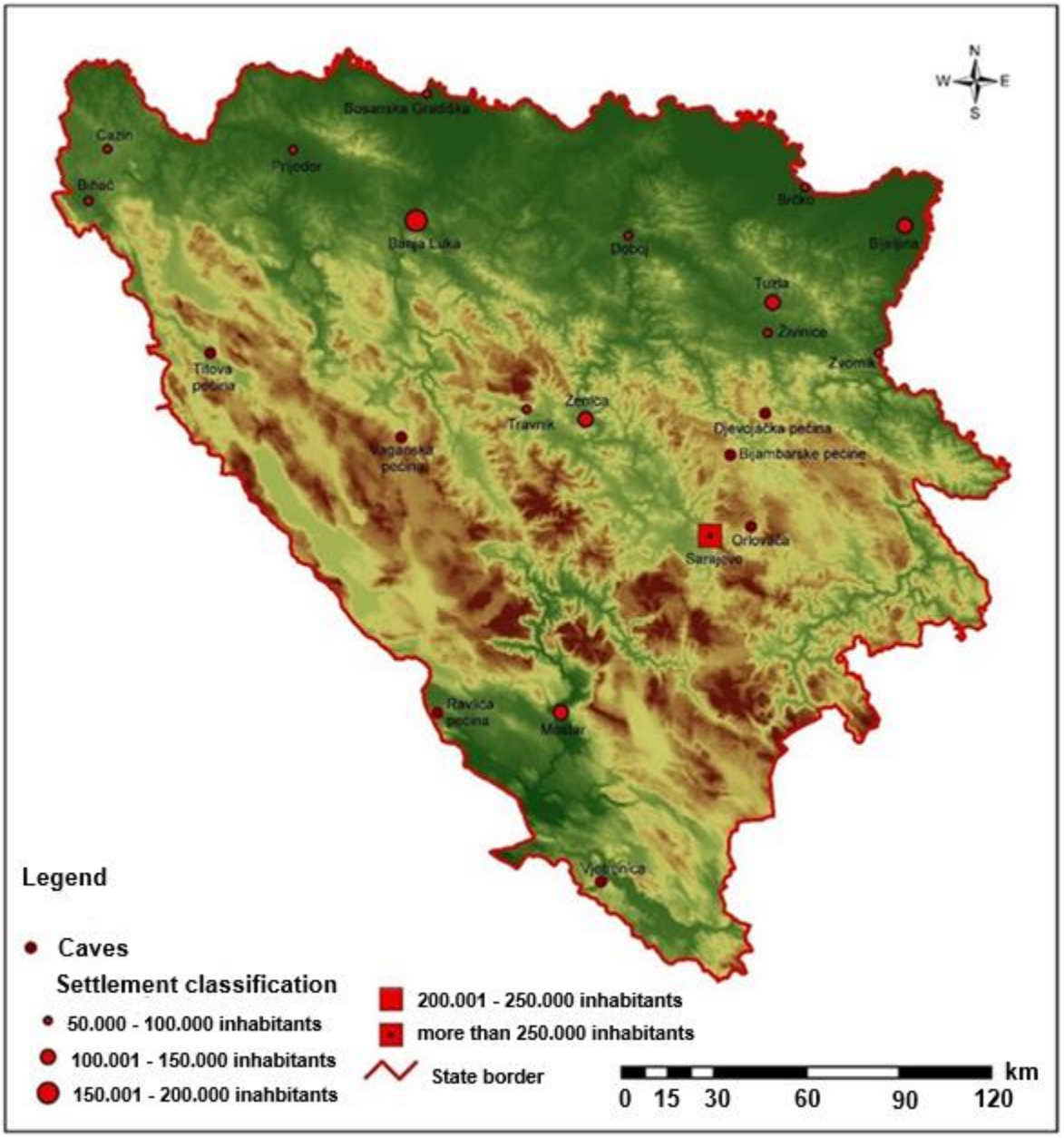

Figure. 3. The most important caves for the development of speleological tourism in BiH
Source: Authors

Djevojačka cave is in the municipality of Kladanj, in the far south of the Tuzla Canton. The cave is approximately 8 km away from the municipal center and the main road M-18, making it favorable for its tourism valuation. It is partially arranged for tourist visits, and it particularly stands out for its significance in the development of religious tourism. This location is the second largest Muslim pilgrimage site in BiH. During the time of prayer at the end of August, between 20,000 and 30,000 visitors come to this cave (Mulaomerović, 2009). A special tourist attraction of this site are the drawings on the cave walls, which date back to the Middle Ages. The local community has provided improvised lighting, but this should be removed, and adequate lighting should be established throughout the cave. There is no adequate parking or access facilities. The offerings, accompanying amenities, and marketing are modest, although the cave and its surroundings have tourist potential.

Rastuša near Teslić holds great significance from paleontological and archaeological perspectives, as remains of animals (primarily bears) and human tools from the last Ice Age have been found in it. In addition to cave formations, the walls of the cave are decorated with what is known as "leopard skin", which places Rastuša among the rare European caves that possess this still unexplained natural phenomenon. The cave was declared a natural monument in 2012, and despite earlier neglect, it has been opened for tourist visits.

The main attraction of the Source of Mokranjska Miljacka cave is the fact that it is one of the longest caves in BiH. To date, 7,100 meters of its channels have been explored. This site is recognized as a highly attractive location for adventure speleotourism. Exploring the interior of the cave is also significant from a biological perspective.

Vaganska cave is located in the western part of BiH, near the village of Vagan. Administratively, it belongs to the municipality of Šipovo. It is 165 km away from Sarajevo, situated close to the main road Šipovo-Kupres. The richness of cave formations and its favorable location provide a solid foundation for the valorization of the cave for tourism purposes (Sivac, 2023).

Moreover, due to their dimensions, diversity of cave formations, and cultural and historical significance, the caves of Dugovještica (Rogatica), Mračna cave (Rogatica), Ledenjača (Foča – RS), Badanj (Stolac), Megara (Hadžići), Ledenica (Bosansko Grahovo), Dabarska cave (Sanski Most), Hrustovača (Sanski Most), and Fajtovačka cave (Sanski Most) also have long-term potential. However, for their tourism valuation, there should be intensive work on improving road infrastructure, arranging them for visits (construction of paths, lighting, information panels, etc), and better promotion.

Conclusion

The results of this research represent a theoretical contribution to the development and improvement of speleotourism. Although the research is limited to a certain area (BiH) and conducted over a shorter period, it serves as a preliminary study that can provide a basis for future research.

Although BiH has significant potential for the development of this selective form of tourism, the current tourist infrastructure and development strategies have not adequately valorized the caves as tourist resources. While some caves, such as Vjetrenica and Bijambarska caves, are open for visits, many remain underutilized due to a lack of information and weaker promotion. Nevertheless, the growing trend of visitors in recent years indicates an interest in these sites. The research revealed that speleotourism does not have a significant place in BH tourism, and to realize its full potential, it is essential to invest in infrastructure development, visitor education, and effective promotion. Including speleotourism in strategic plans can significantly contribute to the sustainable development and protection of these natural resources.

Analysis of visitor satisfaction indicates a high level of contentment, emphasizing the natural values of the area (e.g., the richness of cave decorations), accessibility, and ease of organizing visits as key factors. However, there is a clear need for improving tourist facilities, such as better-maintained paths, tourist signage, and additional services (e.g., bike rentals), alongside better promotional activities.

Given that most caves are located in the karst regions of BiH, which mostly record a lower index of development for municipalities/cities, the tourist valorization of speleological systems can contribute to improving the quality of life for the local population, as tourism fosters the development of complementary activities. Planned tourism development favors the practice of sustainable tourism, which is becoming increasingly important due to the evident impact of tourism on the environment and the population.

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Tourism Development Strategy of the Republika Srpska for the period 2021-2027

Tourism Development Strategy of the Federation of Bosnia and Herzegovina for the period 2022-2027

DYNAMICS AND FINANCING OF THE STRATEGIC INVESTMENTS: AN EXAMPLE OF SLOVENIAN COMPANIES

- ABSTRACT -

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As the main purpose of his research, the author shows how companies in the real sector of the economy carry out their investment activities, especially how they invest in long-term fixed assets, in terms of both investment dynamics and investment financing, with an emphasis on strategic investments. The latter are the only ones that ensure their growth. In the theoretical part of the paper, the author presents certain laws that apply in the field of investment activity, addressing the issue of the intensity of the investment activity of companies over time and the issue of providing the necessary financial resources for the implementation of strategic investments. In his paper author gives significant weight to the dynamics of investing itself. Depending on investment frequency, investment activity in companies takes place in two ways. First, investments in companies take place routinely. Second, from time to time companies are faced with a larger comprehensive investment project (a lumpy, non-divisible investment project). Author describes lumpy investment as an investment-to-capital ratio that surpasses a certain threshold, called the investment spike.

Based on a thorough review of the literature dealing with the financing of corporate investments, the author has outlined certain theories and laws that apply in this area. Thus, under normal conditions, companies can maintain their capital adequacy when they invest a lot, take on heavy debt, and pay off said debt after the investment spike. On the other hand, relatively large investment projects require diverse financial resources. If there are not enough internal resources in the company, the company must find external resources if it is to implement its investment. The author discerns several possible methods related to the external financing of investments. As far as the research methodology, in the theoretical part of the study, the author used the scientific method of description, as well as the scientific methods of classification, comparison, analysis, and synthesis. In the empirical part of the study, the author used statistical methods and processed the data using the SPSS statistical package. The data were captured at a single point in time (cross-sectional data). The primary data were collected in the period January–April 2017 by means of the questionnaire.

In the empirical part of the paper, on a sample of Slovenian large and medium-sized companies from the real sector of the economy, the investment activity of companies in the period 2010–2017, i.e. after the great financial crisis and economic recession, is shown. This is done through the prism of various factors and their effects on investment ability. The author puts forward several research hypotheses (7), which he fully confirms. The goals of the author's research represent a relevant contribution to investment theory as well as to real-world practice, suggesting that company management should be encouraged to achieve lasting competitive advantages so as to strengthen the company's investment ability continuously. The results of this study offer quite a few opportunities for further research in the area under consideration.

Keywords: strategic investments, investment opportunities, investment dynamics, investment financing, investment ability.
JEL classification: G31

1. Introduction

The term “investment” usually means investing money in the purchase of long-term assets, which are used in the business process for a long time and from which certain economic benefits are expected. Although investments can also be understood as investments in various forms of short-term assets, such as stocks, short-term securities, etc., investments mainly mean investments for a longer term, upwards of one year.

We distinguish between productive investments and financial investments. The former are investments in tangible and intangible long-term assets. Tangible long-term assets are fixed assets, such as buildings, equipment, etc., while intangible assets are intangible investments, such as licenses, patents, know-how, etc. Long-term financial investments involve investing money in the purchase of various forms of long-term securities, such as shares, bonds, deposits, loans, etc.

We can shed light on investments from other angles as well. Thus, the terms “investments” and “investing,” which can be found in almost all economic sectors, and of course also in the field of social activities, are closely related to the preservation, reduction or expansion of consumption. Investment plays a major role in the expansion of both personal and social consumption and in the increase or decrease in the economic growth of any national economy.

A distinction has to be made between so-called strategic and non-strategic investments. With strategic investments, such as investments in modern technological equipment, in the development of new products, etc., companies ensure their growth. With non-strategic investments, such as investments in transport equipment, storage facilities, and furniture, they support and maintain their strategic investments.

The purpose of investing is to direct current financial resources into various forms of real or financial assets to achieve expected returns in the future. Here we collide with the concept of uncertainty. The longer the period to which the investment relates, the greater the uncertainty regarding the generation of future returns. It accordingly follows that time and uncertainty are extremely important investment dimensions. We make an investment decision today, and reap its results (the expected returns) in the future. If the investment decision was not considered enough, the future consequences can be very painful for the investor, even fatal (failed investments as a result of wrong investment decisions). Therefore, when making investment decisions, information that can help form a vision about the levels of certainty of the investment’s status in the future is very important.

Serious investors, i.e. companies in the real sector of the economy, various organizations in the field of social activities, individuals, “venture” capitalists (blue angels), and financial institutions such as banks, funds, etc., undertake investments in a prudent manner. This means, among other things, that they try to check and evaluate the economic benefits of their planned investments before making investment decisions. For this purpose, they use a wide variety of investment criteria, giving preference to those that also take into account the temporal aspect. The most widespread among dynamic investment criteria is net present value.

The purpose of investing money in various forms of assets (even money in a current account is a short-term financial asset) is to generate a return. Income generated either by the sale of real estate or a financial investment, or by unrealized capital appreciation (or depreciation), or from investment income, such as dividends or interest, or rental income, or exchange gains or losses, or from a combination of all the above, can be either a profit or a loss (negative return).

Investors generally expect higher returns from riskier investments. Risk is not the same for all investors. Different companies take different risks, i.e. have different risk appetites. Risk appetite is the amount of broad-based risk a company is willing to accept in achieving its strategic goals. Risk appetite reflects the risk management philosophy that a company’s management adopts and that consequently influences its risk culture, its way of operating and decision-making (The Global Fund, 2018).

In this introductory part of the paper, we wanted to present briefly the essence of investments and investing, the types of investments, the purpose of investing, and the basic elements in making investment decisions, to provide a starting point for the presentation of our research. In the following, we only consider productive investments in the real (non-financial) sector of the economy, i.e. investments in long-term tangible fixed assets. Thus, we are primarily interested in strategic investments, their dynamics and their financing.

The purpose of this paper is to show how companies in the real (non-financial) sector of the economy carry out their investment activities, especially how they invest in long-term assets (in physical capital) both in terms of investment dynamics and in terms of investment financing, with an emphasis on strategic investments. In the theoretical part of the paper, we want to present certain laws that apply in the field of investment activity. Thus, we examine the question of the intensity of investment activity by companies over time and the question of providing the necessary financial resources for the implementation of strategic investments. Regarding the latter, we are also interested in the question of companies' access to long-term financial resources on the money and capital markets.

In the empirical part of the paper, where we select a sample of Slovenian large and medium-sized companies in the real (non-financial) sector of the economy, we show the investment activity of companies in the period 2010–2017. We do so through the prism of various factors that influence their investment ability in terms of the exploitation of investment opportunities, the financing of investments or their creditworthiness, and their investment dynamics.

In the following, we first give an overview of the current literature dealing with investments. As mentioned, strategic investments are key for company growth, which is why we pay special attention to them. We are particularly interested in investment dynamics over time, as it does not matter whether companies invest all at once or over time, more or less evenly at specific time intervals. Special attention and weight in this contribution is given to investment financing, the provision of financial resources for capital-intensive investments.

We proceed with an outline of the methodology used in our research. We propose six research hypotheses and briefly present the scientific methods used in the theoretical part of the research and the statistical methods used in its empirical part. We describe in detail the sample of companies and the method of obtaining primary and secondary data. We also point out the main limitations of our research.

In the empirical part of the research, we first test the research hypothesis, whether corporate strategic investments, i.e. investments in tangible fixed assets, are really the only source of value creation for owners and the driver of organic growth of the company. We are particularly interested in how strong this connection is, or the impact of strategic investments on growth, and what is the predictive power of our regression model. In order to make the results more reliable, we expanded the time series of the two data series, i.e. the book values of tangible fixed assets and net sales revenue. We studied these variables for the period 2002-2017.

In the following, we present the investment activity of large and medium-sized companies from our sample in the period 2010–2017. In this context, we are particularly interested in the financing of these companies' investments before and after the last financial crisis and recession. We purposely highlight their creditworthiness and their indebtedness in this time period as important factors for determining their investment ability. To this we add some of our key findings from the analysis of the companies' investment activity in the studied period, taken from the empirical part of our extensive research.

To conclude, in addition to stating the arguments why we fully accept all six research hypotheses, we provide suggestions and guidelines for further research in the field of the investment activity of companies.

2. Literature review

Schultes (2011) studied multiple factors that affect the performance of investments for years, and quite a few academics and other experts (Grazzi, Jacoby & Treibich, 2013; Pollack & Adler, 2014)

examined similar topics, especially those that refer to investments in long-term assets (tangible and intangible), investment projects, and the measurement of their effectiveness from the point of view of the business performance of companies, which can ultimately be discerned from the wide range of literary sources listed at the end of this paper. Great interest has been shown in the areas of strategic investments, their role in strategic planning, and their treatment as a key factor in the growth and progress of a company (Weissenrieder, 1998).

2.1. Strategic corporate investments and investments in long-term assets

Following the literature in the field of investment activity, we can define investments as expenditures intended to increase or maintain capital stock. These are only net investments, which mean a real increase in physical capital. Renewal investments or investment transfers do not increase the productive fund. The capital stock consists of durable goods that are used in the production process. While according to the statistical definition investments are everything that is not consumed, the most general definition states that an investment is any expenditure issued with the purpose of increasing income in the future (Senjur, 1995). Investment expenditures can be classified into three categories: corporate long-term investments, which is the subject of this scientific discussion and consist of business expenditures on durable goods (equipment, buildings), housing investments, and inventory investments.

Whenever investments are analyzed at the corporate level, the first question is how much capital the companies would like to use, taking into account the given costs of and returns on the use of capital and the level of the product that is intended to be produced. So what determines the desired capital stock, i.e. the stock of capital companies would like to have in the long run? Of course, companies cannot immediately adjust their capital to the level needed in production. This requires a certain amount of time. We are talking about the level of adjustment by which companies adjust from the existing capital stock to the desired level of capital. The level of adaptation determines the level of investment. Investments therefore express the level of adaptation of the economy to the desired state (Senjur, 1995). Such micro-level adaptation is, for example, the technological modernization of production processes, such as robotization and digitization in companies. Today, we are facing the fourth industrial revolution, with cyber-physical systems, the Internet of Things (IoT), artificial intelligence, and, above all, rapidly growing production efficiency.[3]

From the point of view of value-based management, business owners are interested in which strategies create value and which do not. In this, they should be guided by business logic. Weissenrieder (1998) classifies investments into two groups: strategic and non-strategic investments. Strategic investments are those whose goal is to create new value for owners and which ensure the growth of the company. Non-strategic investments are those that maintain or preserve the value created by strategic investments. Strategic investments, such as investments in the development of a new product or investments in the acquisition of new markets, are followed by several non-strategic ones. A strategic investment can be an investment in tangible fixed assets, which is the subject of our research, or in intangible assets. It is irrelevant whether there is an investment expenditure or not. Everything that counts as a cash expense in the company is related to the creation of new value, which, according to Weissenrieder (1998), can be defined as a strategic investment.

[3] *Despite many new technologies, the 4th industrial revolution is most marked by the growth of robots, with Asian economies being the most robotized. While South Korea leads the world with 631 robots per 10,000 employees, Slovenia ranks 16th with 137 robots per 10,000 employees (Prašnikar, Koman & Redek, 2018).*

2.2. Dynamics of corporate investment

Modern literature in the field of investment activity gives significant weight to the dynamics of investing itself. While in a certain period of time companies may completely give up investing, in another period of time they may approach the implementation of relatively large investment projects (Becker, Haltiwanger, Jarmin, Klinek & Dan, 2006). Depending on investment frequency, investment activity in companies takes place in two ways. First, investments in companies take place routinely, especially when it comes to, for example, the replacement of depreciated and economically obsolete equipment while the company follows a normal business growth trend. Every viable company must generate enough cash flow from regular operations to replace worn-out equipment, to follow the long-term growth trend in the industry, and to finance routine investments (Im, Mayer & Sussman, 2017). The remaining cash flow should be sufficient to repay debt and provide a market risk-adjusted return for the owners.

Second, from time to time companies are faced with a larger comprehensive investment project (a lumpy, non-divisible investment project), such as the construction of a new production plant, the development and installation of a new production line, or the acquisition of another company. When it comes to capital adjustment in companies, quite a few studies (Caballero, Engel & Haltiwanger, 1997; Doms & Dunne, 1998; Barnet & Sakellaris, 1998; Letterie & Pfann, 2007) have revealed that companies adjust their production factors, such as capital, in a lumpy fashion.

A group of researchers (Grazzi, Jacoby & Treibich, 2013) has claimed that companies' decisions regarding large investment projects and their temporal dimension are related to managers' expectations of future business opportunities and investment cycles. In this regard, Gourrio & Kashyap (2007) demonstrate that most changes in aggregate investments can be explained by changes in the number of companies that are in the large-scale investment phase and have so-called investment spikes. Similar to macroeconomics, where we are interested in how to interpret changes in aggregate investments and how these changes affect economic growth, we would also like to have a good understanding of heterogeneous behavior at the micro level.

Evaluating the impact of investments at the corporate level has not been a common topic of research so far, primarily due to the lack of relevant data. Only in the last 20 years have some researchers begun to deal with the nature of the investment behavior of economic entities. One of the first among such experiments was conducted by Doms & Dunne (1998), who used data on American companies. Afterward, other researchers conducted similar studies in France (Duhautois & Jamet, 2001), Norway (Nilsen & Shantarelli, 2003; Nilsen, Raknerud, Rybalka & Skjerpen, 2009), and Sweden (Carlson & Laseen, 2005). Their common conclusion was the uneven or lumpy nature of business investments: there were years without investments or, conversely, investment maintenance was followed by years of extensive investments. Carlsson & Laseen (2005) showed that non-convex cost adjustment models offer a more appropriate explanation of investment decisions and reject those that assume a uniform pattern of capital accumulation. The aforementioned lumpy nature of investments at the corporate level can be explained in general as a consequence of investment irreversibility, which originates from the characteristic nature of the purchase of capital and the indivisibility of physical capital (Grazzi, Jacoby & Treibich, 2013).

In the literature, lumpy investment is defined as an investment-to-capital ratio that surpasses a certain threshold, called the investment spike, which is typically set at 20% (Cooper, Haltiwanger & Power, 1999). Here it is necessary to take into account that such ratios above 20% are quite common among small companies and that the variance of the ratio between investment and capital decreases significantly with the size of the company. The threshold as an investment spike thus decreases as the size of the company increases (Nilsen, Raknerud, Rybalka & Skjerpen, 2009).

Sometimes companies refuse to invest, while at other times they are caught up in a real wave of investment. Caballero (1999) argues that taking into account this lumpiness of investments is critical, as it has an impact on the formation of the dynamic behavior of aggregate investments.

Gourio & Kashyap (2007) confirmed this thesis with their research on the case of American and Chilean companies. The waves of investment were called investment spikes. According to them, most of the changes in investment levels are due to changes in the investment of companies that had investment spikes. This can be explained by changes in the number of companies that made large investments (extensive limit), but not by changes in the average size of the investment spikes (intensive limit). The aforementioned authors found that the prevalence of investment spikes in a particular year makes it possible to predict aggregate investments in the following year. Years with a relatively greater number of investment spikes are followed by years with less investment (Gourio & Kashyap, 2007). In their research, the authors relied on the model proposed by Thomas (2002), which assumes that companies must pay a certain fixed cost to adjust their capital. However, this model does not foresee the dominant role of investment spikes and the extensive limit of investments. The average level of fixed costs is too low, as is the curvature of the profit function.

In theory, attempts have been made to define the investment spike in several ways (Power, 1994, 1998; Cooper et al., 1999; Nilsen et al., 2009). If the investment rate, which is measured by the ratio between total investments and total assets and the ratio between fixed investments and fixed capital, exceeds the absolute threshold, the investment is defined as an investment spike. The most commonly used threshold is, as already mentioned, 20% (Cooper, Haltiwanger & Power, 1999).

2.3. Financing of more demanding corporate investments

Based on a thorough review of the literature dealing with the financing of corporate investments, we have outlined certain theories and laws that apply in this area. In companies, the regime of financing their business changes over time, when financial resources become limited. That time presents an excellent opportunity for studying various financial patterns. Thus, under normal conditions, companies can maintain their capital adequacy when they invest a lot, take on heavy debt, and pay off said debt after the investment spike (Im, Mayer & Sussman, 2017).

Relatively large investment projects require diverse financial resources. If there are not enough internal resources in the company, the company must find external resources if it is to realize its investment. Grazzi et al. (2013) discern two possible methods related to the external financing of investments. First, the investment activity of a company must be limited if the company has financial constraints, which is also advocated by Schintarelli (1996), Andretsch & Elston (2002), and Whited (2006). This means that the investment desires of the company are very limited, or they simply do not exist due to poor or completely closed access to external financial resources. Second, to the extent that investment affects the growth of a company, financial constraints will preclude the possibility of taking advantage of growth opportunities.[4] In this case, limited access to external financial resources, resulting in insufficient investment, will limit the growth of the company. Oliveira & Fortunato (2006), Whited (2006), Angelini & Generale (2008), and Bottazzi, Secchi & Tamagni (2014) also prove this in their research.

The investment activity of companies is strongly influenced by the macroeconomic policy environment. According to Aktar, Abedin & Gupta (2021), monetary policy is one of the important macroeconomic variables that influence a company's investment decisions. In theory, it is well known that investment is one of the key channels of monetary transmission in a series of standard macro models. Nevertheless, there is still relatively little evidence on how monetary policy affects company investment and which types of companies are most likely to be most responsive to changes in monetary policy with different financial heterogeneities.

It has been found (Aktar, Abedin & Gupta, 2021) that both lower leveraged and higher cash holding companies tend to experience higher capital during a cash shock, implying that low

[4] *In their paper, Rebernik et al. (2018) show the growth of entrepreneurial opportunities in Slovenia in 2017.*

leveraged and cash holding companies are more responsive to monetary policy shocks. Cash holdings play a more important role in explaining the different investment responses of companies to monetary policy shocks than leverage, strengthening the company's investments and increasing the efficiency level of the company's investments in times of contractionary monetary policy. This fact prompts the need to study the asset management and liquidity of companies in addition to their financing methods. Another important finding of the above-mentioned authors is that cash has a greater impact on the level of corporate investment than one period of leverage lag. In any case, the liquid assets of companies play a key role in their ability to finance investments, which should not be considered as a marginal source of financing at any time. Therefore, highly leveraged companies should pay more attention to monetary authorities.

The question of how a company should meet its extraordinary financial needs for unusually large investment opportunities has become the subject of study of many authors (DeAngelo, DeAngelo & Whited, 2011; Elsas, Flannery & Garfinkel, 2014). DeAngelo, DeAngelo & Whited advocate a dynamic capital structure model, which means that companies can deliberately and temporarily move away from the permanent target leverage in the event that they temporarily take on debt to finance their investment spikes. The model of the mentioned authors better explains decisions related to borrowing and deleveraging than the static trade-off model and explains well the changes in financial leverage that accompany investment spikes. In their model, companies have a target leverage similar to the exchange model, and managers can make decisions from time to time that represent a departure from the target leverage. Such a strategy calls for the restoration of the financial balance by deleveraging with a certain delay, conditioned by the temporal dimension of investment opportunities and profit generation. Their model provides a plausible explanation of capital structure decision-making from several perspectives: first, it accounts for why companies often choose to move away from the target leverage, and second, it explains why empirical studies point to a slowness in re-establishing the target leverage. This can also be linked to financial flexibility (Bukvič, 2016).

We can conclude that the financing of investment spikes is quite different from the financing of routine investments. While retained earnings, viewed in aggregate, are by far the largest source of financing for corporate investment, they are not the primary form of financing spike investment. During investment spikes, external financing dominates, with debt as its largest source. The share of investments financed with long-term debt is much higher than the share of investments financed with equity capital. These findings are generalizable and consistent across industries. In contrast, there are noticeable differences in financial patterns over time and between companies. Investment spikes are more prevalent during economic booms than during recessions.[5] Equity financing is more widespread in boom times than in times of stagnation and recession. The biggest differences are certainly between large and small companies. Investment spikes that include acquisitions (purchases of companies) are larger than those that involve only capital expenditures (capex) and are financed by companies predominantly with debt, rather than with equity capital. This applies even to small companies, which, as already mentioned, use more equity than debt financing (Im, Mayer & Sussman, 2017).

3. Research methodology

3.1. Research hypotheses and research methods

In the course of our research, we set the following research hypotheses:

H1: Strategic investments are the only ones that ensure the organic growth of companies.

[5] *The share of companies with investment spikes was noticeably lower immediately after the financial crisis of 2008–2009 (Im, Mayer & Sussman, 2017).*

H2: Companies' investment decisions and investment dynamics are related to expectations about future business (investment) opportunities and investment cycles.

H3: There are relatively many companies that are unable to take advantage of business (investment) opportunities.

H4: Financial patterns during investment spikes differ from patterns outside of this period.

H5: External sources of financing, especially debt, are more important for financing business investments, especially when investment expenditures are relatively high.

H6: There is a strong relationship between the type of creditworthiness of the company and the level of indebtedness of the company.

In the theoretical part of the study, we used the scientific method of description, as well as the scientific methods of classification, comparison, analysis, and synthesis.

In the empirical part of the study, we used statistical methods (descriptive statistics, contingency tables, Chi-square Tests, t-test and linear regression) and processed the data using the SPSS 24 statistical package.

3.2. Method of collecting data

The data were captured at a single point in time (cross-sectional data). This method is suitable for the type of research whose goal is to find connections between specific phenomena or factors (Churchill, 1995). Since our purpose was also to check the connection and influences between investments and the efficiency and effectiveness of business operations, in this case a survey of data referring to the same point in time is more suitable than a survey of data collected sequentially over time (longitudinal data). Another important reason for this choice of research method was the fact that it had been used in the majority of research in the studied field, especially as concerns the influence of the dynamics and volume of investments on the performance of business operations, so the results of our study can be compared to a certain extent with the results of others.

We used primary and secondary data from the GVIN database. Primary qualitative data was collected on the basis of a questionnaire. A total of 267 questionnaires were filled in correctly (23.38% of all respondents). We collected quantitative data from published annual reports of companies in the Slovenian economy, specifically companies active in categories from A to J according to the Slovenian Standard Classification of Activities (SKD 2008, V2).

We included a sample of only large and medium-sized Slovenian companies. Large companies are those that meet at least two of the following criteria: the average number of employees in the last business year exceeds 250, net sales revenue in the last business year exceeds € 40 million, the value of assets at the end of the business year exceeds € 20 million. Medium-sized companies are those that meet at least two of the following criteria: the average number of employees in the last business year exceeds 50 and does not exceed 250, net sales revenue in the last business year exceeds € 8 million and does not exceed € 40 million, the value of assets at the end of the business year exceeds € 4 million and does not exceed € 20 million (Article 55 of the Companies Act-1-NPB14).

The representativeness of our sample is shown by the data in Table 1, Table 2 and Table 3, which show the characteristics of the companies in the sample compared to the entire population (the Republic of Slovenia).[6]

[6]The primary research also presented the age of the surveyed companies, their legal and organizational status, ownership structure, and the form and method of company management.

Table 1: Size of surveyed companies according to Article 55 of the Companies Act-1-NPB14

Size of the companies	Sample (Questionnaire)		Slovenia		Δ
	How much	In %	How much	In %	
Large	78	29,21	336	29,42	-0,21
Medium-sized	189	70,79	806	70,58	0,21
Total	267	100	1 142	100	0

Source: investment ability of the companies, questionnaire 2018.

Table 2: Review of the companies by regions

Region	Sample (questionnaire)		Slovenia		Δ
	How much	In %	How much	In %	
Osrednjeslovenska	77	28.84	406	35.54	-6.70
Podravska	27	10.11	133	11.65	-1.54
Savinjska	50	18.73	125	10.95	7.78
Gorenjska	25	9.36	108	9.46	-0.0
Jugovzhodna Slovenija	19	7.12	71	6.22	0.90
Goriška	11	4.12	64	5.60	-1.48
Obalno-kraška	16	5.99	58	5.08	0.91
Pomurska	12	4.49	56	4.90	-0.41
Koroška	9	3.37	38	3.33	0.04
Posavska	10	3.75	36	3.15	0.60
Primorsko-notranjska	5	1.87	29	2.54	-0.67
Zasavska	6	2.25	18	1.58	0.67
Total	267	100	1 142	100	0.00

Source: investment ability of the companies, questionnaire 2018.

Table 3: Dominant activity according to the standard classification of activities SKD 2008, V2

Dominant activity	Sample (questionnaire)		Slovenia		Δ
	How much	In %	How much	In %	
Processing activities	130	48.70	489	42.82	-5.88
Trade, maintenance and repair of motor vehicles	60	22.47	334	29.25	6.78
Transport and storage	18	6.74	80	7.01	0.27
Construction	14	5.24	63	5.52	0.28
Hotel trade and catering industry	13	4.87	32	2.80	-2.07
Water supply, sewage and waste management, environmental remediation	11	4.12	40	3.50	-0.62
Electricity, gas and steam supply	11	4.12	29	2.54	-1.58
Information and	7	2.62	48	4.20	1.58

communication activities					
Mining	2	0.75	7	0.61	-0.14
Agriculture and hunting, forestry and fishing	1	0.37	20	1.75	1.38
Total	267	100	1 142	100	0.00

Source: investment ability of the companies, questionnaire 2018.

The research refers to the period from 2010 to 2017 inclusive, and to a lesser extent to the longer period from 2000 to 2017 inclusive (for a comparison between the increase in tangible fixed assets and select financial categories). The data is covered on an annual basis for each individual year during this period.

In the research process, we defined the measured variables, determined the measurement scale (we used a 7-point Likert scale), created a survey questionnaire and tested it in terms of its reliability and content validity.

3.3. Limitations

At this point, we should mention the limitations we encountered in our research, which relate mainly to the empirical part of the study. The first limitation is the size of the sample, since the research was conducted only on Slovenian companies. If it had been set internationally, it would have included a larger number of larger companies, where the influence of strategic investments is more pronounced. The relevant literature led us to assume the direction of causality in our conceptual model (the economic effects of investments and their impact on the business performance of companies). Our research is based on cross-sectional data, with which we cannot prove causality. The direction of causality could only be determined through a longitudinal study, which represents one of the opportunities for further research. The next limitation relates to the size of our companies, which are relatively small compared to foreign competitors. That is why the average size of their investments, their investment spikes, is smaller compared to foreign companies. This applies to an even greater degree to medium-sized companies, which were also included in our research sample. The third limitation is related to the possible influence of subjectivity, since as a rule only one person answered the questionnaire (usually a financial officer, in individual cases also a company director or other managerial person).

4. Findings relating to financing of investment activity for Slovenian companies in the period 2010-2017

4.1. Strategic investments – a dynamic capability of creating new value for owners and a driver in company growth

First, we test the hypothesis that only strategic investments create new value for owners and that they affect the organic growth of the company. In our case, we took investments in tangible fixed assets (OOS) as strategic investments, and net sales revenue (ČPP)[7] as the indicator of the

[7] The increase in the volume of strategic investments in tangible fixed assets also has a significant impact on some other financial indicators of the performance of companies, namely the increase in value added, the increase in earnings before interest, taxes, depreciation and amortization (EBITDA), the increase in net profit for the accounting period, and the increase in the financial ratio return on assets (ROA). All of these impacts were studied in our research using regression models.

company's organic growth. For this analysis, we considered a longer time series for the companies in our sample, namely for the period from 2002 to 2017.

For this purpose, it was first necessary to prepare the appropriate data. In doing so, we relied on the AJPES database from the chart of accounts. For tangible fixed assets (OOS), we used annual data on account 0010102, and for net sales revenue (ČPP), we used annual data on account 050.

Account 0010102 shows the current book value of tangible fixed assets. This balance is of course constantly changing, both within a year and after years. This balance is affected by depreciation, or write-off of the value of tangible fixed assets, and the sale of tangible fixed assets (disinvestment), which reduce this balance. On the other hand, this balance is affected by the purchase or acquisition of new tangible fixed assets, or the acquisition of tangible fixed assets on the basis of a long-term financial lease. As already mentioned, we have neglected the possible impact of the revaluation of tangible fixed assets for our sample companies. If the difference between the purchase value of new tangible fixed assets and the written-off value of existing tangible fixed assets, or the value reduced due to disinvestment, is positive, we are talking about net investments in tangible fixed assets. If we look at this balance (book value, i.e. undepreciated value) of tangible fixed assets over a longer period of time, we can determine from the differences (or from chain indices) whether companies have invested or disinvested net in individual years. The difference between the two annual balances (end of each calendar year, as of 31st December) of the book value (undepreciated) of tangible fixed assets OOSt – OOSt-1 (account 0010102) represents the net investments in tangible fixed assets in year t.

Since this is a longer period of time and to ensure comparability of data over time, we have appropriately corrected all values with deflators or inflators of the individual year (SURS – Inflation calculation for the period 2002 – 2017).

For the entire sample (267 companies), we calculated the average values for each of the categories presented above for each year.

For each company included in the sample, we calculated chain indices and, based on them, the average growth rate of the movement of the individual economic category. In doing so, we took into account the geometric mean, which is calculated according to the following formula:

$$(\prod_{i=1}^{n} a_i)^{\frac{1}{n}} = \sqrt[n]{a_1 a_2 a_3 \ldots a_n}$$

When calculating the simple linear regression, we took into account the average values calculated for each year for the independent variable OOS and for the dependent variable ČPP.

Below, we show the calculation of the linear regression for a pair of dependent variables, OOS and ČPP.

Calculation of linear regression for dependent variables OOS and ČPP

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,821[a]	,673	,652	4054964,139

a. Predictors: (Constant), Opr osn sred

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,085E+14	1	5,085E+14	30,926	,000[b]
	Residual	2,466E+14	15	1,644E+13		
	Total	7,552E+14	16			

a. Dependent Variable: Cisti prih od prod

b. Predictors: (Constant), Opr osn sred

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-23654658,1	9981459,460		-2,370	,032
	Opr osn sred	1,505	,271	,821	5,561	,000

a. Dependent Variable: Cisti prih od prod

Bootstrap for Coefficients

Model			Bootstrap[a]				
						BCa 95% Confidence Interval	
		B	Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
1	(Constant)	-23654658,1	-818984,712	11901364,94	,116	-47733387,8	-666241,520
	Opr osn sred	1,505	,027	,338	,012	,894	2,193

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

The calculated R^2 is 0.673, which means that investments in tangible fixed assets account for more than two-thirds of the variation in net sales. In other words, if we are trying to explain why companies increase their sales of their products/services and goods/materials, we can look at the variation in net sales. There are a whole host of factors that can explain this variation, but our model, which includes only investments in tangible fixed assets, can explain as much as 67% of this variation. This means that only a little less than a third of the variation in net sales cannot be explained by investments in tangible fixed assets. Of course, there are other factors, other variables, that influence the increase in the volume of sales of products/services.

The above is an analysis of variance (ANOVA). The calculation gives the sums of squares and the degrees of freedom. From these two values, we can calculate the mean sums of squares by dividing the sums of squares by the corresponding degrees of freedom. The most important part of this table is the F-index, which is 30.93, and which is significant at $p < .001$ (because the value in the column labeled Sig. is less than .001). This result indicates that there is a less than 0.1% probability that the F-index of this magnitude would occur if the null hypothesis were true. Therefore, we can conclude that our regression model is a much better predictor of the increase in net sales revenue than if we had used the average amount of net sales revenue. The regression

model generally predicts the movement of net sales revenue very well. This result seems logical and is expected. We can ask ourselves why companies invest, why they invest money in strategic investments, such as the purchase of equipment, machinery, etc. Because the market offers them new business opportunities, i.e. increased demand for their products/services. Thus, by increasing production and other capacities, companies increase resources in order to increase the volume of their sales in order to ensure further growth and long-term existence.

Other factors that, in addition to an increase in tangible fixed assets, influence a larger volume of sales of products/services of companies and which are not discussed in this research may include an increase in selling prices, an increase in productivity (a larger volume of production per unit of time), export incentives or customs relief, rationalization of operations, improvement of business processes, organizational changes, etc.

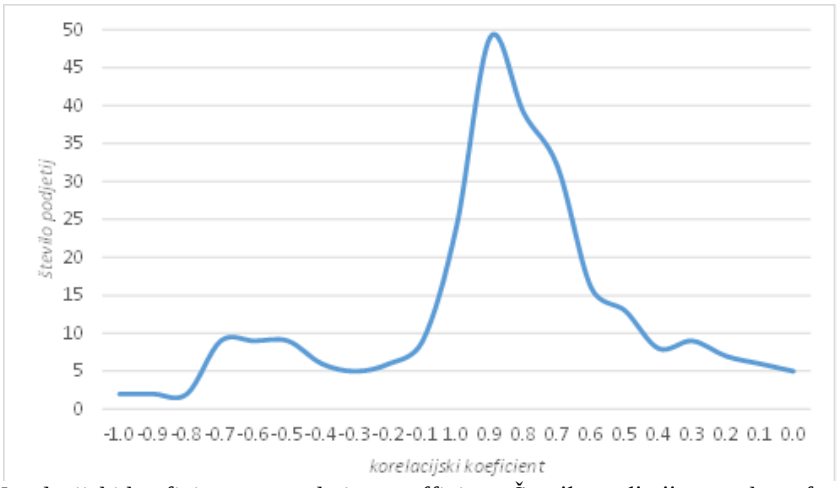
ANOVA shows us whether the model predicts the outcome variable well enough. However, it does not show the individual contribution of the variables, except in our model, when we have only one independent variable. The calculation shows the estimates of the model parameters (beta values) and the significance of these values. In the equation above, b_0 means the intercept on the ordinate axis and this is the value of B for the constant. b_0 is €23.6 million. We can explain this by saying that if companies do not spend a single euro on investments in tangible fixed assets (when X = 0), the model predicts that all companies in our sample together will reduce net sales revenue by € 23.6 million. In the same table, we can read the value of b_1, which represents the slope of the regression line. It is 1.505. Although this value represents the slope of the regression line, it is better to consider it as a change in net sales revenue if the volume of investments in tangible fixed assets changes by € 1. If, for example, investments increase by € 100, net sales revenue from products/services will increase by € 150.5, which can be considered a relatively good result considering the fact that an increase in investments in tangible fixed assets contributes more than two-thirds to the increase in net sales revenue.

Let's look at the values for t in this calculation. The t-test tells us whether the value of b is different from zero (0). The SPSS 24 software tool calculates the exact probability that the observed value of t occurs if the value of b in the population is zero (0). If this observed significance is less than .05, then the result reflects the true effect. This is fully true in our case. For one t value, the probability is .032, and for the other t value, it is .000 (zero to three decimal places), and so we can say that this is the probability of these t values (or greater) if the values of b in the population were zero (0) or less than .001. Therefore, the b is significantly different from zero. In the case of b for investments in tangible fixed assets, this result means that strategic investments, i.e. investments in tangible fixed assets, contribute significantly ($p < .001$) to predicting an increase in net sales revenue.

In the calculation, the bootstrap confidence interval tells us that the population b-value for OOS lies between 0.894 and 2.193, and since this interval does not include zero (0), we can conclude that there is a true positive relationship between investments in OOS and ČPP in the population. The significance associated with this confidence interval is $p = .012$, which is significant. The bootstrap procedure also involves re-estimating the standard error; it changes from .271 to .338. This is a small change. For a constant, the standard error is 9,981,459.46, and the bootstrap estimate of the standard error is 11,901,364.94. The difference is 1,919,905.54. Bootstrap confidence intervals and significance values are useful data and do not rely on assumptions about normality of distribution and homoscedasticity (Field, 2013).

Figure 1 shows the distribution of correlation coefficients between the variables OOS and ČPP for all companies included in the sample.

Figure 1: Distribution of correlation coefficients for the variables tangible fixed assets (OOS) and net sales revenue (ČPP) for all companies included in the sample for the period 2002-2017



Legend: Korelacijski koeficient - correlation coefficient; Število podjetij – number of companies

Source: own work based on the calculation of correlation coefficients for the variables OOS and ČPP for 267 companies in the sample for the period 2002-2017.

4.2. Financing of investments by Slovenian companies before and after the last financial crisis and recession

The first decade of this century, with the exception of its last couple of years, was a period of economic growth, which was greater and faster in South-East Europe, including Slovenia, than in Central Europe. This growth was based on large investments, which companies financed mainly through borrowing (Hunya, 2009). In the period before the last financial crisis and economic recession, Slovenian companies mainly financed their growth and larger investments in tangible fixed assets with borrowed resources, which culminated in high financial leverage and completely destroyed the ratio between net financial debt and the EBITDA required by the banks (2.5). This was the reason why during the aforementioned crisis investments stopped and companies were forced to deleverage afterward.

In the period before the last global financial and economic crisis, the relatively large supply of loan funds with low prices and long maturities drove credit growth directly and especially through banks, so it exceeded 30% annually in 2007 (Bradeško, 2016). The companies directed the borrowed funds to their core business, the expansion of production abroad, and to various takeover activities and real estate projects (Prašnikar, Domadenik & Koman, 2015).

After the global crisis, a discussion began in the academic sphere about how to stimulate economic growth and economic recovery. In the context of our research, this question is somewhat relevant, as it deals with the dynamics of investing in the period after the global crisis, from 2010 onwards. Considering that the crisis started in the financial sector and hit it very hard, one would expect (conventional assumption) that the rehabilitation of the financial sector would be a condition for the rehabilitation of the corporate sector. Although such an assumption seems reasonable, and many researchers around the world have examined it, the recovery of the real sector started before the recovery of the financial sector (Calvo, Izquierdo & Talvi, 2006; Claessens, Kose & Terrones, 2009; Abiad, Dell'Ariccia & Li, 2011). According to Calvo et al. (2006), declines in GDP are associated with sharp declines in the liquidity of a country's financial sector. These creditless recoveries were called the "phoenix miracle." The point is that while credit goes down along with revenue, revenue goes up without credit going up as well. The recovery of the corporate sector should accordingly take place without a renewed increase in credit, i.e. without renewed borrowing.

Based on a survey of CFOs, Campello, Graham, Giambona & Harvey (2011) found that credit lines are an important source of financing current operations in times of crisis, and that companies look for substitutes among credit lines and the internal resources of the company when there is a lack of credit. They found that when companies have limited access to credit lines during a crisis, they make a choice between saving and investing, but still want access to credit lines. Companies that have more financial resources also invest more. Almeida, Campello & Hackbarth (2011) found that companies that had a large proportion of their long-term loans due right at the time of the crisis recorded a significant drop in their investments, i.e. they invested much less.

To sum up, after the financial crisis, companies were expected to recover before the financial sector, i.e. independently of the recovery of banks and other financial institutions, which is called the phoenix miracle according to Calvo et al. (2006). However, in their investigation of different corporate recovery patterns in both developed and developing markets, a group of researchers led by Ayyagari (2001) found that only a small proportion of companies (less than 31%) followed this pattern. Most companies continued their investments and had a positive cash flow from operations.

Based on a study by Bradeško (2016), our sample companies are among those characterized by the phoenix miracle phenomenon. In his research, the author covered the period from 2013 to 2015, i.e. the period after the last major financial crisis and recession, in which a pattern of creditless economic growth can be observed. Aggregate non-credit growth was generated by less than half of the companies that increased turnover and added value when credit was shrinking. The decomposition of cash flows shows that companies mostly deleveraged by reducing short-term bank loans, and the source of deleveraging was the growing positive cash flow from operations. All other items of the cash flow were negative, so that despite the reduction of debt to banks, companies still invested in net fixed assets (even to an increased extent), made financial investments, paid out net payments to owners, reduced their debts to other companies, and increased the balance of money on their accounts (Bradeško, 2016, p. 74). We will return to this question in the empirical part of this study.

4.3. The creditworthiness of companies and their indebtedness as an important factor of investment ability

A company's credit rating is crucial for its investment activity and investment ability. This is particularly important from the point of view of obtaining foreign sources of financing, especially bank credits. This particular segment of the empirical part of the study is sensibly linked to its previously published theoretical part (Bukvič, 2023), in which, within the framework of internal and external factors that influence a company's investment ability, we described in detail the role of financial constraints in defining investments and presented the connection between the company's net worth and capital (Hubbard, 1998). It is also linked to the theoretical part (Bukvič, 2023) that describes the effects on the investment ability of companies caused by restrictions on various types of capital, where we presented in detail the credit model developed by Holmstrom & Tirole (1997). Finally, it refers to the previously elaborated theoretical consideration (Bukvič, 2023) where, in the context of the financing of business investments, we learned about two possible methods related to the external financing of investments (Grazzi, Jacoby & Treibich, 2013), i.e. the limitation of investment activity due to financial constraints of the company and financial constraints to a certain extent excluding the possibility of taking advantage of growth opportunities.

According to Fazzari, Hubbard & Petersen (1988), Kaplan & Zingales (1997), Dasgupta, Noet & Wang (2011), Gatchev, Pulvin & Tarhan (2010), Ostergaard, Sasson & Sørensen (2011), and Drobetz, Haller, Meier & Tarhan (2014), limitations arise from market irregularities, especially information asymmetry and improper choice, which depend on the creditworthiness of the company. It is precisely because of these limitations that companies cannot hire external financial sources to finance investments that would be justified from the point of view of net present value.

Therefore, they can finance investments only with their own resources. The volatility of own funds is therefore reflected in the volatility of investments, and the elasticity of investments with regard to cash flow from operations increases. On the other hand, good companies are not limited in terms of financing, their investments are independent of short-term fluctuations in business performance, and the relevant elasticity is zero or very low (Bradeško, 2016).

According to Bradeško (2016), the analysis of responses to the cash flow impulse from operations does not support his hypothesis of the existence of a credit constraint, i.e. that banks and other financiers will systematically avoid solvent companies with slightly worse credit ratings. The responsiveness of investments as a measure of restrictions decreases monotonously with increasing indebtedness. Fazzari et al. (1988), however, predicted the opposite. When cash flow from operations improves, companies with limited access to financing and good investment opportunities spend it on investments.

In addition to the qualitative data (classification into credit ratings), which are shown for the last year of the studied period (2017) on the basis of the surveyed companies (their financial officers) in Table 1, we follow the example of some other authors (Bradeško, 2016), as an approximation of the credit rating for the same companies also used the ratio between NFD/EBITDA (NFD meaning "net financial debt"), calculated on the basis of data obtained from the AJPES database for all years in the studied period. We did not use other criteria for the credit rating of companies, such as the amount of dividends paid out, as these criteria are rougher, less universal, or simply not available. NFD/EBITDA reflects well a company's current ability to generate cash flow to repay debts, which was also confirmed by other authors who used this indicator (Bradeško, 2016). This indicator is not least suitable for the behavior of investors in cases of takeovers, especially during crisis periods. Bradeško (2016) warns that due to the weak theoretical basis and some other reasons, the results of his model should be interpreted with caution. Companies in crisis lowered their borrowing levels for their own reasons. We cannot overlook the consequences of pressure from buyers and suppliers, which increased the risk of insolvency of business partners. In such a situation, the greater part of the cash flow is dedicated to reducing indebtedness. As a result, the sensitivity of investments to cash flow from operations is lower than is usually the case. In Table 1, we provide the credit ratings of the companies in the research sample.

Table 4. Credit ratings of companies in the sample

Creditworthiness	*Count*	*%*
Class A: companies for which the banks do not anticipate problems with paying their obligations	215	80,52
Class B: companies that have a temporarily weak financial situation, but do not show that it will significantly deteriorate in the future and do not repeatedly pay their obligations late	40	14,98
Class C: companies that do not have sufficient long-term sources of funds to finance investments and from whom the bank does not receive ongoing satisfactory information or appropriate documentation regarding borrowing	6	2,25
Class E: companies judged to be insolvent; with this, they determine their "expected" solvency, and based on this assessment, they manage their credit policy	2	0,75

Unknown	4	1,50
Total	***267***	***100***

Source: investment ability of companies, survey questionnaire, 2018

At this point, talking about the indebtedness of companies, we should highlight another aspect of the issue: the problem of indebted companies with late payments. Prašnikar, Pahor & Cirman (2014) concluded that those Slovenian companies that are in greater debt are also more likely to be late with their payments. Commercial banks that monitor the operations of their clients pay particular attention to those companies that have been late in repaying their debts in the past. Thus, they lowered their credit rating and restricted them from further borrowing (Prašnikar, Bole, Ahčan & Koman, 2003). As a result, companies that have a lack of financial resources and are relatively deep in debt try to solve their liquidity problems also by postponing payments to their suppliers. Thus, in addition to high financial obligations, they also have high obligations from operations.

In order to investigate in greater detail, on a selected sample of large and medium-sized companies, how the NFD/EBITDA ratio is reflected in a company's ability to generate cash flow for debt repayment, and at the same time indirectly indicates the company's investment ability, we divided all the companies in the sample into three segments according to indebtedness. For the period from 2013 to 2015, Bradeško (2016) found that the share of cash flow that companies used for deleveraging increased with the level of indebtedness. To a lesser extent, the share retained by the companies in monetary form also decreased at the same time. Into the first segment, we classified companies with an NFD/EBITDA ratio less than or equal to 2 (<= 2). There were 109 (40.8%) such companies at the beginning of the studied period (2010), and 164 (61.4%) at the end of the studied period (2017). These companies were able to repay their financial debts within two years, so banks and other financiers were ready to grant them new loans. In fact, we also included in the first segment all those companies that were net creditors, with a negative net debt. These are companies whose balance of cash and cash equivalents on the balance sheet date exceeded the balance of financial liabilities. There were 42 (15.7%) such companies in 2010, and 77 (28.8%) in 2017. Into the second segment, we classified companies with a debt of 2 to 5 times the EBITDA; there were 72 (27.0%) such companies in 2010, and 65 (24.3%) in 2017. The third segment included heavily indebted companies with an NFD/EBITDA ratio greater than 5. There were 71 (26.6%) such companies in 2010, and 37 (13.9%) in 2017. We excluded from the analysis those companies that had a negative EBITDA, meaning companies with a negative cash flow from operations. In our sample, there were 13 (4.9%) such companies in 2010, and 6 (2.2%) in 2017.

For the last year of the studied period (2017), we also performed a chi-square test. For this purpose, we created two categories for each variable: for creditworthiness "good creditworthiness" and "bad creditworthiness," and for indebtedness "adequate indebtedness" and "inadequate indebtedness." The results are shown in Table 2.

Pearson's chi-square test, $\chi 2$, checks if there is a relationship between two categorical variables, in our case between the type of creditworthiness of the company and the company's level of indebtedness. With the crosstabs process, we get a contingency table of the results of the chi-square test and its characteristic, the significance value. Pearson's chi-square test checks whether the two studied variables are independent. If the significance value is small enough (conventionally less than 0.05), the hypothesis that the two variables are independent is rejected and confidence in the hypothesis that the studied variables are related in some way is gained (Field, 2013). The value of the chi-square statistic is given in Table 2 along with the degrees of freedom and the significance value. The value of the chi-square statistic is 42.341, which is within the rounding error. This value is highly significant ($p < 0.001$), indicating that the type of credit rating of a company has a significant effect on whether a company's leverage is adequate or not, or, vice versa, indicating that a company's level of leverage has a significant effect on whether the credit rating is good or bad.

The highly characteristic result shows that there is a relationship between the type of credit rating and the level of leverage, regardless of whether the latter is adequate or inadequate. In other words, there is a significant difference in the response pattern (i.e. the proportion of companies with good credit versus the proportion of companies with poor credit) in the case of two levels of indebtedness. On the example of the z-test, we saw that companies with a good credit rating are significantly less indebted, whereas companies with a bad credit rating are significantly more indebted. This important finding can be expressed in percentage terms as follows: more than 60% of companies with good credit ratings (A and B) are adequately leveraged and more than 85% of companies with bad credit ratings (C, D, and E) are inadequately leveraged.

Table 5. The relationship between a company's creditworthiness and its indebtedness, measured by the NFD/EBITDA ratio

Contingency table for the relationship Creditworthiness * Indebtedness

			Indebtedness		
			Inadequate	Adequate	Total
Creditworthiness	Good	Count	68_a	149_b	217
		Expected Cunt	87.3	129.7	217.0
		% within Creditworthiness	31.3%	68.7%	100.0%
		% within Indebtedness	64.8%	95.5%	83.1%
		% of total	26.1%	57.1%	83.1%
		Standardized Residual	-2.1	1.7	
	Bad	Count	37_a	7_b	44
		Expected Count	17.7	26.3	44.0
		% within Creditworthiness	84.1%	15.9%	100.0%
		% within Indebtedness	35.2%	4.5%	16.9%
		% of total	14.2%	2.7%	16.9%
		Standardized Residual	4.6	-3.8	
Total		Count	105	156	261
		Expected Count	105.0	156,0	261.0
		% within Creditworthiness	40.2%	59.8%	100.0%
		% within Indebtedness	100.0%	100.0%	100.0%
		% of total	40.2%	59.8%	100.0%

Each subscript letter denotes a subset of the Indebtedness categories whose column proportions do not differ significantly from each other at the p = 0.05 level.

Chi-square Tests

	Value	df	Asymptotic significance (2-sided)	Exact significance (2-sided)	Exact significance (1-sided)
Pearson's Chi-Square	42.341[a]	1	.000	.000	.000
Continuity Correction[b]	40.175	1	.000		
Likelihood Ratio	43.388	1	.000	.000	.000
Fisher's Exact Test				.000	.000
N of Valid Cases	261				

a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 17.70.
b. Computed only for a 2x2 table.

Source: printout of results from the SPSS 24 program

We can conclude that the level of indebtedness of a company has a significant impact on its creditworthiness: the creditworthiness of a company is good if the company is adequately (i.e. less) indebted.

We calculated the correlation between these two types of data, which are shown in Table 6.

Table 6. Number of companies in terms of creditworthiness and indebtedness measured by NDF/EBITDA

	Creditworthiness					
NFD/EBITDA	***A***	***B***	***C***	***E***	***Unknown***	***Total***
≤ 2	151	10	1		2	164
> 2 and ≤ 5	47	13	2	2	1	65
> 5	16	17	3		1	37
n/a	1					1
Total	***215***	***40***	***6***	***2***	***4***	***267***

Source: survey questionnaire and data from the AJPES database for 2017

For example, it can be seen from Table 3 that in 2017 there were 151 companies to which the surveyed financial officers in the companies assigned a credit rating of A (indicating that this is how their parent banks should treat them), and according to AJPES data these companies had a calculated NFD/EBITDA ratio less than or equal to 2. Such a result is logical. It is also logical that a company with an E rating is placed in the class with the highest NFD/EBIDTA ratio, so it is highly indebted. However, it is not logical, for example, that 16 companies have a credit rating of A and are at the same time highly indebted, or that a company has a credit rating of C while featuring in the first class, with a low level of indebtedness. For four companies in the returned survey questionnaires, it was not indicated what kind of credit rating they have with their parent bank.

We calculated the rank correlation, or Spearman's correlation coefficient, r. We assigned the appropriate rank to both types of data, rating A as the highest rank, i.e. 5, and E as the lowest, i.e. 1. To the least indebted companies, i.e. companies with an NFD/EBITDA ratio of less than 2, we assigned rank 3, to medium-indebted companies rank 2, and to the most indebted companies rank 1. The results are shown in Table 4.

Table 7 shows that the correlation coefficient between the studied variables, i.e. the creditworthiness of the company and the ratio between NFD and EBITDA, is r = 0.437. Under the correlation coefficient, the significance value of the correlation and the sample size (N = 261) are

written. As mentioned, 6 companies were excluded from the sample population because they had negative EBITDA. The significance of the correlation value is less than 0.001 (as indicated by the double asterisk after the correlation coefficient). This significance of the value indicates that the probability of obtaining such a large correlation coefficient in the sample of 261 companies, if the null hypothesis (that there is no relationship between these two variables) were valid, is very small, in fact very close to zero. All significance values are below the standard criterion of 0.05, indicating a "statistically significant" relationship between the variables. Given the lack of normality in some variables, we should be more concerned about the bootstrapping method or confidence intervals than the significance itself (Field, 2013). This is because this interval will not be affected by the distribution of scores, while only the significance of the value can be. The confidence interval is marked in Table 4 with "BCa 95% Confidence Interval" and two values are given for it: the lower and upper limits, i.e. 0.332 and 0.539.

Let us highlight two important points. First, since the confidence limits are derived empirically from a random sampling procedure (or bootstrapping), the results will differ very little when we repeat the analysis. Therefore, the confidence limits will not always be the same, which is normal (Field, 2013). Second, let us consider what it means if the correlation between the studied variables is zero, i.e. if there is no effect. A confidence interval is the range within which the population value lies (within 95% of the samples). If this interval exceeds zero, it means that the population value could be zero, i.e. without any effect. If the interval exceeds zero, it furthermore means that the population value could be a negative number (a negative relationship between the variables) or a positive number (a positive relationship between the variables), making it impossible to say whether the actual relationship between the variables proceeds in one direction or a completely different one. In our case, the confidence interval for the correlation coefficient does not exceed zero, so we can trust (be sure) that there is a true, real effect in the population. This means that if the company has a high credit rating, say A or at least B, it is not heavily indebted, or the ratio between NFD and EBITDA is low. Note that we assigned a rank to both variables: both a high credit rating and a low ratio between NFD and EBITDA received high ranks. Both types of rank values are increasing, so the correlation coefficient is positive, which means that an increase in creditworthiness often occurs simultaneously with a decrease in the NFD/EBITDA ratio and vice versa.

Table 7. Calculation of rank correlation, or Spearman's correlation coefficient, for two variables of the company's creditworthiness and the NFD/EBITDA ratio

Correlations

					Creditworthiness	NFD/EBIDTA
Spearman's rho	Creditworthiness	Correlation Coefficient			1.000	0.437**
		Sig. (2-tailed)			.	0.000
		N			261	261
		Bootstrap[b]	Bias		.000	.000
			Std. Error		.000	.055
			BCa 95% Confidence interval	Lower	1.000	.055
				Upper	1.000	.539
	NFD/EBITDA	Correlation Coefficient			.437**	1.000
		Sig. (2-tailed)			.000	
		N			261	261
		Bootstrap[b]	Bias		.000	0.000
			Std. Error		.055	0.000
			BCa 95% Confidence interval	Lower	.332	1.000
				Upper	.539	1.000

**. Correlation is significant at the p = 0.01 level (2-tailed).

b. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

Source: printout of results from the SPSS 24 program

In the empirical part of the research, we also took into account the longitudinal aspect, since for some indicators we were interested in how the NFD/EBITDA ratio changed in the eight-year period under study and whether anything improved. Unfortunately, we did not have the credit ratings for these companies at our disposal, as we obtained data for the last year of the studied period on the basis of a survey questionnaire. Table 8 shows the distribution of companies in the sample according to their indebtedness, measured by the NFD/EBITDA ratio, at the beginning and end of the studied period.

Table 8. Distribution of companies by indebtedness at the beginning and end of the studied period 2010–2017

Value of indicator NFD/EBITDA	2010 Count	2010 %	2017 Count	2017 %	Index 2017/2010
≤ 2	109	40.82	164	61.42	150
of which net creditors (< 0)	*42*	*38.53*	*77*	*46.95*	*183*
> 2 and ≤ 5	72	26.97	65	24.34	90
>5	71	26.59	37	13.86	52
n/a	15	5.62	1	0.37	7
Total	***267***	***100***	***267***	***100***	
Average value NFD/EBITDA	7		1.92		3.65-times
Weighted average value NFD/EBITDA[8]	1.94		1.2		1.62-times

Source: AJPES database for the period 2010 to 2017

5. Discussion relating to the analysis of the investment activity of Slovenian companies in the studied period 2010-2017

In the following, we summarize some of the key findings from the extensive empirical research we conducted regarding the investment activity of Slovenian companies in the period 2010–2017.

5.1. Lack of financial resources as a key factor of low utilization of business/investment opportunities

Table 9 shows how companies took advantage of those business opportunities on the market that required certain investments.

Table 9. Utilization of business opportunities in the market related to investments

Utilization	Large		Medium-sized		Total	
	Count	%	Count	%	Count	%
Partly	37	47.44	102	53.96	139	52.06
Fully	39	50.00	82	43.39	121	45.32
No	2	2.56	4	2.12	6	2.25
Unknown			1	0.53	1	0.37
Total	***78***	***100***	***189***	***100***	***267***	***100***

Source: companies' investment ability, survey questionnaire 2018

Table 10 shows the reasons why companies did not take advantage or only partially took advantage of those business opportunities on the market that required certain investments.

Covering an eight-year period, the present research also examines the last two years of the great financial and economic crisis, i.e. 2010 and 2011. Therefore, it is understandable that almost 15% of the sample companies responded that their company was forced to deleverage primarily due to borrowed credits in the past, which meant that the companies did not use or only partially used those business opportunities on the market that required certain investments.

Table 10. Reasons for lost business opportunities in the market related to investments

Reason	Count	%

[8] *As weights, we took into account the shares of net sales revenue for an individual company in the sum of the total sales of sample companies, specifically for the years 2010 and 2017..*

Our company did not have enough of its own financial resources for the necessary investments.	72	22.72
Our company was forced to pay off debt primarily due to loans taken out in the past.	47	14.84
The investments were too demanding in terms of value.	27	8.52
No strategic guidelines were adopted for the necessary investments (the investments were not part of the strategic plan of our company).	26	8.2
Our company was unable to obtain debt (borrowed financial resources) for the necessary investments.	26	8.2
The owners (via the supervisory board) did not approve the investment programs or business plans.	20	6.31
In our company, we were not yet ready to realize the necessary investments (in the sense of preparing the necessary project documentation and obtaining the relevant permits and consents).	17	5.36
Other.	17	5.36
During this time, there were major organizational changes in our company.	15	4.73
Our company did not have enough personnel (lack of qualified physical labor).	12	3.79
Our company did not have enough human resources (lack of technical knowledge).	10	3.15
Our company failed to acquire new customers for products/services from newly planned investments.	10	3.15
Our company failed to get new orders from existing customers.	8	2.52
The investments were too demanding from the technological point of view.	8	2.52
Our company has been overtaken by the competition in terms of investments.	2	0.63
Total	***317***	***100***

Source: companies' investment ability, survey questionnaire 2018

Almost 23% of the companies included in the sample answered that their company did not have enough of its own financial resources for the necessary investments, and more than 8% of the companies said that their companies failed to obtain debt (borrowed financial resources) for the necessary investments. As a result, it can be concluded that during this period a certain number of companies did not take on new debt for new investments, because they already had too much financial leverage, i.e. an inadequate capital structure, or they could not get new loans due to the credit crunch.

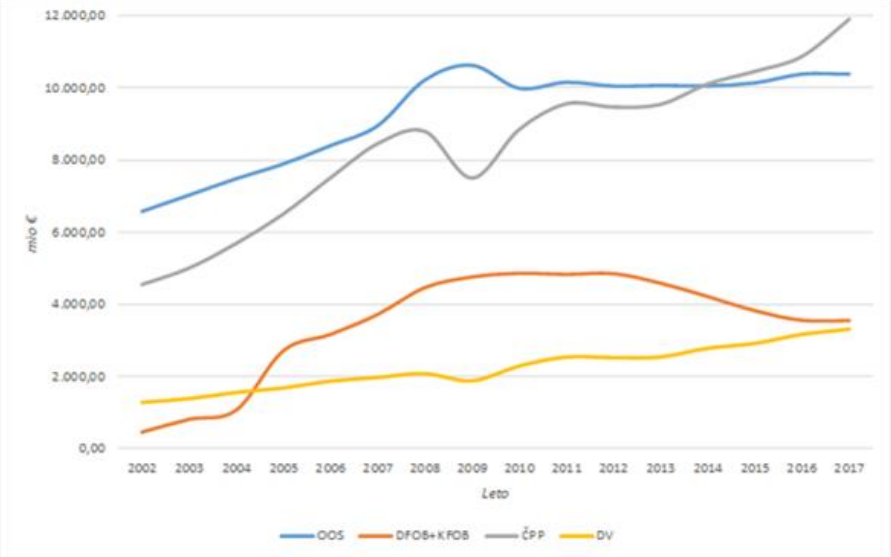
More than 45% of the sample companies answered that during the studied eight-year period they fully utilized those business opportunities on the market that required certain investments, which means that these companies mainly increased the volume of their operations during this period, that is, if we exclude those that only made investments in order to modernize their production process (automation). This post-crisis period was, as mentioned, a credit crunch period that lasted quite a few years. Therefore, we can talk about credit-free economic growth, which was typical of Slovenia in the period from 2013 to the end of 2015 (Bradeško, 2016). Credit-free growth is only a special (marginal) form of reducing financial leverage. This reduction continued even later, after the revival of credit growth. Indeed, there are episodes when the economy recovered after the crisis without a simultaneous or prior recovery of credit growth. This phenomenon was observed in cases of crisis exits by Calvo, Izquierdo & Talvi (2006). The emergence of these crises was associated with the sudden stoppage of the inflow of capital to developing countries, but later these same authors and others (Claessens, Kose & Terrones, 2009) found similar patterns also in exits from crises that had a different genesis, even in developed countries. This phenomenon of creditless growth is known as the "phoenix miracle."

According to Bradeško (2016), the current quarterly rates of economic growth turned positive at the beginning of 2013, while the annual rates turned positive at the end of 2013 and then increased further in 2014. The dynamics remained similar throughout 2015. Later, we can already

talk about a full economic recovery. Solid economic growth took place right after the crisis at the same time as the credit of domestic banks was shrinking. According to Bradeško (2016), the economic recovery of Slovenia up to and including 2015 corresponds to a pattern of creditless growth or recovery, which can be account for by: (a) the re-allocation of production factors to sectors with lower requirements for external financing, (b) the increase in alternative sources of financing, (c) improved cash flow from business operations, and (d) the reduction of investments and assets sales. Alternative sources of financing include securities, long-term financial leasing, the sale of receivables (recourse factoring), and borrowing from foreign banks.

We checked whether creditless recovery also applies to our sample companies after the great financial crisis. Figure 2 shows that from the beginning of the previous decade until the great crisis of 2009, investments in tangible fixed assets increased in parallel with bank loans. This means that bank credits were a generator and accelerator of investment growth.[9] After the great financial crisis and recession, investments in the vast majority of companies in our sample stagnated (investment took place in the scope of depreciation, i.e. with so-called replacement investments in tangible fixed assets), but picked up again after 2014, while bank loans visibly decreased until 2016. The recovery of the companies in our sample was accompanied by a decrease or negative growth of bank loans. Based on the aggregate data shown, we cannot conclude that the phoenix miracle applies to the companies in our sample, since it would be necessary to take into account and analyze the data at the micro level, which can be the subject of further research.

Figure 2. Increase in tangible fixed assets, net sales revenue, and value added versus the decrease in financial liabilities (bank loans) after the last recession



Legend: OOS-tangible fixed assets; DFOB-long-term financial liabilities; KFOB-short-term financial liabilities; ČPP-net sales revenue; DV-added value
Source: own work (AJPES data base for the period 2002–2017)

5.2. Dynamics of investing

[9] *In the statistical software tool SPSS 24, we calculated the linear regression between investments as a dependent variable and bank loans as an independent variable. The R^2 value is 0.842, which means that bank loans can explain as much as 84.2% of the variation in investments. The F statistics for this data is 74.49, which is statistically significant at $p < 0.001$.*

Table 11 shows the dynamics with which companies realized larger and more financially demanding investments during the studied period.

Table 8. Investment dynamics of Slovenian large and medium-sized companies in the period 2010–2017

Dynamics of investing	*Medium-sized*		*Large*		*Total*	
	Count	*%*	*Count*	*%*	*Count*	*%*
Equally, in approximately the same amount every year	98	51.85	42	53.84	140	52.44
Concentrated, with an investment spike in one or two years at the end of the eight-year period	49	25.93	16	20.51	65	24.34
Concentrated, with an investment spike in one or two years in the middle of the eight-year period	18	9.52	9	11.54	27	10.11
Concentrated, with an investment spike in one or two years at the beginning of the eight-year period	21	11.11	8	10.26	29	10.86
Unknown	3	1.59	3	3.85	6	2.25
Total	***189***	***100***	***78***	***100***	***267***	***100***

Source: investment ability, survey questionnaire 2018

More than half of the surveyed companies invested steadily during the studied eight-year period, i.e. without major investment spikes. This finding applies more or less to both large and medium-sized companies. About a quarter of all companies included in the research sample invested in a concentrated fashion, with an investment spike in one or two years at the end of the eight-year period. Investment activity was somewhat more pronounced in medium-sized companies. This can also be explained by the fact that in the first years after the crisis, those companies that were in above average debt allocated their accumulation created on the fly for debt relief and less for investing in tangible fixed assets. In this case, we can once again refer to the financial accelerator and support the facts given above with findings from the already mentioned study by Bole, Oblak, Prašnikar & Trobec (2017), who build on the realistic assumption that the size of the financial accelerator changes not only in different phases of the business cycle (boom, crisis, and revival of economic growth), but also in different types of investments (i.e. investments in the real sector), across different industries and regions, and in terms of the solvency of economic entities.

In addition to data from the survey questionnaire, we tried to obtain data from the AJPES database on the book (current) value of tangible fixed assets for each year in the studied period 2010–2017 for the companies in our sample, and on this basis determine, first, whether their book value increased or decreased in these eight years, second, what was the average growth rate of this increase or decrease, and third, with what dynamics the book value changed, i.e. either uniformly or in a concentrated manner at the beginning, end, or middle of the studied period.

Table 12 shows the number and structure of companies that increased or decreased the book (current) value of their tangible fixed assets (2017/2010). We also show the average growth of their increase or decrease, calculated as the weighted geometric mean of the chain indices by individual years for each company and also for all companies in the sample taken together.

Table 12 shows, among other things, that 150 companies (a little less than three fifths of all companies) in our research sample had a positive investment growth (16%) in the studied eight-year period, and that 105 companies (two fifths) had a negative investment growth in the same period (−8%).

Table 12. Number and structure of companies according to the movement of the book (current) value of tangible fixed assets in the studied period 2010–2017

Movement (trend)	*Count*	*%*
Increase of the book value of tangible fixed assets	*157*	*58.81*
Decrease of the book value of tangible fixed assets	107	4.07
Unchanged book value of tangible fixed assets	3	1.12
Total	***267***	***100***
Positive growth	150	56.18
Negative growth	105	39.33
Zero growth	12	4.49
Total	***267***	***100***
Average rate of increase in the book value of tangible fixed assets	16%	
Average rate of decrease in the book value of tangible fixed assets	8%	
Average investment growth rate for all companies in the survey sample	***6%***	

Source: AJPES database for the period 2010–2017

Slightly less than 5% of the companies in the research sample had zero investment growth during the studied period. In the period 2010–2017, the average annual growth rate of investment in tangible fixed assets for all companies in the research sample was 6%. This means that almost three fifths of the companies invested more rather than wrote off the value of their tangible fixed assets during this period. Of course, the increase in the book (present) value of tangible fixed assets could also be influenced by the revaluation of these assets. We did not take this factor into account in our research, as we did not have the relevant data at our disposal, which means that the calculations may not be completely accurate. However, given the fact that the eight-year period studied was subject to a low inflation rate, and even deflation in the last years of said period, we assume that companies predominantly did not revalue their tangible fixed assets during this period and that this error is therefore negligible in the scope of the analysis.

6. Conclusions and implications

Based on a thorough review of the literature on the topic of investment activity of large and medium-sized companies in the real non-financial sector of the economy and on the basis of empirical research, which included a relatively large and very representative sample of Slovenian companies, we can fully accept the research hypotheses set out in the research methodology section of this paper. Let us look at them again and provide arguments in favor of their confirmation.

H1: Strategic investments are the only ones that ensure the organic growth of companies.

It is an undeniable fact that only strategic investments, meaning investments in long-term assets whose goal is to create new value for the owners, are the only ones that ensure the organic growth of companies. From the point of view of value-based management, business owners are interested in which strategies create value and which do not. In our study, we tested this hypothesis on a pair of two variables, namely, we set up a regression model where the independent variable was tangible fixed assets and the dependent variable was net sales revenue. For this purpose, we have chosen a longer time period of 2002-2017. The relatively high correlation coefficient R^2 (0.673) means that investments in tangible fixed assets account for more than two-thirds of the variation in net sales revenue. We also checked whether the regression model predicts the company's growth (in our case, measured by the growth of net sales revenue) as a function of investments well enough. Using a t-test, we checked the model parameter beta value and its significance. Since the observed significance is less than 0.05, the result reflects the true effect. In our case, this means that strategic investments contribute significantly ($p < .001$) to predicting an increase in net sales revenue.

H2: Companies' investment decisions and investment dynamics are related to expectations about future business (investment) opportunities and investment cycles.

Exploitation of business (investment) opportunities is one of the key variables of investment ability according to resource-based theory. Therefore, the investment decisions of companies and the dynamics of their investments are strongly related to expectations about future business (investment) opportunities and investment cycles.

Depending on its intensity and frequency, investment activity in companies takes place in two ways. First, companies invest routinely and follow the normal trend of business growth. Second, from time to time, during campaigns and in certain cycles, companies undertake larger and more demanding investments when they want to take advantage of select investment opportunities, leading to so-called uneven investments and investment spikes. If we look at our sample of Slovenian companies, we find that in the studied eight-year period 2010–2017 more than half (52,44 %) of the surveyed companies invested evenly, routinely and without major investment spikes. About a quarter (24,34 %) of all companies included in the research sample invested in a concentrated fashion, with an investment spike in one or two years at the end of the eight-year period. Undoubtedly, an important reason for such an investment pattern was the deleveraging of companies after the last great crisis.

H3: There are relatively many companies that are unable to take advantage of business (investment) opportunities

Given the results of our empirical research, in this context, we can accept the research hypothesis that there are relatively many companies that are unable to fully take advantage of business (investment) opportunities (52,06 %). Among the most frequently cited reasons for such a state of affairs, we can point out those related to financial resources, such as a lack of own financial resources 22,72 %), excessive indebtedness (14,84 %), too capital-intensive investments (8,52 %), and denied access to borrowed financial resources 8,20 %). Together, these account for more than half (54,28 %) of all stated reasons why companies did not take advantage of the offered investment opportunities.

H4: Financial patterns during investment spikes differ from patterns outside of this period.

In terms of investment dynamics, we can also confirm the research hypothesis that during investment spikes financial patterns differ from patterns outside of this period. While in most periods internal financial resources mainly cover routine investments, debt resources dominate during investment spikes. Debt resources are less important in the period immediately after investment spikes, as companies are slowly re-establishing their target leverage.

This hypothesis can be confirmed in the case of Slovenian companies if we compare two curves in Figure 2, the first one showing the movement of investments during the great financial crisis and after it until 2017, and the second one showing the movement of their financial liabilities for the same period. We have called this phenomenon the Phoenix miracle, which was first pointed out by Calvo for the case of American companies. During the great financial crisis, investments stopped and after it their modest growth can be observed. Namely, companies used their accumulation for debt reduction.

H5: External sources of financing, especially debt, are more important for financing corporate investments, especially when investment expenditures are relatively high.

This research hypothesis is related to the previous one (H4) and can also be fully confirmed, since during investment spikes the share of investments financed by debt is much higher than the share of other sources. This is especially true for large companies, where it is only a matter of capital expenditure and which companies finance to a greater extent with debt than with equity capital. This is true even for small businesses that use equity rather than debt financing.

When confirming this hypothesis in the case of Slovenian companies, we must rely on the NFD/EBITDA indicator, which shows that companies were relatively heavily indebted at the beginning of the period under study (2010), meaning that they financed their investments in the first decade of this century to a large extent with borrowed funds. We have already noted for this period

that borrowing from banks was very liberal. Companies had relatively easy access to bank funds. In 2010, 53.56% of all companies in our sample had an indicator value of more than 2. This share then decreased to 38.20% by the end of 2017. Figure 2, which shows a longer time period, clearly shows how, since 2002, as the investments of companies in our sample increased, their financial liabilities also increased, until the great financial crisis in 2008.

H6: There is a strong relationship between the type of creditworthiness of the company and the level of indebtedness of the company.

In the context of obtaining foreign (debt) sources of financing, the credit rating of the company as an investor is crucial. In an empirical study of a representative sample of Slovenian companies, we used the z-test to verify that companies with a good credit rating are significantly less indebted and, conversely, that companies with a bad credit rating are significantly more indebted. At the end of the studied eight-year period, according to their financial officers, a good half (56,55 %) of the sample Slovenian companies had a credit rating of A, and the studied ratio was less than or equal to 2. Among other things, we used the ratio between net financial debt and EBITDA that, in the case of Slovenian companies, this ratio is reflected in the ability of companies to generate cash flow to repay debts.

Despite the limitations of the research stated in the methodology section of the paper, we estimate that we have achieved our stated goals. These goals represent a relevant contribution to theory in the field of investment as well as to real-world practice, suggesting that company management should be encouraged to achieve lasting competitive advantages, so as to strengthen the company's investment ability continuously. As previously mentioned, the results of our research offer quite a few opportunities for further research in the area under consideration. In order to be able to confirm the cause-and-effect relationships in our conceptual model, it would be prudent to undertake a longitudinal study to investigate the time lag and the delayed effects of investments (the dynamic aspect of investing). Here, we should once again point out that we set our research in the period after the last major financial crisis and economic recession, in the immediate aftermath of which companies, with certain exceptions, mainly deleveraged rather than invested heavily.

It would also make sense to extend the research to small companies and perhaps include some other aspects that may be important for a company's investment activity, such as the influence of ownership structure on investment decisions.

It would be interesting to compare investment activity and its specifics by industry. Finally, it would be sensible to examine to what extent strategic investments in companies are the result of prior investment in own development and research, in own knowledge. This connects investments in physical capital with investments in human capital, providing a clue for further, more extensive research in the field of investing.

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GOING CONCERN ASSESSMENT – THE CHALLENGES FOR ACCOUNTANTS

-ABSTRACT-

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The assumption going concern in the financial statements of companies implies the intention of the entity to continue operations in the future. According to the requirements of International financial reporting standards, each business entitiy is obliged to publish information about the subject's ability to continue with unlimited operations in the notes to the financial statements. Although the management has the primary responsibility for presenting the going concern assumption, accountants, by preparing financial statements, also take the responsibility for evaluating the company's ability to continue operating. In addition, auditors have the task of assessing the going concern presumption through the financial auditing in accordance with the requirements of international standards on auditing. In the light of different international and national frameworks, there are different regulations related to the assessment and publishing of information about the going concern assumption. This paper analyises the guidelines prescribed by current international accounting and auditing standards and theoretical models that accountants can apply during the preparation of financial statements. Taking into account the lack of research related to the issue of going concern assesssment in the local context, the main goal of the subject research is: to investigate and analyze whether and which positions of financial statements, and whether and which financial indicators based on the positions of financial statements of companies in the Federation Bosnia and Herzegovina can provide insight into potential problems with time-limited business operations. The research was conducted on a sample of companies from the Federation of BiH that filed for bankruptcy or liquidation in 2022 or 2023, and a sample of companies from the Federation of BiH that did not publish financial problems in the highlighted years. The analysis of financial positions and financial indicators were carried out on the basis of financial reports for 102 companies over a five-year period (2018 – 2022). The results of the research showed that the positions: equity and net profit, as well as indicators: current ratio, quick ratio and financial leverage can serve accountants in the assessment of whether the company has potential problems for continuing operations. Posting such analysis in the notes to the financial statements, accountants can justify the preparation of financial statements on a going concern basis, in accordance with IFRS requirements.

Keywords: going concern, financial statements, financial positions, financial indicators, accountants.
JEL classification: M40

1. Introduction

The going concern concept represents a topic that has become especially relevant in the recent period, caused by the situation of the COVID-19 pandemic, when a large number of companies were faced with challenges such as business decline, bankruptcy or liquidation. However, even before the onset of the coronavirus pandemic, the going concern concept was recognized as a key postulate in accounting and represented the basis of the previous Framework for the preparation and presentation of financial statements (1999) as well as the current Conceptual Framework for Financial Reporting (2010) and International Financial Reporting Standards.

According to International Accounting Standard (IAS) 1 - Presentation of financial statements (p.26) if the entity previously achieved a profit and had unhindered access to financial resources, it can be concluded that the accounting assumption going concern is appropriate without the need for detailed analysis. However, in other situations, factors such as current and expected profitability, debt repayment plans and possible alternative sources of financing need to be carefully considered before concluding about the appropriateness of the going concern assumption. In today's challenging economic environment, an entity's operations can be affected by a wide range of factors compared to the past, and IAS 1 requires entity to consider all available information about the future.

Accountants indirectly assume the responsibility for the preparation and presentation of financial statements, which, in accordance with the going concern principle, also includes an assessment of the company's ability to continue operating. There are different approaches and methods for evaluating a going concern. Certain experts investigate the use and importance of financial indicators in this context, others emphasize the importance of cash flow, while a smaller number has recently been engaged in research that includes qualitative factors in the assessment.

Taking into account the above, as well as the lack of research regarding the issue of going concern, especially in local conditions, and the fact that companies are increasingly encountering unexpected financial challenges, there is a need to develop tools that can predict possible problems in the future of the company's operations. Accordingly, the primary goals to be achieved through this research work are:

- Investigate and analyse whether financial statement positions can provide insight into potential problems with going concern and
- Investigate and analyse whether financial indicators based on financial statement positions can provide insight into potential going concern problems.

The stated goals should ensure that the research results, not only contribute to the academic narrative, but also improve practical application in accounting practice, providing relevant guidelines for the assessment of going concern of economic entities.

2. Literature review

The going concern concept is considered as basic postulate in accounting because it represents a fundamental assumption about the nature and continuity of business operations of companies. The postulates are not specific to any particular accounting standard or practice. They are universally applicable principles that support the entire field of accounting and apply to all entities for the preparation of financial statements, whether they are large corporations, small businesses or non-profit organizations (Moontiz, 2021). While the going concern concept is a postulate that assumes business continuity, it also requires management to assess and disclose any uncertainties or events that may cast doubt on the entity's ability to continue with the going concern assumption. This dual aspect of the going concern concept ensures that potential risks are transparently communicated to users of financial statements.

Although the generally accepted international accounting standards recognize the going concern as a fundamental assumption for the preparation of financial statements, a large part of the accounting regulation has not yet given sufficient and clear guidelines, and there are great doubts during application of this concept (Sever Mališ & Keglević Kozjak, 2016). In addition to the previously mentioned IAS 1, at the beginning of 2021 the International Accounting Standards Board (IASB) published a document about the going concern concept with a focus on disclosure called "Going concern – a focus on disclosure" (IASB, 2021). The document was published during the period when the Corona virus pandemic and the restrictions caused by it were at their peak. Namely, in the period 2020 -2021. a large number of companies encountered problems in business, and many were even forced to initiate bankruptcy or liquidation proceedings and to suspend their operations. Deficiencies occurred during the going concern assessment and consequences of insufficient attention to the mentioned concept were observed and IASB tried to solve them by special document focused on the basic accounting postulate.

Considering all the above, additional question arises: who is responsible for the evaluation the going concern of company. According to research by Hospodka (2018), that responsibility should primarily be attributed to the management of the company because it has the best understanding of the financial situation of the company and if there is any doubt about its ability to continue in the future, the information should be disclosed in the notes accompanying the financial statements. However, the problem arises because the management usually refuses and avoids announcing any doubts about the going concern of the company. Some literature claims that this could be partially solved by introducing an obligation for management to publish a confirmation about going concern (Venutti, 2004).

Additionally, according to Hospodka (2018), in the case of doubt that the going concern of entity was not disclosed in the notes to the financial statements (if it existed), it can be concluded that accounting does not fulfil its primary role: management control. Therefore, the following responsible parties for the going concern assessment process are accountants. In the previous literature, there is little information about the responsibility of accountants in the process of going concern. However, accountants as parties responsible for the preparation and presentation of financial statements can be considered practically responsible for the assessment of the company's ability to continue operating in accordance with the going concern principle and its publication within the notes - part of the financial statements set.

Various approaches and methods are used to estimate the going concern. Some authors base the going concern assessment on the analysis of the positions of the financial statements, while others use financial indicators that can provide insight into the company's financial condition. In their research, Gromis di Trana and Alfiero (2019) presented the use and importance of financial indicators when assessing a going concern. Since liquidity difficulties cause financial problems and threaten the going concern, liquidity ratios are the central research variable in numerous studies of going concern assessment (Zmijewski 1984; Martens, Bruyneseels, Baesens, Willekens & Vanthienen, 2008; Korol, 2013; Cultrera & Bredart, 2016; Rezende, Montezano, Oliveira & Lameira, 2017; Svabova, Durica & Podhorska, 2018; Bogdan, Šikić & Bareša, 2021). Considering that inventories often represent a significant part of current assets, but they are characterized by difficult liquidity, the quick ratio is used as a more reliable measure of liquidity. Additionally, studies show that companies with poor solvency, i.e., those with weak liquidity ratios and high levels of indebtedness, fall into the high-risk category (Rasplock, 2001; Weiss 2002). Financial statements positions that showed significant predictability, as independent items and also through the financial indicators, are capital and net profit (or financial result, in general). These are the key positions of the balance sheet and income statement, which, thanks to the method of recognition and valuation, synthesize the effect of all financial positions and business events on the company's operations.

3. Research methodology

In accordance with the presented research problem, as well as the review of previous literature the following research hypotheses were set and tested in the research part of the paper:

- H_1: Financial statement positions can serve as a valuable tool for accountants in assessing going concern.
- H_2: Financial indicators based on financial statement positions can serve as a valuable tool for accountants in assessing going concern.

3.1. Relevant sample information

The backbone of the research is the comparative method applied to two samples. One sample consisted of companies with expressed business problems. The criterion for concluding that the company has business problems was considered to be reported bankruptcy or liquidation procedure. The sample included 51 companies that operate in the territory of FBiH, have initiated bankruptcy proceedings in 2022 or 2023, and have available financial reports on Bisnode for the period 2018 - 2022. The second sample consisted of 51 companies that did not record problems in business during the observed period, rated with grade A, which Bisnode assigns as the best grade for companies that record exceptionally good operations based on data from the companies' financial reports.

3.2. Research variables

According to earlier research findings, net profit and capital were used as the most relevant positions of financial statements for the assessment of going concern, and as the most relevant financial indicators used are: current ratio, quick ratio and financial leverage. The method of calculating the research variables was shown in table 1.

Table 1. ***The method of calculation of research variables***

Variable	Calculation
Financial result	income statement item: net profit or loss for the period
Capital	balance sheet item: total assets - total liabilities
Current ratio	current assets / current liabilities
Quick ratio	(current assets – inventories) / current liabilities
Financial leverage	total debt / equity

Source: Anggana (2013), Sever Mališ & Keglević Kozjak (2016), Klikovac, Varović & Volarević (2019).

Reference points were defined for selected research variables and presented in Table 2.

Table 2. ***The reference points of research variables***

Variable	Reference point	Description
Financial result	>0	Satisfying
Capital	>0	Satisfying
Current ratio	>1	Satisfying
Quick ratio	>1	Satisfying
Financial leverage	<2	Satisfying

Source: Author's selection

The reference point >0 was shown as a satisfactory amount of capital, which means that the amount of capital is satisfactory if it is positive, and if it is negative, it is an indicator for potential concern. The same is valid for the financial result, where >0 was also used as a reference point, which means that a negative financial result indicates that the subject is facing potential problems in business.

Current and quick ratio belong to the financial indicators of liquidity. A reference point for both indicators was >1. If the current ratio is greater than 1, it means that the company has a larger amount of current assets compared to current liabilities and is able to settle its current liabilities in the short term. If the quick ratio is greater than 1, it means that the company has a larger amount of cash, cash equivalents and current receivables and investments in relation to current liabilities and is able to settle its current liabilities in the short term without using inventories. Current and quick ratios less than 1 indicate liquidity problems.

Financial leverage is an indicator from the group of solvency indicators. For financial leverage, it is quite challenging to choose an appropriate reference point, because it often depends on the industry and it varies with individual company strategy. However, the literature most often shows two basic reference points for this indicator: financial leverage less than 1, which represents a more conservative capital structure with less reliance on debt financing and financial leverage greater than 2, which represents a somewhat more 'aggressive' capital structure with a much greater degree of reliance on debt financing.

3.3. Research results

The research results were presented for each variable individually. The goal is to show the number of companies that recorded the corresponding indicator above and below the selected reference point and its average increase or decrease for the period 2019 – 2022. The increase was shown for the mentioned period due to the fact that financial data for 2017 were not available, which were needed to calculate the change of value in 2018. All of the above were calculated for both selected samples. The first sample, which consists of companies with potential business problems, is referred to below as *Sample 1*. The second sample which consists of companies with an outstanding creditworthiness is referred as *Sample 2* in the following text. In order to test the statistical significance of the observed parameters, the non-parametric Mann-Whitney U test was used.

3.3.1. Financial result

The tables below show the structure of companies according to the nature of the achieved result as well as the average percentage change in the financial result over the observed period.

Table 3. ***Financial result – the sample structure according to the reference value***

Financial result	**2018**		**2019**		**2020**		**2021**		**2022**	
Sample 1										
<0	13	25%	17	33%	22	43%	23	45%	37	73%
>0	38	75%	34	67%	29	57%	28	55%	14	27%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***
Sample 2										
<0	0	0%	0	0%	0	0%	0	0%	0	0%
>0	51	100%	51	100%	51	100%	51	100%	51	100%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***

Source: Author's calculation

According to the results shown in the tables above, it can be concluded that no company in Sample 2 reported negative financial result in a period of 5 years. On the other hand, Sample 1 shows an increase in the number of companies that recorded a negative financial result in the period from 2018 to 2022. For example, in 2022, i.e. in the year of initiation of the bankruptcy/liquidation procedure or in the year before the initiation of the bankruptcy/liquidation procedure, 37 companies recorded a negative financial result, which represents 73% of the companies from the selected sample. According to the results shown in Table 3, it can be concluded that there was a noticeable increase in the number of companies from the Sample 1 with recorded a negative financial result as the date of initiation of the bankruptcy/liquidation procedure approached. Considering that, in order to get an even clearer picture, the table below show the percentage increase/decrease in the financial result for both samples for the period 2019 – 2022. During the analysis, a large number of companies with extreme percentage changes (deviations, outliers) were observed, and in order to avoid a distorted picture of the average increase/decrease, instead of calculating the standard average, the median was used as a statistical measure. Firstly, the percentage change was calculated for each company individually in the observed year compared to the previous one. After that, the statistical measure of the median was applied to the obtained results of percentage changes of individual companies to calculate the average percentage change for all companies within the sample.

Table 4. ***Financial result - Average percentage change***

Financial result	**2019**	**2020**	**2021**	**2022**
Average Percent Change - Sample 1	-9%	-77%	-34%	-51%
Average Percent Change - Sample 2	9%	2%	45%	29%

Source: Author's calculation

Based on the results shown in Table 4, it can be concluded that on average, companies from Sample 1 record a decline in financial results for the period 2019 – 2022 while the companies from Sample 2 on average record an increase in results from year to year, although this increase varies during the period. So, for example, it is noticeable that the particularly problematic year for companies from both samples was 2020, when companies from Sample 1 on average recorded the biggest drop in financial results (77%), and companies from Sample 2 in the same year recorded the smallest increase in financial results (2%) in the observed period. It is important to take into account that this is the year of the beginning of the Corona virus pandemic, when the economy had experienced a large decline at the global level. In the next year, the companies from both samples have managed to recover in some way. Companies from Sample 1 managed to mitigate the decline in financial results in 2021 compared to 2020 from 77% to 34%, while companies from Sample 2 for the same period managed to increase their financial result by 45% on average. Such example can serve as a good lesson that there are a large number of unpredictable factors that can affect a company's operations.

According to the results obtained based on the analysis of the financial results for 102 companies for the period 2018 – 2022, it can be concluded that the financial result can provide significant insight into the financial health of the company. By monitoring the changes in the financial result for a certain period, a significant assessment can be made about the temporal continuity of the business. Companies from Sample 2, which are considered financially healthy companies, do not record a negative result for the observed period, and already based on that, it can potentially be concluded that the company should not have problems with the continuation of business. On the other hand, Sample 1 has recorded a constant decline in the financial result for the observed period, and the increase in the number of companies recording a negative result. This

shows that continuous monitoring of the financial result is extremely important. The company may not currently record a negative result, however, if a decline in results was recorded through financial analysis, this should raise suspicion among users of financial statements.

3.3.2. Capital

The structure of the companies in the samples according to the character of capital, and the average percentage change in capital during the analysed period were shown in the following tables.

Table 5. ***Capital – the sample structure according to the reference value***

Capital	**2018**		**2019**		**2020**		**2021**		**2022**	
Sample 1										
<0	9	18%	9	18%	11	22%	15	29%	22	43%
>0	42	82%	42	82%	40	78%	36	71%	29	57%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***
Sample 2										
<0	0	0%	0	0%	0	0%	0	0%	0	0%
>0	51	100%	51	100%	51	100%	51	100%	51	100%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***

Source: Author's calculation

The results in table 5 have a lot of similarities with the results in the table related to the financial result. No company from Sample 2 records negative capital in the period 2018 – 2022, while the situation with companies from Sample 1 is quite different. In 2018 already, 9 companies recorded negative equity, and that number will increase after 2020, so in 2022, 22 companies from Sample 1 with negative capital were recorded, which represents 43% of the total sample. Furthermore, table 6 shows the average percentage change in capital for companies from both samples for the period 2019 – 2022. After additional analysis of the structure of samples, and the fact that capital is a financial statement position that in a large number of cases remains the same from period to period, to calculate the average, the arithmetic mean was used as the standard mean value.

Table 6. ***Capital - Average percentage change***

Capital	**2019**	**2020**	**2021**	**2022**
Average Percent Change - Sample 1	-86%	-12%	49%	-142%
Average Percent Change - Sample 2	13%	16%	28%	30%

Source: Author's calculation

According to the data from Table 6, it can be concluded that companies from Sample 1 in the period 2019 – 2022 recorded capital growth only in 2021. After additional analysis of the Sample, it was found that companies had significant increase in their capital in 2021, and for this reason the average has increased significantly. Regarding that recapitalization was done in 2021, the assumption is that investors or owners tried to mitigate the decline in business caused by the coronavirus pandemic. Except for the characteristic year 2021, for all other periods from 2019 to 2022, companies from Sample 1 record a decline in total capital. On the other hand, the companies from Sample 2 record an increase in all years during the period 2019 – 2022.

Taking into account the results of the research of financial results and capital for the period 2018 - 2022 for 102 companies, which were presented above, the first hypothesis of the paper can be accepted, i.e. financial statement positions can serve as a valuable tool for accountants in assessing going concern. Analysing and monitoring data in the years before the initiation of bankruptcy or liquidation proceedings for 51 companies, and which can be identified with the cessation of business, can lead to the conclusion that the initiation of bankruptcy or liquidation proceedings was even certain and expected, because the mentioned companies recorded a negative financial result and capital from period to period, or a decrease in financial result and capital over a period of 5 years.

3.3.3. Current ratio

The following tables show the results related to the current ratio for 102 companies. The reference point for the current ratio is 1, and the Table 7 shows the structure for both samples according to the reference value for the analysed period.

Table 7. ***Current ratio – the sample structure according to the reference value***

Current ratio	**2018**		**2019**		**2020**		**2021**		**2022**	
Sample 1										
<1	16	31%	18	35%	21	41%	21	41%	24	47%
>1	35	69%	33	65%	30	59%	30	59%	27	53%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***
Sample 2										
<1	0	0%	0	0%	0	0%	0	0%	0	0%
>1	51	100%	51	100%	51	100%	51	100%	51	100%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***

Source: Author's calculation

According to the current ratio, all companies in Sample 2 should be able to meet their current liabilities by using current assets. The situation was constant for a period of 5 years. The results from Sample 1 show an increase in the number of companies with a current ratio less than 1. This would mean that an increasing number of companies from Sample 1, as the date of initiation of bankruptcy or liquidation proceedings approaches, are facing liquidity problems. Looking at Table 7, it can be concluded that more than 50% of companies, even in the year of initiation of the bankruptcy/liquidation procedure or in the year before its initiation, did not record problems with liquidity. Therefore, in order to gain a better insight into the liquidity indicator, the table below shows a comparison of the average current ratio for both samples over a 5-year period by using the median as statistical measure.

Table 8. ***Current ratio – Average value and percentage change***

Current ratio	**2018**	**2019**	**2020**	**2021**	**2022**
Sample 1					
Average value	1,34	1,39	1,24	1,21	1,20
Average percentage change	N/D	4%	-11%	-2%	-1%
Sample 2					
Average value	5,23	4,64	6,91	7,88	8,36
Average percentage change	N/D	-11%	49%	14%	6%

Source: Author's calculation

Given that the current ratio is an indicator for which the acceptable and satisfactory reference value can be accurately determined, it is possible to display them for both samples. On the other hand, the financial result and capital are positions from the financial statements for which there were not acceptable or non-acceptable value determination, because these positions largely depend on the size of the company, industry, etc., and so that their average values were not presented in the previous tables. Table 8 shows the average values of the current ratio for a period of 5 years and its average percentage changes for a period of 4 years for companies from both samples. The average percentage change for 2018 was not shown due to the unavailability of data for the period of 2017. From Table 7 it is noticeable that slightly more than 50% of companies from Sample 1 had a current ratio above 1, and Table 8 shows that the current ratio for these companies were between 1.2 and 1.3. Also, a decrease in the current ratio from 2019 to 2022 was visible for companies from Sample 1. On other side the current ratios for companies from Sample 2 were between 5 and 8 from 2018 to 2022. Also, a drop in the current ratio for companies from Sample 2 was noticeable in 2019 while an increases in the current ratio were recorded in the following years. According to the data from Tables 7 and 8, it could be concluded that the companies from both samples were relatively liquid, and they were able to settle their current liabilities by using their current assets. Therefore, for the purpose of determining liquidity, a somewhat stricter indicator is often used, quick ratio.

3.3.4. Quick ratio

By analysing the current ratio, it could be concluded that the companies from both samples were liquid during the analysed period. The tables below show results of quick ratio analysis. Quick ratio is an indicator that excludes inventories from calculation. Quick ratio is often considered as a more relevant liquidity indicator, precisely for the aforementioned reason. Inventories in certain industries and in certain companies sometimes are not so liquid, i.e. they cannot be sold in a short period. With the exclusion of inventories, the quick ratio provides a more conservative estimation of a company's ability to meet its short-term liabilities. In times of financial stress or economic crisis, a company may have difficulties with quickly converting its inventories into cash. The quick ratio therefore gives a more accurate picture of a company's immediate liquidity. The quick ratio is particularly useful for assessing a company's ability to meet its most immediate financial obligations, such as paying off short-term debts or covering operating costs. This can be especially important in industries with seasonal fluctuations or where sudden financial challenges may arise. The results of the quick ratio analysis are shown below.

Table 9. ***Quick ratio – the sample structure according to the reference value***

Quick ratio	**2018**		**2019**		**2020**		**2021**		**2022**	
Sample 1										
<1	24	47%	26	51%	28	55%	26	51%	26	51%
>1	27	53%	25	49%	23	45%	25	49%	25	49%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***
Sample 2										
<1	5	10%	3	6%	1	2%	0	0%	1	2%
>1	46	90%	48	94%	50	98%	51	100%	50	98%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***

Source: Author's calculation

Table 9 shows the number of companies from Sample 1 that had a quick ratio less than 1 for a period of 5 years - more than 50% such companies, which would mean that more than 50% of companies from Sample 1 in the period before the initiation of bankruptcy or liquidation proceedings showed problems with liquidity. On the other hand, if a comparison was made with the companies from Sample 2, it is evident that these companies generally did not have problems with liquidity. In 2022, only one company from Sample 2 had potential problem with meeting current liabilities by using current assets excluding inventories. Also, according to the data shown in the table above, a more conservative approach in the calculation of quick ratio can be additionally confirmed by its comparation with the current ratio. If Table 9 was compared with the results shown in Table 7, it can be concluded that according to the current ratio, no company from Sample 2 had problems with liquidity, while Table 9 - which represents a quick ratio - shows that a certain number of companies from Sample 2 potentially had liquidity problems. In any case, that number is rather insignificant considering the number of companies in Sample 1 that were reporting problems with the settlement of current liabilities by using current assets excluding inventories. Also, the table below shows the average value of the quick ratio and the average percentage change for companies from both samples for a period of 5 years.

Table 10. ***Quick Ratio – Average value and percentage change***

Quick ratio	**2018**	**2019**	**2020**	**2021**	**2022**
Sample 1					
Average value	1,01	0,97	0,75	0,85	0,90
Average percentage change	N/D	-4%	-23%	13%	6%
Sample 2					
Average value	3,12	3,52	3,26	4,71	5,96
Average percentage change	N/D	13%	-7%	44%	27%

Source: Author's calculation

According to the data in Table 10, the companies from Sample 1 had a quick ratio greater than 1 only in 2018. This suggests that, on average, companies from Sample 1 experienced liquidity issues according to the quick ratio four years before the initiation of bankruptcy or liquidation proceedings. Although there is a visible increase in the quick ratio from 2020 to 2022 for companies from Sample 1, that increase is still not enough for the average quick ratio to be satisfactory according to reference measures. Further analysis of the data shows that companies from Sample 2 compared to Sample 1 have a significantly higher quick ratio. Also, increase in the quick ratio for companies from Sample 2 was noticeable through the whole analysed period, except for 2020 which was the year of the Corona virus pandemic, when business to a large extent recorded a decline at the global level. However, already in the following year, there was a noticeable recovery, so the ratio grows by 44% in 2021 compared to 2020.

3.3.5. Financial leverage

Financial leverage can largely serve as an assessment of a company's financial risk. Namely, high financial leverage often makes a company more vulnerable during major economic downturns or changes in interest rates. Accordingly, the following tables show data on financial leverage for Sample 1 and Sample 2 for a period of 5 years. The sample structure according to reference point value 2 were shown in Table 11. According to the previous discussion, financial leverage below 1 is considered satisfactory, while a ratio above 2 is concerning. In this regard, 2 was taken as a

reference point, which means that for all company's coefficient financial leverage below 2 is considered as satisfactory.

Table 11. ***Financial leverage – the sample structure according to the reference value***

Financial leverage	**2018**		**2019**		**2020**		**2021**		**2022**	
Sample 1										
<2	36	71%	32	63%	32	63%	38	75%	39	86%
>2	15	29%	19	37%	19	37%	13	25%	12	14%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***
Sample 2										
<2	49	96%	49	96%	50	98%	51	100%	51	100%
>2	2	4%	2	4%	1	2%	0	0%	0	0%
Total	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***	***51***	***100%***

Source: Author's calculation

According to the data from Table 11, it can be concluded that most of the companies from Sample 1 recorded a satisfactory value of financial leverage during all 5 years. The number of companies with financial leverage above 2 even decreases from period to period. However, by looking into the results for Sample 2, it is noticeable that only 2 companies recorded financial leverage greater than 2 in 2018 and 2019, while in 2021 and 2022 no company from Sample 2 had a recorded financial leverage greater than 2. Therefore, it could be concluded that even satisfactory financial leverage can lead to bankruptcy or liquidation, so an excessive value of financial leverage should automatically alarm the users of financial statements as a sign that the company is experiencing potential problems. The following table shows average values and percentage changes of financial leverage for both samples.

Table 12. *Financial leverage - Average value and percentage change*

Financial leverage	**2018**	**2019**	**2020**	**2021**	**2022**
Sample 1					
Average value	15,52	12,90	13,83	5,33	3,57
Average percentage change	N/D	-17%	7%	-61%	-33%
Sample 2					
Average value	0,45	0,46	0,34	0,25	0,20
Average percentage change	N/D	1%	-27%	-26%	-20%

Source: Author's calculation

According to the first comparison of the average values of financial leverage, it can be concluded that the companies from Sample 1 generally had a significantly higher financial leverage on average compared to the companies from Sample 2. Also, it is important to note and emphasize that this value for Sample 1 decreased during the analysed period, however, that reduction is still not enough for the indicator to be within a satisfactory reference point. On the other hand, companies from Sample 2 on average have a financial leverage less than 1 for all 5 years. Companies from Sample 2 also recorded a decrease in financial leverage from period to period, which is a good sign.

3.3.6. Synthesis of research results

After presenting the analysis of financial indicators for five years period for 102 companies divided into 2 different samples, it can be concluded that monitoring financial indicators over a certain period gives significant value for understanding the financial health of the company. Through this research, only some of the basic indicators were shown (current ratio, quick ratio and financial leverage), however there is a large number of liquidity and solvency indicators. It was possible to conclude from the above 3 indicators that they can provide significant insight into the financial stability of a company, and certainly with a more comprehensive and extensive analysis that includes a greater number of indicators, even wider insight and understanding of the business of a certain company could be obtained. Research results show that sometimes even companies with satisfactory financial indicators can face problems in business, but it is certain that when a company shows problems with liquidity or solvency it should be a warning sign for investors, owners, management and other users of financial statements, as well as accountants who prepare financial statements. Ultimately, the accountant prepares the financial statements in accordance with the principle of going concern or not, depending on assessment performed.

In order to examine the existence of statistically significant difference in the median values of the observed indicators between companies in sample 1 and 2, the non-parametric Mann-Whitney U test was used. The test results are presented in the Table 13.

Table 13. ***Mann-Whitney U test results based on comparison of observed samples***

Year	**Current ratio**	**Quick ratio**	**Financial leverage**
2018	0.000***	0.000***	0.001***
2019	0.000***	0.000***	0.003***
2020	0.000***	0.000***	0.022**
2021	0.000***	0.000***	0.587
2022	0.000***	0.000***	0.000***
Note: * $p \leq 0.10$; ** $p \leq 0.05$; ***$p \leq 0.001$			

Source: Author's calculation

It is observed that the current, as well as the quick ratio were statistically significantly higher in companies with an outstanding creditworthiness rating (Sample 2), compared to companies with potential business problems (Sample 1) during all observed years. Furthermore, the use of financial leverage is statistically significantly higher in companies with potential problems in business (Sample 1) during all years except 2021. This confirms the second hypothesis of the paper, i.e. financial indicators based on financial statement positions can serve as a valuable tool for accountants in assessing going concern.

4. Conclusion

Although the going concern assumption is considered as fundamental in the accounting standards for the preparation of financial statements, the current accounting regulation still leaves a lot of space for a more precise definition of its application. It often happens that companies submit their year-end financial reports without any evaluation of going concern.

In accordance with the above, one of the goals of this paper was to present examples and ideas regarding the going concern assessment, and which accountants could very easily apply in their regular routine, especially at the end of the reporting year for the preparation and presentation of annual financial reports. The research was conducted by using a comparative method based on historical data of companies that initiated bankruptcy or liquidation proceedings. The goal is to come to a conclusion whether such an outcome could have been predicted by regular analysis of the

financial statements of companies in the period before initiation of bankruptcy or liquidation proceedings. The basic positions of the financial reports and the basic financial indicators for 102 companies operating in the territory of FBiH for a period of 5 years were analysed. The research results point to the conclusion that by analysing capital and net profit as positions of financial statements, and by analysing the current ratio, quick ratio and financial leverage as financial indicators, accountants can very quickly and effectively determine whether the company has potential problems for continuing operations. By attaching such analysis when submitting financial statements, accountants can very simply justify the preparation of financial statements on a going concern basis, or on some other basis, all in accordance with International financial reporting standards.

Although this study provides significant insight into the understanding of the concept of going concern in the accounting world, it is important to emphasize that there are certain limitations within this research. The lack of extensive prior research in this specific area limits the scope of available literature for comparison. However, this limitation also emphasizes the exploratory nature of the paper, contributing to the emerging body of knowledge in this area. Future research efforts could benefit from expanding the literature base to further improve general understanding of the accounting assessment of going concern.

An additional limitation is the research based on a sample of 102 companies operating in the territory of FBiH, limited to the time period 2018 – 2022. This means that it is possible that the time frame and area in which the research was conducted influenced the results. A limitation of the research may be the focus on financial reports and financial indicators. Although financial statements are considered the most reliable representation of a company's operations, they alone cannot fully capture all the complexities of the business. In today's business environment, where there are many external factors that can have an impact on the company in an unpredictable way, accountants should extend the analysis to non-financial indicators that may indicate potential problems in the company, such as attributes of corporate governance and analysis of the environment in which the business entity operates.

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CAN EMOTIONAL INTELLIGENCE OF LEADERS REDUCE EMPLOYEES' RESISTANCE TO ORGANIZATIONAL CHANGES?

— ABSTRACT –

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People are not inclined to change by nature, and since changes on each level in organizations are constant and always bring something different and quite unknown, people are most often afraid of them. One of the biggest challenges of modern management, both today and in the future, is represented by numerous negative emotions observed in a large number of employees as one of the most significant sources of resistance in the process of managing organizational changes. The aim of this paper is to prove that the existence of empathic values as a component of emotional intelligence in managers of organizational changes leads to the remission of negative emotions and the reduction of employees' resistance to organizational changes. Two hypotheses were put forward in the research: managers of organizational changes have developed empathic values and processes of compassionately guiding employees through changes (1), empathic values and processes of the same lead to a reduction of resistance to organizational changes among employees (2). Primary data for this research was collected through two online surveys (two survey questionnaires). The first survey questionnaire was intended for managers (n=36), and the second one for employees (n=120). The respondents were from 36 medium and small companies from different industries from the area of three counties in northwestern Croatia (Koprivničko- križevačka, Varaždinska, Zagrebačka). The companies were selected randomly. The method of linear discriminant analysis (LDA) was applied. This analysis is closely related to one-way multivariate analysis of variance (ANOVA) and regression analysis. It seeks to evaluate the linear combination of variables that best discriminates the belonging of individual elements to a certain group. Based on this, the discrimination analysis is reduced to determining the differences between the two groups with regard to the mean values of their variables. The results of the research indicate the achieved level and meaningful forms of implementation of emotional intelligence in employees' resistance to organizational changes. The existence of empathic values and empathic tendencies in the majority of managers was established, which gives visible results in reducing the intensity of negative emotions of employees towards organizational changes. Leaders of changes, however, do not yet have such developed empathic values and tendencies that lead to more intense generation of positive and rejection of negative emotions and resistance among employees. The results of the research should be useful knowledge in the implementation of a compassionate empathic style of management of employees that leads to the involvement of employees and support for organizational changes.

Keywords: changes, emotions, guidance, employees, resistance

JEL classification: A13, D22, M14, M53

GOAL SETTING IN THE EARLY STAGES OF ENTREPRENEURSHIP

─ ABSTRACT ─

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Entrepreneurship is an interdisciplinary phenomenon with high dynamism and innovation, which requires taking into account different concepts, applied samples and heterogeneous attributes from dependent socio-economic fields. However, the issues affecting entrepreneurial goal setting in the initial stage of the activity are still underrepresented in the scientific literature and the practical field. The studies are fragmentary and do not offer a general construct with a focus on entrepreneurial goal setting. In the current article, based on the integration approach, a conceptual framework of entrepreneurial goal setting is derived, which is a set of stages and actions corresponding to the initial entrepreneurial process. For this purpose, a systematic review of relevant areas and consolidated practical experience is carried out. Through a set of activities that can be followed by entrepreneurs, we present a model for approbation in a business environment. The research methodology is a synthesis of empirical observations and desktop research. We collected two categories of data - theoretical and practical-applied. The main source of the practical data is gathered by an international project, funded via Erasmus+ program of EU. In parallel with the work on the project activities, the lack of a theoretical basis regarding the first stages of the entrepreneurial process and, more specifically, goal setting, was established. This prompted part of the project team to search and develop this idea. The result is presented in the present paper as we believe that such a model with adjacent activities will support start-up entrepreneurs. At the same time, we bring forth a new field for discussion in scientific circles. Attempting a supportive model will put a focus on entrepreneurship and innovation when they are still an intention, among scientists and practitioners.

Keywords: goal setting, starting phase, model,

JEL classification: L26

1. Introduction

One of the most studied by economists, management specialists, psychologists, sociologists, anthropologists and other representatives of the scientific fields is that of entrepreneurship. With a considerable degree of conviction, we can claim that there are hardly two identical definitions of what entrepreneurship is, but this is not the reason why it accumulates significant interest even now. The reasons for the unabated interest in it is into the fact that it continues to be one of the most important factors in the construction and subsequent development of a market economy and is the charge that drives the economic growth of an individual company or country forward and expands

the boundaries of the known and the traditional, opening up new horizons for business. And since the importance of entrepreneurship is the key to the rise of the economy as a whole, its theoretical knowledge is a challenge for both researchers and those involved in its implementation.

The entrepreneurial process in the initial stage accumulates energy with a diffuse, sometimes chaotic, sequence of application. The individual or the team with entrepreneurial intentions accelerates interactions with varying degrees of pressure. Pressure is divided into internal (determines action or inaction) and external (consequence). The influence of pressure realizes actions, i.e. energy is expended. The transformation of such a sequence is detected when a process is started.

Entrepreneurship is not filled with static variables and a fixed series of activities. It represents dynamically developing models with a certain autonomy and distinct uniqueness. The process of creating an organization and working in it transforms the collected energy. The leading point of contact between individual entrepreneurial agents in the initial stage of entrepreneurial initiative can be found in the view of Pettigrew: “a sequence of individual or collective events, actions and activities unfolding over time in context” (Pettigrew, 1997, pp. 338).

The activities, actions and tasks are a consequence of a decision taken to start an economic activity for one's own benefit. The absence of such an individual and conscious act, accompanied by action, means - no entrepreneurial activity is available. The step from idea to activation starts the entrepreneurial process.

The process of changing the internal setting from thought to action is characterized by the concretization of the idea - what product or service will be created and commercialized. Phases in an initial entrepreneurial stage (according to theory and practice) follow a relatively constant chronology. Performance differs because it conveys the individual/collective identity of the entrepreneurial holder. It is notable that goal setting remains an understudied area in early-stage business.

In this study the authors are outlining the following thesis: goal setting is present in the entrepreneurial entity in every cycle of its development in a full or partial form, which depends on the management policy and technology implemented by the entrepreneur or the managers appointed for the purpose. The initial goal setting remains understudied by scientists and somehow out of research focus of entrepreneurial subjects. The entrepreneurs themselves, due to the scarcity of expertise and competences, to some extents do not apply the full scale and do not use all the potential opportunities coming from entrepreneurial goal setting. The lack of goal setting at the beginning of business activity is transformed into a prerequisite for three critical developments. The affirmative reasons for this omission are united in: 1) Distraction and deconcentrating of entrepreneurial efforts - there is no focus and detailed reasoning in the future activity. The entrepreneur has not specified what he will do, what product or service he will offer and for whom. Uncertainty causes delays, mistakes and wrong choices. 2) Planning and goal setting are interrelated and directly dependent. Therefore, the entrepreneur will not have a plan of action, an objective forecast for his business. The effect is expressed in several directions that are equally harmful to future entrepreneurs - preparation of a wrong/defective plan; incorrect distribution of material, time and human resources, followed by a shortage or excess; the cash resource will not be divided evenly over time, which leads to difficulties in payments and limitations in the company's capital buffer. 3) The formulation of strategic goals and the desired future positions is omitted - viewed in this way, it is not creating a strategy for development and sustainability. Short-termism does not guarantee success and survival. Many failed businesses are the result of not creating or incorrectly specifying a vision for the future and a toolkit for achieving it.

Following the outlined thesis the authors assume that goal setting in the initial stage of the entrepreneurial process represents an independent and complete cycle of consecutive and mutually complementary activities that can support the economic growth and sustainability of a start-up. This understanding could be divided further into 5 hypotheses visualized in Table 1.

Table 1. HYPOTHESES OF THE STUDY

Hypothesis	Description	Source of test	Verification
H1	Goal setting in entrepreneurship has the main characteristics of goal setting in management	- - Successful entrepreneurs	Via: - Interview - Survey
H2	Goal setting in the initial and advanced phases of entrepreneurial process has its own characteristics and distinctive features	- - Established companies	Via: - Interview - Survey
H3	Entrepreneurial goal setting can be understood as a fundamental factor for success - it gives concrete parameters and goals to be followed	- - Entrepreneurs	Via: - Interview - Survey - Observation
H4	Entrepreneurial goal setting answers important questions facing the individual with entrepreneurial intentions	- - Entrepreneurial entities – established and start-ups	Via: - Interview - Survey - Observation
H5	Entrepreneurial goal setting when setting goals brings and conveys the potential of the entrepreneur, which makes it a unique and strictly individual process	- - Successful examples from established entrepreneurial entities	Via: - Experience shared - Interview - Database with good practices

Sources for proving theses and hypotheses are entrepreneurs who have gained experience after implementing an entrepreneurial project. Access to information can be provided in direct form or through an indirect source.

2. METHODOLOGY

The research methodology is qualitative. It deals with explaining and systematizing the thought process of creating a goal by an entrepreneur - goal setting. A synthesis of 15 scientific papers is used (see: Sources for documentary study at Reference section), ranged from 1990 to 2022. The study is categorized as a documentary study, with a main tool – content analysis. Conclusions and generalizations are made on data taken from the listed scientific sources and on project experience.

The methodology is motivated by the idea of a new conceptual model to be proven at a later stage. The need for additional research into the domains in our model reduced the toolkit to a qualitative one. The goal of the development is realized through a methodology that sets the framework for a theoretical option, but also deduces the need for future quantitative measurement of the claims in a real environment.

The tools were chosen taking into account the lack of a unified view on the research question. We applied a 32-year time horizon for selecting scientific papers on which to build our hypotheses. The separate works are in two directions - goal setting and management; entrepreneurial research affecting goal setting. The study went through three phases: 1. Research and selection of works; 2. Synthesis of the achievements in the selected works - search for common points with our study; 3. Formulation of a theoretical author's model.

The sample of scientific papers was made on: selection of a small number of objects (scientific papers); study of the relevance of the content to our problem; stratification of the works; clustering of similar works in one group; synthesis and analysis. The analytical activity went through - goal setting and entrepreneurship general statements; profiling with an emphasis on goal setting in entrepreneurship; analysis of common points and mutually arguing positions; developing authors' thesis and hypotheses.

3. LITERATURE REVIEW

Entrepreneurship is broadly connected to the understanding that it is the engine of economic growth which creates new and productive ventures as traditional factors and creativity are essential prerequisites.

Historically, the roots of entrepreneurship take us back to the early trade periods in Europe, and perhaps even further back in time. The entrepreneur or middleman was the center of attention of ancient philosophers because of their importance for the society development. The term *entrepreneur*, described by Richard Cantillon in the middle of the 18th century, refers to intermediaries who receive income from the difference between demand and supply in the market by "buying goods at a lower price and selling them at a higher price" (Savchenko**,** 1995, p. 46.). However, prior to this definition, entrepreneurs were simply someone who undertook an activity, regardless of its nature, as the entity was not clearly defined and could be interpreted in different ways.

Theoretical developments with a focus on entrepreneurship cover various aspects of it and continue to explore new and emerging fields. Despite the diversity of views, the contributions of Jean-Baptiste Say, Alfred Marshall, Joseph Schumpeter, Friedrich Knight, Israel Kirzner and others, who formed the so-called classical theories of entrepreneurship in the field of economic sciences, are of decisive importance for the contemporary understanding. In a modern aspect, there is also considerable diversity in approaches and positions from which entrepreneurship is interpreted. In general, present theories can be divided into economic, sociological, behavioral and personal (Todorov, 2001, pp. 80-100), and each of them has as a different starting point position regarding the meaning of entrepreneurship.

The continuing interest in entrepreneurship on the part of various branches of human knowledge does not mean that scientists have reached a consensus regarding its essence. Although in the modern literature there is still no clear definition of what it is, in the present study it is assumed that entrepreneurship is a dynamic process of creative search and realization of the identified opportunities by carrying out independent and independent activity while assuming risk and responsibility for the actions performed and receiving the resulting monetary and personal remuneration (Hisrich & Peters, 1989, p. 6). In this sense, the entrepreneur is a key figure in the overall process of entrepreneurial activity, who connects the individual elements of the process into a single working beginning, regardless of nature and type of structure in which it functions.

In the literature, there are various views on the nature, components of the entrepreneurial process, their specific number and content. According to the degree of the entrepreneurial process detailing, the conceptions of the authors could be divided into two main directions: those that generally outline the phases of the process; and scientists who decompose it into a considerable number of constituent elements. The first group of scientists refers to those who advocate the view that the entrepreneurial process consists of a small number of generalized elements (Hisrich & Peters, 1989, p. 6 cited in Stevenson, Roberts & Grousbeck, 1985, pp. 16-23. and Gorfinkel et. al. 1999, p. 16.): idea generation and or opportunity identification and evaluation; business plan development; determining the required resources; and enterprise management. According to these authors, the formulated phases are "mutually connected, they follow one another, which does not mean, however, that the next one begins only after the complete completion of the previous one. For example, to successfully identify and evaluate an opportunity (phase 1), the entrepreneur must consider the type of business structure desired (phase 4)"(Hisrich & Peters, 1989, p. 31).

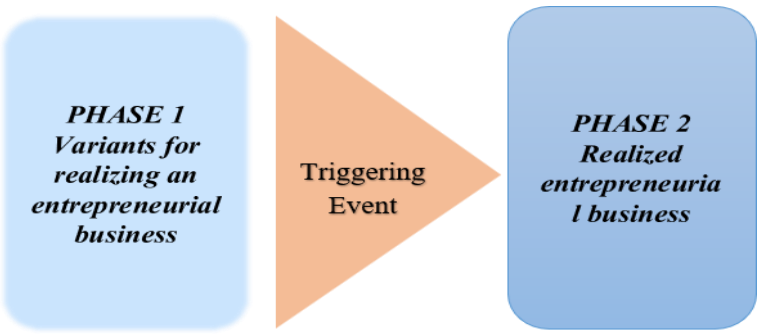
The entrepreneurial process is presented in much more detail by Bulgarian researchers, as the most detailed distinction by individual stages of this process can be found in the works of Koev (Koev, 1998, p. 29). He outlines 12 steps, noting that despite the differences in how they occur in a concrete entrepreneurial process, they are identified in each one. The highlighted elements are: choosing a subject of activity; business establishment decision; discovery of the new; assessment of the possibilities and limitations of the new product/service; establishing the new product;

entrepreneurial resource analysis; new business localization; entrepreneurial activity institutionalization; developing a business plan; business management and closure.

In an attempt to organize and analyse the models of the entrepreneurial process, Peter Moroz and Kevin Hindle (Moroz & Hindle, 2012, pp. 791-818) examine 32 models developed by different authors. They studied the models in order to separate the "entrepreneurial" ones, distinguishing them from others that relate to management. All models are analysed by testing: their distinctiveness (ie whether the method described in a model applies specifically to entrepreneurship and not to management in general); the generality (whether each variant of this process is observed in all cases that can be called entrepreneurial); accuracy (there is an evidence base of the whole process) and simplicity (expressed in the degree of complexity so that it does not border on impracticality and serves as a guide for practice and researchers). The authors' long-term goal is thus to lay the foundations of a single, comprehensive model of entrepreneurial process. After performing the analysis of the models, the authors indicate only four that meet the above criteria - these are the models of Gartner, Bruyat and Julien, Sarasvathy and Shane.

Based on the analysis of various views of scientists regarding the essence of the entrepreneurial process and its components in this article, the view of Hristova & Stoyanov (Hristova & Stoyanov, 2015, p. 123) is accepted, that the entrepreneurial process covers the entire variety of activities in entrepreneurship, starting from the business idea to the closure of the enterprise. This understanding is a consequence of the perception of a process as a successive change of state in the development of something, a course, a development. In this overall process of creative search and implementation of ideas and opportunities in products/services, two phases[10] can be outlined - one related to the thought and development of options for realizing the idea; and the other - with the actual business activities implemented by the entrepreneur. The watershed in this process is the "triggering event" that prompts the potential entrepreneur to adopt a real status. Despite the extreme diversity of ongoing processes and activities in different spheres of the economy, the entrepreneurial process can be represented by means of a combination of an algorithmic presentation of individual stages with the temporal arrangement of their progress. Based on the previous models, it can be presented as follows (see fig. 1):

Figure 1. A GENERALIZED MODEL OF THE ENTREPRENEURIAL PROCESS



Source: Author's illustration

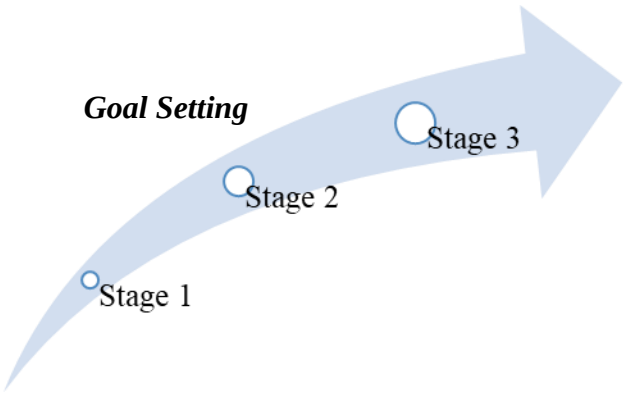
We have real entrepreneurship when we cross the line from thought to action. An important role for this is played by the triggering event - the motive. The entrepreneurial process represents the materialization of the idea in a real business environment and the generation of profitability by the entrepreneur. Ideation brings together individual views and understandings to solve problems or exploit an identified opportunity. The intangible aspect makes it abstract and unrealistic, referring

[10] A phase is any stage in a series of events or in a process of development. See: https://dictionary.cambridge.org/dictionary/english/phase

only to a generated idea, without subsequent verification and concretization activities. Clearing the conceptual model goes through analysis, compliance and viability checking, internal and external evaluation. All these operations are performed by the potential entrepreneur. Performance objectivity will provide an effective starting point for taking action.

The triggering event prompts the individual or the team to take actions to implement the idea. Entering into an entrepreneurial process transforms intention into reality, but reaching the market and gaining market share does not end with the establishment of a company. In order to talk about maturity, one has to go through a difficult entrepreneurial path. The start-up entrepreneurial process demonstrates the transformation from a mental model to a practical model. We outlined that there are very limited studies focused on goal setting into the early stage of the formation of the entrepreneurial company itself. The goal setting is simultaneously positioned in: Stage 1 (business start-up idea/opportunity); Stage 2 (evaluation); Stage 3 (selection of a specific product/service).

Figure 2. BASIC STAGES OF GOAL SETTING



Source: Author's illustration

Each stage requires or is influenced by the formulation of a goal. The difference between an idea and a goal is understood to be minimal. Their common areas and coincidences should not be preferred. They are considered in comparative order.

Table 2. COMPARISON BETWEEN IDEA AND GOAL

Idea		**Goal**	
Abstraction	A dream, a thought - without exact parameters and a concept with meters	Transformation	Moving from thought to action through fixing an expected outcome
	A messy set of thoughts and intentions without the necessary assessments and correct formulation		Drawing up a plan of sequential activities and steps
Internally inherent	Just a thought, no ambition	Externally inherent	The act of turning intention into a program
	A collection of experience, observation and emotion, but lacks conclusion and determination		The sum is accompanied by alternatives (followed by proceeding to a choice)
Idea + Decisions + Defined Goals + Motive = Start x (Goal + Result + Action)^2			

Source: Authors' development

The main differentiator between an idea and a goal is identified in: lack of precision of the assumed final effect, deadlines and resources, while the goal systematizes quantitative and

qualitative measures and indicators to track progress. The original goal overlaps 80-95% with the generated idea. A goal describes the ideal outcome desired for a future period of time. The end point is achieved through the fulfillment of previously set tasks, achieved through purposeful actions. The general entrepreneurial goal emphasizes the development and establishment of a working business. Success is achieved by ensuring high financial profitability, with high added values for the individual and for society. Achievement originates from the effective exploitation of an open opportunity or the efficient resolution of a significant problem for the community.

Individual entrepreneurs have diverse goals set before them. Initially, they do not determine the path to be taken. The first entrepreneurial goals are a concept that needs to be systematized and detailed. A decision to choose from multiple set goals is found after applying the entrepreneurial goal setting process.

Entrepreneurial goal setting develops an action plan with described resources and time to realize the entrepreneurial intentions. It is a conscious individual process built on creative and precise methods and tools. Entrepreneurial goal setting is a systematization and distribution of techniques and methods of action in the realization of entrepreneurial intentions. Goal setting concretizes and quantifies the goals of the entrepreneurial project. The set of goals is structured under the influence of importance for the product/service that is at the center of the entrepreneurship. The entrepreneur sets several goals, the leading one being the so-called strategic. It formulates the strategy, vision and values of the entrepreneurial entity. For its implementation, many goals of a heterogeneous nature are realized, but the totality of them helps to achieve the general effect. Variations of goals are affirmed according to the idea. The determination of the regular goals takes place in two directions, i.e. working simultaneously on the formulation of goals by time and by manifestation.

Table 3. TRADITIONAL TYPE OF GOALS

Goals according indicator *time*	**Goals according indicator *appearance***
✓ Strategical goals	✓ Market and marketing goals
✓ Tactical goals	✓ Economic and financial goals
✓ Operational goals	✓ Management goals
	✓ Technological goals
	✓ Social goals

Source: Authors' development

Entrepreneurial goal setting is a creative act. It must necessarily be based on accurate data and reliable information. The process of setting a goal by the entrepreneur should adhere to the following mandatory regularities:

- Objective and subjective determination of the goal. Objectivity in goal development follows the requirement for clear and unambiguous wording. Subjective certainty – complete and accurate perception of the target by the contractor(s).
- Realism of goals - setting realistic and achievable goals that are consistent with the actual situation and conditions, analysis of available and potential resources, description of potential risks and barriers to the entrepreneurial initiative. There is an option for autonomy of individual goals. No conflict between the different goals is allowed under any circumstances.
- Verification – output of specific quantitative and qualitative indicators. The entrepreneur has the opportunity to carry out faster and easier monitoring and track the progress of his initiative. It is inadmissible to manipulate the set indicators. Goal-setting is transformed into a vicious practice, and guideposts are variable for personal satisfaction.

- Comprehensiveness – complete and accurate description of the requirements and parameters of the goal, their relationship with other goals and tasks. Comprehensiveness provides the most objective and correct information about details and details related to the main goal.

Entrepreneurial goal setting is not seen as a one-time act. The process evolves with the accumulation of entrepreneurial experience, with routine and expertise developing with continued application. An analogy between goal setting in management and entrepreneurship shows many commonalities as well as a number of differences. The main distinguishing element is found in the technology of the process and the persons who implement it. Cases prevail when the entrepreneur does not have experience and knowledge of structural support for the formulation of a goal. Another difference is the way of grading and summarizing the goals - the entrepreneur acts intuitively, while the manager applies the tools of strategic planning and forecasting.

The initial stage of entrepreneurship does not have sources and resources for goal setting of the kind known to us in classical management. The structure differs due to said deficiency. Stages are mandatory starting points through which the entrepreneur must pass. Adhering to them allows developing and adopting the best possible strategic goal for an entrepreneur, including operational and tactical goals for it.

The developed model presents the leading stages. Each of them has its own crucial role for the future entrepreneurial success. The sequential implementation model allows for a smooth transition between operations of varying complexity. The miss rate is minimized and the objectivity and comprehensiveness of the entrepreneurial goal is increased. There are exceptions where certain stages can be run in parallel. The point is to make a mistake, deviation or omission.

4. CONCEPTUAL MODEL

Goal setting is a transition from a mental formulation of an intention or idea to an action plan with set expected, desired and pursued end results. The function of goal formulation is not a one-time and spontaneous act of an individual or collective. It refers to a conscious process of analysis, development of options, confirmation of an alternative, actions to fulfill a goal and verification of the actual to the preliminary expectation. The general approach when embarking on entrepreneurial goal setting should follow the sequential model of work. Reason - skipping, missing a phase reduces efficiency, new risk and deviates the objective view from the real situation of the entrepreneurial ecosystem of business localization. Every omission, every underestimate is a danger for the entrepreneur, because he/she risks setting unrealistic or unfeasible goals. Thus, he/she is put through a variant of the impossibility of realizing the entrepreneurial potential of his/her own idea.

On the basis of a literature review and scientific synthesis, as well as based on authors' observations and experience gathered during implementation of MELES BOT project (https://bot.meles-project.eu/), an authors' model was created, which corresponds to the thesis and visualizes the process of developing and implementing an entrepreneurial goal in the initial stage of the entrepreneurial initiative. The project work provided a basis for the development of a conceptual model, through which to visualize the general appearance of entrepreneurial goal setting.

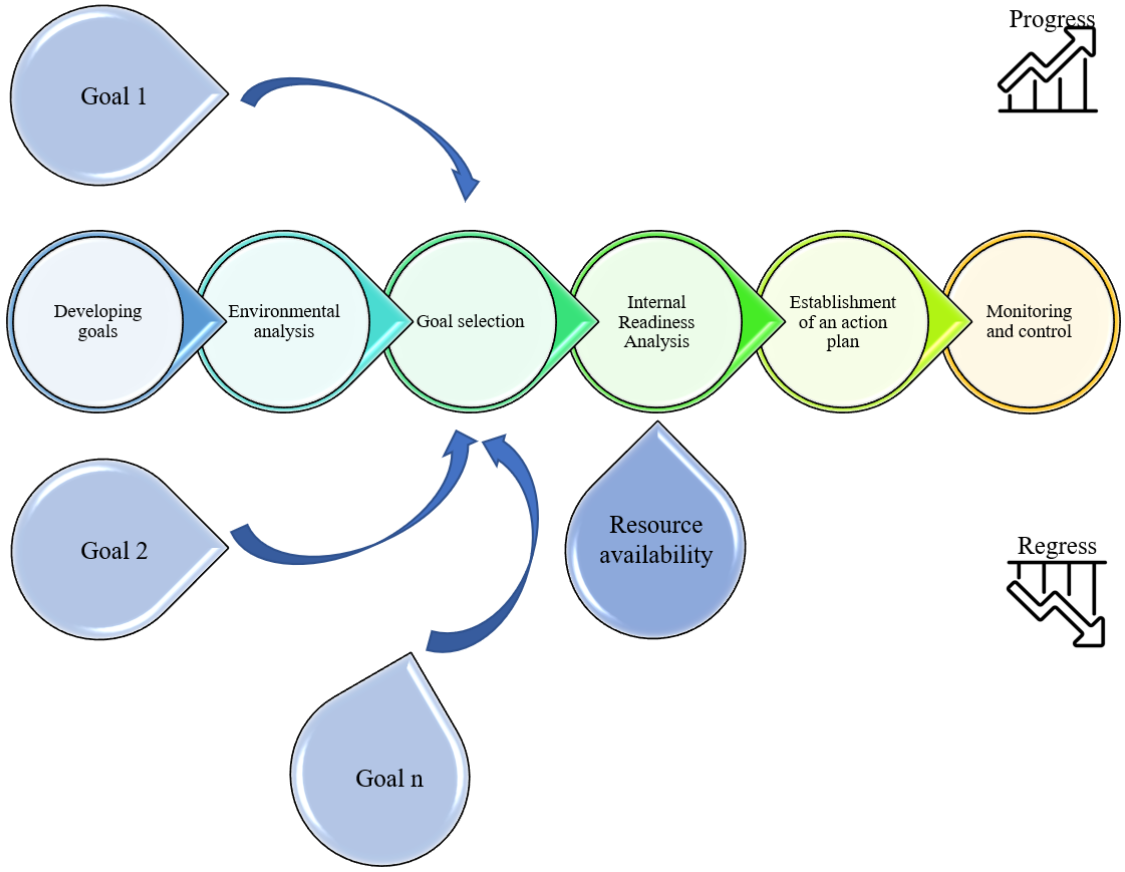
The model is the result of empirical work within the implementation of MELES BOT project. A survey was made of 15 scientific and theoretical works[11] (on-line and paper version) on early-stage entrepreneurship. It was found that the process of entrepreneurial goal setting is poorly developed or absent from scientific works. The practice, deductively and based on observation, proves the application of the goal-setting function by the new entrepreneurs. The conceptual model represents a theoretical view of the authors, created as a consequence of research and synthesis of scientific works and practical developments.

The authors vision includes six general stages of entrepreneurial goal setting. The stages are a foundation for the future prosperity of the startup entrepreneur. The characteristic of target

[11] See: Sources for documentary study at Reference section.

entrepreneurial constructivism is iterative production. It has differences in micro marks and unification in macro marks (see fig. 3).

Figure 3. CONCEPTUAL MODEL OF GOAL SETTING IN ENTREPRENEURIAL PROCESS



Source: Authors' development

The first stage of the initial process of entrepreneurial goal setting is called "Developing goals". The reproduction of a final version of the leading goal goes through the generation of alternatives. Entrepreneurial goals with different content are differentiated - evasive and stretchy definitions prevail. Efforts are not always in the right direction, rather they are an intuitive replica of individual views. The primary variations of goals, in addition to the lack of accuracy, lack of coherence between the intention and the actual conjuncture of the environment. The stage allows to draw a mental map of the views in a perspective plan of the idea, despite the high dose of unrealism.

Reaching to the final version of a leading goal goes through the development of alternatives. They provide the right to choose and create the first dependencies and connections between the entrepreneurial intention and the real environment. A similarity is found in the "Developing goals" and the phase of idea generation. The point of contact of low concretization of the intention between the two activities proves this connection. Desire and expectation are another common characteristic, and they are precisely the engine for going through these complex and exhausting thought processes. The entrepreneur or the team creates multiple alternatives, adhering to the boundary defined by the nature of the new business idea. The initial ideas are imprecise and do not fully express the intentions. They serve as a guideline or orientation that will assist in the work in the following stages.

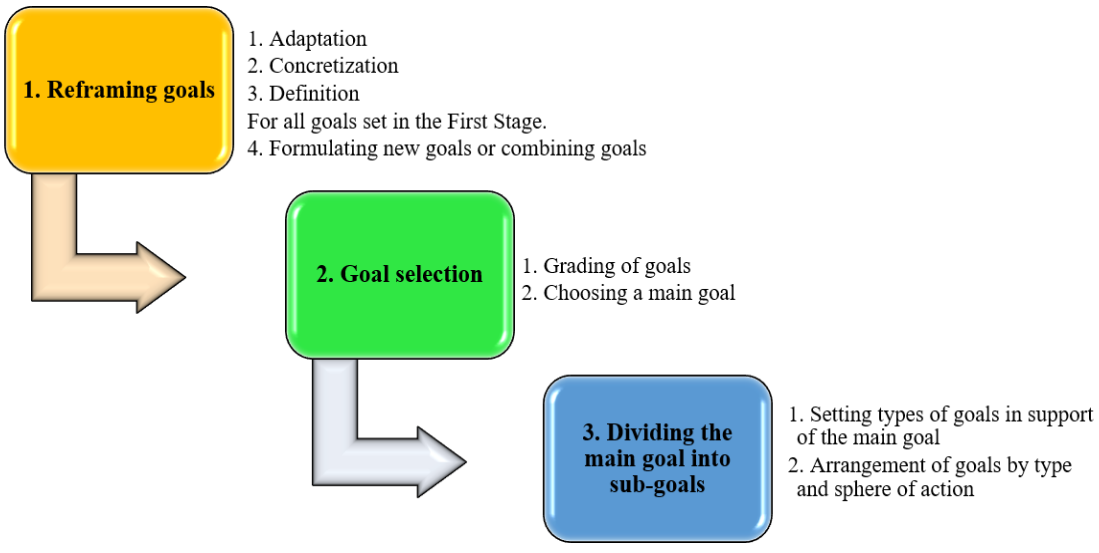
Despite the absence of specifics, a ranking of potential targets can be made in order of importance. The classification is mainly based on individual judgement. Goals are divided into primary and secondary. In subsequent stages, these goals are reformulated and rearranged.

The second stage "Environmental analysis" emphasizes the localization environment of the new business. Coincides with environmental scanning as part of early-stage entrepreneurial engagements. Given the weak possession of specific competencies for analysis and evaluation, it is recommended that entrepreneurs (except those who have experience in marketing and finance) use the so-called static methods. In the presence of a separate financial resource, it is best to resort to the services of a consultant.

The collection of data on the start-up environment is done through analysis and assessment tools. The data are collected from reliable sources - national statistical institutes; business associations; websites of public and regional authorities, etc. Collected data is not useful in itself. They must be converted into information - the specified methods of analysis and evaluation are used. A universal tool, relatively easy and convenient to use in the initial stages, is PEST/PESTLE analysis, ABC and SWOT. The potential entrepreneur, by carefully studying all the conditions and factors of the environment, acquires an objective and correct assessment of it. Evaluation by defining qualitative inferences helps to precisely define the types of goals.

"Goal selection" is associated with refining the first stage goals formulation. The entrepreneur achieves a complete match between an idea and a main goal. The goal pronounces the idea and makes the plans for its implementation regulatory. Synchronization between the two thinking-creative parts of the general entrepreneurial process increases the chances of an ultimate positive effect. The stage includes optimization activities of the initial variations of the goals. The redefinition of priorities and tasks is based on the conclusions made during the second stage. Bringing the primary goal to the fore emerged as the most important task. Through it, the entrepreneurial focus is determined and the vision for the development of the entrepreneurial project is drawn. The key activities for effective implementation of the stage are summarized in fig. 4:

Figure 4. IDEA-GOAL TRANSFORMATION STEP



Source: Authors' development

The choice of goal determines the way and the technology for realizing the entrepreneurial idea in the long term. Complex creative activity is answered by defining ambition. Sharp attention

to this stage provides answers to basic questions. Substitution of initial abducted thoughts with fixed positions offers a higher chance of success.

The fourth stage "Internal readiness analysis' is implemented in two main directions. In the first place is the personal determination to take action to achieve goals and ideas. The second direction focuses on the resource provision of the initiative. The goal is assessed against individual readiness and available resources (currently).

At an internal level, it is taken into account whether qualities, skills and knowledge are available. The main focus should not be placed on competencies, because they can be compensated in one form or another. Knowledge in the field of entrepreneurship, in the absence, is acquired by hiring experts, consulting or training. Personal conviction and determination are the object of inner readiness. They refer to answering whether the emotional inner comfort and order established over the years would accept the change. The entrepreneurial step changes positional habits and personal traditions in the direction of complete self-giving and self-sacrifice. Often the reason for entrepreneurial failure is the inability to cope with the pressures of responsibility, risk and the introduction of a new work regime. The inability to bear responsibility and take risks overloads the entrepreneur, making him unsuitable for the entrepreneurial process.

Goals shape the entrepreneur's strategic views. They compare different variables when compiling potential starting positions, i.e. using variables, a plan subordinate to the objectives is developed. Seriousness and commitment are found in the objectivity of personal readiness assessment and resource availability analysis.

Readiness, when internally proven and the ambition is not only mental, moves to the next stage. The development of a plan to achieve the goals is included in the stage of creating a business plan. The difference is found in the scales and segments of the content. The "Establishment of an action plan" stage is an integral part of planning (understood as a management function). It should be noted that this is a primary and incomplete form of planning. The startup entrepreneurs, without much experience and expertise in the field of analysis and business processes, can use the 5 W`s method[12].

The plans are subject to correction and updating, according to the actual situation and the realities of the environment. Practice shows that the optimization of plans helps to readjust to achieve the target effect. The plans are the personal work of the entrepreneurs and reflect their point of view on the mechanism of their implementation.

The last stage "Monitoring and control" is carried out throughout the process of initial goal setting and after the implementation. The stage creates safeguards to minimize damage from default and alerts the entrepreneur to deviations. It assesses progress and compliance.

Every entrepreneur has their own approach to setting goals at the beginning. Specificity visualizes the person's views. Following ready-made patterns and matrices does not always give the desired results. The individuality of the process contains risks, but more importantly, it is understood by the developer. Early-stage goal setting is done in one form or another. There is no entrepreneur who has not developed his/her own goals, as well as updated them over a period of time. The authors' model is a framework to support entrepreneurs at the beginning of the long and difficult entrepreneurial journey. It does not give ready-made solutions, but offers a sequence of actions.

5. DISCUSSION

The study showed that goal-setting in the initial phase of entrepreneurship has a high similarity in individual cases in terms of the stages it passes through. Indeed, entrepreneurs are rather focused on

[12] They can follow 5 questions, starting with W: *What* - what will be done, essence of activities and actions? *Who* - who are the executors of the tasks and operational goals? *When* - the timeframes and deadlines for implementation, including a start date! *Why* - the way of performing the assigned tasks! *Where* - the performance location!

the idea, but at a certain period of the start, they have to put emphasis on the goal setting. Regardless of the concrete economic activity of entrepreneurial initiative, the idea transformation into a goal is mandatory. An effectively formulated goal outlines the direct path to success. The basic actions of goal definition do not differ much from case to case, despite the individual differences of entrepreneurs.

The proposed conceptual model follows the baseline of goal setting known from the practice. The research that we present aims to derive and describe the constant values in the process of goal setting in entrepreneurship. Our views are based on scientific works and project experience. The research made has proven that the goal setting process has not changed its essence and construction over time. The main task that we implement is the creation of a logical framework of the creating a goal in the initial entrepreneurial stage process, presented in the form of a model. The general model constructs are practically oriented in order to facilitate the young entrepreneurs and unification of scientific achievements in the research area.

The model has the potential to be widely used by entrepreneurs. It shows the recommended steps that would facilitate the goal formulation process. Amplification of the effect would be achieved by digitizing it following the example of PEST templates in a web environment. Such use requires validation of the theoretical insights in a real environment and optimization of the steps in the model. Perspectives are created for science to explore and prove/remodel the model and elements. Our vision for the future application of the model is - validation and verification of its structure; debugging of potential errors in the formulated version; verification of each step and its update according to practice. A corollary for education would be the inclusion of the model as a topic in entrepreneurship courses, and for students and pupils, access to a tool to help them when they have entrepreneurial intentions.

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ASSESSING CONVEREGANCE CRITERIA IN BOSNIA AND HERZEGOVINA: A PATH TO EU MEMBERSHIP

– ABSTRACT –

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Abstract

One of the most important strategic goals of Bosnia and Herzegovina (BiH) is to become a member of the European Union (EU). Membership negotiations commenced in March 2023, marking a pivotal moment for BiH, following its membership request in 2016 and the attainment of candidate status in December 2022. On its path to European integration, BiH is achieving the necessary alignment to become a full member of the EU. Through accession negotiations and the fulfillment of requisite conditions, BiH is witnessing economic development. This progression towards a strong economic and political community like the EU places the candidate country in a politically and economically more stable category, thereby fostering favorable opportunities for economic growth. Candidate status and the initiation of negotiations enhance the country's rating and attract foreign investors, which in turn creates better conditions for entrepreneurship development, labor market improvement, efficient functioning of institutions, and numerous other economic opportunities.

The aim of this paper is to evaluate whether Bosnia and Herzegovina will be able to meet the monetary and fiscal convergence conditions on its path to EU accession, based on the trends of indicators used in the analysis of convergence criteria. This paper examines the relationship between these variables and key macroeconomic indicators, highlighting their correlations and significant influence on trends. In addition to nominal convergence criteria, the paper also analyzes real convergence criteria, which assess a country's development level relative to the average developed countries of the European Union. The focus is on several key indicators of real economic convergence, including GDP growth and GDP per capita.

This research is of critical importance for Bosnia and Herzegovina as it examines the fulfillment of the economic convergence criteria necessary for European Union membership, thereby ensuring the country's economic and financial stability. Furthermore, the assessment of Bosnia and Herzegovina's capacity to meet monetary and fiscal convergence conditions offers valuable guidelines for economic policies and reforms. Ultimately, the findings of this research can assist authorities in accelerating the EU integration process, attracting foreign investments, and fostering overall economic development within the country.

Keywords: Maastricht convergence criteria, price stability, public finance, real economic convergence indicators, Bosnia and Herzegovina

JEL Classification: E00, E31, E6, F63, H6

1. Introduction

The idea for the creation of the European Union arose after World War II, as a consequence of the war-torn European economy, fragmented by national borders and divided markets in the reduced space caused by decolonization and the rise of socialism. The main goal of the largest European countries at that time was the need for an organized approach to solving common problems (Hadžiahmetović, 2009, p. 356). Just as the formation of the European Union itself sought to consolidate peace and prosperity in Europe, so did its expansions. Europe has always been guided by the ideology that a larger Europe is a stronger and more stable Europe, better equipped to face internal and external challenges. From the original 6 countries that founded the European Union to the current 27 members, the main motives for creating the European Union were economic, political, military-strategic, and ideological. These motives have guided the European Union through all of its expansions so far. Many countries have joined, and through their journey and expansion, they have become part of the Union, while the United Kingdom, which was also one of the founding members, is the only country that left the community of European nations. It exited the European Union in January 2020, after 47 years of membership.

At the Copenhagen Summit in 1993, the European Union defined the criteria for the accession of future member states. These criteria reflect the values upon which the European Union is founded: democracy, the rule of law, respect for fundamental rights, and the importance of a functioning market economy. These principles laid the foundation for historic changes and the accession of Central and Eastern European nations, and they remain relevant today. They have also served as a framework for reforms in all countries that are candidates or potential candidates for membership. Currently, the Western Balkan candidate countries are Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, Serbia, and Turkey. In addition to these countries, Ukraine, Moldova, and Georgia also have candidate status. Kosovo holds the status of a potential candidate.

The criteria and conditions for expansion are defined by the Copenhagen (1993), Essen (1994), and Brussels (1995) criteria. The latter relate to the White Paper, which contains proposals for the European Union's actions in specific areas. These include: the White Paper on Artificial Intelligence – A European Approach to Excellence and Trust (2020), the White Paper on leveling the playing field regarding foreign subsidies (2020), and the White Paper on the Future of Europe – Reflections and Scenarios for the EU27 by 2025 (2017). The so-called "Copenhagen Criteria" encompass three elements that each new member state must fulfill:

- **Political criteria:** Relate to the stability of institutions guaranteeing democracy, the rule of law, human rights, and respect for and protection of minorities.
- **Economic criteria:** Involve the existence of a functioning market economy capable of coping with competition and market forces within the European Union.
- **The third criterion:** Refers to the acceptance of the European Union's laws and regulations and the ability to assume all membership obligations, including adherence to the political, economic, and monetary union's objectives.

The new revised EU enlargement methodology is built upon four key principles: credibility, predictability, dynamism, and enhanced political governance. It structures its previous chapters into six thematic clusters: an overarching area that includes the rule of law; the internal market; competitiveness and inclusive growth; the green agenda and sustainable connectivity; resources, agriculture, and cohesion; and external relations (European Commission, 2020). The accession process has become increasingly rigorous and comprehensive over the years, directly reflecting the development of European Union policies, but also many mistakes and lessons learned from previous expansions. Progress towards membership depends on each country individually and its steps towards achieving the outlined criteria at each stage. In addition to the defined economic

criteria, the accession process of member countries has also significantly depended, and continues to depend, on the political ideologies and objectives of individual member countries, particularly those that have had the greatest influence, which is closely correlated with their economic and political power.

Main aim of this paper is to evaluate whether Bosnia and Herzegovina will be able to meet the monetary and fiscal convergence conditions on its path to EU accession. This evaluation is based on analyzing the trends of the indicators used to assess the convergence criteria, specifically focusing on price stability and public finance stability. Additionally, the paper examines the relationship between these variables and key macroeconomic indicators. The methodology in this paper involves a analysis of key indicators related to price stability and public finance, with an emphasis on understanding the relationships between these indicators and broader macroeconomic variables. The study also excludes two of the Maastricht criteria (long-term interest rates and exchange rate stability) due to the specific economic setup of BiH, which operates under a currency board and does not issue long-term government bonds. The paper is structured as follows: **Introduction which provides an overview of** background on EU accession, the importance of convergence criteria. Second section includes the discussion on both nominal and real convergence criteria, with a focus on price stability, public finance, and the development level of BiH compared to the EU. Third section of the paper provides a detailed examination of the Maastricht criteria and it is followed by the fourth section which is focused on the real convergance criteria. Conclusion is provided at the end of the paper.

2. Candidate Status of Bosnia and Herzegovina for European Union Membership and the Implementation of Key Priorities

The Council of the European Union, in December 2022, granted Bosnia and Herzegovina the status of a candidate country, following the recommendations of the European Commission. After submitting its application for EU membership in February 2016, Bosnia and Herzegovina had to meet 14 key priorities. The rule is that the European Commission recommends the opening of accession negotiations with the European Union once it assesses that the country has achieved the necessary level of compliance with the membership criteria, particularly in fulfilling key priorities. A certain positive momentum followed immediately after the candidate status was granted, but with limited progress regarding key priorities. Positive developments at the national level were in stark contrast to negative developments at the level of the Republika Srpska entity, which affected the country as a whole. After gaining candidate status, the commitment of political parties to the strategic goal of European integration brought positive results. The Council of Ministers adopted strategies for combating organized crime, developed an updated risk assessment and accompanying action plan to prevent money laundering and combat the financing of terrorism, adopted migration strategies and action plans, and appointed a supervisory body for the implementation of the national war crimes prosecution strategy. All the political and economic issues that occurred, particularly in Republika Srpska, contributed to delays in the necessary reforms to fulfill the priorities. These were primarily issues concerning the functioning of the Constitutional Court and violations of the constitutional and legal order of the country.[13] Once a country gains candidate status, the next step is the opening of negotiations. Accession negotiations are a process in which the candidate country negotiates with the member states of the European Union. In the case of Bosnia and Herzegovina, this process took more than a year, from December 2022 to March 2024.

2.1. Fiscal Aspects of Bosnia and Herzegovina's Accession to the European Union

[13] More in European Commission (2023).

During the accession process, from applying for membership, gaining candidate status, to full membership, the country needs to go through all phases of fiscal integration. With full membership in the European Union, the country becomes part of the single European market as well as part of the EU fiscal system. Throughout the accession journey, fiscal relations with the EU are built, and fiscal institutions are developed in a way that enables full integration with the EU. The fiscal aspect of accession involves two fiscal pillars of the European Union. One is the EU budget and the ability to use EU funds, both in the accession process and during the candidate status, which is where Bosnia and Herzegovina currently stands, and in gaining full membership. The second and much more challenging aspect of accession is the harmonization of Bosnia and Herzegovina's tax system.

2.1.1. Using European Union Budget Funds

Bosnia and Herzegovina has so far utilized a significant portion of EU funds, and following the granting of candidate status, there are further possibilities for using funds from pre-accession funds. After the end of the war and before the first official steps towards EU membership, Bosnia and Herzegovina used EU funds through humanitarian and other aid programs, mainly through the CARDS program and others. After gaining full membership, Bosnia and Herzegovina will no longer be able to use pre-accession funds but will be able to use other funds from the EU budget that relate to the budget for structural operations, i.e., funds from the Structural and Cohesion Funds of the European Union. In this future phase of using EU funds (as well as now through the use of pre-accession funds), it is crucial that the European Union prepares appropriate regional development strategies. Furthermore, the efficient use of EU funds depends on the optimal and purposeful allocation of funds across different levels of government in Bosnia and Herzegovina. The use of EU budget funds in the pre-accession phase is carried out through the Instrument for Pre-Accession Assistance (IPA), which is the main tool for providing aid to candidate countries in the process of aligning with EU standards and policies, through financial assistance, technical, and expert support. IPA was established in 2006 to support candidate and potential candidate countries and consolidates all previous support instruments (CARDS, SAPARD, ISPA, PHARE, etc.). IPA is primarily intended for institutions at all levels of government in Bosnia and Herzegovina, but it is also used by non-governmental organizations, local government units, the business community, and other types of legal and physical entities.

The current framework is IPA III for the period from 2021 to 2027. It is intended for the Western Balkans and Turkey and has the largest budget of all IPA funds so far. IPA III is the third generation of the European Union's Instrument for Pre-Accession Assistance for the Western Balkans and Turkey. Through this instrument, the European Union supports candidate countries in becoming its members. With a budget of €14.2 billion over the seven-year period from 2021 to 2027.

2.1.2. Harmonization of Bosnia and Herzegovina's Tax System with European Union Requirements

Tax harmonization, by definition, is the process of removing tax barriers and inconsistencies in tax systems in certain state communities, with the goal of strengthening the internal economic and fiscal space and thereby achieving macroeconomic stability. The adjustment of the tax system for each candidate country is carried out according to EU Directives, which are part of EU legislation and, after the Treaties establishing the European Union, represent the second most important legal instrument. In addition to the Directives, the EU also uses other instruments for the harmonization of tax systems, such as efforts to eliminate harmful tax competition across all tax forms. This mainly refers to direct taxes, particularly corporate tax.

Bosnia and Herzegovina, after obtaining candidate status, will now have to take several measures for further harmonization of direct and indirect taxes. In the field of indirect taxes, particularly in the area of VAT, the harmonization process has been achieved to a greater extent compared to direct taxes. Major reforms in the area of indirect taxation have been implemented gradually since 2003, culminating in 2006 with the introduction of VAT into Bosnia and Herzegovina's tax system. Before that, there was a complex process of transferring constitutional competences for indirect tax policy from the entity level to the state level. Although the VAT system has certain shortcomings, its introduction has been regarded by many experts as the best transition from a sales tax system to a VAT system. Bosnia and Herzegovina's VAT Law is aligned with the EU's Sixth Directive on VAT. In recent years, there have been no significant reforms in the VAT segment, although the introduction of differentiated VAT rates, following the example of some European countries and neighboring countries such as Croatia, Serbia, and Slovenia, has been discussed for years. (source needed – specify expert opinions or reports).

The issue of further VAT harmonization is crucial for fiscal adjustment in the area of indirect taxes. This issue is defined by the EU's Sixth Directive, with a particularly important part related to VAT being the introduction of reduced rates and zero rates of taxation, i.e., exemptions. This issue has been discussed for many years, and with the granting of candidate status, it will certainly continue in this direction. The mere fact that reduced VAT rates and zero rates exist in half of the EU member states indicates that Bosnia and Herzegovina must also address this issue in detail. According to the Sixth Directive, it is recommended to use one standard rate not less than 15% and one or two reduced rates not less than 5%.

When it comes to other forms of indirect taxes in Bosnia and Herzegovina, such as excise duties and customs, significant harmonization with EU countries has been achieved in this segment as well, following the relevant Directives. The signing of the Stabilization and Association Agreement with the European Union (July 1, 2008) resulted in a significant loss of customs revenue, which the fiscal authorities of Bosnia and Herzegovina attempted to compensate for by increasing excise duties in line with EU standards. The new Excise Law of 2009 increased road tolls as a special type of excise on petroleum products and established a continuous excise increase for cigarettes. Due to the increase in minimum excise rates in the European Union, a new adjustment schedule for excise duties on tobacco products and energy was established in Bosnia and Herzegovina in 2011. The most recent amendments to the Excise Law have been in effect since 2022.

In the direct tax harmonization segment, more attention is paid in the EU to corporate taxation than to income taxation, which has the lowest degree of harmonization in the European Union. Given that direct taxation of citizens can lead to harmful tax competition, the EU's legislative bodies have adopted the first directives in this tax area. When it comes to income tax harmonization, the Directives pay particular attention to the taxation of parent and associated companies, the tax treatment of mergers, demergers, and the transfer of assets and shares between companies, and the taxation of interest and royalties between associated legal entities. In connection with the aforementioned, the two most important directives in this area are the Directive on Small and Associated Companies and the Merger Directive.

In terms of direct taxation in Bosnia and Herzegovina, the most significant reform was implemented with the introduction of corporate and income tax laws in the Federation of Bosnia and Herzegovina, Republika Srpska, and Brčko District. Corporate and income taxes were first introduced in Republika Srpska in 2007. The Federation of Bosnia and Herzegovina began implementing its Corporate Tax Law in 2008, and its Income Tax Law in 2009. The Federation of Bosnia and Herzegovina currently applies the Corporate Tax Law, which came into force in 2016. In Brčko District, a new Corporate Tax Law was introduced on January 1, 2012, and its provisions are largely harmonized with the corresponding legal solutions in the Federation of Bosnia and Herzegovina and Republika Srpska.

It is considered that corporate tax should fall under the jurisdiction of the central government, i.e., at the state level in Bosnia and Herzegovina. This is justified by the fact that the devolution of corporate tax competences to lower organizational units (the Federation of Bosnia and Herzegovina, Republika Srpska, and Brčko District) has led to unhealthy tax competition, an issue that is particularly monitored in the European Union. Ideally, the direct taxation system in Bosnia and Herzegovina should be centralized at the state level, similar to the case with indirect taxes. Income taxation in Bosnia and Herzegovina is at the entity and Brčko District level. When it comes to income taxation, it is not significantly covered by EU guidelines. Structurally, Bosnia and Herzegovina's tax revenue system differs significantly from both transitional and developed EU countries. A high share of indirect taxes (especially VAT) in total revenue characterizes both transitional EU countries and Bosnia and Herzegovina, but compared to these countries, Bosnia and Herzegovina has a very low share of direct taxes. (source needed – provide supporting references).

Despite a series of reforms in Bosnia and Herzegovina's tax system, there has been no significant positive effect on investment, GDP, or the country's competitive position. Bosnia and Herzegovina remains in the group of highly uncompetitive countries, with the worst position in the region. Among other factors, high tax rates and complex tax regulations have a particularly negative impact on the assessment of competitiveness. These lessons indicate that policymakers in the coming period must clearly bear in mind that tax policy should be developmental and focused solely on the simplest, most efficient, and fairest collection of tax revenues that serve to finance state expenditures. The European Commission's 2023 report, in Chapter 16, states that Bosnia and Herzegovina should enhance cooperation between tax administrations in the coming period, with a focus on information exchange to prevent tax evasion and fraud. It also emphasizes the need to harmonize VAT and excise regulations with the EU acquis and to continue work on the electronic signature to ensure interoperability and consistency throughout the country. Although the VAT system's legal framework is largely aligned with the acquis, further regulatory harmonization is necessary, and joint tax audits between all tax administrations in Bosnia and Herzegovina should be ensured, with the Indirect Taxation Authority retaining a central role in this. Furthermore, it is essential to strengthen the personnel and information capacities of all tax administrations in Bosnia and Herzegovina. In the domain of direct taxes, entity tax systems and the social contribution system should be harmonized, with a particular emphasis on the need to reduce the tax burden in the Federation of Bosnia and Herzegovina.

3. Convergence Criteria Analysis

The most important step in the creation of the European Monetary Union (EMU) was the convergence of fiscal and monetary rules of its member states through the signing of the Maastricht Treaty on February 7, 1992. The signing of this treaty marked the beginning of a new stage of integration and new integration goals, the most significant of which was the implementation of the final phase of economic and monetary integration, namely the introduction of a common currency. For this purpose, five criteria were established to determine whether a country is ready to adopt the euro as its currency and become part of the European monetary area. These are the following areas:

1. **High price stability** – The inflation rate must not exceed 1.5% above the average inflation rate of the three countries with the most stable prices;
2. **Budget deficit** – It should generally be less than 3% of GDP;
3. **Public debt** – It must not exceed 60% of GDP;
4. **Long-term interest rates** – They must not exceed 2% above the interest rates of the three member states with the lowest interest rates;
5. **Achieving a stable exchange rate** – Two years before the introduction of the euro, the national currency must not devalue and must remain within the limits of the European Monetary System.

One of Bosnia and Herzegovina's most important strategic goals is EU accession, and the country has been strongly committed to this goal for many years. The condition for joining the European Union is achieving an appropriate level of real and nominal convergence, which involves the country's macroeconomic stability and a competitive economy compared to other EU member states. Nominal convergence includes monetary and fiscal convergence, and it is defined by the Maastricht convergence criteria. Real convergence, on the other hand, is a more complex economic category and represents the actual development of the country and its competitiveness compared to the rest of the world or, in the case of Bosnia and Herzegovina's accession, compared to EU countries. Since these two categories of convergence are closely connected, when determining measures to achieve one, it is essential to consider how this will affect the other category. This relationship is particularly important in the short term because, for example, achieving a higher level of real convergence can increase inflation, indebtedness, and the budget deficit. This may happen in the short term, but in the long term, a higher level of real convergence, reflected in a higher degree of development and competitiveness, has positive implications for nominal convergence criteria, as economic balance will be achieved through the multiplier effect.

3.1. Nominal-Criteria Using the Example of Bosnia and Herzegovina

Meeting the nominal convergence criteria is a prerequisite for joining the Economic and Monetary Union, and it is crucial that a country fulfills these conditions even before gaining European Union membership status, as Bosnia and Herzegovina is currently in candidate status. This is also the reason for analyzing the fulfillment of these criteria in this article. The importance of these criteria stems from the fact that the single monetary policy implemented by the European Union cannot be successful if all its members do not meet the criteria related to price stability, exchange rate stability, public finance stability, and criteria concerning interest rates before entering the monetary union.

3.1. 1. Price Stability Analysis

When it comes to the criterion of high price stability that a country must meet, the Maastricht Criteria define that the inflation rate must not exceed 1.5% above the average inflation rate of the three countries with the most stable prices. In such cases, the reference rate is calculated at the level of the European Union, which is then compared to the inflation rate in a given country. Meeting this criterion is of primary importance for maintaining price stability in the monetary union. The aim of introducing this criterion is to bring inflation rates in high-inflation countries closer to the inflation rates of low-inflation countries. The inflation data for Bosnia and Herzegovina for the period from 2010 to 2023 are presented in the following table and refer to the average annual price growth rate.

Table 1. Inflation in Bosnia and Herzegovina (2010-2023)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Average annual CPI growth rate (%)	2.1	3.7	2.1	-0.1	-0.9	-1.0	-1.1	1.2	1.4	0.6	-1.0	2.0	14.0	6.1

Source: CBBH

The latest official data published in periodic macroeconomic statistical publications by the Central Bank of Bosnia and Herzegovina (BiH) for the annual level was released for the year 2023. Compared to the previous year, inflation significantly decreased. Of all the observed years in the tabular overview, the year 2022 particularly stands out, having recorded a peak inflation rate. The annual inflation rate for 2022 was 14%, while for 2023, it was 6.1%. According to comprehensive analyses by the Central Bank presented in their publications (quarterly bulletins and annual reports), pronounced inflationary pressures marked the beginning of 2022, and these trends continued throughout all months of that period. This occurred partly due to the low inflation base in previous years and the occurrence of deflation in 2020, as well as a significant increase in consumer prices, which was much higher than in the Eurozone, particularly in the period following the onset of the Ukraine crisis in the second quarter of 2022. The war in Ukraine especially contributed to the rise in prices of energy, food, and all production raw materials on international markets. In fact, as assessed, this war was merely the trigger for already disrupted economic and political relations worldwide, stemming from numerous previous crises (the 2009 crisis, the pandemic crisis, etc.).

As for the data on inflation for 2022, the overall inflation increase was driven by rising prices in hospitality, tourism, and trade, as well as in the manufacturing industry (CBBH, 2024). Despite certain improvements in the labor market, which marked the end of 2021 and the beginning of 2022, due to pronounced negative demographic trends, large-scale migration of the population, particularly the working-age population, there were no significant positive economic trends in 2022. Due to labor shortages, wages increased in the medium and long term, which largely strengthened inflationary trends through rising domestic consumer prices. The war in Ukraine and the sanctions imposed on Russia resulted in record increases in the prices of all energy, food, and production materials on a global scale. These price increases particularly affected low-income populations, as rising prices meant that an increasing portion of disposable income was allocated to basic necessities. Bosnia and Herzegovina is among the first countries in this category.

Inflation in Bosnia and Herzegovina was present throughout all months of 2022, reaching a record annual rate of 14%. By the end of the year, inflation was significantly above the multi-year average and more than double the rate measured in 2006 when the 17% value-added tax (VAT) was introduced (CBBH, 2024). Food prices contributed the most to the inflation rise, with almost half of the total inflation attributed to food and non-alcoholic beverages. In Bosnia and Herzegovina, as in other developing countries, rising prices in the food and non-alcoholic beverage categories have a significant impact on overall inflation. According to available statistical data, the share of this category in the total consumer basket is around 33%. After the large and extraordinary inflationary shock that occurred in 2022, average consumer prices slowed down in 2023 across the entire region, resulting in an inflation rate of 6.1% in 2023.

The continuation of the weakening of inflationary pressures is expected in the coming period, as indicated by already available data for 2024. Inflation in 2023 was not solely the result of exogenous factors but also significant pressures on domestic prices. Core and overall inflation in 2023 were slightly higher (5.9% and 6.1%, respectively), primarily due to the significant increases in food and non-alcoholic beverage prices, which rose the most (10.6%), as well as significant growth in other goods and services categories (9.5%). Electricity prices also contributed significantly to inflation in 2023, with an annual increase of 6%. Certain categories, such as transportation costs, saw price declines, which contributed to inflation stabilization in 2023 (CBBH, 2023). Economists have always paid special attention to the occurrence of deflation, which was present during 2020. After several years of moderate inflation (around 1%), 2020 saw annual deflation of 1%. Deflation was largely the result of negative contributions from certain sectors, such as transport, trade, and others. Deflation was also present in 2014, 2015, 2016, and 2020.

The reference inflation value in the European Union for 2023 was 3.3%, and according to this, Bosnia and Herzegovina had inflation significantly above that value.[14] In this case, the reference

[14] More in European Central Bank (2024).

value for inflation measured by the Harmonized Index of Consumer Prices (HICP) is for the period from June 2023 to May 2024. According to the European Union's Convergence Report published in June 2024, the twelve-month average inflation rate in five out of six observed states was significantly above the reference value for the price stability criterion of 3.3%. Inflation strongly increased in 2021, largely influenced by base effects, a sharp rise in energy prices, supply chain disruptions due to the coronavirus, and strong growth in global demand for products. Due to the war in Ukraine and the problems caused by this crisis, inflation also sharply rose in most countries in 2022, but it followed different trends due to various domestic policies. Compared to the 2022 Convergence Report, inflation slowed down in most countries, but in Bulgaria, the Czech Republic, Hungary, Poland, and Romania, it remained higher due to their pronounced sensitivity to external shocks and negative trends in the labor market, resulting in inflation significantly exceeding the reference value.[15]

3.1.2 Budget Deficits as a Convergence Criterion

The second nominal convergence criterion is the budget deficit, which should not exceed 3% of GDP. Bosnia and Herzegovina's complex fiscal arrangement, decentralized and uncoordinated fiscal policy, negatively affects achieving fiscal balance and a fiscal position that contributes to public finance stability and sustainability. This situation has led to high public expenditures and insufficient public revenues for years. Reducing expenditures across the board is key to fiscal consolidation, but the long-standing growth trend is difficult to stop without radical changes. As shown in the following table, which tracks budget surpluses/deficits at the Bosnia and Herzegovina level from 2010 to 2023, positive changes were observed between 2015 and 2019, when a positive budget balance was recorded. However, the onset of the coronavirus crisis led to a decrease in tax revenues and budget deficits, which have characterized the last three years.

This indicates that, in the realm of fiscal policy, regardless of occasional surpluses, many measures need to be implemented to ensure that Bosnia and Herzegovina's tax and budget policy have a developmental and stabilization component and align with European and international standards. The current situation, characterized by frequent imbalances and budgetary disparities, leads to unstable public finances and the creation of frequent fiscal imbalances at all levels of government.

Table 2. Bosnia and Herzegovina - Surplus/Deficit Trends as % of GDP (2010-2023)

Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Balance	-2.4%	-1.2%	-2.0%	-2.2%	-2.0%	0.7%	1.2%	2.5%	2.2%	1.9%	-5.2%	-0.3%	-0.4%	-1.2%

Source: CBBH

[15] Inflation in 2023 amounted to 8.6% in Bulgaria, 12% in the Czech Republic, 17% in Hungary, 10.9% in Poland, and 9.7% in Romania, data source – Eurostat.

In the period of 2006 and 2007, Bosnia and Herzegovina achieved budget surpluses, but the rapid and strong spillover of the crisis from neighboring and global countries into Bosnia and Herzegovina in 2008 and 2009 changed this situation, leading to a sudden weakening of demand for domestic products, reduced exports, production decreases, increased unemployment, and a general state of pessimism. This ultimately resulted in a 3% drop in GDP in 2009, along with a large gap between revenues and expenditures, leading to a deficit of over 1 billion BAM, or 4.3% of GDP. The amount would have been much higher (estimated by the IMF at over 5.5%) had there not been savings at all levels of government, prompted by the stand-by arrangement.

After the major economic crisis of 2009 and a certain degree of economic recovery that occurred with the mitigation of the negative effects of the crisis, the following years saw GDP growth until the onset of the COVID-19 crisis, when GDP fell by 3%. The last three years have been marked by GDP growth, which was the highest in 2021 (7.4%), but then began to decline, reaching only 1.7% in 2023. In most cases, with the arrival of crises, rapid and strong spillovers of crises from neighboring and global countries into Bosnia and Herzegovina lead to a sudden decline in demand for domestic export products, modest foreign direct investments, and a drop in private investments. Reduced export demand results in lower exports and a drop in export prices, leading to general pessimism in the economy, which triggers a chain of negative events such as a decline in production, a decrease in employment, and a reduction in tax revenues. Tighter credit conditions resulting from this lead to reduced consumption of capital and durable consumer goods.

Analyzing Bosnia and Herzegovina's macroeconomic indicators in this observed period, it is evident that every economic crisis occurring globally immediately causes significant consequences for Bosnia and Herzegovina's economy, and the unstable fiscal position results in budget deficits, which are driven by years of increasing public expenditures and declining revenues, with insignificant or negative GDP growth. All this indicates that Bosnia and Herzegovina, as a fiscally and politically complex country with poor macroeconomic indicators, cannot sustain such high public spending. In 2020, public spending amounted to 46.8% of GDP, placing it among the highest in Europe and neighboring countries, and it was at approximately the same level in previous years[16]. Given that the realized deficits were mainly used to finance current spending and were financed by public debt, such a situation does not contribute to strengthening fiscal capacities, and this needs to be addressed. However, this requires structural reforms and tackling key macroeconomic challenges, such as insufficient GDP growth, low foreign investment, and the country's poor balance of payments position.

When it comes to meeting the convergence criterion related to the budget deficit, in all the observed years in Table 2, it remained within defined limits, i.e., it did not exceed the 3% threshold, except in 2020 when it reached 5.2%.

3.1.3. Public Debt as a Convergence Criterion

Bosnia and Herzegovina's total public debt, which in this case includes total domestic debt and public external debt, excluding private external debt, increased in all years from 2010 to 2023, except in 2018 due to a reduction in domestic debt and in 2023 due to a decrease in external debt. The share of public debt in GDP up to 2016 averaged around 40% of GDP, but in the following years, it began to decline, primarily due to GDP growth, which was significantly higher than the growth of indebtedness.

When it comes to the relationship between external debt and GDP in this observed period, there were different trends. In the period immediately after the war (although there were high GDP growth rates), this indicator was quite high, as the total GDP was relatively low, but from 1999 to

[16] In 2009, public spending in Bosnia and Herzegovina amounted to 46.1% of GDP, in Germany 47.5% of GDP, and in Italy 51.8%. Among the neighboring countries, only Montenegro had slightly higher public spending than BiH (47.7% of GDP) – data source: Eurostat for EU countries, and for Montenegro Central Bank of Montenegro.

2018, it increased significantly. The highest share of external debt was recorded between 2019 and 2016, when external debt amounted to 28% of GDP. In most of the observed years, budget deficit growth was accompanied by public debt growth, which increased by 12% in 2010 compared to the previous year, by 11% in 2014, and by 10% in 2020. Although public debt slightly decreased by 0.4% in 2023, it remained within the permissible reference frameworks of the European Union's fiscal rules in recent years, there has been a deterioration of many other debt indicators. (Specify which debt indicators have deteriorated to align with Table 3).

Table 3. Public Debt of Bosnia and Herzegovina for the Period from 2010 to 2023

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Public Debt (% of GDP)	37.4	38.0	39.9	38.9	42.1	41.3	40.0	3.7	32.7	31.3	35.1	32.8	28.5	25.1

Source: MFT BiH (2024)

In all the observed years, public debt is below the limits determined by the convergence criteria, and in that case, Bosnia and Herzegovina meets the requirements. However, the movement of indebtedness is closely linked to the movements of other macroeconomic indicators. Just as every economic phenomenon reflects on another through the multiplier effect in macroeconomics, so too do public, external, and internal debts closely correlate with trends in economic activities, government spending, revenues, exports, interest rates, etc. In this case, the movement of public debt should be directed toward growth and development and the improvement of the state's macroeconomic position.

3.1.4. Criterion of Long-Term Interest Rates and Exchange Rate Stability

The last two convergence criteria refer to long-term interest rates, which must not exceed 2% of the interest rates of the three member states with the lowest interest rates, and achieving a stable exchange rate. These are not considered in this paper, as the exchange rate stability criterion cannot be considered due to the Currency Board system in place in Bosnia and Herzegovina. Under this system, the domestic currency (BAM) is pegged to the euro as the 'anchor currency,' with full coverage of monetary liabilities by foreign reserves. Similarly, given that Bosnia and Herzegovina does not issue long-term government bonds, the variable of long-term interest rates on government bonds is not analyzed.

3.2. Real Convergence Criteria

In addition to the nominal convergence criteria, which are quantified and precisely defined, real criteria include a broader range of indicators related to development, employment, competitive position, and others. Real criteria are important because their fulfillment allows a country to be competitive in the single European market. In this case, broader development indicators are observed.

Table 4. Development indicators for the period 2010-2023

Year	Nominal GDP BiH (in million BAM)	Public Debt (in million BAM)	Population (in thousands)	GDP per capita (BAM)	Debt per capita (BAM)	GDP Growth Rate (%)	Population Growth Rate (%)	Unemployment Rate (%)
2010	25.365	9.491	3.541	7.163	2.680	0,9	0,0	27,2
2011	26.231	9.976	3.538	7.414	2.819	1,0	-0,1	27,6
2012	26.223	10.464	3.535	7.418	2.960	-0,8	-0,1	28,0
2013	26.779	10.423	3.531	7.584	2.952	2,4	-0,1	27,5
2014	27.359	11.516	3.526	7.759	3.266	1,2	-0,1	27,5
2015	28.929	11.949	3.518	8.223	3.397	3,1	-0,2	27,7
2016	30.265	12.098	3.511	8.620	3.446	3,2	-0,2	25,4
2017	31.803	11.354	3.504	9.076	3.240	3,2	-0,2	20,5
2018	33.942	11.107	3.496	9.709	3.177	3,7	-0,2	18,4
2019	35.785	11.211	3.491	10.251	3.211	2,8	-0,1	15,7
2020	34.728	12.193	3.475	9.994	3.508	-3,1	-0,5	15,9
2021	39.145	12.858	3.453	11.326	3.723	7,4	-0,6	17,4
2022	45.618	13.017	3.434	13.284	3.790	4,2	-0,6	15,4
2023	48.948	12.952	3.427	14.280	3.427	1,7	-0,2	13,2

Source: BHAS and CBBH

The trends in debt per capita were lower, with debt increasing by 37%. In 2007, it amounted to 2,492 BAM, and in 2023, it was 3,427 BAM. Given the very poor trends in natural population growth, i.e., in recent years, the birth rate has been lower than the mortality rate, and there has been significant migration of the population, the debt per capita is very likely to increase in the coming period. This is supported by the fact that external debt plays a very dominant role in Bosnia and Herzegovina's total debt. The problem of rising debt is also related to other factors of indebtedness and significant exposure to currency risks due to the structure of debts, which are not expressed in euros but in dollars or other currencies and arrangements with the IMF.

BiH has a very low GDP per capita compared to most European Union countries and the highest unemployment rate in Europe. GDP per capita has significantly increased in recent years, but it is lower than in all European countries and is nearly seven times smaller than that of Luxembourg, which has the highest GDP per capita in the EU. It is also much lower than the countries with the lowest GDP per capita in the EU (Bulgaria, Greece, Latvia). When it comes to the unemployment rate in Bosnia and Herzegovina, according to data from the previous table, it is evident that it has been exceptionally high for many years and among the highest in Europe. Due to the pronounced trend of emigration from Bosnia and Herzegovina, the unemployment rate has been lower in recent years compared to the period from 2010 to 2015 when unemployment reached over 27%. Most European countries have unemployment rates below 10%, with some even below 5%. The lowest unemployment rate in the past three years has been recorded in Germany (3.7% in 2021, 3.1% in 2022, and 3.1% in 2023). After Germany, countries with very low unemployment rates include Malta, Poland, the Czech Republic, the Netherlands, and others. Greece and Spain have had the highest unemployment rates in Europe for years, with rates of 16.3% and 15.5%, respectively, in 2020, but even they reduced unemployment to 11.1% and 12.1%, respectively, in 2023. In this area, Bosnia and Herzegovina does not meet the realistic convergence criteria and needs to create favorable conditions for the labor market. In this regard, pre-accession funds from the European Union should help significantly. Achieving real economic convergence primarily depends on institutional economic convergence, which involves the process of building an appropriate

economic structure and state regulation that will adequately implement the necessary economic policy measures.

4. Conclusion

Obtaining candidate status is an essential milestone in the process of joining the European Union and comes before the accession itself. It is awarded to a country that has made significant progress in meeting specific criteria. In essence, candidate status indicates that Bosnia and Herzegovina will have to align its legal framework, economy, and societal structures with those of the European Union before achieving full membership. Countries on the path to EU membership gain access to European funds, which are distributed based on projects each country proposes, offering opportunities that should be fully leveraged. Even though Bosnia and Herzegovina was granted candidate status during a time of political complexity and difficulties, exacerbated by the economic crisis triggered by the war in Ukraine and other simultaneous challenges, this achievement marks a critical moment. It offers substantial economic and financial advantages for Bosnia and Herzegovina, serving as a stepping stone toward societal advancement and overall development

When it comes to nominal convergence criteria, Bosnia and Herzegovina does not have significant deviations in this area. The movement of public debt and budget deficits has, in most observed years, been within the allowable Maastricht convergence criteria, and these expectations are likely to continue in the future. Considering that inflation has significantly decreased recently, it is expected that the predicted conditions in this area will also be met. However, the challenge lies in meeting the real convergence criteria, where significant efforts must be made to create positive economic trends focused on the economic growth and development of the country. This will result in an increase in GDP per capita, employment growth, an increase in exports, a reduction in the negative trade deficit, and the attraction of foreign investments. In the case of Bosnia and Herzegovina, it can be concluded that the fulfillment of nominal convergence criteria has come at the expense of real convergence criteria. However, this cannot be fully accepted as the reason for Bosnia and Herzegovina's significant deviation from EU countries in terms of real economic convergence criteria, which relate to insufficient economic growth, significant unemployment, low GDP per capita, a large trade deficit, and low levels of foreign investment, among others. In this regard, Bosnia and Herzegovina and its authorities must focus on continuing to build institutional capacities that will support the country’s growth and development. Meeting these economic convergence criteria will ensure that Bosnia and Herzegovina economically and financially integrates as soon as possible into the community of EU member states operating within the single European market.

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STABILITY OF THE BANKING SECTOR IN BULGARIA DURING THE COVID AND POST-COVID PERIOD

– ABSTRACT –

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The banking sector plays a key role in the financial system in Bulgaria, as well as in all economies. As a main supplier of financing banks are among the main driving forces in economic processes. In the recent years the assets in the Bulgarian banking system show constant growth reaching the GBP, which is why its stability is crucial for the Bulgarian economy.

The Covid and the post-Covid period was challenging for the stability of the banking sector due to the unprecedent changes in the economy, locking of many sectors and uncertainties. Some economic sectors almost stopped their activities during the pandemic or had to change entirely their business models. Many companies had to leave their business sector due to failures or restructuring. The banks also had to change their business model and to devote more to remote working, digital channels and online offering to products and services. Regulatory changes were implemented during the pandemic affecting bank profits, capital buffers, lending as bank on dividend distributions, placements, loan moratoria. These measures aimed to contribute to the stability of the banking sector and to its smooth path through the turbulent period.

During the pandemic Bulgaria became a member of the Banking Union as four banks started to be directly supervised by the ECB. During the Covid pandemic moratorium on bank loans was in force as well as the measures applicable for the banks in the EU, e.g. decrease of counter-cyclical buffer, ban on dividends, ban on transfers of bank placements abroad. All these measures were implemented by the Central Bank of Bulgaria aiming at increasing bank resilience.

The aim of the paper is to investigate the stability of the banking system in Bulgaria during the Covid and post-Covid period as key determinants for the stability are investigated using data from the banks financial reports. Key research papers in the field are investigated and applied to the banking sector in Bulgaria by considering its local peculiarities. To achieve its aim the article analyses key banking indicators. In the applied model the main capital adequacy ratios are used as dependent variables as the independent variables are divided into two categories - internal banking

independent variables as ROA, ROE, Loans-to-Deposits ratio, Loans-to-Asses, NIM, Cost-to-Income ratio, Credit Impairments-to-Loans, and Leverage ratio, NPLs. Independent variables characterizing the banking system, e.g. bank size, bank concentration, direct supervision of the ECB and ownership are also used in the analyses as well as macroeconomic independent variables as the GDP growth, market capitalization and level of inflation. The results are interpreted for Bulgaria as recommendations and possibilities for developing the model are proposed.

Keywords: banking system, capital adequacy, stability, profit
Jel classification: G2, G21

INVESTIGATING BARRIERS TO BUILDING INCLUSIVE FINANCIAL SYSTEMS IN SOUTHEAST EUROPEAN COUNTRIES

─ ABSTRACT ─

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Inclusive financial systems refer to ensuring financial inclusion of all countries population into financial system in terms of ensuring access to formal financial services/products such as bank accounts, savings, borrowing and insurance). Development of inclusive financial systems are in line with the overall sustainable development goals and as such, financial inclusion has been on the governments agendas for more than two decades. Vast number of research have confirmed over the years that inclusive financial systems contributes to countries economic growth, poverty reduction, decrease in overall inequalities among different income groups, lover inflation and makes economies more resilient to different macro shocks.

The main purpose of this paper is to investigate the key barriers towards developing a more inclusive financial system in Southeast European counties (SEE), namely Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, Romania, Slovenia, Serbia and Turkey in the period from 2011 to 2021.

Methodology approach includes creation of the multidimensional index of financial inclusion (FII) using Principal Component Analysis (PCA) for measuring the level of financial system inclusiveness, and development of the panel regression model (OLS, fixed-effect and random-effect models) for investigation of the relationship between inclusive financial systems and barriers to financial inclusion.

The research shows that in the period from 2011 to 2021 the mayor barriers to financial inclusion decreased. Although a decreasing number of respondents state the existence of barriers to opening a bank account, the following were singled out as the most significant barriers: lack of financial resources, opening a bank account of another family member and the cost of financial services. The results of the panel regression model, which analyzed the contribution of barriers to the level of financial system inclusiveness, show that the following barriers: the price of financial services, not having the necessary documentation for opening a bank account, trust in a financial institution, and the open bank account of another family member, have a statistically significant impact on the level of financial inclusion. The research results are the starting point for both governments to create strategies and action plans for financial inclusion, and for financial institutions to create more inclusive financial products/services.

Keywords: inclusive financial systems, financial inclusion, barriers, Southeast European countries (SEE), Principal Component Analysis (PCA), panel regression
JEL classification: G20, G50, O52, O57, C38, C33

DEVELOPING SOLUTIONS FOR THE IMPROVEMENT OF BUSINESS PROCESSES IN THE MACEDONIAN AUTOMOTIVE INDUSTRY

─ ABSTRACT ─

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This paper presents the research towards developing solutions for the improvement of business processes in the automotive industry in the R. N. Macedonia by implementing the techniques and methods of the Kaizen philosophy. The principal goal of the paper is a comprehensive analysis of the factors that enable the improvement of the entire production process through the application of tools for identifying, monitoring and solving problems. The first part of the methodology is taking the initiative by the management or the management structure of the company to use modern tools and techniques to improve quality towards achieving the planned goals. The implementation of activities preparations implies the formation of teams for improvement, detection of problems and selection of Kaizen technique. Furthermore, it follows the definition of a plan with activities, foresees goal setting and projection of the outcome of the results of the planned corrective measures. After obtaining and analyzing the results, an internal analysis is conducted and the processes in the business process are standardized. As a result of the implemented changes in all production processes in the automotive industry, the responsible persons of each department commence to standardize their daily activities and implement greater coordination in their teams. The introduction of modern tools and techniques of Kaizen aimed to improving business processes in the automotive industry, enabled slow but continuous changes at all levels and in all areas of operation. The awareness of the management and all employees was growing that something should be done on a daily basis in order to obtain a result, improve the work, productivity, efficiency and effectiveness, make the workplace a pleasant working place and of course ultimately to result in increased profits and higher wages.

Keywords: Kaizen philosophy, methods and techniques, continuous improvement, automotive industry

JEL classification: O32 Management of Technological Innovation and R&D; O33 Technological Change: Choices and Consequences

Introduction

Kaizen as a philosophy is commonly implemented through a series of small, incremental improvements performed by the employees at all levels of the organization. These improvements are mostly low-cost and low-risk, making them easier to implement and maintain over time (Omotavo et al., 2018). By organizing events or Kaizen workshops, large-scale improvements are facilitated or specific challenges are addressed. In general, Kaizen is not just a set of tools or techniques, but also a way of thinking that encourages continuous learning, experimentation and improvement (Chan & Tay, 2018; Gonzalez-Aleu et al., 2018). By accepting the principles of Kaizen, the organizations can create a more agile, efficient and innovative environment that will enable them to thrive in an ever-changing world. Continuous improvement is an ongoing process of improving products, services or processes gradually over time. It is a systematic approach for making small, incremental changes that lead to overall improvements in quality, efficiency and effectiveness. Continuous improvement is rooted in the philosophy that there is always a room for improvement and emphasizes the importance of constant evaluation, adaptation and innovation (Singh & Singh, 2018; Iwao, 2017).

This paper presents the research towards developing a solution for the improvement of business processes in the automotive industry in the R.N. Macedonia through the application of tools for identifying, solving and monitoring problems. The results and analyzes contributed positive effects of the activities that were performed by standardizing business processes and work obligations through the application of the 5S method. By daily practice of this tool, the workspace becomes more organized and more pleasant for working. With the implementation of the Poka-Yoke method, a process was established that prevented the mistakes that operators made. Following the innovations and the automation of the processes allows us to facilitate the way of manufacturing and achieving the desired quality of the product. The problem discovery steps identified solutions to all the challenges we faced in manufacturing, supply chain management and product design. After all the changes that have been implemented in the processes, we must always monitor them and make improvements continuously, because this is how we develop the skills and awareness of the employees. By adopting the principles of Kaizen, the company can more easily adapt to changing market dynamics, encouraging innovation to ultimately achieve higher levels of customer satisfaction and operational excellence.

Kaizen is a Japanese philosophy that represents a set of tools and techniques for improving the quality of business processes, products and services. The Japanese philosophy is based on small and continuous process improvements, which increase the efficiency of the organization and the production and achieve greater results, including all the organizational members, regardless of which hierarchical level they are and without making large capital investments (Suárez Barraza et al., 2018; Kumar, 2019).

The work organization plays a key role in the entire process of improving the business processes and competitiveness of the company Solaimani et al., 2019). The management of the company must reconsider and establish the organizational and business processes under new conditions and on a higher level. It is extremely important to establish a modern management of operations and duality of the managerial and ownership function of operations, to accept new working methods and techniques in which all the employees will be involved (Vo et al., 2019; Vinodh et al., 2021).

Hence arises the need for creation of a concept for complete quality management in all segments of the operation, its planning, control and improvement, all with the aim of creating a product or

service of high quality that will meet and exceed the needs and expectations of the market (Kumar et al., 2018; Mitra Debnath, 2019; Jaca et al., 2018).

Materials and Methods

The main topic of the research in this paper is to analyze the factors that determine the improvement of the operation of a Macedonian automotive company and its competitiveness through the improvement of business processes in all aspects. The purpose of the research is to determine the benefits and results of adopting the Kaizen philosophy and its methods and techniques, which are of strategic importance for continuous success in the development of business processes (Goyal et al., 2019; Carnerud et al., 2018). The first part of the methodology is taking the initiative by the management or the management structure of the company to use modern tools and techniques to improve quality towards achieving the planned goals. The implementation of activities preparations implies the formation of teams for improvement, detection of problems and selection of Kaizen technique. Furthermore, it follows the definition of a plan with activities, foresees goal setting and projection of the outcome of the results of the planned corrective measures. Quality control tools and techniques are used to set measurements at critical points, where results are monitored and ongoing control is established. After obtaining and analyzing the results, an internal analysis is conducted and the processes in the business process are standardized. Finally, with the self-assessment method, the final evaluation of the results and effects of the designed and applied methodology is provided (Fonseca & Domingues, 2018; Enshassi et al., 2019). The implementation of methods and techniques derived from the Kaizen philosophy offers an approach towards continuous improvement within automotive companies. Kaizen has enabled the company to achieve sustainable growth and competitiveness by improving business processes and by fostering a culture and empowering employees at all levels to identify and address inefficiencies. By emphasizing the importance of small, incremental changes and including every employee in the improvement process, Kaizen fosters a sense of ownership, engagement and commitment throughout the organization.

Results and Discussion

The company from the automotive industry for the production of car seat covers is the first company in R.N. Macedonia and the eastern region, which has been actively working for 13 years with its headquarters in Shtip in the technological industrial zone. It is a global automotive seat cover manufacturing company for multiple car models and classes for Ford, Mercedes, VW Golf and Volvo. The company has built its own facility with huge plants that are equipped with the most modern ordinary and special machines such as Lectra, Teseo and others. This company produces about 2000 different covers and it is recognized for the high quality of its products that are installed in the cars of the most famous brands in the automotive industry. The automotive industry is one of the most dynamic and influential industries in the world and it adapts to global standards, technologies and innovations to improve the production processes. During these 13 years, this company has succeeded to establish itself in the market and to demonstrate that it is a desirable and caring employer for the employees in R. N. Macedonia. It is a company that brings value on a global level, offers products of the highest quality for customer satisfaction and contributes to the socio-economic development of the country. The implementation of the Kaizen philosophy in the company from the automotive industry is realized through various tools (Carnerud et al., 2018; Chung, 2018).

In order to achieve greater efficiency and effectiveness in the automotive industry, it is established a process in which by layout or schedule of operations by machine, the operator rotates in a chain from operation to operation to produce a finished product. By this concept, the productivity and

quality of production is improved, because a complete plan of the process is performed. The space, number of machines, number of required employees and other necessary resources are calculated. According to these analyses, the layout and setting of operations by machines is made according to the specification, necessary guides, shoes, etc. The number of necessary machines amounts to 45, of which 30 machines are for ordinary composition, 5 machines are for sewing a decorative stitch - double-head, 5 machines are for a decorative stitch - iber and 5 machines are for cutting certain operations - edge trimming. During the manufacturing of the product, each operator is obliged to cut the stitch, perform a self-inspection of the piece, put a stamp to verify that the piece is quality-made and approved for the next operation so that the entire cover is handed over for final control. The target that the client is looking for the production of seat covers is 200 sets per day. It takes 35 employees to produce these sets. At the beginning of the project, 40 operators were trained and started with efficiency of 50%. In the first week, it was considered that the team was growing slowly in terms of efficiency and production of sets, because there were more operators than targeted and more time was wasted, because not everyone worked with the same speed and there was no possibility of rotations. After the implemented measurements by the process engineer and the team leader of the cell, the results of the tack time and the real times of the operators were analyzed and a decision was made to be removed 5 operators with weaker performance. Proposals for improvement were also taken into account in the places where it was considered that there was a "bottle neck" by the employees and a small change was made in the schedule of operations for the movement of the pieces, more precisely, production was followed in the flow of one piece (One-piece flow production) to prevent empty steps, loss of time, waiting, but also stock creation. With the allocation of resources, proper training and rotation of operators, the team increased the efficiency by 15% in the second week of the project, i.e., achieved efficiency of 65%. By optimizing the operations and the number of employees, the efficiency improved and the set target of 200 sets for which the client had a request was achieved Alvarado-Ramírez et al., 2018).

In certain projects, due to the problem of the cover design, an alternative solution must be found to detect and prevent certain manufacturing errors, therefore the Poka-Yoke method is applied. In the initial phase of each project, an initial application of the Poka-Yoke method is considered which is later continuously improved. In this case, this method had to be installed on a special double-head decorative stitch machine, because it was concluded that there is an increased number of scrap pieces, because during the operation, the seam is underneath the piece and the operator does not notice it visually. Therefore, during the actual sewing, the seam kept closing. By implementing the Poka-Yoke method, the scrap of this critical operation was prevented by placing a sensor on the underside of the working table surface of the machine and if it happened to twist the seam, the machine will close (stop) and the operator must set the seam correctly – to open it, so that the sensor can be unblocked and complete the operation accurately and with quality (Al-Hyari et al., 2019).

Besides all these methods and techniques, the JIT (Just In Time) strategy also have an important role, without which an accurate and timely flow of the processes cannot be ensured. A just-in-time (JIT) inventory system is a management strategy that harmonizes the raw material orders - from suppliers - directly with production schedules. Automotive companies use this inventory strategy to increase efficiency and reduce waste by receiving only the goods they need for the production process, thereby reducing inventory costs. This method requires manufacturers to accurately forecast the demand. Instead of storing large stocks of materials and components in warehouses, with this strategy, minimum stock levels are maintained and quantities are obtained from suppliers as much as we need to manufacture pre-planned capacities. For example, the material order is made by the logistics coordinator who, based on the previously received EDI quantities (electronic numbers for capacities), in the CUTMAN system calculates how much material is needed for the production of the sets requested by the customer. If the coordinator does not predict that there is stock, a low reserve of material in case of scrap during tailoring, sewing of the covers or increase in

demands can lead to a stoppage of the entire production. The next example is the specific component IZOFIX button (a component that indicates on the back seat where a child seat should be placed) where an order is made to the supplier on a weekly basis with a low stock calculation, but if no quantity is foreseen for a possible scrap or increase in demands, this component will cause a stoppage in the entire production process. In case of a major problem, which means that even the minimum stock is not enough, a backup plan is needed for immediate delivery by the current supplier or another supplier in the shortest time with lower additional delivery costs. In general, JIT helps car manufacturers to operate more efficiently, to minimize costs related to storage space, handling, insurance, obsolescence and respond more quickly to changes in customer demand (Álvarez-García et al., 2018).

The 8D (Eight Disciplines) method is commonly used in the automotive industry to effectively solve the quality problems. An example of the application of this method in the sewing of car seat covers is a recurring problem that has arisen in the production line, which is a stitch on the front side. This finding was also observed on the production line at the customer. Upon request of the buyer, it is necessary 8D report to be made.
Steps in applying the 8D methodology (Eight Disciplines) Enshassi et al., 2019):

- Firstly, a team is formed: The first step is to assemble a cross-functional team that includes representatives from manufacturing, quality control and engineering. This team works together to analyze and solve the problem.

- Defining the problem: A clear definition of the problem and in this specific case it is the stitch on the front side of the car seats. It has been identified that there are frequent defects in the stitching of the seat covers, leading to inconsistencies in appearance and durability.

- Internal emergency actions: Implementing interim actions to contain and prevent further defective covers from reaching customers. This includes more rigorous sorting through selection and inspection of case covers before they leave the production line and warehouse area.

- Identifying the root causes: Techniques such as “5 Why” or Ishikawa diagram are applied to identify the root cause of cover defects. It can be determined that there are problems with the sewing machines, insufficient training of the operators or problems with the quality of the used stitch.

- Defining corrective actions: Based on the findings of the root cause analysis, corrective actions are developed and implemented. This could include replacing sewing machines, providing additional training to operators in proper stitch cutting techniques.

- Confirmation of corrective measures: The identified corrective measures should be applied into practice. This may include retraining operators, installing new equipment or updating standard operating procedures.

- Taking preventive measures: In order to prevent the occurrence of similar problems in the future, preventive measures are established. This may include implementing regular maintenance schedules for sewing machines, conducting ongoing operator training and improving quality control processes to detect potential problems early.

- Recognizing Team Effort: Finally, the team's efforts in solving the problem should be recognized and celebrated. This encourages continuous improvement and collaboration among team members.

The methodology of 8D (Eight Disciplines) is shown in Figure 1.

Figure 1: Application of the eight-discipline-8D methodology in the automotive industry

By applying the 8D (Eight Disciplines) methodology for solving the problems in sewing car seat covers, car manufacturers can effectively identify and solve quality problems, leading to improved product quality, customer satisfaction and operational efficiency.

Pareto analysis is applied to identify the problems that occur during the production of car covers and with the Ishikawa analysis, the causes of the error are determined. The Pareto diagram is applied when analyzing data for frequent problems which appear in the quality process. An example through which these two analyzes will be applied is the finding in a production line. Through the recording of errors by the final control using the Pareto method, it can be concluded that of all the errors that are found internally in the production line, the most common error is a stitch on the front side of the seat, while the other defects are less numerous. Therefore, it is necessary to take corrective measures to reduce or permanently solve this problem, as shown in Figure 2.

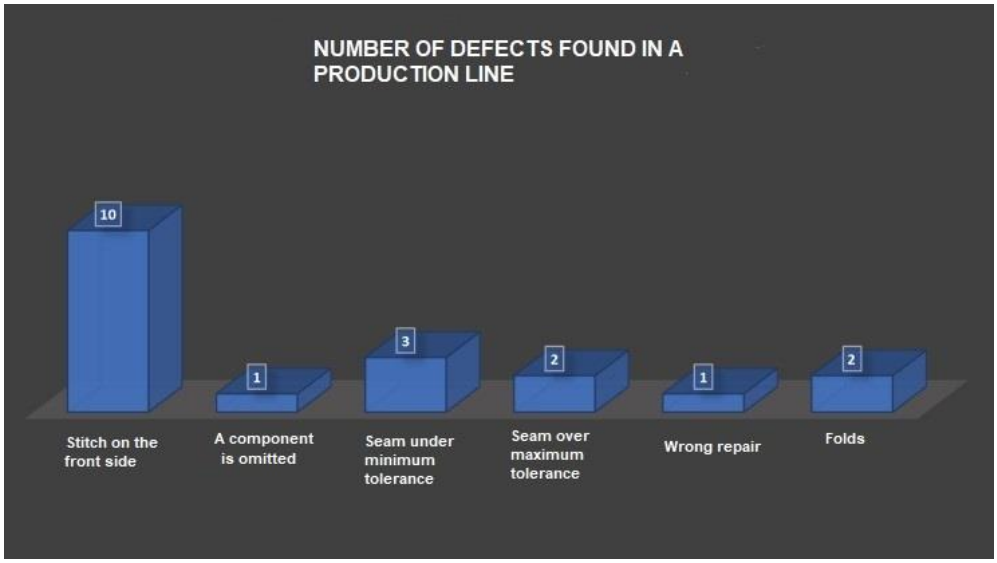

Figure 2: Pareto analysis in problem solving in a production line

Based on the Pareto diagram, an Ishikawa analysis was performed to determine the potential causes of this recurring error. After the conducted analysis, it can be determined that the human factor and in this case the operator did not self-control of the operation he/she sewed, as shown in Figure 3.

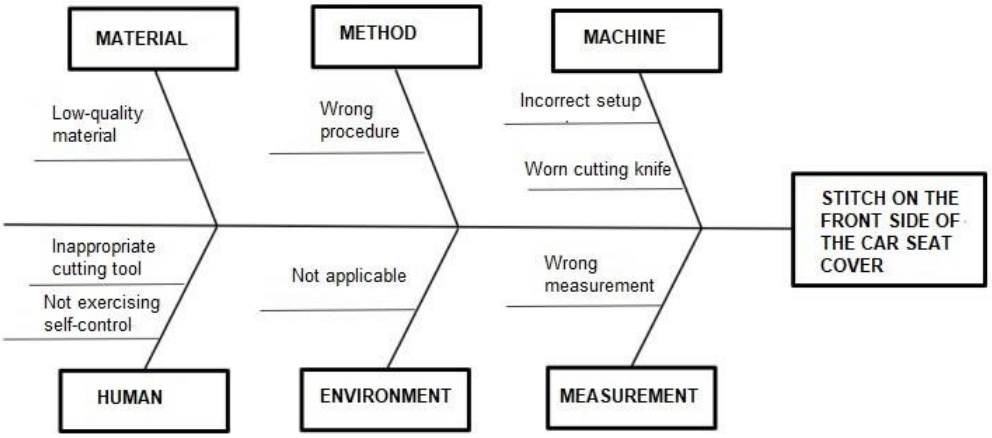

Figure 3: Ishikawa analysis of a production line problem

It should not be omitted the whole procedure to be checked if the machine is set correctly, if the sharpness of the knife of the machine meets the quality criteria and to check the cutting tool, i.e. the sharpness of the scissors to be used by the operator eventually after the operation is completed. After all these steps are completed, a time frame should be set for monitoring the error, whether there will be improvement, i.e., reduction, complete resolution or repetition of the problem.

Problem solving method can be used to solve complex challenges. Through the structured approach, problem solving first begins with defining the problem, gathering relevant information, identifying the symptoms or problems and looking for the root cause of the problem. The "5 Why" technique can also be used to dig deeper into the root causes. An example for which this tool was used is an omitted component in a production line, as shown in Figure 4.

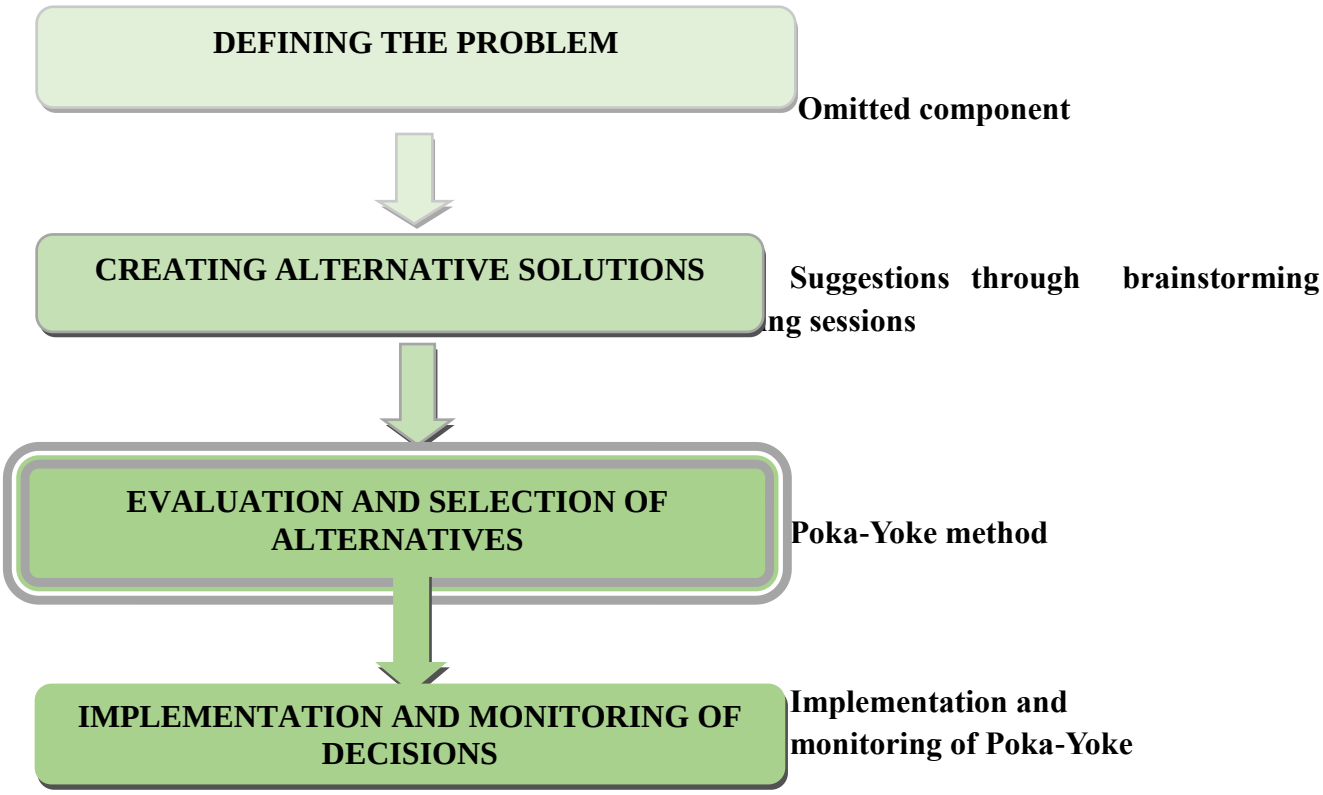

Figure 4: Steps in the problem-solving process

After defining the problem that occurred, which is that the operator omitted the component, the next step is to create an alternative solution. By encouraging creativity through brainstorming sessions from the employees, the idea of choosing a Poka-Yoke method that will bring a long-term solution was reached. After the conducted analyzes and evaluation, this alternative was chosen and the implementation of the chosen solution was carried out. On the machine sensors are placed the boxes marked with part numbers of various components that the operator has to pick up in a predetermined order. If the operator does not follow the order, the sensors block the machine, a sound signal is activated and the operator has no possibility to make a mistake. However, apart from this, a metal holder was placed on the next machine where the semi-finished product should be attached. If there is no component, the operator will not be able to postpone the piece to the next operation. After implementing this method, the results were monitored and it was determined that this error never happened again.

With the "5 Why" method was identified the root cause of the problem for the omitted component. To the question, Why did the problem occur, the answer is that the operator did not respect the work process, because he/she skipped an operation. Why did he/she skip an operation? Because he/she did not have adequate training and did not perform self-control and the process itself was not set to ensure that the piece was made with quality. All of this could have been foreseen when creating the process of movement and making the piece and if it had been implemented Poka-Yoke method at the beginning, it would have prevented this error. Through this method the problem is determined, as shown in Figure 5.

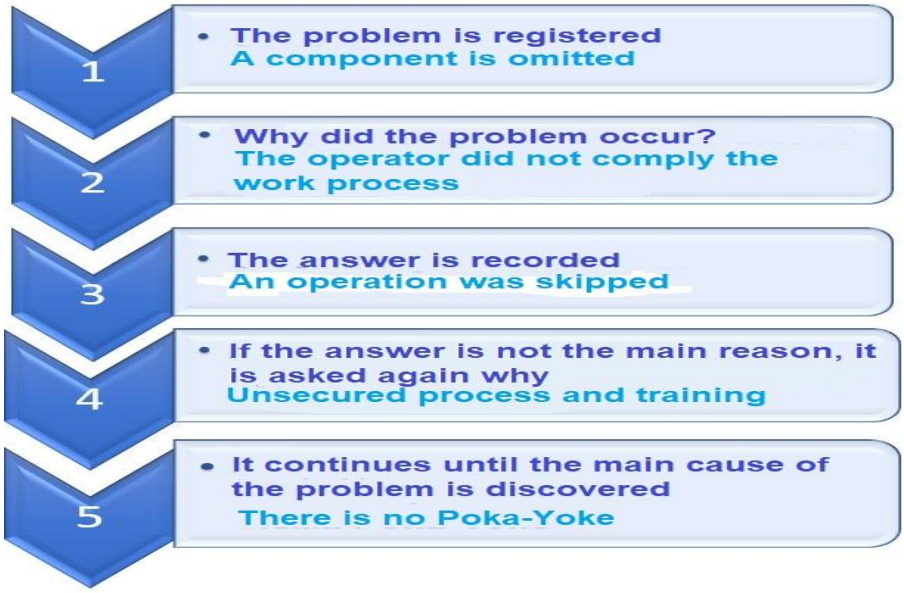

Figure 5: Steps in applying the "5 Why" method

The implementation of the 5S method in a company from the automotive industry contributed to better results in the organization of the working space, because a daily routine was introduced to apply all the steps of the 5S tool. Of course, it would not work permanently if there was no traceability of the daily situation. In the logistics sector, upon receipt of the shipment by the warehouse department, if the materials and components were mixed, with the introduction of 5S, a detailed arrangement is conducted in alphabetical order by shelves and part numbers. And with the introduction of the FIFO (First in First Out) method, effective stock management commence, ensuring that goods are used in the order in which they were purchased. Those who entered the

stock first, should be the first to leave. This improves the process of receiving and handing over materials and components because each warehouse operator can more easily arrange them on receipt or find them for issue by FIFO. This reduced the time required for searching, checking, hiring workers and all other non-productive work. From the incoming control, all materials are checked according to the meterage, thickness and shade of the material, where each roll is marked with a colored flag (red, yellow and green) and according to the required specifications, it is issued to the tailoring department. All obsolete materials and components after completion of the projects are placed in a predefined location which are later used in a training cell for training new machine operators. In the production department of the tailoring department, mixed or fallen rolls were often found, but with the introduction of 5S, metal holders-separators were installed to separate the rolls vertically, according to part numbers, colors, dimensions, etc. Thus, when taking the rolls for laying the lectras for tailoring, the process of finding them was facilitated for the operators and the damage to the material from the breakage that happened when the roll fell to the floor was prevented. In the sewing department there are always many points to solve which cause countless problems in the process of making the covers.

The part of the points for which a solution was found through the application of Kaizen, i.e. 5S method, are the following:

Mixed Kanban components
Two similar components were placed on a Kanban next to each other, however when manipulating the components from the boxes there was a mix-up because there is very little difference in design. A brainstorming solution was provided by one of the employees who was the supplier of the material and component, to move one box from the first row on the left of the Kanban to the second row on the right of the Kanban so that they could be further apart. This small change prevented component mix-ups and saved time, resources and costs for additional repair and scrap covers if the component reached the sewing cell.

Scrap pieces in subline
In the production line, there have been situations when the machine operator made a mistake during the production of a certain piece that could not be repaired and had to throw it away as scrap. When there was no place for putting that piece, it was left on the machine and usually mixed with the quality made pieces and it ended up with a finished product. By considering the problem, it was invented to be placed a red box for scrap pieces. That box was placed at the beginning of the sub-line where it immediately stood out as a scrap and orange boxes were placed in the line that were marked for pieces for repair if an operation went wrong during sewing and it can be repaired.

Messy production lines
One of the frequent findings at the end of a shift was undiscarded waste from pockets, floors and machine dust. With the introduction of a 5-minute cleaning at the end of a shift, each operator has a duty of emptying the waste from the pocket of the machine where the operator worked into a bin by placing several small bins in each sub-line. For maintaing the floor clean, brooms and shovels are provided per cell in a designated location for cleaning tools and at the end of a shift each operator is responsible for removing the waste from the sub-line. Dusters were provided for each machine to remove dust and each employee obligatorily wipes the work surface and leaves the work area tidy and clean for the next shift. All this to be maintained is monitored by the designated captain in the sub-line who performs daily records in a checklist.

Identification of unnecessary parts, tools or materials
Findings of parts, objects, tools, materials and components whose utility status was unknown were constantly observed throughout the workspace. In order to decide whether the objects that have

been found are needed or not, a process called Red tag has been introduced. A real-life example from the automotive industry of using this tool is removing components from a completed project from the Kanban. After the project completion, the warehouse operators, according to the directions of the material coordinator from logistics, should remove all the materials and components of the Kanban, but an omission was made by the warehouse operators by not withdrawing all the part numbers that were already obsolete. Therefore, the material handler from the sewing department removes the boxes with components with a red tag and puts them in the marked Red tag zone, where the process of considering whether these components will be returned to the warehouse or thrown into the waste. In order not to repeat this finding after the project completion, a record list was introduced which components should be removed from the Kanban and withdrawn to the warehouse.

Conclusions

As a result of the implemented changes in all production processes in the automotive industry, the responsible persons of each department commence to standardize their daily activities and implement greater coordination in their teams. At the same time, continuous corrections were performed to the weaknesses in the teams, by rejecting all the unnecessary activities, which are not in the direction of achieving progress and do not contribute to the creation of new values. The introduction of modern tools and techniques of Kaizen aimed to improving business processes in the automotive industry, enabled slow but continuous changes at all levels and in all areas of operation. The awareness of the management and all employees was growing that something should be done on a daily basis in order to obtain a result, improve the work, productivity, efficiency and effectiveness, make the workplace a pleasant working place and of course ultimately to result in increased profits and higher wages. The adoption of the Kaizen philosophy in the company has led to a complete orientation towards the customer, which in this industry is a key factor for successful production, gaining reputation and following all current demands and criteria (Álvarez-García et al., 2018). Hence arises the need for continuous progress and changes, small but significant steps in every segment of daily operations. The implementation of the Kaizen philosophy is expected to provide even greater results in the long-term period because over time it becomes a way of working accepted and approved by all the employees and management (Chung, 2018; Solaimani et al., 2019).

Through applications such as Gemba walks, PDCA cycles, LEAN manufacturing, analysis and problem-solving tools, the company systematically identifies opportunities for improvement, streamlining processes and improving overall performance. The results and analyzes contributed positive effects of the activities that were performed by standardizing business processes and work obligations through the application of the 5S method. By daily practice of this tool, the workspace becomes more organized and more pleasant for working. With the implementation of the Poka-Yoke method, a process was established that prevented the mistakes that operators made. Following the innovations and the automation of the processes allows us to facilitate the way of manufacturing and achieving the desired quality of the product. The problem discovery steps identified solutions to all the challenges we faced in manufacturing, supply chain management and product design. After all the changes that have been implemented in the processes, we must always monitor them and make improvements continuously, because this is how we develop the skills and awareness of the employees. By adopting the principles of Kaizen, the company can more easily adapt to changing market dynamics, encouraging innovation to ultimately achieve higher levels of customer satisfaction and operational excellence.

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TO DIVERSIFY OR NOT? ANALYSIS OF AGRICULTURAL CASE STUDIES FROM BULGARIA

-ABSTRACT-

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Abstract

Agriculture has traditionally been an important sector for Bulgaria, but over the past 30 years its role has been significantly transformed. Today it is one of the lagging sectors, with a low share of GDP (3-5%) and low value added. However, the potential for development is high: a significant number of farms and producers (132742 total number of farms in Bulgaria, according 2020 census) and a growing entrepreneurial interest, stimulated by factors such as increasing demand for food, EU policies and access to EU funds, favourable climatic conditions in Bulgaria, etc.

Current Situation: Agricultural entrepreneurship is characterized by a wide range of activities carried out by agricultural producers, which covers from the implementation of innovations in production technology and the use of new raw material sources to the development of new markets for their production. Farms and producers are predominantly focused on monoculture crop production. This makes them vulnerable to unpredictable weather conditions, climate change, market fluctuations, etc. Diversifying the "portfolio" of activities could ensure greater sustainability and stimulate growth, including innovation in the sector. In support of our thesis, the report presents comparative analyzes on macro level - Bulgaria and micro level - Severen Tsentralen statistical region based on the presence/absence of diversification in the offered agricultural products, which serve as a practical insight into the realities of Bulgarian agriculture.

Research aims to analyse the business environment in Bulgarian agriculture and to evaluate diversification as a tool for sustainable growth. To implement it, a mixed approach is applied:

Methodology: A mixed approach was used, based on a combination of the following methods:

- Deduction: to derive the hypothesis that diversification can reduce vulnerability in agriculture.

- Two-stage empirical test: on macro level: SWOT analysis to assess the macroeconomic environment and the factors influencing the sector's development opportunities; and on micro level: empirical study of the practices of Bulgarian farms and producers.

- Induction: to provide general conclusions from specific farms and producers.

The study examines the entrepreneurial environment in Bulgarian agriculture, investigates diversification as a tool for sustainable growth, and provides recommendations for Bulgarian farms and producers. This would help farmers at the micro level to make better informed decisions about the development of their farms, while at the macro level the state could focus support measures in the agriculture sector where there are natural features and traditions in production.

Keywords: agriculture, entrepreneurship, SWOT analysis

JEL classification: Q10, Q12, O0, O5, R10

1. Introduction

Global challenges such as climate change, depletion of natural resources and a growing world population in recent decades have highlighted the need to rethink traditional agricultural models. The concept of sustainable development has become a guiding principle worldwide, with the focus on meeting the needs of the present without compromising the ability of future generations to meet their own needs. In this context, sustainable agriculture is emerging as a key component of sustainable development, aiming to provide food, feed and other useful products in a way that preserves ecological balance, enhances social equity and maintains economic viability.

Sustainable agriculture is defined as a system for "the efficient production of safe, high-quality agricultural products in a way that protects and enhances the natural environment, the social and economic conditions of farmers, their employees and local communities, and the health and well-being of all farmed species" (Buckwell et al., 2015 cit. op. Marandure, T., et al.,.2020, p.1). It aims to optimize the use of natural resources, reduce negative environmental impacts and improve the quality of life for local communities. The main goal of sustainable agriculture is to achieve efficiency and sustainable growth.

Agriculture in Bulgaria is currently changing to become sustainable. This process is slow and requires addressing challenges such as:

- *Fragmentation of land*: Small and scattered farms make it difficult to apply modern technologies and practices.

- *Weak competitiveness*: Bulgarian farms often have low productivity and limited access to markets.

- *Climate change*: Frequent extreme weather events threaten the stability of production and increase the risk of losses, especially in monoculture production.

- *Insufficient numbers* of young people in the sector, leading to a decline in innovation and difficulty in adapting to new conditions.

In order to adapt to new conditions, farms need to seek innovative solutions and improve their sustainability and resilience. The extent to which "agricultural sustainability at the local level is achieved by practices that simultaneously increase resource-use efficiency or overall system self-sufficiency, while, decreasing environmental degradation and enhancing the social well-being of farmers" (Moraine et al., 2017, cit op. Marandure, T., et al.,.2020, p.1), diversification of agricultural activities has emerged as a key strategy to address the challenges faced. By diversifying crops, products and even areas of activity, farmers can reduce risk, increase income and create more sustainable farms.

The aim of this study is to analyze the business environment in Bulgarian agriculture and to assess the potential of diversification as a tool for sustainable growth. To achieve this goal, a mixed approach is used, combining both qualitative and quantitative research methods. The study includes a two-stage empirical test: at the macro level, using SWOT analyses to assess the macroeconomic

environment in Bulgaria and the factors influencing the development of the sector; and at the micro level, through an empirical study of the practices of Bulgarian farms and producers in Severen Tsentralen statistical region[17].

This research will contribute to the achievement of the country's sustainable development goals, while providing valuable information for the development of effective strategies for the development of Bulgarian agriculture.

2. THEORETICAL FRAMEWORK

Diversification in general is an approach that describes the application of the principle of distribution to adapt to dynamic changes in the environment through innovation, resilience and growth. Depending on the specifics of the different areas, the understanding of diversification specifies the objectives and the context of application. Agricultural diversification[18], for example, is a process of reduction of reliance on a single crop, livestock and/or farming activity and the introduction of a variety of crops, livestock and activities. (Petit, M. and Barghouti, Sh., 1992, pp. 6-8; Schuh, G. Ed. and Barghouti, Sh., 1988, p. 42) It occurs at four levels: farm, sector, regional and inter-sectoral (national). There are three main forms of agricultural diversification, depending on the nature of the change:

(a) a shift from farm activities to non-farm activities;

(b) a shift from less profitable crops/activities/enterprises to more profitable ones; and

(c) the use of resources in different but complementary activities (Vyast 1996, p. 637).

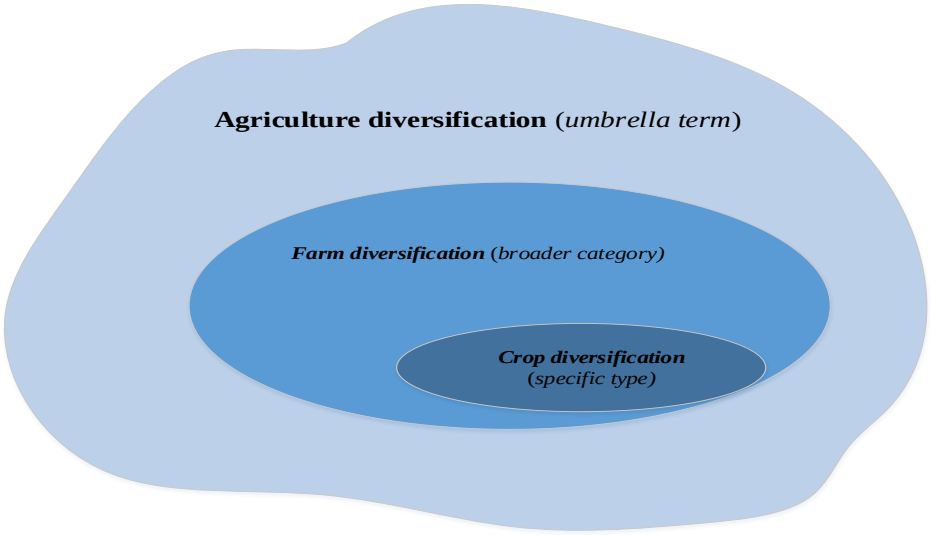
Agricultural diversification is a broad concept that can be specified in different dimensions, such as crop diversification and farm diversification. The first type of diversification focuses solely on the variety of crops grown (crop rotation) at the farm level. Farm diversification, on the other hand, covers a wider range of activities at the macro level (sectorial, regional). It includes not only agricultural activities but also non-agricultural activities such as agro-tourism and the development of related markets. Although with different specializations, both types of diversification are components of agricultural diversification, which can be visualized as follows (Figure 1).

Diversification creates opportunities for achieving higher and more stable rural incomes through the more efficient use of resources and the exploitation of comparative advantages (Trends in Agricultural Diversification. Regional Perspectives, Shawki Barghouti, Lisa Garbus, and Dina Umali, editors, The World Bank Washington, D.C.,1992, p. i). However, these opportunities are limited by land, climate, and socio-economic factors (Zandstra, 1992, p.13). These limitations can be overcome through appropriate policies, infrastructure, and support for rural areas.

Figure 1. COMPONENTS OF AGRICULTURAL DIVERSIFICATION

[17] We use Eurostat name of Severen Tsentralen statistical region in the article, which is transliterated from North Central statistical region in Bulgarian.

[18] We agree with Hufnagel et al. (2020, p. 13) that there is no clear definition of diversification in agriculture and that the term is therefore used in many different ways. The following definition is the authors' view of the essence of diversification in agriculture.



Source: Authors' development.

The inherent characteristics of agricultural diversity are essential for the growth and prosperity of both rural farming and the agricultural sector. By cultivating a variety of crops and livestock, it becomes possible to mitigate risks, increase incomes, generate employment, and strengthen food security. Furthermore, agricultural diversification promotes environmental sustainability and stimulates value-added processing. Diversification is an effective business strategy to build resilience and ensure long-term growth (Rizvi, 2024), including for farms and agro-enterprises.

Agricultural diversification has considerable potential for the improvement of rural livelihoods. By optimizing resource use, implementing activities and exploiting comparative advantages, farmers can achieve higher and more stable incomes. However, geographical, climate and socio-economic constraints can hinder this process. Supporting policies, infrastructure and rural development initiatives are essential to overcome these challenges.

3. LITERATURE REVIEW

Diversification in agriculture is becoming an increasingly important strategy for adapting to a dynamic economic environment and enhancing farm resilience. With climate change, growing competition, and evolving consumer preferences, agricultural enterprises face numerous challenges that require flexibility and innovation. For this reason, more and more farmers are recognizing the benefits of diversification and efficient allocation of their resources, products, and activities. Despite the growing interest in implementing diversification strategies, there is a limited amount of research in the Bulgarian context. Existing studies focus on:

Macroeconomic aspects of diversification: Research has focused on the macroeconomic effects of diversification, such as the economic benefits for rural areas and the impact on the national economy (Atanasova, 2023, pp. 56-62); factors for the development of agricultural enterprises in Bulgaria (with a focus on small farms) (Borisov, Radev, Nikolov, 2014); and attitudes towards the development and diversification of investments and activities in small farms (Study of MIG Belene - Nikopol, 2019). Through SWOT analyses, diversification is identified as a strength for the development of agricultural enterprises (Borisov, Radev, Nikolov, 2014, p. 39). At the same time, the low level of diversification is one of the factors causing fluctuations in the average net income of agricultural holdings (Institute of Agricultural Economics, 2020, p. 45). This limits the opportunities for increasing income and increases the risk of income instability (Institute of Agricultural Economics, 2020, p. 95).

Diversification as a risk management tool: Diversification is described as a tool to minimize risk and stimulate the agricultural sector (Nikolova, Linkova, 2011, p. 306). It provides entrepreneurs with opportunities to generate additional income, resulting in a reduced dependence on the production of subsidized agricultural products (Nikolova, Linkova, 2011, p. 319). Diversification is considered an effective risk management strategy in agriculture when farmers rely on several activities or assets whose incomes are negatively or weakly correlated (Georgieva, Kirechev, 2021, p. 58).

Diversification as a driver for farm development in the following directions

- *Sustainability and efficiency of farms*: Diversification is one of the preferred and applied solutions to achieve higher agricultural sustainability (Bachev et al., 2019, p. 230). Its application leads to positive changes that occur slowly and still apply to a limited number of farms (Doichinova, 2021, p. 21).

- *Economic growth*: Research examines how integrated development through diversification enables multifunctional use of resources, which increases opportunities for growth (Turlakova, 2014).

A review of the literature shows that most of the studies to date have focused on the macro-economic aspects of agriculture and on the impact of diversification at the sectoral level. However, there is a lack of in-depth analysis of individual farms, their specific conditions and the challenges they face in implementing diversification strategies, as well as information on whether they implement such strategies. This study aims to fill this gap by focusing on the factors that influence farmers' decisions to diversify their activities, as well as the specific difficulties and benefits they encounter in this process. The results of the study will have both theoretical and practical significance, contributing to a better understanding of diversification processes and providing valuable information for the development of effective policies and programs to support farms.

4. AGRICULTURE IN BULGARIA – BULGARIAN CONTEXT IN EUROPEAN UNION

Agriculture remains a cornerstone of the European Union's economy, with market-oriented agricultural holdings playing a crucial role in ensuring food security, economic stability, and social welfare especially in rural areas. The transition towards market-oriented agricultural holdings has been a key aspect of Common Agricultural Policy (CAP) reforms within the EU. This shift aims to enhance competitiveness, efficiency, and sustainability within the agricultural sector. Agricultural holdings in Bulgaria are not isolated from the global trend of EU. The market-oriented agricultural holdings are part of all farms and are divided into different stages according to their standard output. The standard output (SO) of an agricultural product (crop or livestock) is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock[19]. The standard output is used to classify agricultural holdings by type of farming and by economic size[20]. This article delves into the development of such holdings in Bulgaria, providing a case study that reflects the broader EU context. The analysis is divided on two parts, i.e. Bulgaria covered the period 2007 – 2022 and Severen Tsentralen statistical region covered period 2016 – 2022. This is made due to better in-depth research comparable in accordance with data as well as before and after Covid-19 turbulence.

The selected indicators for this research are Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm) which will be examine on macro level – Bulgaria, and microlevel - Severen Tsentralen statistical region.

The comparative analysis as method is used to compare the situation in different types of agricultural holdings within Bulgaria. The types of specialization are 8, i.e.

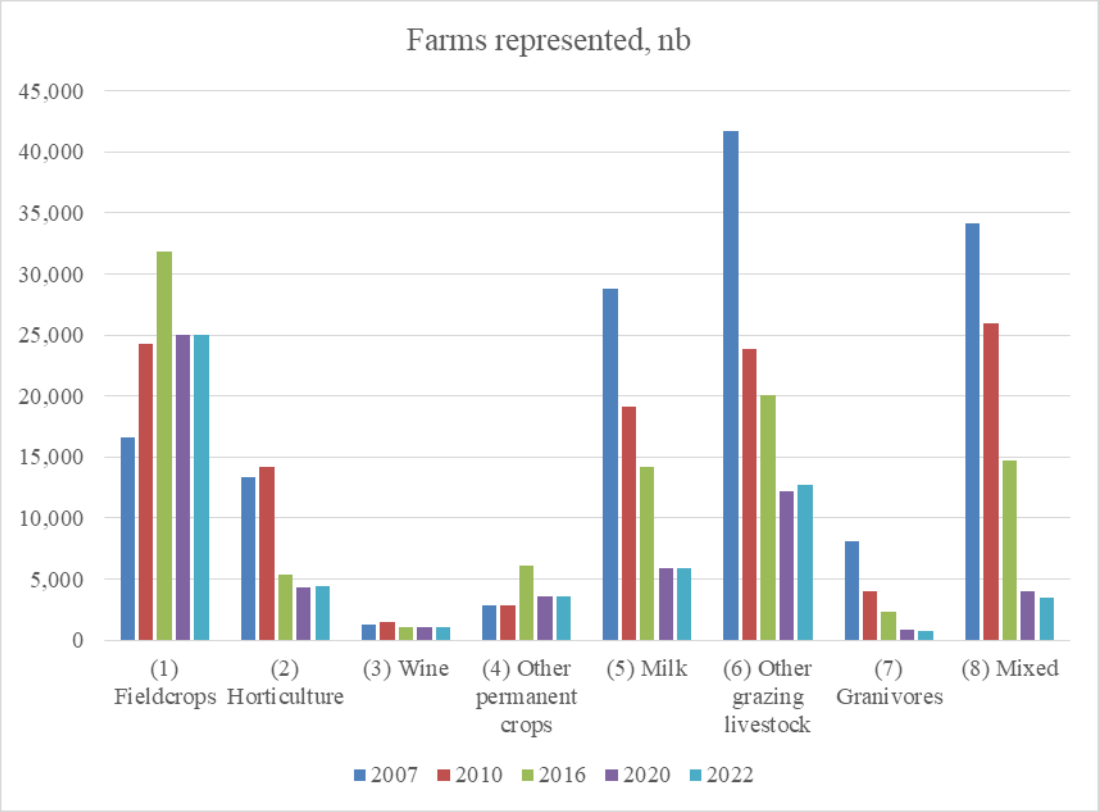
[19] Glossary:Standard output (SO) - Statistics Explained (europa.eu) [Accessed: Aug. 3, 2024].
[20] Glossary:Agricultural holding - Statistics Explained (europa.eu) [Accessed: Jul. 25, 2024].

(1) Fieldcrops
(2) Horticulture
(3) Wine
(4) Other permanent crops
(5) Milk
(6) Other grazing livestock
(7) Granivores
(8) Mixed

It helps to contextualize the findings and understand the relative performance or characteristics of the subject of study. The researchers of this study assume that agricultural holdings which have Mixed specialization should be more sustainable compared to others.

Figure 2 represents the dynamics of the market-oriented agricultural holdings in Bulgaria according to their specialization through the period 2007 – 2022. The total number of these holding drops by 61 % (or 89 782 farms disappeared) for the reference period which is a clear indicator for constant consolidation of the farms. The other two exceptions are specialized farms in Fieldcrops and Other permanent crops which have increased their presence with 50% and 29% respectively from the beginning of the period. The most severe drop is in farms specialized in Granivores and Mixed – with 90 % for the period. The milk farms drop by 79 % while the Other grazing livestock is down by 70 %. As we can see the sustainability of the farms on macro level is questionable despite the CAP funds and EU membership of Bulgaria. Sustainable practices must be followed to ensure that agriculture is responsible towards the natural resources, biodiversity, climate and the society itself (H.Uzunov and E.Marinov, 2021, p. 125). The economic uncertainty since COVID-19 and different interventions in Europeans countries are the most relevant difficulties with which the market-oriented holdings must resolve. The EU managed to react timely to the new market developments and responded fast to the COVID-19 crisis by applying new rules and procedures, not only in sectoral policies, but also in the more general competition and competitiveness stimulating policy directions (E. Marinov, 2022, p. 621).

Figure 2. TRENDS IN NUMBER OF MARKET-ORIENTED AGRICULTURAL HOLDINGS IN BULGARIA



Source: Authors' development on the base of FADN data [Accessed: Aug. 18, 2024].

The bigger and mixed in specialization farms in terms of economic point of view means better economic sustainability and more options of adoption of new Agriculture 4.0 related cut edge technologies. The application of smart village's concept is a forefront example of social innovation in rural areas (Ilcheva, 2022, p. 275). However, tremendous decreasing of the smallest farms could indicate severe depopulation of the rural areas. Thus, will undeniably lower national security. The topic of career attitudes is rooted in human resource management, provoking academics, practitioners, psychologists, labor market analysts and others to seek solutions to real and potential challenges. The subject is dynamic due to changing generations, living environment, and career opportunities (Mancheva-Ali and Kostadinova, 2023, p. 190). The lack of infrastructure and job opportunity add more negative effect of rural areas in Bulgaria.

Mixed farms should be more sustainable and open for applying innovations and cutting-edge technologies; thus, we can't see this according to their rapid vanish. On the one hand, advances in science and technology have had an impact on how the results of human labour are presented, accessed, used, and disseminated. On the other hand, demand, market niches and sales have undergone revision and reorganization. Changes in supply, demand and affordability have become an opportunity and/or a threat (Stoyanov, 2023, p.168). The unpredicted turbulence during the period reveals weaknesses of market-oriented farms which are shown as too fast decreasing of their numbers without any clear improvement of competitiveness. The digitalization and innovations in market-oriented agriculture will be in great beneficent for the society and Bulgarian's economy. In recent years the interest in innovation and implementation of digital solutions in the public sector is growing at a rapid pace, both at global and regional level (Dimitrova, 2018, p. 1).

4.1. SWOT analysis of Bulgarian agriculture

The environment in which agricultural farms realize their activities is a complex network of interactions with other economic and non-economic entities, government organizations, social, natural and other systems. Agricultural structures themselves are also open and complex systems

that are “fed” by the external environment with the resources they need to produce their final product/service. A set of methods are used to analyse the internal and external environment in which agricultural farms operate, the most frequently applied being PEST and SWOT analyses. Taking into account the threats and opportunities in the development of environment and taking into account the strengths and weaknesses of the Bulgarian agricultural farms, a strategy is being developed for its survival and development. In recent years, a detailed analysis through this tool was implemented in 2020 by the Institute of Agrarian Economics at the Agricultural Academy (Analysis of the State of Agriculture and Food Industry: SWOT Analysis, 2020). It draws substantiated conclusions and recommendations from the positions of some of those laid down in the Regulation of European Parliament and EU and the general cross-sectoral goal for innovation and digitization in agriculture, namely:

• Goal 1: Support sufficiently reliable agricultural incomes and sustainability across the EU to improve food security;

• Goal 2: Strengthen market orientation and increase competitiveness, including placing greater emphasis on research, technology and digitization;

• Goal 3: Improving the position of farmers in the value chain;

• Goal 7: Employment and attraction of young farmers;

• Goal 9: Improve the responsiveness of EU agriculture to societal food and health demands, including for safe, nutritious and sustainable food and animal welfare;

• Main Goal: Modernize the sector by stimulating and sharing knowledge, innovation and digitization in agriculture and rural areas and promoting their use to a greater extent.

Summarizing the data for these goals and based on the changes that have occurred since the period of preparation of the Analysis, through the prism of the diversification of agricultural farmers in Bulgaria, the following strengths and weaknesses can be deduced:

Table 1. STRENGTHS AND WEAKNESSES OF AGRICULTURAL FARMS IN BULGARIA

Strengths	Weaknesses
- Consolidation of agricultural holdings at an accelerated pace	- Insufficient manpower in the industry.
- Modernization and renewal in the sector is proceeding at a rapid pace, which contributes to the consolidation of production and reduction of the employed.	- The added value in the industry is relatively low per area unit and animal unit.
- Good and sustainable position of agricultural producers from the grain and technical crops sectors in the value chain.	- Problems with profitability and efficiency in many sectors make it difficult for farmers to innovate.
- The interest of agricultural farmers in short supply chains is growing, which are a prerequisite not only for increasing producers' incomes, but also strengthen competition.	- The capacity of the processing plants is partially loaded.
- Higher orientation of young farmers, compared to others, to the implementation of innovations and the use of digitization in agriculture.	- Low professional qualification level of farm managers, including young ones.
- The certified areas for growing organic products in our country are increasing, as well as the number of operators in bio-agriculture.	- Small number of processing enterprises for some of the sectors (livestock) and insufficiently developed processing sector (livestock).
- The number of recognized new varieties and hybrids of plants and breeds of animals, established technologies, is significant.	- Deteriorated personnel security and age structure of R&D in the agrarian sphere.

Source: Analysis of the State of Agriculture and Food Industry: SWOT Analysis, 2020 and Authors' Own View.

Table 1 summarizes the strengths and weaknesses of specialized farms in Bulgaria relevant to this publication. The authors do not claim that these alone are the most important elements, but they are the most focused at the time of research.

Table 2. OPPORTUNITIES AND THREATS

Opportunities	Threats
- With a focused policy, small viable farms can increase their potential and improve their economic performance.	- Strong dependence of farmers' income on the received subsidies and uneven distribution of support by types of agricultural holdings.
- The modernization of agricultural holdings is an important direction of public support for Bulgarian holdings.	- The support is insufficient to stop the decline in production and the reduction in the number of agricultural holdings in the mountainous regions.
- Integration and membership in EU contribute significantly to increasing not only the trade turnover in the sector, but also improve access to a much bigger European market.	- Bulgarian producers orient their behavior very often towards receiving subsidies rather than towards market competitiveness.
- Linking investment support in processing with quality standards and use of local raw materials.	- Presence of a significant grey sector.
- Modernization and implementation of new technologies and techniques to improve working conditions are the way to overcome the majority of problems.	- Demographic crisis (permanent depopulation, constant reduction and deterioration of the age structure of the rural population, etc.).
- The prospect of getting good returns from farming and developing is a reliable motive for retaining young people in agriculture.	- Agriculture continues to have unacceptable technical (low degree of mechanization), technological, ergonomic, etc. working conditions for young people.
- Growing demand for clean and tasty organic products and orientation towards applying environmentally friendly agricultural practices.	- Growing requirements for agricultural producers in terms of environmental protection, production quality, animal welfare, which increase costs and create obstacles for agricultural producers.

Source: Analysis of the State of Agriculture and Food Industry: SWOT Analysis, 2020 and Authors' Own View.

From the presented Table 2, the significant opportunities and threats for specialized agricultural holdings, considered at the macro and micro level in this article, are clearly distinguished. Regardless of the visible progress in Bulgarian agriculture, there is still a wide horizon for improvement, innovation and diversification of adopted policies and strategies for its development. However, the threats to it are substantial, since the strong influence of the demographic crisis, the depopulation of villages and lack of enough people for the sector, can partially reduce the outlined opportunities.

4.2. Empirical section

Methodology

In this article, an approach is used to analyze the business environment in Bulgarian agriculture by evaluating diversification as a tool for sustainable growth. The research includes SWOT analyses to provide a comprehensive view of the sector. Using the deductive approach, the following hypothesis is proposed: Diversification of agricultural activities can reduce vulnerability to external factors and promote the growth (or sustainable growth) of Bulgarian agriculture. The study includes a two-stage empirical test consisting of macro- and micro-level analyses.

At the macro level, the SWOT analysis used data sources such as: national and international reports on Bulgarian agriculture, state statistics and academic literature. Strengths, weaknesses, opportunities and threats are identified and categorized based on the data collected.

The micro-level analysis used a purposive sampling method to select a diverse population of farms representing different sizes, types of production and levels of diversification. Survey studies were conducted with farm owners and managers to gather detailed information about their practices, challenges and views on diversification.

Data from SWOT analysis is quantified to measure the impact of various factors on the agricultural sector. Statistical tools and software (eg SPSS, Excel) were used to analyze the survey data and draw meaningful conclusions.

The blended approach, combining macro-level SWOT analyze with micro-level empirical studies and case studies, provides a comprehensive understanding of the agricultural sector in Bulgaria. This methodology ensures that the research results are well grounded, offering practical understanding and recommendations regarding diversification in Bulgarian agriculture.

Analysis

The farm accountancy data network (FADN) will be the primary data source for this study, which provides comprehensive and detailed data on farm economics within the EU. The FADN monitors farms' income and business activities and is a reliable informative source for analysis of market-oriented agricultural holdings. This database of microeconomic variables is based on harmonized bookkeeping principles, i.e. covers only EU agricultural holdings which, due to their size, can be considered commercial.

The secondary data analysis is a quantitative method which involves analyzing existing data sets, such as agricultural productivity statistics, economic indicators, and demographic data. This data for agricultural holdings is from FADN EU databases, research institutions, and international organizations.

The research is focused on three types of specialized agricultural holdings – Fieldcrops, Granivores and Mixed. The types of farms are representative in the Severen Tsentralen statistical region, thus it’s possible to compare the selected variables of the region in micro level with the same variables at national macrolevel.

Results

This section provides a comprehensive analysis of various indicators relevant to agricultural holdings in Bulgaria. Examines trends with a focus on different types of farms, including field crops, cereals and mixed farms. The analysis highlights key economic indicators such as net farm value added, total livestock and total crop production, offering insight into the overall performance, sustainability and challenges facing these agricultural enterprises. The results highlight significant changes in farm size, productivity and economic sustainability within the sector over the observed period.

Figure 3 is focused on analyze of Fieldcrops farms in Bulgaria. The dynamic of following indicators as Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm) is examined on macrolevel. The first indicator Farms Represented (number) we can see clear decreasing of the smallest farms which is almost twice for 15 years. The bigger holdings are increasing their numbers between 2 and 4 times. In these types of holdings, it’s clear that expression “the bigger, the better” is valid for hundred per cent. This is proven through analysis of the second indicator Total output (€/farm) – shows increasing at all levels of the farms. Here we should proceed with caution because the increase is not so huge as the decreasing of numbers. So, the efficiency of these holdings might fall behind in the future which will result in their competitiveness. According to this indicator the only farms with an increase of more than two times are the biggest ones with an economic size equal to or more than 500 000 €.

At the same Figure 3 the indicator Total crops output (€/ha) is even more interesting – the smallest increase in it is the smallest farms in stage (1) of economic size. The other stages of these types of farms reveal better values between 3 and 4 times – the best here are farms in stage (5) economic size where increasing is 4,34 times. The next indicator Total livestock output (€/LU) shows us that the animal breeding is really challenging for these types of specialization in Bulgaria. Here we should remark that in 2020 in the farms of stages (1), (2) and (4) this indicator was higher than in 2022 with relatively same numbers of the holdings. So, under any other equal conditions, we could conclude that these holdings suffer from market fluctuations more than the others in this specialization. There is the same issue in the farms of stages (3) and (5) but in 2016 to 2020.

The last indicator under review in Figure 3 is Farm Net Value Added (€/farm) which is crucial for the financial future and sustainability of the farm. It's good that there is an increase of the value in all stages of agricultural holdings but within the period there is clear view that between 2010 and 2016 there was clear drop of the values. This is likely of more depreciation costs and opportunity for the farms to participate in CAP subsidies for renewing their facilities.

Figure 3. TRENDS IN FIELDCROPS MARKET-ORIENTED AGRICULTURAL HOLDINGS IN BULGARIA

(1) Fieldcrops	(SYS02) Farms represented (nb)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	10 224	14 261	14 061	5 651	5 641
(2) 8 000 - < 25 000 EUR	2 568	4 259	8 684	9 105	9 109
(3) 25 000 - < 50 000 EUR	943	1 375	2 387	3 090	3 179
(4) 50 000 - < 100 000 EUR	1 049	1 685	2 517	2 695	2 596
(5) 100 000 - < 500 000 EUR	1 567	2 235	2 925	3 158	3 160
(6) >= 500 000 EUR	296	500	1 283	1 298	1 295

(1) Fieldcrops	(SE131) Total output (€/farm)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	6 637	8 052	4 895	6 579	9 387
(2) 8 000 - < 25 000 EUR	14 535	21 333	16 290	13 745	23 365
(3) 25 000 - < 50 000 EUR	38 029	55 497	33 409	32 553	47 176
(4) 50 000 - < 100 000 EUR	75 877	82 511	55 255	61 302	114 231
(5) 100 000 - < 500 000 EUR	264 878	409 993	231 474	260 809	472 774
(6) >= 500 000 EUR	883 167	1 383 373	1 188 526	1 212 840	2 182 972

(1) Fieldcrops	(SE136) Total crops output (€/ha)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	898	1 223	1 155	1 128	1 459
(2) 8 000 - < 25 000 EUR	412	617	882	769	1 384
(3) 25 000 - < 50 000 EUR	339	561	792	878	1 141
(4) 50 000 - < 100 000 EUR	333	471	618	740	1 386
(5) 100 000 - < 500 000 EUR	332	570	687	780	1 422
(6) >= 500 000 EUR	417	621	772	808	1 592

(1) Fieldcrops	(SE207) Total livestock output (€/LU)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	666	592	315	1 294	279
(2) 8 000 - < 25 000 EUR	360	454	773	817	739

(3) 25 000 - < 50 000 EUR	556	482	535	431	1 658
(4) 50 000 - < 100 000 EUR	530	256	511	1 896	720
(5) 100 000 - < 500 000 EUR	544	842	769	532	1 198
(6) >= 500 000 EUR	813	888	802	1 006	1 025

(1) Fieldcrops	(SE415) Farm Net Value Added (€/farm)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	3 908	5 599	3 857	5 812	8 487
(2) 8 000 - < 25 000 EUR	6 846	11 706	11 957	12 944	20 328
(3) 25 000 - < 50 000 EUR	21 913	30 043	26 146	33 440	39 794
(4) 50 000 - < 100 000 EUR	48 146	56 059	39 511	45 372	73 656
(5) 100 000 - < 500 000 EUR	141 367	240 164	125 272	154 142	287 649
(6) >= 500 000 EUR	500 413	841 878	573 786	680 481	1 405 797

Source: Authors' development on the base of FADN data [Accessed: Aug. 21, 2024].

Figure 4 represents the microlevel of Fieldcrops in Severen Tsentralen statistical region. The indicators are the same, i.e. Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm), but the timeline is shorter from 2016 till 2022. Here is obvious that the smallest farms in this region disappear from 2018 onwards, while the number of farms from the other stages are relatively constant. In the region in total the decrease is 35% for the period – this is the opposite of the macro level increasing. The Total output (€/farm) is increasing between 50%, in the biggest farms to twice in the other economic sizes. Again, it's quite different compared to macro level for these holdings. The same picture we can observe in the next indicator - Total crops output (€/ha) where in all economic sizes, without the smallest, we can see increase of the value in 2022 two times compare to 2016.

In Figure 4 the last two indicators are very interesting, i.e. Total livestock output (€/LU) and Farm Net Value Added (€/farm). The livestock output has even negative value which shows great difficulties during the period in the Severen Tsentralen statistical region. This could be influenced by a few animals deceased and following termination of animal breeding in the farms. According to the last indicator - Farm Net Value Added (€/farm), the increase in the value is notable especially in the farms of economic size in stage (3), i.e. 3 times. The other farms in the rest of economic stages increased their Net Value Added 1,5 till 2 times and it's the same as in the macro level in Bulgaria.

Figure 4. TRENDS IN FIELDCROPS MARKET-ORIENTED AGRICULTURAL HOLDINGS IN SEVEREN TSENTRALEN STATISTICAL REGION OF BULGARIA

(1) Fieldcrops	(SYS02) Farms represented (nb)			
	2016	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	2 232			
(2) 8 000 - < 25 000 EUR	1 474	1 559	1 567	1 545
(3) 25 000 - < 50 000 EUR	420	430	373	478
(4) 50 000 - < 100 000 EUR		428	453	380
(5) 100 000 - < 500 000 EUR	532	534	536	561
(6) >= 500 000 EUR	258	276	282	282

(1) Fieldcrops	(SE131) Total output (€/farm)			
	2016	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	3 202			

(2) 8 000 - < 25 000 EUR	13 067	15 899	10 733	25 992
(3) 25 000 - < 50 000 EUR	34 722	32 040	30 425	63 888
(4) 50 000 - < 100 000 EUR		79 779	66 972	138 467
(5) 100 000 - < 500 000 EUR	293 045	354 890	338 586	620 741
(6) >= 500 000 EUR	1 130 318	1 312 561	1 268 160	1 993 943

(1) Fieldcrops	(SE136) Total crops output (€/ha)			
	2016	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	829			
(2) 8 000 - < 25 000 EUR	701	983	718	1 497
(3) 25 000 - < 50 000 EUR	759	726	774	1 561
(4) 50 000 - < 100 000 EUR		912	787	1 675
(5) 100 000 - < 500 000 EUR	726	858	828	1 599
(6) >= 500 000 EUR	817	910	916	1 696

(1) Fieldcrops	(SE207) Total livestock output (€/LU)			
	2016	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR				
(2) 8 000 - < 25 000 EUR	1 130	542	59	1 805
(3) 25 000 - < 50 000 EUR	431	-23	412	
(4) 50 000 - < 100 000 EUR		402		-120
(5) 100 000 - < 500 000 EUR	557	199	-52	1 256
(6) >= 500 000 EUR	665	914	930	922

(1) Fieldcrops	(SE415) Farm Net Value Added (€/farm)			
	2016	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	3 022			
(2) 8 000 - < 25 000 EUR	11 206	13 305	11 084	22 076
(3) 25 000 - < 50 000 EUR	16 907	26 524	22 683	49 624
(4) 50 000 - < 100 000 EUR		50 733	38 940	89 388
(5) 100 000 - < 500 000 EUR	167 614	227 496	196 269	383 981
(6) >= 500 000 EUR	565 986	722 620	709 416	1 276 454

Source: Authors' development on the base of FADN data [Accessed: Aug. 21, 2024].

Figure 5 examines the Mixed agricultural holdings – this is type of specialization which should bring better diversification opportunities thus more sustainability. The figures tell us different stories. Here we examine the same variables - Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm). The number of these farms decreased 90 percent for the period of 15 years and from 34151 farms in 2007 there are only 3517 farms left in 2022. The most significant decrease in farms was in the smallest one in stage (1). The next stages according to economic size are relatively constant with trends of increasing in (3), (4) and (6) stages. The small number at the national level leads to gaps in information for the next indicators. In total we can conclude that the better values in the rest of the indicators are mainly due to the sharp decrease in the farms in Mixed specialization. We can exclude the biggest farms from this conclusion – they really improve their economic

performance during the period, i.e. these farms should be studied more closely in the future on site research.

Figure 5. TRENDS IN MIXED MARKET-ORIENTED AGRICULTURAL HOLDINGS IN BULGARIA

(8) Mixed	(SYS02) Farms represented (nb)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	32 102	23 745	11 911	1 429	1 249
(2) 8 000 - < 25 000 EUR	1 678	1 651	2 220	1 807	1 500
(3) 25 000 - < 50 000 EUR	130	200	193	304	321
(4) 50 000 - < 100 000 EUR	95	166	197	133	67
(5) 100 000 - < 500 000 EUR	96	139	182	210	297
(6) >= 500 000 EUR	49	39	51	79	83

(8) Mixed	(SE131) Total output (€/farm)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	4 137	5 264	3 866	4 010	8 560
(2) 8 000 - < 25 000 EUR	8 558	15 378	13 035	10 413	12 594
(3) 25 000 - < 50 000 EUR	-	-	30 204	27 878	39 071
(4) 50 000 - < 100 000 EUR	-	-	-	-	-
(5) 100 000 - < 500 000 EUR	312 281	404 920	233 661	225 912	316 652
(6) >= 500 000 EUR	-	-	1 381 439	1 642 968	2 668 010

(8) Mixed	(SE136) Total crops output (€/ha)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	494	614	729	1 093	364
(2) 8 000 - < 25 000 EUR	287	531	828	646	864
(3) 25 000 - < 50 000 EUR	-	-	739	421	672
(4) 50 000 - < 100 000 EUR	-	-	-	-	-
(5) 100 000 - < 500 000 EUR	376	415	627	488	672
(6) >= 500 000 EUR	-	-	644	684	1 418

(8) Mixed	(SE207) Total livestock output (€/LU)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	617	660	556	679	3 122
(2) 8 000 - < 25 000 EUR	624	538	1 573	1 099	488
(3) 25 000 - < 50 000 EUR	-	-	500	543	563
(4) 50 000 - < 100 000 EUR	-	-	-	-	-
(5) 100 000 - < 500 000 EUR	718	861	648	913	992
(6) >= 500 000 EUR	-	-	1 019	883	1 510

(8) Mixed	(SE415) Farm Net Value Added (€/farm)				
	2007	**2010**	**2016**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	1 218	2 444	2 944	2 095	5 590
(2) 8 000 - < 25 000 EUR	2 683	7 796	10 552	7 975	12 128
(3) 25 000 - < 50 000 EUR	-	-	20 689	26 722	26 181

(4) 50 000 - < 100 000 EUR	-	-	-	-	-
(5) 100 000 - < 500 000 EUR	152 696	200 374	102 526	129 913	180 166
(6) >= 500 000 EUR	-	-	461 411	795 738	1 368 787

Source: Authors' development on the base of FADN data [Accessed: Aug. 11, 2024].

Figure Six is focused on the Mixed agricultural holdings but in Severen Tsentralen statistical region of Bulgaria, i.e. the micro level. The variables are - Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm). As we can see there are farms only in the second stage of economic size after 2016. In 2022 the number of farms represent 20% of total farms in Bulgaria in the second stage of economic size. There should be noted that in all indicators these agricultural holdings are better than on the national level. Furthermore, they are interested in a future on-site examination for their better practices which made them more competitive than average on national level.

Figure 6. TRENDS IN MIXED MARKET-ORIENTED AGRICULTURAL HOLDINGS IN SEVEREN TSENTRALEN STATISTICAL REGION OF BULGARIA

(8) Mixed	(SYS02) Farms represented (nb)			
Economic Size	**2016**	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	2 014			
(2) 8 000 - < 25 000 EUR	420	218	385	299

(8) Mixed	(SE131) Total output (€/farm)			
Economic Size	**2016**	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	2 995			
(2) 8 000 - < 25 000 EUR	12 830	11 100	9 540	17 968

(8) Mixed	(SE136) Total crops output (€/ha)			
Economic Size	**2016**	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	231			
(2) 8 000 - < 25 000 EUR	801	994	747	1 638

(8) Mixed	(SE207) Total livestock output (€/LU)			
Economic Size	**2016**	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	222			
(2) 8 000 - < 25 000 EUR		3 719	567	796

(8) Mixed	(SE415) Farm Net Value Added (€/farm)			
Economic Size	**2016**	**2018**	**2020**	**2022**
(1) 2 000 - < 8 000 EUR	3 155			
(2) 8 000 - < 25 000 EUR	13 120	11 534	9 502	16 879

Source: Authors' development on the base of FADN data [Accessed: Aug. 18, 2024].

The last market-oriented agricultural holdings for analyzing are specialized in Granivores. At the national level there is a sharp decrease in the number of these holdings – 90% in 2022 compared to 2007, i.e. 8 075 farms to 767 farms. At regional level there is increasing of these farms in 2022 compared to 2016 – from 44 to 77. Here we should say that at Severen Tsentralen statistical

region of Bulgaria these holdings are represented only in stage (6) economic size – the biggest ones, except for the last year 2022 when all represented holdings are situated in stage (5) economic size. The variables are - Farms Represented (number), Farm Net Value Added (€/farm), Total livestock output (€/LU), Total crops output (€/ha), Total output (€/farm). Each of these indicators are higher than at the national level. In 2022 these holdings are in stage (5) of economic size and represented 30% of these specialization in Bulgaria. So, we must wait for future data to see where and how they should develop to make a more general conclusion.

5. CONCLUSION

The analysis of agricultural holdings in the Severen Tsentralen region of Bulgaria reveals a complex landscape of structural change and economic performance. The results indicate significant disparities in performance among different farm types in Bulgaria, with larger farms generally showing better economic outcomes compared to smaller ones. Fieldcrop farms demonstrate steady growth in productivity, while mixed farms face challenges in maintaining both crop and livestock production. The analysis also revealed that diversification strategies, while beneficial for environmental sustainability, did not uniformly translate into higher economic returns across all farm types. This highlights the need for tailored approaches that consider the unique conditions and capabilities of each farm type to optimize both economic viability and sustainability.

While field crop farms, especially the larger ones, are currently performing well, the sector faces potential risks due to the decline of smaller farms and the challenges related to maintaining efficiency and competitiveness. The competitiveness, restructuring, and social impact of these holdings relate to the country's socio-economic context. Smallholder farms lack behind their development in Bulgaria's agriculture, emphasizing the need for a balanced approach that integrates technological innovation with ecological and social considerations. The competitiveness of these holdings should be shaped by effective management, innovation, and the integration into sustainable food supply chains. Smallholder market-oriented farms, despite facing challenges, should remain integral to Bulgaria's food security and the well-being of rural communities. The study underscores the importance of innovation in ensuring the long-term viability of these agricultural systems, particularly in the face of ongoing market fluctuations and consolidation trends.

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NAVIGATE THE MAZE: THE CONCEPTUAL FRAMEWORK OF SUSTAINABILITY ACCOUNTING

-ABSTRACT-

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Abstract

Sustainability, which encompasses environmental, social and economic well-being, has become a top priority for businesses, investors and society at large. The growing uncertainties of climate change, resource depletion and social inequality require a fundamental shift to ensure the long-term survival of our planet and its inhabitants. Businesses have a critical role to play in this transition, as their practices have a significant impact on the environment, society. In response, companies are increasingly integrating environmental, social and governance issues into their decision-making processes. This integration requires a framework and principles for measuring, reporting and disclosing a company's impact across these three aspects. Sustainability accounting is emerging as a tool to meet this need, providing a structured approach to navigating the complexities of ESG integration. It goes beyond a narrow focus on profit to a more holistic view that recognises the interlinkages between environmental, social and economic concerns.
The Current Landscape: A Maze of Information. Despite the extensive literature on sustainability accounting, there is a significant gap in the research on its theoretical and conceptual framework. The lack of a comprehensive theoretical foundation limits the understanding of a holistic approach to accounting for sustainable practices, their impacts, risks and consequences within organisations.
This research aims to clarify sustainability accounting framework by identifying key elements, exploring forms and analysing underlying concepts.
Methodology: This research adopts a holistic approach, integrating content analysis, logical deduction and thematic analysis to investigate the conceptual framework of sustainability accounting. This systematic approach ensured a comprehensive understanding and enhanced the credibility of the study.
Expected Outcomes: The paper attempts to clarify the conceptual framework as it provides a structured understanding of the conceptual framework of sustainability accounting and offers an innovative 'compass' model for the conceptual framework of sustainability accounting.
By highlighting the conceptual framework of sustainability accounting, this research provides companies with a roadmap for navigating the complexities of ESG integration. By adopting this framework, companies can achieve greater transparency and accountability for their ESG performance. Ultimately, this fosters a more sustainable business environment, benefiting not only companies but also stakeholders and society as a whole.

Keywords: *accounting, sustainability, sustainability accounting, conceptual framework*

JEL classification: M41, Q56

Introduction

At a time when the world faces increasing environmental challenges (climate change, limited natural resources, pollution) and social inequality, poverty, discrimination and conflict, the need for resilience, care and empathy has never been greater. They are the key to a better future. In

recent decades, governments, international organisations, business and society have been working together to solve social and environmental issues, and sustainability and sustainable development have become the panacea. Under social and public pressure, companies - the creators of goods and services for people and society - began to meet the needs and demands for information about their involvement in social and environmental issues by providing information about the impacts and risks associated with them and communicating it to interested parties. Thus, a revolutionary direction in accounting was formed - sustainability accounting. Sustainability accounting is in general defined as the accountability related to demonstrating the responsible attitude of companies/organisations towards the environment and society, which is implemented in their corporate governance. (Petrova, 2024, p.56). There is a growing interest among academics and practitioners alike. Despite numerous studies, articles and other publications, there is a lack of a unified approach to accounting for sustainable practices in companies, their impacts, risks and consequences. This paper aims to clarify and define the conceptual framework of sustainability accounting by outlining its key elements and their interactions. A comprehensive research approach that integrates theoretical analysis, literature review and conceptual modelling is used to: systematise existing theoretical approaches to sustainability accounting; develop a structured conceptual framework for sustainability accounting; and propose a conceptual model of sustainability accounting that can be used for better understanding and application in the business context. The systematic approach ensures a holistic study by integrating different perspectives and theoretical concepts, thus increasing the credibility and reliability of the findings and providing a comprehensive perspective on sustainability accounting and its conceptual framework.

The research is carried out in three steps: theoretical overview of sustainability accounting, literature review and the authors' conceptual approach to sustainability accounting.

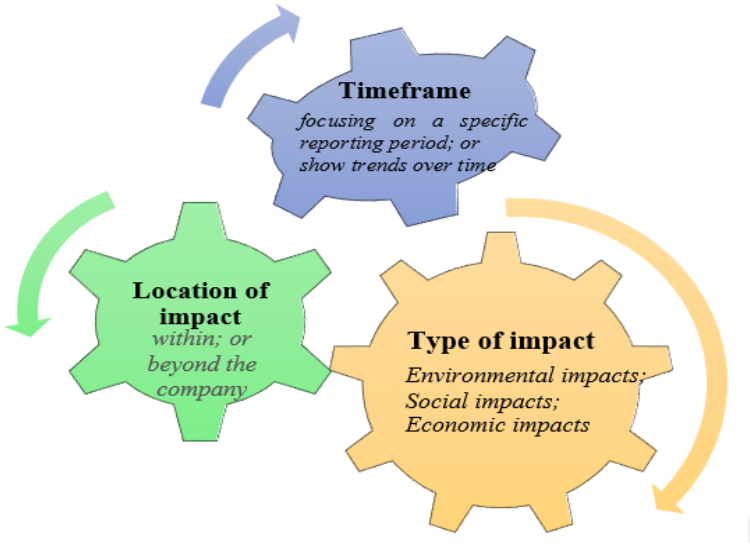
The study makes a twofold contribution to the development of the theoretical foundations of sustainability accounting and encourages further research in this area, and it helps companies to understand the philosophy of sustainability accounting, which is a key factor in the preparation of sustainability reports.

Theoretical background: an overview of sustainability accounting

Sustainability accounting is a synergy of providing, measuring, disclosing and analyzing information about the impact and interaction of business with the environment and society (Petrova, 2024, p. 57). It aims to achieve: *transparency and accountability; comprehensive disclosure and decision-making.* The three objectives of sustainability accounting are as follows (a) to prepare reports that transparently communicate a company's interactions with society and the environment; (b) to disclose both financial and non-financial information about a company's sustainability performance (social and environmental); (c) to extend traditional financial accounting by considering a wider range of information, including monetized (assigned a financial value) environmental, social, and economic impacts, to support informed decision-making (Ozili, 2022, p.4). According to Ben and Richardson (2003, p.11), the key dimension of sustainability accounting are:

- **Type of impact:** Sustainability accounting categorizes impacts as environmental (e.g., carbon emissions, water use), social (e.g., labor practices, diversity, equality and inclusion), or economic (e.g., community investment, job creation).
- **Location of impact:** The analysis can focus on impacts within the company's operations (internal), such as employee well-being or waste generation. It can also address external impacts (beyond the company), such as the environmental footprint of its supply chain or its community engagement initiatives.
- **Timeframe:** Sustainability reports can serve as a snapshot in time, focusing on a specific reporting period (e.g., one year), or they can show trends over time, highlighting a company's progress or regression towards sustainability goals. (Figure 1.)

Figure 1. KEY DIMENSIONS OF SUSTAINABILITY ACCOUNTING



Source: Author, adapted from Ben and Richardson, 2003, p.11

Sustainability accounting is the individual approach of a company or organisation to sustainable development. It provides information on progress towards sustainable goals.

A closer look reveals that the theoretical framework of sustainable accounting is based on three concepts: the concept of sustainable development, corporate social responsibility (CSR) and the triple bottom line (TBL).

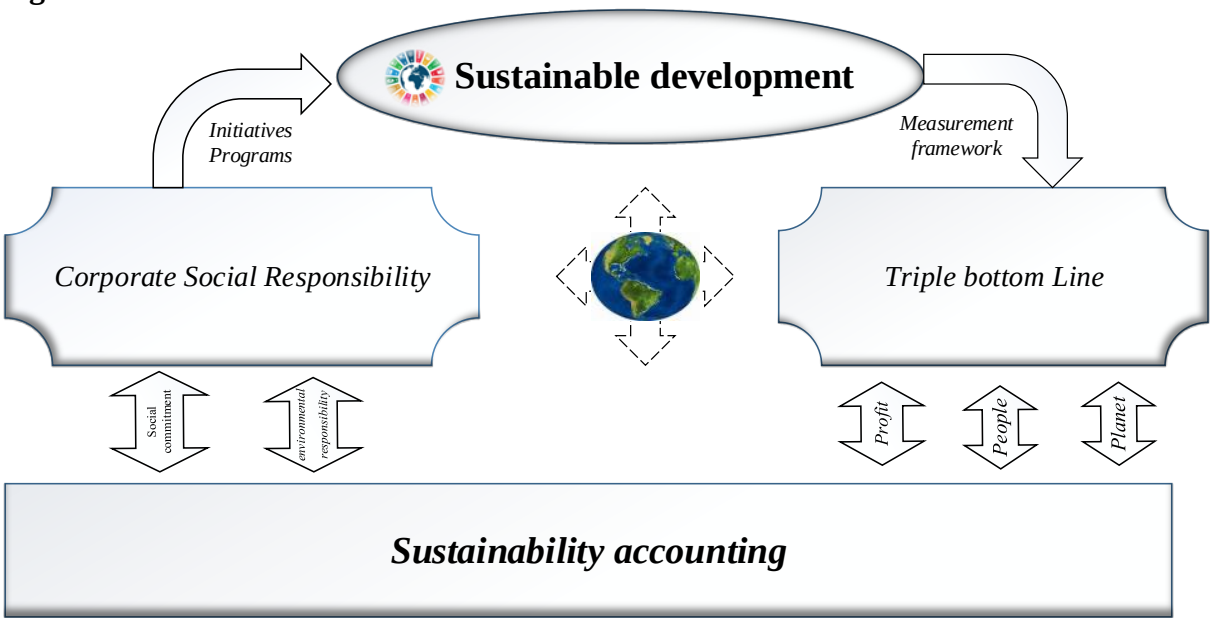
Sustainable development is a ubiquitous development paradigm (Mensah, 2019, p. 2) that outlines the concept of development, the concept of needs and the concept of future generations (Klarin, 2018, p. 76). It is a visionary approach that emphasises positive transformation that achieves a balance between economic growth, environmental protection and social equality, which are the three pillars of sustainability. (Mensah, 2019, p. 9).

Social responsibility is defined as the obligation of businesses to pursue those policies, make those decisions or follow those lines of action that are desirable in terms of the objectives and values of our society. (Bowen, 1953, p.6 cited in Asmara et. al. 2023). These are voluntary corporate initiatives that contribute to a better society and a cleaner environment. Social responsibility encompasses the expectations that society has of organisations at a given time: to be financially stable and profitable; to comply with the law; to be ethical; and to contribute to the community by participating in voluntary activities and improving the quality of life of that community. (Caroll, 1991, pp. 40-42).

The triple bottom line is a sustainability framework that examines a company's social, environmental and economic impacts. (Elkington, 2018). This framework encourages companies to consider the wider impact of their activities on society and the environment, alongside financial performance. (Jaiswal & Meena, 2024) TBL assesses a company's performance in three dimensions: social, environmental and economic, often referred to as the 3 Ps - People, Planet and Profit.

Sustainable development, corporate social responsibility, the triple bottom line and sustainability accounting are concepts that are intertwined in a dynamic system characterised by interacting and interlinking. (Figure 2)

Figure 2. LANDSCAPE OF SUSTAINABILITY ACCOUNTING: LINKAGES



Source: Developed by the author

Sustainable Development is the ultimate goal pursued by all: to achieve balanced economic, social and environmental progress by implementing sustainable practices and policies. It sets out the macro framework.

CSR and TBL are approaches that contribute to global sustainable development goals. The focus of each is different. CSR focuses on "what needs to be done to achieve the sustainability goals", while TBL is about the quantitative measurement of the results of social and environmental commitments made and their impact in the three dimensions of economic, social and environmental performance.

Sustainability accounting is a cornerstone for accountability of sustainable business practices, providing a mechanism for accountability and control over a company's social and environmental commitment through the use of financial and non-financial indicators.It represents the micro-level view by which individual business performance is monitored and assessed. In this sense, sustainable accounting can be defined as a "bridge" between sustainability concept and companies' specific practices and sustainability performance. Several theoretical approaches are also used to help understand Sustainable Accounting. Legitimacy theory, stakeholder theory and institutional theory are of key importance (Benvenuto et al., 2023; Benameur, et al., 2023).

Legitimacy theory is based on the paradigm of the 'social contract' between the company and society (Benvenuto, 2023). **This perspective suggests** that companies should strive to maintain their legitimacy by behaving according to a "socially constructed system of norms, values, beliefs and definitions" (Schuman, 1995, p. 574).

According to stakeholder theory, companies should create value for each of their stakeholders: customers, employees, suppliers, communities, investors and all groups and individuals who can affect or be affected by the company's activities (Freeman, 2010, p.9). As a result, companies have to take into account the different perspectives and expectations of each stakeholder who has an interest in the company's activities (Badia et al., 2020), as their influence and value are crucial to the company's success (Leon & Salesa, 2023, p.21435).

Institutional theory provides a relevant perspective on how organisational survival is influenced by the need to comply with social norms. (Andrades, et al, 2024). It recognises that organisations are economic entities that operate in an environment that contains institutions that influence their behaviour and expectations (Benvenuto et al., 2023). . In this context, companies

have to behave in a socially acceptable way and follow certain norms and values that are imposed by laws, policies and regulations (Andrades, et al., 2024).

Each of these theories helps to reveal the reasons why companies engage in sustainable practices, while also illuminating different aspects of the nature and functions of sustainable accounting. (Table 1)

TABLE 1. THEORETICAL PERSPECTIVES AND THEIR CONTRIBUTION TO SUSTAINABILITY ACCOUNTING

Theoretical perspectives	***Value added to sustainabilty accounting***	
Legitimacy theory	Links sustainability reporting to societal expectations and emphasises the role of accountability as a means of demonstrating compliance with standards and regulations.	Explains why companies publish non-financial information: to maintain their legitimacy in society;
		Links sustainability acounting to public expectations
		Emphasises the role of sustainability reports as a means of demonstrating compliance with standards and regulations
Stakeholder theory	Argues for the need for transparency and accountability, taking into account the interests of all stakeholders	Expands the focus of reporting: adds non-financial reporting of social and environmental concerns and risks
		Requires transparency and accountability
Institutional theory	Explains how the adoption of sustainable practices in organisations is driven by regulatory or other standards.	Highlights the role of regulation and standardisation
		Reveal how and why companies adopt sustainable practices under external pressure (regulatory or other requirements)

Source: Authors' elaboration

The theories discussed above highlight the different approaches and motivational factors that may encourage or compel companies to adopt sustainability accounting as a practice. They thus contribute to understanding the core of sustainability accounting.

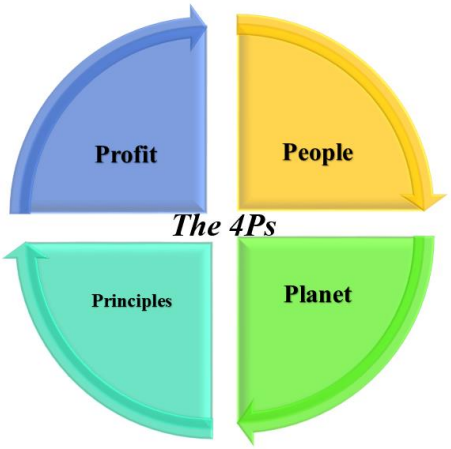
In order to provide a complete theoretical framework for sustainable accounting, it is necessary to integrate ESG (environment, society, governance). ESG is a holistic approach to measuring sustainability in three main areas: social responsibility, environmental management and corporate ethics. To be effectively implemented, ESG requires a structured approach to measuring and reporting, which is provided by sustainability accounting. The two approaches are complementary: ESG sets the guidelines and criteria for sustainable development, while sustainable accounting provides the framework for their implementation, monitoring and reporting.

The analysis conducted revealed that:

- Sustainability accounting is a holistic concept, formed by the interaction of different theoretical approaches and concepts;
- Sustainability accounting integrates sustainability into the practices of the company;

- Sustainability accounting provides information in four areas: wealth, environment, social responsibility and ethical norms. Taken together, these four form the 4Ps model of sustainable accounting: Prosperity, People, Planet and Principles (Figure 3).

Figure 3. THE 4s OF SUSTAINABILITY ACCOUNTING



Source: Developed by the author

The 4Ps Model is a framework designed to help achieve long-term sustainability and create value for all stakeholders involved.

In summary, sustainability accounting provides a holistic view of business by integrating the different dimensions - economic, social, environmental and ethical. As well as improving transparency and accountability, it supports the long-term sustainability of companies through the creation of value for all stakeholders.

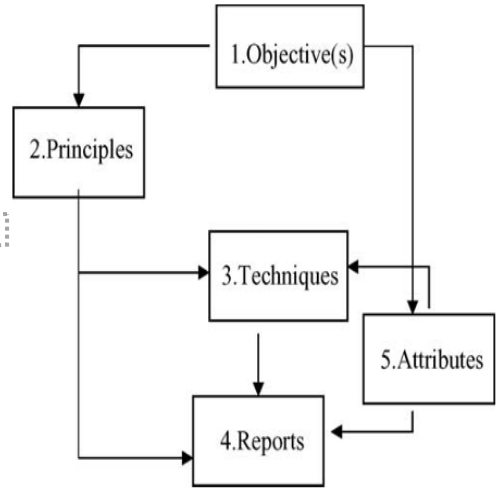
Literature review

Sustainability accounting has received significant research attention in recent years (Vysochan et al., 2021, pp. 97-101; Zyznarska-Dworczak, 2020, pp. 4-5). This growing interest is driven by: the relevance and importance of sustainability and sustainable development issues; the demonstration of commitment to and implementation of sustainable business models; and proactive communication between companies and stakeholders. Furthermore, unexplored areas of sustainability accounting continue to emerge, creating new spaces for exploring how knowledge is created, validated, and translated (or not) alongside policy and practice (Bebbington & Larrinaga, 2014, p. 395). Furthermore, unexplored areas of sustainability accounting continue to emerge, creating new spaces for exploring how knowledge is created, validated, and translated (or not) alongside policy and practice (Bebbington & Larrinaga, 2014, p. 395). Despite the increasing number of studies, however, there is still a relative lack of research on the theoretical underpinnings of sustainability accounting.

The literature review showed that one of the pioneers in developing a conceptual framework for sustainability accounting is ***Robert Gray,*** who identified three distinct methods for accounting for sustainability: sustainable costs, natural capital accounting, and input-output analysis (Gray, 1994, pp. 33-37).

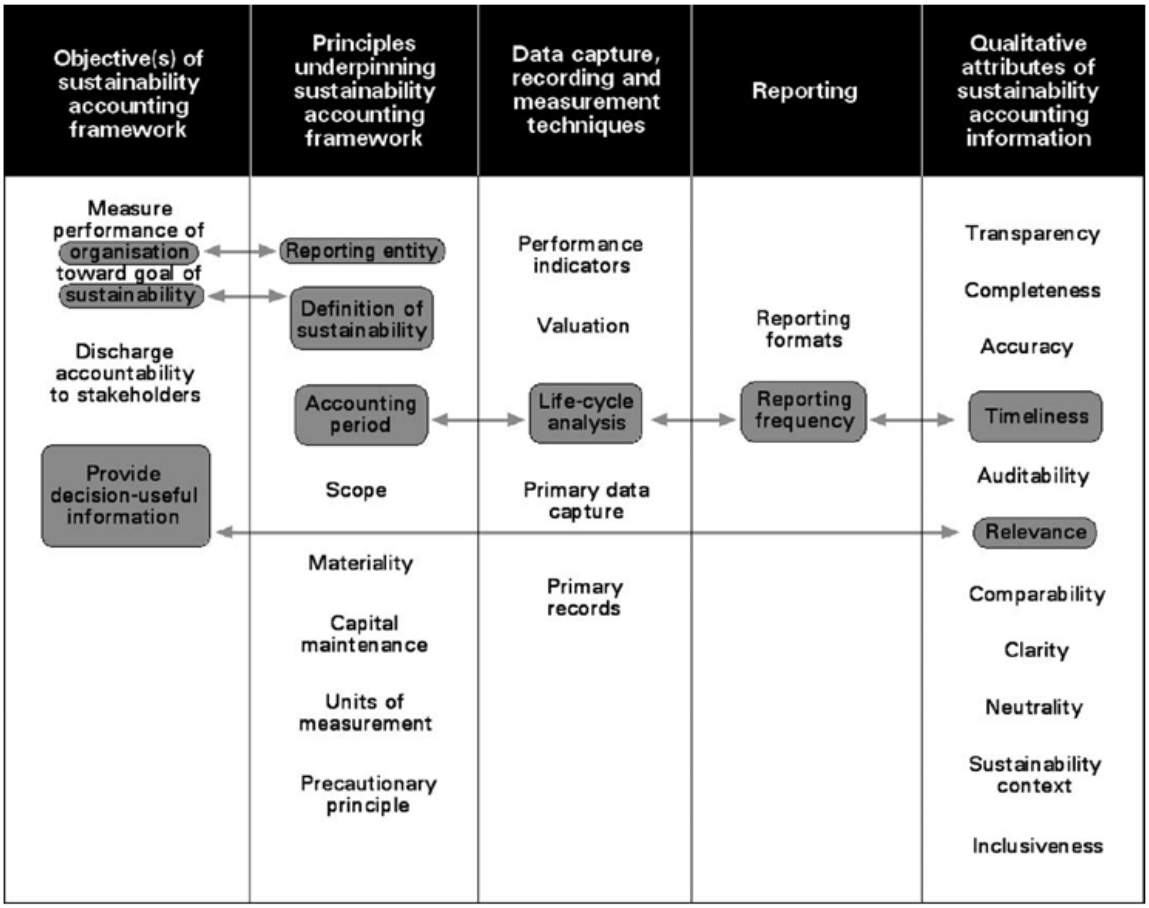
Only *Lamberton* (2005) has developed a conceptual framework for sustainability accounting. His framework consists of five components: (1) objective(s) of the sustainability accounting framework; (2) principles, which underpin application of the framework; (3) data capture tools, accounting records, and measurement techniques; (4) reports used to present information to stakeholders; and (5) qualitative attributes of information reported using the framework. (Lamberton, 2005, pp. 16-18). (Figure 4, Figure 5)

Figure 4. COMPONENTS OF SUSTAINABILITY ACCOUNTING FRAMEWORK



Source: Lamberton, 2005, c. 16

Figure 5. COMPREHENSIVE SUSTAINABILITY ACCOUNTING FRAMEWORK



Source: Lamberton, 2005, c. 17

Another contribution is the **Sustainability Accounting Framework Model,** proposed by ***Zyznarska-Dworczak* (2020).** This model is based on an innovative holistic approach to sustainability accounting. It positions sustainability accounting as a normative framework for understanding its meaning, scope and functions. The elements of the framework for sustainability accounting are: **(i)** sustainability accounting purpose, (ii) the users of sustainability information, (iii) the qualitative characteristics of useful sustainability accounting information, (iv) the subjective scope of

sustainability accounting, (v) reporting rules, including recognition, valuation and presentation, and (vi) rules for verifying the reliability of sustainability information (Zyznarska-Dworczak, 2020, p. 14).

Research by scholars such as M.Milne, R. Gray, Schaltegger and Burritt, Bebbington and Larrinaga, and Ozili explores nuance in the conceptual framework of sustainability accounting from different perspectives, contributing to a deeper understanding of its nature and potential.

Milne (1996) argues that in order to ensure a more comprehensive and accurate assessment of a company's activities, sustainability accounting should adopt a systems-based approach that considers both the environmental and social systems in which the company operates.

Gray (2010) emphasises the need for a more nuanced and entity-specific approach to sustainability accounting, based on an in-depth analysis that highlights the shortcomings and limitations of existing sustainability measurement and reporting methodologies. Rather than a one-size-fits-all model, he argues for an individualised approach to sustainability reporting, tailored to the specific characteristics of each reporting entity. This perspective .

Schaltegger and Burritt (2010) extend the discussion by highlighting the dual nature of sustainability accounting - both as a philosophical concept and as a practical management tool, focusing on its practical applications.

Bebbington and Larrinaga (2014) propose a broader, integrated approach to sustainability accounting, drawing on sustainability science and exploring the interaction between accounting and sustainable development.

Ozili (2021) examines the role of accounting in assessing social and environmental outcomes that concern both organisations and society. He discusses its objectives and motivations, and provides conceptual insights into how companies can effectively use sustainability accounting.

The analysis of the existing research on the conceptual framework of sustainability accounting has found that scholars take a holistic approach that is individualised according to their specific perspective. Their focus is primarily on the conceptual framework for sustainability reporting. This approach: (a) prioritises sustainability accounting as a process for measuring, reporting and disclosing the environmental, social and economic performance of organisations, with an emphasis on the regulatory framework of sustainability accounting (reporting); and (b) neglects the broader aspects of sustainability as a system of interrelated elements and as a management tool and their reflection in accounting practice, thus limiting the ability to assess the comprehensive framework of sustainability accounting.

Rethinking Sustainability Accounting: Conceptual Perspective

The sustainability accounting framework is the blueprint for sustainability accounting. It is essential for understanding the complex nature of sustainability accounting and its application in organisations/ companies. Similar to sustainability accounting, which is an information system composed of various subsystems with specific focus, objectives and scope (such as social accounting, environmental accounting, sustainability reporting), each subsystem has its own conceptual framework. These frameworks provide guidance on how to identify measure and report on the relevant aspects of sustainability performance within that particular field. Emphasis is placed on the conceptual framework, which provides the basic guidelines for the entire sustainability accounting system and sets the parameters within which its sub-systems function.

Two approaches, systemic and functional, can be used to develop a conceptual framework for sustainability accounting. The systemic approach allows for a clear distinction between individual elements and their interrelationships, making it ideal for extracting fundamental, theoretical knowledge. In contrast, the functional approach focuses on the processes and actions involved and provides a detailed description of the sequence of steps within these processes. While the systemic approach provides a broader 'big picture' perspective, the functional approach is more practice-oriented and process-driven. In the context of sustainability accounting, the systemic

approach is well suited to deriving theoretical insights, while the functional approach[21] effectively characterises sustainability accounting as a dynamic activity involving the identification, measurement, reporting, disclosure and analysis of the interactions and impacts between environmental, social and economic factors.

A systemic approach to the conceptual framework of sustainability accounting is essential for understanding the multiple factors that influence its development and application. This approach highlights the dynamic and evolving nature of sustainability accounting and the interrelationships between stakeholder expectations[22], management motivations[23], constraints and limitations[24]. By recognising these interdependencies, organisations are able to develop a conceptual framework for sustainability accounting that is both comprehensive and flexible. This balance ensures that sustainability accounting practices are not only aligned with stakeholder interests, but are also feasible and effective within the organisation's operational context.

The conceptual framework for sustainability accounting sets out a system of interrelated elements designed to ensure that sustainability accounting effectively addresses the information needs of stakeholders in relation to environmental and social issues. These core elements include the ***purpose, subject matter, scope and principles of sustainability accounting***.

In the context of sustainability science and the interaction between sustainability accounting and sustainable development (according to Bebbington and Larrinaga, 2014, p. 405), the **purpose** of sustainability accounting is to achieve sustainability in the organisation/company. This is achieved through several key objectives: ensuring transparency, managing sustainability, informing stakeholders and supporting strategic decision-making. These objectives are interrelated and contribute to sustainability in the following ways

Providing transparency: Transparency enables stakeholders to assess the organisation's (company's) impact on the environment and society, which is essential for building trust and promoting responsible practices.

Sustainability management: Sustainability accounting provides information to help organisations identify, measure and manage sustainability impacts and risks, leading to resource efficiency and mitigation of negative impacts.

Providing information to stakeholders: Access to reliable information enables stakeholders to make informed decisions about their relationship with the organisation.

Supporting strategic decision-making: Sustainable accounting provides managers with key information on sustainability impacts and risks, enabling them to develop more effective strategies and make informed decisions that ensure the resilience of the business .

The **subject** of sustainability accounting encompasses the two-way interaction between an organisation and its environment, society and corporate governance, both in monetary terms and in non-monetary units. It defines the boundaries of scientific inquiry and directs researchers towards specific phenomena, processes or objects.

The **scope** of sustainability accounting encompasses the identification, assessment and management of sustainability impacts, risks and opportunities. It includes objects such as:

[21] The conceptual framework of sustainability accounting developed under the functional approach is beyond the scope of this study.

[22] Stakeholders, encompassing investors, customers, employees, local and international communities, organizations, regulators, and internal management, have diverse expectations regarding sustainability performance.

[23] Managers are driven by various motivations to implement sustainability accounting systems, including: greenwashing, industry mimicry and pressure, self-regulation and ethical consideration, ect. (Schaltegger and Burritt, 2010, pp. 375 - 384). These motivations influence how sustainability accounting is structured and prioritized within an organization.

[24] The constraints and limitations are characterised by the difficulties and challenges of sustainability accounting: difficulties in collecting data on sustainability indicators, lack of assessment of non-financial information, etc. Addressing these constraints is crucial for the effective integration of sustainability accounting practices.

Natural capital: All renewable and non-renewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organisation (IFRS, 2021 p.19).

Sustainable investments: Investments that prioritise people and nature, lead to improved sustainability or solve social or environmental problems, such as investments in environmentally friendly technologies; investments in the training and development of workers and employees.

Environmental and social revenues and expenses: The financial consequences of activities that have an environmental and social impact, for example: expenditure on social programmes and initiatives, expenditure on improving working conditions, expenditure on repairing environmental damage, costs of waste management and pollution, etc.

Non-financial indicators (ESG factors): Metrics used to assess the sustainability of an organisation, including greenhouse gas emissions, waste generation, water and energy consumption, labour conditions, safety standards, human rights practices, ethical policies, and other environmental, social, and governance (ESG) factors.

The principles of sustainability accounting[25] are

Accountability: the right to receive information about the social and environmental interactions, impacts, risks and opportunities for the enterprise and the duty to supply it. (Grey, 1992 p.413)

Transparency: willingness to share true, accurate, relevant and timely information with stakeholders on social and environmental issues.

Proactivity: focus on long-term environmental and societal impacts, opportunities and risks, i.e. in perspective.

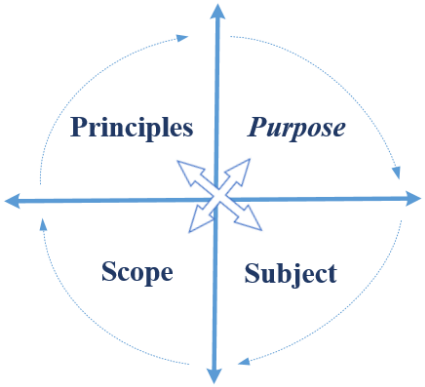
Multidimensionality: comprehensiveness of all aspects of the activity, including financial, social and environmental; perspectives and viewpoints.

Flexibility and adaptability: the ability to change and adapt to a changing environment, taking advantage of opportunities and avoiding risks.

The principles of sustainability accounting are closely interrelated and mutually enhancing. Understanding their nature requires a holistic view. Accountability provides transparency, while proactivity requires multidimensionality, flexibility and adaptability in assessing future opportunities and risks.

The interaction between the elements of the conceptual framework of accounting: purpose, subject, object and principles of sustainability accounting is fundamental to understanding sustainability accounting as both theoretical knowledge and activity. It can be depicted as follows: (Figure 6.)

Figure 6. ELEMENTS OF CONCEPTUAL FRAMEWORK OF SUSTAINABILITY ACCOUNTING



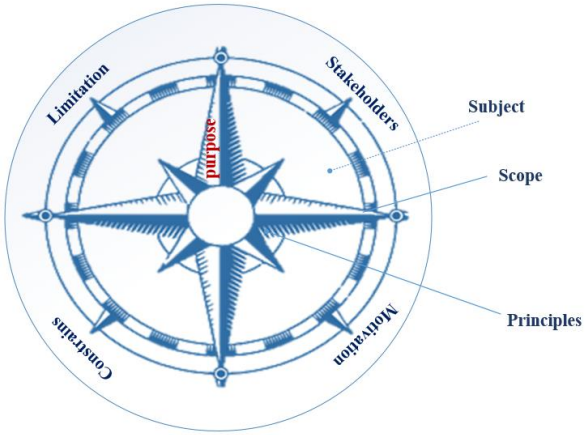
[25] The principles of sustainability accounting are different from the principles of sustainability information. The latter are subject to regulations, accounting standards and guidelines for sustainability reporting by the company.

Source: Developed by the author

In this diagram, each element plays a critical role in navigating the complexities of sustainability accounting. The purpose sets the foundation, the subject defines the scope, the object identifies the focus, and the principles ensure the integrity and reliability of the accounting process.

Beyond these core elements, the conceptual framework of sustainability accounting can be further illustrated through a conceptual model, specifically one that embodies the idea of a compass. (Figure 7).

Figure 7. COMPASS MODEL OF SUSUTAINBILITY FRAMEWORK



Source: Developed by the author

This compass visualisation serves as a practical tool for understanding the interrelationships between the elements and their application in business scenarios.

Features of the compass model are:

- The Needle (purpose): Pointing organisations towards sustainable practices.
- The dial (subject): Defining the interactions between the organisation, environment, society and governance.
- The Cardinal Directions (scope): Specifying the focus on natural capital, social and environmental income and expenditure, ESG factors and etc.
- The Internal Mechanism (principles): Ensuring the reliability of the accounting process through accountability, transparency, proactivity, multidimensionality, flexibility and adaptability.

This model not only highlights the interconnectedness of these core elements, but also integrates the influence of factors such as stakeholder expectations, management motivations, limitations and constraints. By incorporating these dynamics, the Compass model provides a comprehensive and dynamic representation of the conceptual framework of sustainability accounting. This visualisation helps to understand how the framework translates into actionable practices, thereby enhancing the effectiveness of sustainability accounting in organisational decision making.

To summarise, sustainability accounting is a dynamic, developing area which requires a holistic approach. The conceptual framework of sustainability accounting provides a basis for effectively integrating sustainability into business practices and achieving long-term goals.

Conclusion

The paper outlines the significance of sustainability accounting in contemporary global business world. It emphasizes the imperative for corporations to seamlessly integrate Environmental, Social, and Governance (ESG) factors into their strategic decision-making and operational activities, As businesses face increasing pressure to align with sustainability goals, sustainability accounting

emerges as a critical tool for assessing and managing sustainability-related risks and opportunities. Examining the nature of sustainable accounting and its links to sustainable development, this study focuses on the conceptual framework as a comprehensive model of their interaction.

Key findings of this research include:

Integrates core elements and ensures coherence through a systemic approach, providing a holistic theoretical and conceptual framework for sustainability accounting.

Introduces an innovative compass model that visually illustrates the interrelationships within the sustainability accounting framework, incorporating stakeholder expectations, managerial motivations and operational constraints.

This paper makes a valuable contribution to the field of sustainability accounting by providing a structured and comprehensive understanding of its conceptual framework. By bridging theoretical foundations with practical insights, the study provides a foundation for further academic exploration and business implementation. The proposed framework and compass model serve as useful tools for companies, researchers and policymakers to help integrate sustainability into accounting practices. This study supports the transition to a more sustainable business environment by enhancing transparency, accountability and strategic decision-making.

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DIGITALLY EMPOWERED: UNVEILING THE IMPACT OF DIGITAL LITERACY ON EMPLOYEE PERFORMANCE IN EMERGING ECONOMIES

– ABSTRACT –

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Abstract

Small and medium-sized enterprises (SMEs) in emerging economies significantly contribute to job creation and inclusive economic growth but face challenges such as limited digital literacy among employees. This study examines the impact of digital literacy on employee performance in SMEs in Bosnia and Herzegovina (BiH), employing the TOE (Technological, Organizational, and Environmental) model. The study finds that digital literacy acts as a catalyst for tech proficiency, enhancing employee performance. Employees often have limited understanding of how their managers communicate the digital agenda, which hampers their acceptance of new technologies and affects the resilience and adaptability of SMEs in the digital landscape.

Research shows that digital literacy is crucial for productivity, competitiveness, innovation, risk management, employee satisfaction, and social inclusion. The study aims to provide practical guidance for enhancing digital literacy among SME employees to foster improved performance and successful digital transformation. The main hypothesis is that digital literacy among employees in SMEs in BiH contributes to their performance, with auxiliary hypotheses exploring sectoral, age, and educational differences in digital literacy levels.

Using a quantitative approach, data was collected from 281 employees in SMEs across BiH. The results indicate that digital literacy positively impacts employee performance, with environmental factors having the most significant influence, followed by organizational and technological factors. The findings reveal that while employees possess basic digital skills, there is a lack of strategic direction and understanding of digital agendas.

The study concludes that enhancing digital literacy is essential for the successful digital transformation of SMEs in BiH. This requires addressing barriers such as resistance to new

technologies and improving communication of digital agendas by managers. The COVID-19 pandemic has accelerated the need for digital skills, but there is still much work required to fully leverage digital literacy for meaningful transformation.

Key recommendations include targeted training programs to improve digital literacy and better communication strategies to align employees with organizational digital goals. Government support in the form of training and resources is also vital. Future research should include a more diverse sample to understand the broader impact of digital literacy on SME performance in different contexts. Additionally, focusing on long-term digital literacy initiatives can ensure sustained growth and adaptability in an ever-evolving digital landscape.

Key words: Digital Literacy; Digital Transformation; Small and Medium-sized Enterprises; Employee Performance; TOE Model

JEL classfication*:* O33, J24, I21

1. Introduction

Digital transformation, although there is no single definition, represents a significant organizational change built on digital technology, leading to modifications in previous business practices (Osmundsen et al., 2018). Such changes lead to anxiety and uncertainty. When these changes occur within enterprises, all employees are affected. As a result, employee resistance often arises (Basyal et al., 2017). One way to reduce resistance and ensure that set goals are achieved in the process of digital transformation is to invest in digital literacy among employees. Digital literacy is the ability to succeed in interacting with electronic infrastructure and tools that are integral to life in the twenty-first century (Martin, 2005). It encompasses a set of competencies necessary for engagement in the knowledge society. It includes knowledge, skills, and behaviors essential for the effective use of digital devices such as smartphones, tablets, laptops, and desktop computers for collaboration and communication (Abas, Ros and Mogd, 2019). Previous research shows that a higher level of digital literacy among employees leads to better workplace productivity (Jose, 2016), improved performance (Marsh, 2018), and easier acceptance of the digital transformation process when faced with it (Basyal et al., 2017). Understanding the current level of digital literacy as one of the prerequisites for implementing the process of digital business transformation (Pirzada and Khan, 2013) is essential for increasing employee productivity. Given that businesses can more easily address internal rather than external barriers, and that these barriers are mostly directed towards employees and applied technologies, this suggests the need for digital business transformation. Even when financial barriers are overcome and decisions are made to introduce new and more modern business technologies, which require equipment procurement, company directors need to invest additional resources and efforts to successfully implement the digital transformation process and ultimately achieve increased productivity, reduced operating costs, and better competitiveness in the market.

The importance of employees who are users of the introduced technology is often overlooked in the process of digital business transformation (Osmundsen et al., 2018). Adopting new knowledge and accepting new technologies can create particular obstacles in small and medium-sized enterprises with long-standing traditional business practices. This may also depend on previously acquired knowledge, as well as the age of the employees. Therefore, understanding the extent to which the current level of digital literacy among employees affects the process of digital transformation is important for assessing the possibilities for its successful implementation. Small and medium-sized

enterprises (SMEs) are integral to Bosnia and Herzegovina's (BiH) economy, contributing significantly to job creation and inclusive economic growth. They account for over 60% of total employment and generate more than 60% of the gross domestic product (GDP) (BHAS, 2019). In fact, SMEs make up an overwhelming 98.9% of all enterprises in BiH, with micro-enterprises comprising the largest share at 72.8%, followed by small (19.7%), medium-sized (6.4%), and large enterprises (1.1%) (BHAS, 2019). Despite their significance, SMEs in BiH encounter various challenges that impede their competitiveness in the global market. These challenges include complex administrative procedures, a weak legal system, and internal barriers such as low levels of knowledge and skills in new technologies, outdated technology, and a focus on traditional production and local markets (Hasić, 2006). Given these challenges, there is an urgent need to explore avenues for enhancing employee productivity within SMEs to drive economic growth and development in the country. Limited adoption of information and communication technologies (ICT) and a lack of digital literacy among employees are identified as major barriers to SME advancement in BiH. Therefore, this study aims to investigate the current level of digital literacy among employees and its impact on their performance. The findings will provide valuable insights for company directors and policymakers, underscoring the importance of investing in employee skill development, particularly in the context of SMEs striving to compete globally and establish a presence in international markets.

This study has two main research objectives: (i)To comprehensively understand the role and impact of digital literacy within small and medium-sized enterprises (SMEs), including its influence on employee performance, digital transformation processes, and overall competitiveness; (ii) To provide practical guidance and recommendations for directors of SMEs, particularly in Bosnia and Herzegovina, aimed at enhancing digital literacy among employees to foster improved performance, successful digital transformation, and enhanced competitiveness in the global market. Within the framework of the described research problem, the main hypothesis is proposed:

H1: Digital literacy among employees in small and medium-sized enterprises in BiH contributes to their performance.

In addition to the main hypothesis, the following auxiliary hypotheses are formulated:

H1a: There are statistically significant differences in the level of digital literacy among employees in small and medium-sized enterprises in BiH operating in different sectors.

H1b: There are statistically significant differences in the level of digital literacy between younger (18-30) and older (31-65) employees in small and medium-sized enterprises in BiH.

H1c: There are statistically significant differences in the level of digital literacy among employees in small and medium-sized enterprises in BiH based on their level of prior education.

This paper is structured into five main sections. The section that follows the introductiory part, defines the process of digital transformation and basic concepts related to this process in enterprises, with a specific focus on the characteristics of the digital transformation process in SMEs. The third sectionc os dedicated to digital literacy among employees, starting with the definition of the concept and basic concepts, followed by elements and factors that may influence the level of digital literacy. The fourth part presents the results of a quantitative research conducted in SMEs in BiH, starting with the presentation of the applied methodological framework, descriptive analysis of the sample, and results of the applied methods and tests, along with an explanation of the limitations of the conducted research. In the laste section, conclusions based on a systematic review of literature and research conducted in BiH are presented, along with recommendations aimed at the broader community and suggestions for further research in this area.

2. Literature review

2.1. Digital transformation and small and medium enterprises

The digital transformation or its early forms emerged as early as the beginning of the 20th century. The first use of the term digitalization can be traced back to an essay from 1971 published in the North American Review (Brennan and Kreiss, 2014). Although currently a popular point of discussion, the concepts of digital products, services, and media were already well understood in the 1990s and 2000s (Auriga, 2016). Examples can be found in the retail industry, where mass media advertising campaigns were considered important digital channels for reaching customers in the 1990s and 2000s, despite most purchases still being made in physical stores, often with cash payments. From 2000 to 2015, increased use of smart devices and social media platforms led to a drastic change in how customers communicated with businesses, as well as their expectations regarding response time and the availability of multiple communication channels. As a result, businesses began to realize that they could now digitally communicate with their customers on an individual basis, often in real-time. The increasing variety of digital payment options, such as PayPal, also contributed to the growing number of online stores and available options on web-based platforms. Today, the focus is on mobile devices and creating value for customers by leveraging personalized customer data that mobile technologies can generate to a large extent. Businesses leverage the benefits of this personalized data to better tailor their products, communication, and interaction to meet specific customer needs (Schallmo and Williams, 2018).

Currently, there is no single, universally accepted definition of the term digital transformation; in fact, the terms digitization, digitalization, and digital age are often used interchangeably (BDI and Roland Berger, 2015). To understand the concept of digital transformation of business models, it is important to understand what "digital" means in digital transformation. Several definitions of "digital" exist (Berman, 2012; Auriga, 2016), but here we present the definition developed by McKinsey, which defines digital less as a process and more as how businesses conduct their operations (Dorner and Edelman, 2015).

McKinsey's definition of "digital" can be divided into three primary areas (Schallmo and Williams, 2018):

- Creating value at new frontiers of the business world
- Optimizing processes that directly impact customer experience
- Building foundational capabilities that support the overall business initiative.

The concept of digital transformation revolves around the process of reshaping business models through the integration of new technologies, transitioning manual operations into (semi)automated processes. Understanding this process necessitates a grasp of what constitutes a business model. Schallmo (2013) defines the business model as the fundamental logic of a company, outlining the benefits it provides to customers and partners and how these returns translate into revenue. This approach enables differentiation from competitors, strengthens customer relationships, and fosters competitive advantages. The ultimate objective for any company is to synergize elements of the business model to facilitate growth in a manner that is challenging for competitors to replicate (Schallmo and Williams, 2018). Implementing digital transformation requires strategic investment of time to forge new business models and practices. This entails leveraging technologies such as the web across various functions including design, production, marketing, sales, promotion, and data-driven management models. By embracing digital transformation, companies enhance their capabilities and refine their business processes, leading to overall improvements (Ulas, 2019). It's

crucial to distinguish digital transformation from business process reengineering (BPR). While there are similarities between the two, BPR primarily focuses on automating rule-based processes, whereas digital transformation aims to acquire new data and utilize them to restructure old rule-based processes (Proctor, 2017; Schallmo and Williams, 2018).

In recent years, industries have witnessed significant technological shifts, driven by market volatility and the necessity for enhanced responsiveness to demand. This has prompted companies to seek optimization of business performance through digital transformation, aiming to enable business agility and adapt to evolving work methods (Henriette, Mondher, Boughzala, 2015). While large enterprises hold an advantage due to greater financial resources, their size can complicate the transformation process. Often, companies view technology investments as routine, failing to explore its potential for innovative business practices (Fitzgerald et al., 2014). Managers across companies recognize the transformative potential of digital technologies but struggle with implementation strategies, particularly in small and medium-sized enterprises (SMEs) that seek to emulate successful digital adoption by larger counterparts (Fitzgerald et al., 2014).

Digital transformation is a continuous process aimed at elevating digital maturity through the integration of digital technologies and organizational practices to foster a digital culture. Successful adoption of digital transformation yields better returns on investment, increased profitability, and improved competitive advantage by enhancing service delivery and responsiveness in complex environments (Westerman et al., 2011). Thus, the primary goal of digital transformation is to revamp organizational operations with digital technologies to achieve benefits such as productivity enhancement, cost reduction, and innovation. However, barriers to digital transformation persist, including SMEs' limitations in making substantial investments, lack of internet technology understanding, sector-specific challenges, data security concerns, and insufficient information on digital standards, among others (Ulas, 2019).

Before embarking on the digital transformation journey, it is crucial for SMEs to acquaint themselves with available programs and software that facilitate the transition between transformation phases. Understanding the prerequisites for digital transformation, including employees' digital literacy level, is paramount for successful implementation (Henriette, Mondher, Boughzala, 2015). Therefore, given the challenges and potential benefits, further examination of how to facilitate the digital transformation process in SMEs is of utmost importance.

2.2. Digital literacy and employee performance

The concept of digital literacy is relatively newer compared to related concepts such as computer, media, information, or technological literacy, which were recognized in literature and practice earlier. Computer literacy emerged as a need from the late 1960s. According to Martin and Grudziecki (2006), the concept of computer literacy went through three developmental phases: the mastery phase (until the mid-1980s), the application phase (from the mid-1980s to the late 1990s), and the reflective phase (late 1990s onwards). Technological literacy emerged in the 1970s in response to two concerns: growing awareness of the potential environmental and human hazards of technological development, and increasing fears that ignorance of developing technologies would jeopardize the workforce, particularly in countries sensitive to competition from more technologically aware countries (Waks, 2006, as cited in Martin and Grudziecki, 2006). Information literacy developed in the United States from the late 1980s in academic circles, in light of the trend towards student-centered learning, and largely explains the pre-digital context. With the increasing presence of the World Wide Web as a seemingly endless source of information, the information literacy movement gained more prominence (Martin and Grudziecki, 2006).

Collard states that the nature, scope, purpose, and methods of developing media literacy have been, and still are, the subject of debate in the media and academic community (Collard et al., 2017). There are many similarities between definitions of media literacy and information literacy, suggesting that generic competencies are very similar. Media literacy focuses more on the nature of different media genres and how messages are constructed and interpreted - in this perspective, the characteristics of the author/sender and receiver are key to understanding the meaning and content of the message. In contrast to media literacy, information literacy has been focused on ways to access information and evaluate content (Martin and Grudziecki, 2006). The digital shift in society is changing all means of information and communication, requiring new competencies for information retrieval and sharing or for maintaining and developing social interactions (Collard et al., 2017). Communication literacy emphasizes the importance of communication as a human activity, actually, as the foundation of social interaction, and is considered a fundamental personal attribute, regardless of whether it is realized orally or digitally. However, the advent of the digital era, which has enabled communication with one or more persons remotely from the previously exclusive face-to-face communication, requires users to be more aware of the nature and implications of the media (Martin and Grudziecki, 2006).

Before defining the concept of digital literacy, it is necessary to understand the concept of literacy itself. Literacy is traditionally characterized as a set of skills related to reading and writing (Nikou et al., 2019). However, similar to modern or technologically driven society, the essence of literacy has undergone its own evolutionary sense. Today, it is true that in much of Europe and many other parts of the world, we live in a digital society where our actions are often mediated by digital tools, and the objects we encounter are often shaped by digital intervention (Martin and Grudziecki, 2006).

Digital skills and digital literacy have emerged as crucial concepts in contemporary society, impacting social inclusion, employment, and economic growth (European Commission, 2010, 2016a, 2016b; Ferrari, 2012; Gallardo-Echenique et al., 2015). Definitions of digital literacy have evolved over time, initially focusing on computer proficiency and later expanding to encompass broader digital competencies (Fraillon, J. et al., 2019; Lavin and Kralik, 2009; Ala-Mutka, 2011). The European e-Skills Forum and subsequent European Commission initiatives have emphasized the importance of e-Skills and digital competence in responding to societal and economic needs (European Commission, 2007; Gallardo-Echenique et al., 2015). Digital competence, defined by European institutions in 2006, emphasizes the safe and critical use of ICT for various purposes, recognizing it as essential for lifelong learning (European Council, 2006). However, the concept of digital competence remains fluid and subject to ongoing debate (Ferrari, 2012; Ferrari, Punie, and Redecker, 2012; Ilomäki, Kantosalo, and Lakkala, 2011).

Digital literacy encompasses a range of skills related to digital technology, including ICT literacy, information literacy, media literacy, and visual literacy (Curtarelli, 2014; Martin, 2006). Martin (2005) defines digital literacy as the ability to effectively navigate digital tools and resources in various life situations, emphasizing its dynamic nature and integration of multiple literacy skills. Gilster (1997) similarly highlights the importance of understanding and utilizing digital information from diverse sources. Recent research has explored the relationship between digital literacy and technology adoption, organizational capabilities, and social inclusion (Aavakare, 2019; Bayrakdaroglu and Bayrakdaroglu, 2017; Nikou et al., 2018; Cetindamar Kozanoglu, and Abedin, 2021). Additionally, related concepts such as digital media literacy have emerged as crucial components of social participation (Fastrez, 2010; Basyal and Seo, 2017). In summary, digital literacy is a multifaceted skill set that plays a vital role in contemporary society, influencing

individuals' abilities to navigate digital environments effectively and participate fully in social, economic, and cultural activities.

3. Results of research on the impact of digital literacy on performance

3.1. Model and Research Methodology

Various methods have been used in studies examining the impact of digital literacy on employee performance, including quantitative and qualitative techniques or their combination (Pirzada and Khan, 2013; Basyal and Seo, 2017; Osmundsen et al., 2018; Cherry, 2016; Marsh, 2018; Collard et al., 2017; Jose, 2016; Ivančić, Vukšić and Spremić, 2019). These studies have explored the concept of digital literacy in different contexts, examining factors, influences, and the relationship of digital literacy to the digital transformation process, productivity, and employee performance. In relation to the research questions and the defined research objectives, the relationship of digital literacy to company performance will be examined through the TOE model, which has been previously used to investigate this impact in the oil and gas industry in Malaysia (Abas, Ros and Mogd, 2019). TOE stands for Technological, Organizational, and Environmental factors, representing the components of digital literacy.

To examine the TOE model in SMEs in Bosnia and Herzegovina, we will conduct quantitative research by collecting data from a sample of employees working in SMEs in Bosnia and Herzegovina. A modified questionnaire from the study by Abas, Ros and Mogd (2019) will be used to collect data, where the introductory part of the questionnaire includes questions about the demographic characteristics of employees and the size of the company to identify small and medium-sized enterprises by the number of employees. The introductory section of the questionnaire also includes questions about gender, age, level of education, field of education, and the sector in which the company operates where the respondents are employed. These questions will be used to test auxiliary hypotheses. The survey will be conducted on a representative sample of employees in small and medium-sized enterprises in Bosnia and Herzegovina, randomly selected through an online survey. To confirm or reject the auxiliary hypotheses, ANOVA test will be used, assuming normal distribution of responses to the questions.

In the process of confirming or rejecting the main hypothesis, following the methodological approach in the mentioned study (Abas, Ros and Mogd, 2019), we first conducted a factor analysis, which initially used default settings (Principal Component Analysis - PCA) and rotated the loading matrix to obtain orthogonal (independent) factors (Varimax rotation with Kaiser normalization). The criterion for grouping components within one factor is based on the approach from Igbaria and Iivari (1995), where loadings greater than 0.60 under one component and loadings less than 0.35 under other components should be grouped into the same components. After grouping the components and conducting additional diagnostic tests (Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity) to test the direction, strength, and interdependence of independent T, O, and E variables and the dependent variable (employee performance), multiple regression analysis will be used. Based on the coefficients obtained in the regression model and the level of statistical significance in relation to the defined error level of 5%, it will be examined whether digital literacy in SMEs in Bosnia and Herzegovina contributes to the performance of employees employed in these companies. In the continuation of the work, we first present the basic descriptive analysis of the sample, followed by the results of the procedures conducted in the statistical program Stata 14.2.

3.2. Data and sample

Collecting primary data for the research on the impact of digital literacy on employee performance in SMEs in Bosnia and Herzegovina was conducted from July to August 2021 by distributing the questionnaire via email. An online survey was sent to a total of 1,500 email addresses using the LimeSurvey response collection program. The total number of responses received was 346, which corresponds to a response rate of 23.07%. Respondents who answered that they are currently unemployed and employees of large companies were excluded from the total number of responses. All analyses were conducted on the final sample of 281 respondents. Table below provides a detailed overview of the main characteristics of the sample.

Table 1: Overview of basic characteristics of the sample

Characteristic		Frequency	%
Size of the company	0-9 employees	77	27.40
	10-49 employees	122	43.42
	50 – 249 employees	82	29.18
	Total	281	100
Gender	Male	126	44.84
	Female	155	55.16
	Total	281	100
Level of education	Completed doctoral studies	11	3.91
	Completed university or academy	136	48.40
	Completed master's studies	67	23.84
	Completed specialization after high school	6	2.14
	Completed high school lasting 4 or 5 years	40	14.23
	Completed high school lasting 3 years	3	1.07
	Completed vocational school	18	6.41
	Total	281	100
Age	≤ 30	69	24.82
	30+	209	75.18
	Total	278	100

Source: Authors's work

3.3. Results

The descriptive analysis of responses provided by employees of SMEs in Bosnia and Herzegovina regarding their level of digital literacy and perception of performance shows high average values with low standard deviation. In the section concerning questions related to the technological context, the highest average value of 4.29 (with a standard deviation of 0.85) is in response to the question about using scanning/processing techniques for quick access to key relevant information on the website. In the dimension of questions related to the organizational context, the highest average in the given responses is for the question about communicating with others online (via

forums, blogs, social media websites, audio, video, etc.), where the average is 4.44 with a standard deviation of 0.77.

In the environmental context, the highest average in the collected responses, amounting to 4.46 with a standard deviation of 0.66, was obtained for the question about understanding the concept of digital literacy, which includes learning, critical thinking, and interpretive skills beyond professional boundaries. The second-highest average within this dimension relates to the question about using reliable social networks to find information relevant to work (average of 4.33 with a standard deviation of 0.73).

In the section concerning employees' perception of their performance, the highest average in responses was recorded for the question about understanding the need for department members to be digitally literate and contribute to the value of the economy. The overall average response to this question is 4.56 with a standard deviation of 0.58.

The lowest recorded averages are for the question about applying search strategy and strategic analysis based on big data (average of 3.72 with a standard deviation of 1.02), the question about leaders (managers) communicating their digital agenda and how employees contribute to its development (average of 3.75 with a standard deviation of 1.00), and the question about determining the ownership of data and ideas found online and how to legally use them (average of 3.88 with a standard deviation of 1.00). The presented analysis actually shows that in most cases, employees know how to use tools for website search and online communication via social networks, as well as how to use data found through social networks for their own work. On the other hand, the least developed elements of digital literacy relate to strategic factors and understanding the digital agenda, as well as the culture of using others' data and ideas found online. This actually shows that on average, most employees in SMEs have developed basic digital literacy skills, and companies are caught between the conservative and modernist phases, with a lack of strategic direction indicating that SMEs lag behind their digital role models.

After analyzing the responses to the questions within the TOE dimensions, we conducted a factor analysis to confirm that the questions were properly distributed within the specified dimensions. We used default principal component analysis (PCA) settings and rotated the loadings matrix to obtain orthogonal (independent) factors (Varimax rotation with Kaiser normalization). The results of the factor analysis are presented in Table 2.

Table 2: Results of factor analysis

	Variable	Factor 1	Factor 2	Factor 3	Factor 4
Technological	P1	0,6646	0,1994	0,1801	0,2016
	P2	0,7502	0,2111	0,1785	0,2188
	P3	0,7620	0,2218	0,1681	0,2418
	P4	0,7479	0,2813	0,1174	0,2742
	P5	0,6908	0,1415	0,2539	0,2119
	P6	0,6057	0,2396	0,2679	0,3475
	P7	0,6390	0,1931	0,2840	0,2235
	P8	0,6862	0,2007	0,2542	0,1850
	P9	0,5555	0,1487	0,3672	0,1558
	P10	0,5475	0,4542	0,1391	0,1077
	P11	0,2117	0,1220	0,7137	0,3720

	P12	0,0432	0,2484	0,7063	0,0416
	P13	0,1746	0,2059	0,7967	0,2187
	P14	0,1950	0,3451	0,6296	0,1786
	P15	0,3340	0,2616	0,6680	0,3270
	P16	0,3257	0,2728	0,6225	0,2869
	P17	0,4146	0,2997	0,6359	0,1815
	P18	0,3731	0,1667	0,5352	0,3771
Enivornmental	P19	0,2996	0,2577	0,2888	0,5462
	P20	0,3280	0,4181	0,2105	0,4240
	P21	0,3233	0,2447	0,2665	0,6203
	P22	0,2808	0,2889	0,1150	0,7139
	P23	0,2738	0,1881	0,3604	0,6875
	P24	0,2500	0,2347	0,2400	0,7591
	P25	0,2449	0,2615	0,2990	0,6642
	P26	0,1388	0,4141	0,3536	0,4713
Employee performance	P27	0,0990	0,6276	0,2130	0,2515
	P28	0,1310	0,7857	0,1817	0,1455
	P29	0,2089	0,7948	0,1751	0,1539
	P30	0,3692	0,6911	0,2535	0,2057
	P31	0,2154	0,6307	0,2967	0,3128
	P32	0,2631	0,7130	0,1912	0,2070
	P33	0,2536	0,6444	0,2125	0,2888
	P34	0,2162	0,7215	0,2226	0,2184
	Bartlett's test of sphericity	P-value : 0,000			
	The Kaiser-Mayer-Olkin measure of sampling adequacy	KMO: 0,952			

Source: Authors's work

Igbaria and Iivari (1995) states that items with loadings greater than 0.60 under one factor and loadings less than 0.35 under other factors should be grouped into the same factors. The results from Table 5 confirm that the items have been correctly grouped into the appropriate factors, where Factor 1 represents the technological context, Factor 3 represents the organizational context, while Factor 4 represents the environmental context. Factor 2 comprises a group of items describing employees' own perception of performance. After conducting the factor analysis, the results were further confirmed through the Bartlett's test of sphericity (with a p-value of 0.000) and the Kaiser-Meyer-Olkin measure of sampling adequacy, which yielded a result of 0.952, indicating that conducting the factor analysis was an appropriate method.

To test the measure of internal consistency within the defined factors (components) of the questionnaire used, Cronbach's alpha measure was calculated. Cronbach's alpha measurement is used as a popular measure for reliability, where a result of 0.60 or higher for a component reveals that the measurement items under that specific component provide a reliable measure of internal consistency. The results of Cronbach's alpha measured for the 4 defined factors (components) are presented in Table 6, from which we can see that all results are above 0.9, indicating a high degree of internal consistency of the scales.

Table 3: Results of scale reliability measure (Cronbach's alpha)

Dimension	Average inter-item covariance	Number of items in the scale	Coefficient of scale reliability (Cronbach's alpha)
Technological context	0,4544	10	0,9229
Organizational context	0,4618	8	0,9117
Environmental context	0,3794	8	0,9025
Employee performance	0,3129	8	0,9211

Source: Authors's work

After familiarizing ourselves with the responses to the questionnaire through descriptive and factor analysis, following the described methodological approach, we use a multiple regression analysis model to confirm the main hypothesis. Let's remind ourselves of the main hypothesis: The digital literacy of employees in small and medium-sized enterprises in Bosnia and Herzegovina contributes to their performance.

The responses to questions in the respective dimensions have been aggregated, thus obtaining the values of individual dimensions which were used as independent variables in the specified regression model:

$$\mathrm{EP} = \alpha_1 + \beta_1 T\mathrm{C} + \beta_2 O\mathrm{C} + \beta_3 E\mathrm{C}$$

Where:

EP – Employee performance
TC – Technological context
OC – Organizational context
EC – Environmental context

In the defined model, the dependent variable is the assessed perception of employee performance, while the independent variables are factors of digital literacy defined through technological, organizational, and environmental context.

Table 4*:* Results of the multiple regression model

Variable	**Coefficient**	**Standard error**	**t**	**Significane**
TC	0,1436	0,0404	3,55	0,000
OC	0,1770	0,0512	3,46	0,001
EC	0,3556	0,0594	5,98	0,000
EP	10,9726	1,2614	8,70	0,000

Source: Authors's work

The results of the multiple regression model in Table 7 show that all three defined factors have a significantly positive impact on employee performance. Among the analysed factors, employee performance is most influenced by digital literacy defined within the environmental factor (EF), where an increase of 1 unit within these factors contributes to a performance increase of 0.3556

units. Following these factors, organizational factors of digital literacy have the most impact, while technological factors have the least. The coefficient of determination, at 56.57%, indicates that more than half of the variation in employee performance is explained by the three defined factors of digital literacy, while the remaining 43.43% represents other factors not defined in the tested regression model.

In the conducted research, we sought to test the following auxiliary hypotheses:
H1a: There are statistically significant differences in the level of digital literacy among employees in small and medium-sized enterprises (SMEs) in Bosnia and Herzegovina operating in different sectors. H1b: There are statistically significant differences in the level of digital literacy between younger (18-30) and older (31-65) employees in SMEs in Bosnia and Herzegovina. H1c: There are statistically significant differences in the level of digital literacy among employees in SMEs in Bosnia and Herzegovina based on the level of previously acquired education.

In testing the auxiliary hypotheses, an ANOVA test was used assuming normal distribution, and no statistically significant results were obtained in the conducted tests. Therefore, we cannot claim that there are statistically significant differences in the level of digital literacy among employees in SMEs considering the sector of operation, age, and level of education. Part of the reason for these results lies in the structure of the analysed sample, where, as seen in the descriptive analysis section, there was no significant dispersion in most responses (lower standard deviation values), and the sample mostly consisted of younger employees and individuals with higher education levels.

4. Conclusion

Business operations on a global scale have undergone significantly different formats and outlines in recent decades compared to the time before the Fifth Industrial Revolution. New technologies, particularly AI, the increasing use of the internet in both personal and professional life, have altered the functioning of many businesses. However, these changes, albeit rapid, have occurred gradually, requiring a paradigm shift that we witness today. The processes initiated by the Fourth Industrial Revolution continue to unfold and are increasingly present in Bosnia and Herzegovina (BiH). It's already evident that for small and medium-sized enterprises (SMEs), these are distinct challenges, considering the general economic situation and post-war development period. Hence, it is crucial to examine all factors that can contribute to a smoother convergence of our traditional business management approaches towards those more acceptable and competitive in the global market.

While various approaches have been used in previous research to examine how digital literacy affects employees and companies, viewing it both as a consequence and a catalyst of the digital transformation process, one of the most prevalent models is the TOE model. Technological, organizational, and environmental factors (TOE) within this model demonstrate how the contexts, culture, and environment in which employees' digital skills develop influence their performance perception. Conducted research has shown a positive and significant relationship between these factors and employee performance, allowing, based on the results of these studies in various industrial sectors, an understanding of the importance of digital literacy and its impact on employee performance. The application of the TOE model to a sample of employees from SMEs in BiH aimed to explore the current level of digital literacy, which factors are more prevalent and have a greater impact, and which areas require further work. The study also sought to confirm whether the elements identified within the TOE model were correctly identified, which was confirmed in the research results through factor analysis and relevant tests. The TOE model encompasses elements that, when examined, can determine the connection between digital literacy in the specified contexts and employees' performance perception. Additionally, the goal was to examine whether the results of previous TOE model research could be applied to a sample of companies in BiH.

The research conducted on a sample of employees from MSPs in BiH, distributed through an email questionnaire, confirmed the main hypothesis of this study. We can conclude that digital literacy among employees in SMEs in BiH contributes to their performance. The research results show that environmental factors contribute the most, followed by organizational factors, while technological factors contribute the least. This is consistent with the observation that MSPs in BiH are in the phase of conservatives, where digital technologies have been acquired or purchased, and there is management with a vision for their use, yet there is still resistance to using these technologies in the process of digital business transformation. Resistance to the introduction of new technologies is a common occurrence, and understanding how to reduce this resistance and transition to the modernist phase is essential for SMEs in BiH. Previous research has shown that digital literacy enables employees to better understand and use technologies in their daily work. Unfortunately, the results of the research conducted in BiH indicate that, although digital literacy contributes to employee performance, it is still at a low level of development. Results show that employees best understand online work, internet searching, and the use of data found online. One of the reasons for these results is the COVID-19 pandemic, which has changed the ways businesses, societies, and communities operate, somewhat compelling even staunch traditionalists to use new technologies to operate and function.

In summary, while there have been initial strides, there is still much work required to harness employees' digital literacy in SMEs and leverage its positive impact on performance for a meaningful digital business transformation. The research highlights that employees struggle the most with understanding managers' digital agendas, a critical aspect during transitions in digital transformation phases. Additionally, the study aimed to explore if demographic characteristics like business sector, age, and education influence digital literacy levels. However, no significant differences were found among these groups in the sample analysed. While this suggests a consistent yet low level of digital literacy across SME employees, it also indicates the need for further investigation into individual causes. Considering the support needed for SMEs in Bosnia and Herzegovina (BiH), the research underscores the significant role of environmental factors, such as competitive pressure, government support, and consumer readiness for new technologies. Identified areas for improvement include transitioning employees from basic digital literacy to practical usage and training SME managers to understand and effectively communicate digital agendas. Government organizations can play a pivotal role by offering support beyond financial aid, ensuring proper training and cultural integration. Understanding the dynamic interactions among stakeholders amidst global changes is paramount, and it is hoped that the study's findings will propel SMEs in BiH towards a more comprehensive digital transformation, aligning them with global standards.

The results were obtained based on the analysis of responses to the questionnaire distributed via email lists, following the described methodological procedure. This represents one of the major limitations of the conducted research, as due to the social distancing measures caused by the COVID-19 pandemic, alternative data collection methods were not feasible. In this way, a portion of the sample without an email address or internet access was excluded from the analysis, with the assumption that the perception and responses of this segment of the population may differ from the participants included in the analysis. Although the questionnaire was distributed to a large number of addresses targeting a highly diversified sample, the structure of the sample shows that the majority consists of highly educated individuals of younger age. Given such a sample structure and the fact that the auxiliary hypotheses aimed to determine how demographic characteristics influence the level of digital literacy, we assume that part of the reason for not confirming the stated assumptions lies in the sample structure. We propose that the analysis be repeated, including respondents who do not use the internet, and that the sample be larger with potentially different structure in future research.

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DO EXPORT, FORMAL PARTNERSHIPS WITH FOREIGN COMPANIES AND FOREIGN OWNERSHIP CONTRIBUTE TO THE BETTER ENVIRONMENT PERFORMANCE OF COMPANIES IN TRANSITION COUNTRIES - THE CASE OF BOSNIA AND HERZEGOVINA

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Abstract

Trade and foreign direct investment (FDI) have been associated with positive spillover effects by transferring technology and knowledge from developed countries with stricter environmental regulations to developing countries with more lenient regulations. While theory suggests trade and FDI can improve environmental performance, empirical evidence shows they aren't consistently linked to such gains, highlighting the need to further consider specific circumstances and factors shaping this relationship. Essentially, empirical studies with microeconomic foundations, in particular in transition countries, have observed conflicting but interesting results related to the effects of trade and capital flows on the environmental performance of local companies and industries.

Given the assigned ambiguous role of trade and FDI in relation to environmental performance in the literature, this research attempts to provide new insights with respect to the specific factors that determine companies' environmental performance, and the role played by knowledge and technology transfer. Using company-level data from pollution-intensive manufacturing sectors in Bosnia and Herzegovina, logistic regression is employed to investigate the impact of export, foreign ownership, and foreign market linkages on environmental management performance. The findings reveal a strong relationship between market liberalisation and environmental protection. Particularly, the obtained results highlight the importance of exports to the EU as companies with stronger market ties to the EU are more likely to adopt international environmental standards. Further, the research embarks from previous literature in that it sheds light on the role of formal partnerships with foreign companies in influencing companies' behaviour. Specifically, the results of empirical models reveal a somewhat controversial outcome, i.e., that formal partnership is negatively associated with environmental management performance. Contrary to the assumption that foreign partnerships would improve environmental standards, these results suggest a trend of relocating pollution-intensive production to regions with more lenient regulations, such as Bosnia and Herzegovina. Furthermore, despite the relatively small sample of foreign-owned companies, the study indicates that these companies often lack international environmental standards. Therefore, foreign investments in pollution-intensive industries appear driven by cost efficiency and lenient environmental regulations, as documented in existing literature.

The results of econometric analysis thus provide a novel insight into determinants of environmental management practices of companies in the specific context of less developed

transition economy. Further, this research adds to recent literature by relaying on company level data, analysis of which are scarce especially considering Western Balkan economies including Bosnia and Herzegovina. The findings of the study offer valuable insights for policymakers and businesses.

Keywords: firm environmental management performance, market liberalisation, knowledge transfer, transition countries

JEL classification: O44, P28, Q56

Introduction

The expansion of economic development and activity has increasingly impacted the environment, leading to significant degradation of natural resources and adverse effects on human well-being. This has prompted the implementation of stricter environmental regulations. As regulatory frameworks continue to evolve, discussions around the interplay between economic growth, environmental policies, and environmental health have become more complex, especially in light of growing market liberalization.

Driven by a desire to understand the effects of market liberalization and global interdependencies on the environment, researchers are increasingly examining how global trade and capital flows contribute to the state of environment. Critics argue that key aspects of market liberalization, such as deregulation, privatization, and the reduction of trade barriers, can lead to significant environmental challenges. As countries adopt these measures to boost competition and attract foreign investment, they may prioritize economic growth over ecological sustainability. For instance, the ease of moving goods and capital across borders can encourage "dirty industries" to relocate to countries with weaker environmental regulations, known as the Pollution Haven Hypothesis (PHH).

Proponents of market liberalization, however, often emphasize the positive environmental impacts of international competition and global capital flows, aligning with the Porter Hypothesis (PH). This view argues that the pressure of global competition and the desire to attract foreign investment can drive companies to become more efficient and adopt cleaner technologies. Firms may be incentivized to comply with higher international environmental standards, which are increasingly demanded by global markets and investors.

Although the PHH and the PH represent two opposing perspectives, the examination of firm-level incentives and behaviours is fundamental to both frameworks. Recognizing this connection and considering the nuanced and complex circumstances that shape the overall impact of trade and capital flows on environmental conditions, researchers are increasingly directing their attention toward the analysis of behaviour of companies. Researchers are exploring both external and internal factors, including trade and FDI, that influence this behaviour, aiming to understand the elements that contribute to higher environmental management performance within firms. Empirical studies examining the influence of trade and FDI on companies' environmental management performance have yielded largely inconclusive and mixed findings (Albornoz, Cole, Elliott & Ercolani, 2007; Bluffstone & Sterner, 2006; Dasgupta, Hettige & Wheeler, 1998; Eskeland & Harrisson, 1997; Hartman, Huq & Wheeler, 1997; Henriques & Sadorsky, 2006; Pargal & Wheeler, 1996). The findings suggest that, while trade and FDI can have a positive influence on companies' environmental performance, this effect is not consistent and can, at times, yield contrary outcomes.

This paper aims to contribute to the recent literature on environmental management performance by examining the external and internal factors, motives, and barriers influencing companies' environmental behaviours. It specifically looks into the effects of technology and knowledge transfer on environmental performance of companies. By focusing on the manufacturing polluting industries in Bosnia and Herzegovina, this study explores the impact of FDI, export, and

formal linkages with foreign companies on companies' environmental performance. As a developing transition country recognized by the EU as a candidate for membership, Bosnia and Herzegovina provides a unique business environment for companies and their environmental management efforts. The environmental impacts of market liberalization should be especially pronounced in transitional economies. While increased foreign investment offers opportunities to introduce advanced environmental technologies and stricter standards, these economies also face challenges, as their evolving regulatory frameworks and limited institutional capacity can attract industries looking to exploit weaker environmental regulations.

The remainder of the paper is organized as follows: Section 2 reviews the theoretical and empirical literature; Section 3 outlines empirical analysis including conceptual framework, data description, methods of investigation and the results; Section 4 concludes.

Theoretical and Literature Review

The environmental impacts of market liberalization, shaped by growing trade and capital flows, remain a point of ongoing discussion. The two main theories, the Pollution Haven Hypothesis (PHH) and the Porter Hypothesis (PH), offer different perspectives on how market liberalization impacts environmental outcomes. PHH suggests that strict environmental regulations in one country may reduce the competitiveness of its companies by increasing their production costs. When trade barriers are lowered, these companies might relocate their pollution-intensive activities to countries with weaker environmental regulations. Conversely, PH proposes that strict environmental regulations can boost competitiveness by driving innovation and efficiency. Additionally, global competition and liberalized markets may encourage firms to transfer environmentally friendly technologies to other countries, which can help lower emissions and improve environmental quality in those countries.

Research on the PHH and the PH has produced largely inconclusive findings, highlighting an ongoing gap in understanding the complex relationship between environmental regulations, trade, FDI, and their environmental impacts (Cole & Elliott, 2003; Grossman & Krueger, 1993; Javorcik & Wei, 2003; Mani & Wheeler, 1997; Xu, 2000). While studies generally offer limited support for the PHH, authors emphasize that this does not entirely refute the existence of pollution havens or diminish the relevance of pollution concerns. Further, even though factors like labor costs and resource availability tend to drive industrial location decisions, lenient environmental regulations can still influence these choices (Cole & Elliott, 2003; Grossman & Krueger, 1993; Kheder & Zugravu, 2012). On the other hand, some research demonstrates that trade and FDI can have beneficial effects on the environment in developing countries, promoting clean technology and knowledge transfer (Kheder & Zugravu, 2012; Xu, 2000). Findings reveal that trade and FDI’s environmental impacts are shaped by diverse factors, underscoring the importance of understanding firm-level behaviour and environmental management performance.

From a company perspective, trade facilitates the exchange of environmentally friendly goods and services, allowing companies to import advanced technologies and practices from nations with stricter environmental standards. Additionally, trade stimulates competition among firms, driving them to adopt more efficient and sustainable production methods to meet the demands of global markets. In their efforts to maintain competitiveness, companies are often incentivized to integrate cleaner technologies and align with higher environmental standards.

Furthermore, it is assumed that multinational corporations (MNCs) benefit when keeping advanced, cleaner technologies and practices. MNCs typically aim to establish consistent environmental standards across their global operations, often adhering to the higher standards set by their home countries. MNCs can also benefit from transferring or "exporting" their superior environmental management practices and standards to the countries in which they operate, thereby enhancing their global reputation, improving operational efficiency, and potentially reducing long-term costs associated with environmental damage or regulatory changes in the host country.

Accordingly, researchers are increasingly prioritizing the role of corporate dynamics in driving environmental performance, alongside a greater emphasis on understanding knowledge and technology transfer. These studies focus on environmental management performance as various practices companies use to reduce their environmental footprint, such as adopting clean technologies, obtaining environmental certifications, implementing waste reduction measures, and developing environmental strategies. Specifically, authors are aiming to identify what contributes to more effective environmental management within firms by examining both external factors and internal factors that influence a company's environmental performance.

Empirical studies examining the influence of trade and FDI on companies' environmental management performance have yielded largely inconclusive and mixed findings. The substantive line of microeconomic research support theoretical conceptualizations that trade and capital flows are factors possible of increasing environmental performance of companies. However, as is to be seen from the postulated literature review below, trade openness per se, and exports explicitly have not always been associated with improved environmental performance of local companies and industries.

Although it is often hypothesized that companies engaged in international trade adopt higher environmental standards to gain access to foreign markets and meet regulatory requirements, a significant body of research challenges this assumption. Studies by Bu, Liu, & Gao (2011), Hartman, Huq and Wheeler (1997), Henriques & Sadorsky (2006) and Luken, Van Rompaey & Zigova (2008) found no evidence to suggest that exporting to OECD countries leads to significant improvements in environmental performance or encourages the adoption of cleaner technologies in companies in developing countries. This limited impact may be attributed to various factors, including the nature of trade relationships, the composition of export markets, and insufficient regulatory pressure from international buyers indicating importance of various factors on determining the effect of export.

On the other hand, numerous studies confirm the positive influence of export on the environmental performance of companies. This is evident in the faster adoption of clean technologies (Andanova, 2003); improvements in environmental performance indicators and employee training (Henriques & Sadorsky, 2006); the implementation of audit, waste minimisation, and pollution prevention measures, as well as the establishment of environmental departments (Bluffstone & Sterner, 2009); and ISO 14001 certification (Bellesi, Lehrer & Tal, 2005; Bluffstone & Sterner, 2009; Christmann & Taylor, 2001; Qi et al., 2011). Authors do, however, highlight importance of other factors such as significance of enforcement institutions (Andonova, 2003) and firm size (Bluffstone and Sterner, 2006) for example.

Furthermore, the evaluation of how trade liberalisation influences the environmental performance of companies is often intertwined with the examination of foreign direct investments. Similar to the analysis of exports, several studies suggest that specific environmental practices, such as reduced energy consumption, environmental audits, ISO 14000 certification, and the adoption of environmentally friendly technologies, tend to benefit from FDI under certain conditions (Andonova, 2003; Albornoz et al., 2009; Bluffstone & Sterner, 2006; Bu, Liu & Gao, 2011; Christmann & Taylor, 2001; Eskeland & Harrisson, 1997; Henriques & Sadorsky, 2006). However, some research also suggests that in certain instances, FDI may not have a discernible impact on enhancing environmental performance (Andonova, 2003; Cole, Elliott & Strobl, 2008; Garcia, Bluffstone & Sterner, 2009; Gallagher, 2006; Qi et al., 2011).

As mentioned, transition countries offer an interesting context for studying the impact of market liberalization on environmental outcomes, particularly regarding firm-level environmental management practices, often yielding mixed results. Andonova's (2003) study, one of the first of its kind, used firm-level data from 1990 and 1997 on companies in Bulgaria, Hungary, Lithuania, Poland, and Slovakia and found that increased openness via international trade and capital positively influenced environmental management in Central and Eastern European firms, though not as strongly as theory might predict. While international trade pressures encourage cleaner

technologies, the relationship between exports and environmental performance weakens when accounting for country-specific factors, emphasizing enforcement institutions' role in driving sustainable practices. Additionally, although multinational firms often excel in formal environmental practices like ISO 14000 certification, the study questions assumptions that foreign capital consistently drives cleaner technology adoption. Similar microlevel research by Bluffstone and Sterner (2006), Henriques and Sadorsky (2006), and Garcia, Bluffstone & Sterner (2009) also report nuanced outcomes. Overall, research on market liberalization and environmental outcomes in transition countries indicates that while openness positively affects firm-level environmental practices, this relationship is complex, underscoring the importance of regulatory enforcement and domestic institutional stability in motivating firms to adopt sustainable practices.

While all these empirical studies offer valuable insights into the factors influencing the environmental management performance of companies, it is essential to highlight the diverse range of indicators used by authors to assess this performance. Depending on the regional and country context, prevailing trends, and available data, researchers utilize various metrics, including pollution levels, self-reported environmental performance, electricity use, energy efficiency, compliance with environmental regulations, ISO certification, clean technology adoption, et. Such variations in indicators can significantly contribute to disparities in research findings.

Additionally, there is a notable absence of examination regarding formal linkages with foreign companies, which can play a crucial role in shaping a company's environmental management performance. These partnerships may involve joint ventures, alliances, original equipment manufacturing, etc. that can facilitate knowledge transfer, resource sharing, and access to advanced technologies. Understanding these dynamics is essential, as they can, similar to trade and FDI, reveal pathways for companies to leverage external expertise and support in their environmental initiatives.

Furthermore, current research lacks in-depth observations of the concrete motives and barriers that influence the environmental actions of these companies. Identifying the specific reasons companies choose to pursue or neglect environmental management practices is vital for several reasons. It helps clarify whether firms are motivated by regulatory compliance, market demand, competitive advantage, or ethical considerations. Moreover, understanding the barriers that hinder effective environmental action, such as financial constraints, lack of knowledge, or insufficient regulatory support, can inform about the challenges companies face in implementing sustainable practices.

Empirical Analysis

Conceptual framework

This study aims to contribute to the discussion on the effects of market liberalization on the environmental management performance of companies. We focus on how technology and knowledge transfer, facilitated by market liberalization, affect environmental management performance of companies. Specifically, we explore the relationship between a company's environmental performance and its export orientation, as well as the role of technology transfer through FDI and formal partnerships. Additionally, the research seeks to address gaps in existing studies by examining barriers to adopting environmentally friendly practices and how formal partnerships, beyond just trade and FDI, affect companies' environmental management performance.

Building on existing firm-level research that investigates environmental management practices and their link to foreign markets, our study zeroes in on manufacturing companies in environmentally impactful industries in Bosnia and Herzegovina. Research uses company level data on ownership, exports levels and destinations as well as existence of other formal linkages with foreign markets to determine the type and level of relationship with foreign markets. This data is

analysed alongside company-specific information on environmental management practices, including motivations and barriers to adopting these practices, in order to identify patterns and relationships between foreign market integration and environmental management performance. Such analysis is expected to provide deeper understanding if and how links with foreign markets affect environmental performance of companies in Bosnia and Herzegovina and how certain social, economic and business factors (motives and barriers) affect companies' environmental performance.

This research poses two main questions:

1. What external and internal factors influence environmental performance of companies in polluting sectors in Bosnia and Herzegovina?
2. Are export, foreign direct investment and formal linkages to foreign markets linked to higher probability of companies possessing environmental certification (ISO or EMAS)[26] of companies in polluting sectors in Bosnia and Herzegovina?

The Sample and Data

Questionnaire

The research data for this study were collected using a questionnaire specifically designed for this analysis. The development of the questionnaire was guided by the conceptual framework of the research, ensuring a coherent alignment with our research objectives. We built upon earlier studies that investigated environmental management practices, and foreign linkages through comprehensive company-level surveys. Specifically, we rely on environmental management practices concepts and measurement constructs developed by Sroufe, Montabon, Narasimhan and Wang (2002), measurement of foreign linkages used in Silajdzic (2011:2014) empirical study, while assessment of social, economic and business factors (motives and barriers) that affect companies' environmental performance builds on list of motivators and barriers identified through literature review conducted by Singh, Singh and Dhingra (2012).

In line with the research conceptual framework, the questionnaire contains question on environmental performance measured through environmental management practices, company profile and linkages with foreign markets as well as social, economic, and business impact factors (motives and barriers)[27].

Sampling Method

Data was collected from manufacturing companies in pollution heavy industries in Bosnia and Herzegovina (metal, rubber and plastic production, textile and leather production, paper and paper products and chemical industry). The selection of companies was randomized from those classified under NACE rev-2 in the mentioned manufacturing sectors. List of companies engaged in these fields in Bosnia and Herzegovina were obtained from Agency for Intermediary, IT and Financial Services of Republika Srpska and Tax Administration of Federation of Bosnia and Herzegovina. Total of 101 companies provided their answers to the questionnaire through an online survey, telephone interviews or in person interviews.

The Data

The collected data contains information on:

[26] ISO 14001 and EMAS are globally recognized environmental management and certification systems. ISO 14001, established in 1996 by the International Organization of Standards, seeks to standardize and promote environmental practices to facilitate international trade. It encompasses aspects such as environmental management systems, audits, performance assessment, labelling, life cycle assessment, and product standards (Tibor and Feldman, 1996). On the other hand, the EU Eco-Management and Audit Scheme (EMAS) is an environmental management program developed and endorsed by the EU. Like ISO 14001, EMAS aims to assist companies in enhancing their environmental performance through systematic data collection, assessment, and reporting.

[27] The full questionnaire is available upon request.

- company profile and linkages with foreign markets (overall profile of the company such as industry branch, legal status, age, size, ownership type, export, formal partnerships and structure),
- environmental management practices (existence of environmental objectives, audits, monitoring, certification, environmental departments, waste management practices, energy efficiency, introduction of cleaner technologies, etc.) and how much predefined motives and barriers influenced introduction of environmental management practices.
- basic quantitative indicators of the company (data on revenues for the past three years and the last year as well as source of the revenues and investment expenses).

Total of 101 companies provided answers. The percentages of participating companies per industrial sector as well as size is presented in Table 1.

Table 1 Percentages of Participating Companies per Industrial Sector and Size

	metal	rubber & plastic	textile & leather	paper	chemical	Total per size
micro (< 10 employees)	9/101	5/101	4/101	3/101	2/101	**23**/101
small (< 50 employees)	28/101	16/101	6/101	4/101	3/101	**57**/101
medium(<250employees)	11/101	8/101			1/101	**20**/101
large (> 250employees)	1/101					**1**/101
Total per industry	**49**/101	**29**/101	**10**/101	**7**/101	**6**/101	

In our sample majority of companies are locally owned and only 10 out of 101 companies are foreign owned. Metal sector stands out with 7 out of 10 foreign owned companies. Foreign owned companies in our sample show close links with foreign markets also thought exports (7 of these companies export more than 50% of their main product to EU) as well as formal cooperation with foreign companies (7 have some form of formal cooperation with foreign companies).

Furthermore, companies in our sample carry out noticeable export to EU. There are 33% of companies that export more than 50% to the EU and additionally 41% that export between 5% and 50%. There are 56 companies that have some form of formal cooperation with foreign companies. As expected, companies mainly engage in original equipment manufacturing and subcontracting. Low representation of strategic alliance, joint ventures and licensing was observed in other research done at company level in Bosnia and Herzegovina (Silajdzic, 2011:2014) where it was assumed that lack of such more sophisticated partnerships is a result of deficient competences of Bosnia and Herzegovina's enterprises.

List of variables and descriptive statistics can be found in Tables 2, 3 and 4 below.

Table 2: Definition of Variables

Label	**Description**
ISO_EMAS	International environmental certificate is a dummy variable taking the value of 1 if the company has ISO or EMAS certificate; 0 otherwise.
Size	Company size defined as the total number of employees.
Industry	Data integrates 5 dummy variables distinguishing 5 pollution-intensive industries, namely metal, rubber and plastic, textile and leather , paper and paper products, and the chemical industry
lIncome_employee	Productivity of the company defined through average income of the company for the last three years per employee expressed in BAM (convertible mark) (in logarithms)
Foreign	Foreign is a dummy variable taking the value of 1 if the controlling owner of the company is either a foreign individual,

	or foreign industrial company; 0 otherwise.
OEM	Original equipment manufacturing or subcontracting is a dummy variable taking the value of 1 if a company engages in original equipment manufacturing or subcontracting; 0 otherwise.
EXP_EU	Export to EU defined as the percentage of exports of the company to the European Union over a three-year period.
EMP1	Waste management and clean technology operational management practices is a dummy variable taking the value of 1 if a company is using waste management and clean technology operational management practices; 0 otherwise.
Barrier_high_expenses	Barrier high expenses is a dummy variable taking the value of 1 if a company sees high expenses as a very important or important, and 0 if the company considers the high expenses as moderately important, slightly important, or not important barrier to the introduction of environmental management practices.
Barrier_HR,	Barrier lack of human resources is a dummy variable taking the value of 1 if a company sees lack of human resources as a very important or important, and 0 if the company considers the lack of human resources as moderately important, slightly important, or not important barrier to the introduction of environmental management practices.

Table 3: Descriptive Statistics (continuous variables)

Variable	**Obs**	**Mean**	**Std. dev.**	**Min**	**Max**
Size	100	41.75	65.00744	2	500
lIncome_employee	81	255098.2	787446.1	200	5E+06
EXP_EU	100	0.3313	0.3530292	0	0.96

Table 4: Descriptive Statistics (binary variables)

Variable	**Frequency 0**	**Frequency 1**	**Percentage 1**	**Percentage 0**
ISO_EMAS	75	26	74.26	25.74
Metal	52	49	51.49	48.51
Chemical	95	6	94.06	5.97
Foreign	91	10	90.10	9.90
EMP1	78	22	78.00	22.00
Barrier_high_expenses	69	32	68.32	31.68
Barrier_HR	73	28	72.28	27.72

Model - Determinants of Environmental Performance

The absence of precise emissions data has led to the widespread use of environmental management practices (such as ISO certification, audits, environmental policies, dedicated departments for cleaner technology adoption, training programs, etc.) as proxies on environmental performance in empirical research. Environmental management systems (EMS), such as ISO 14001 or EMAS are frequently regarded as the most relevant practices for assessing environmental management (Andonova, 2003; Bellesi, Lehrer & Tal, 2005; Bluffstone & Sterner, 2006; Christmann & Taylor, 2001). The EMS are standardized frameworks that incorporate key aspects of environmental

management (such as monitoring and reporting, audits, and identification), thereby establishing EMS as credible reference points in environmental management research.

In this model, we lean on the above-mentioned research and use ISO and EMAS as the most suitable proxy for the environmental performance of companies. Our model adds to earlier literature through an integrated and comprehensive approach to the modelling of environmental performance factors by extending the existing analyses with the formal linkages with foreign companies as well as external barriers. Our analysis explains the environmental management practices of firms in the framework of the following model:

Model - Determinants of environmental performance

$$ISO/EMAS_i = \beta_1 Size_i + \beta_2 Industry_i + \beta_3 Income/employee_i + \beta_4 Foreign_i + \beta_5 FormalCooperation_i + \beta_6 EXP/EU_i + \beta_7 EMP1_i + \beta_8 Barriers_i$$

In our model, the dependent variable (*ISO_EMAS*) is a dummy variable taking the value of 1 if the company has the ISO 14001 certificate and/or the EU Eco-Management and Audit Scheme (EMAS); otherwise, the value is 0. We control for company characteristics through the *Size* variable, which represents the number of employees, and control for the industry sector[28] (if a company is from the metal, chemical, rubber and plastic, textile and leather, or paper and paper products sector) through dummy variables. Further, we control for productivity through the *Income_employee* variable, which represents the average income of the company for the last three years per employee in BAM (convertible mark). *Foreign* is a dummy variable having the value of 1 if the controlling owner of the firm is either a foreign individual or foreign industrial firm and 0 otherwise. *Formal Cooperation*[29] is also a dummy variable representing formal cooperation with foreign companies. The *EXP_EU variable* is defined as the percentage of exports of the company to the European Union over a three-year period. In our research, we examined operational EMPs, which are tangible activities companies take directly to improve environmental performance (waste management, energy efficiency, and clean technology). The *EMP1*[30] variable is a dummy variable taking 1 if the company is using waste management and clean technology operational management practices and 0 otherwise.

Our model integrates barriers to the introduction of environmental management practices that were usually not taken into consideration in earlier studies. This is expected to provide additional insights, as barriers are presumed additionally to impact the environmental performance of companies. In our research we have collected data for the following barriers: lack of financial resources, lack of human resources, lack of understanding and perception (lack of understanding of benefits, excessive paperwork, doubts about efficiency, unclear standards, etc.), inconsistent management support and resistance to change, high expenses of introducing environmental management practices, active involvement of employees but too much dependence on individual knowledge, and dependence on external knowledge (consultants, etc.). As suggested by literature, two barriers are notably significant for companies. Specifically, the high expenses associated with introducing environmental management practices and the lack of human resources are viewed as important barriers. Other obstacles did not demonstrate comparable significance.

Consequently, in our model these two barriers have been separately incorporated to mitigate the issue of multicollinearity. In "Model a: Determinants of environmental performance," we assess whether the high expenses associated with the introduction of environmental management practices

[28] In our analysis we control for those industry sectors that were found to be significant, namely metal and chemical sectors

[29] Although we collected data for several types of formal cooperation (joint ventures, original equipment manufacturing, subcontracting, licensing, strategic alliances, and secondments) we control for the cooperation that was found to be significant, namely original equipment manufacturing.

[30] In our analysis we control for those operational environmental management practices that were found to be significant, namely waste management and clean technology

act as hindrances (*Barrier_high_expenses*). In "Model b: Determinants of environmental performance," we investigate whether the lack of human resources hampers the implementation of environmental management practices (*Barrier_HR*). Both variables are represented as dummy variables, taking the value of 1 if a firm perceives the barrier as very important or important and 0 if the firm considers the barrier as moderately important, slightly important, or not important.

Methods of investigation

Given the nature of our dependant variable (dummy variable) we chose logistic regression as a most suitable method of investigation. In the realm of economics, Logit models play a pivotal role in understanding and modelling discrete choices like in our research where companies are choosing or not to introduce ISO or EMAS. The Logit model, with its logistic link function, effectively captures the probability of an event occurring, ensuring predictions lie within the bounded range of 0 to 1. This is particularly valuable when dealing with economic decisions that inherently have binary outcomes such as our Model. Further, the coefficients estimated through Logit regression provide insights into the impact of various factors on the odds of the event, facilitating the identification of key determinants in economic decision-making.

Results

The results of the analysis are presented in Table 5 below showing marginal coefficients. As mentioned, to avoid multicollinearity, we distinguish model a and b by examining the same set of predictors in both models, except for barriers to the introduction of environmental management practices. Here we distinguish between financial barriers, which indicate high expenses of the introduction of environmental management practices (model a), and lack of human resources (model b). All the presented results are, on average, *ceteris paribus*. In our model, we control for the size of the company and the industry sector.

Table 5: Determinants of Environmental Performance of Companies (Model a and Model b) (Marginal Coefficients)

Determinants of environmental performance of companies		
	model a	**model b**
Number of observations	*81*	*81*
Dependant variable	*Possession of ISO and/or*	*Possession of ISO and/or*
Method of investigation	*Logistic regression*	*Logistic regression*
Independent variables	***Coefficient (z-stat.)***	***Coefficient (z-stat.)***
ISO_EMAS	-2.71 (0.199)	-3.78* (0.09)
Environmental management practices		
EMP1	1.142* (0.092)	.596 (0.368)
Link to foreign markets		
EXP_EU	2.06** (0.038)	2.12** (0.032)
Foreign	-2.03* (0.104)	-2.31* (0.064)
OEM	-1.38** (0.040)	-1.38** (0.040)
Barriers for introduction of environmental management practices		
Barrier_high_expenses	-1.156* (0.091)	
Barrier_HR		-1.55* (0.057)
Firm characteristics		
Size	.001 (0.728)	.001 (0.789)
Metal	1.106* (0.100)	1.301* (0.057)
Chemical	4.654*** (0.003)	5.030*** (0.002)
lIncome_employee	.075 (0.675)	.172 (0.362)

Notes. [1] **Significance level=0.10. **Significance level=0.05. ***Significance level=0.0*

The results show that companies that export to the EU are more likely to possess an ISO or EMAS certificate (coefficient significant at the 5% level for both models). Further, the findings indicate that companies that have foreign ownership (coefficient significant at the 10% level for both models) or are engaged in original equipment manufacturing or subcontracting with foreign companies (coefficient significant at the 5% level for both models) are more likely not to possess an

ISO or EMAS certificate. Important to emphasise is that out of six means of formal cooperation that we researched (joint venture, original equipment manufacturing, subcontracting, licensing, strategic alliance, and secondments), only original equipment manufacturing was taken into the final model. This is because only original equipment manufacturing was significant, which is not surprising given that companies in Bosnia and Herzegovina mainly engage in original equipment manufacturing and subcontracting as opposed to other forms of formal cooperation, as discussed earlier. In each model, the findings show that companies facing significant barriers, such as high expenses of the introduction of environmental management practices (coefficient significant at the 10% level) and a lack of human resources (coefficient significant at the 10% level), are less likely to obtain ISO or EMAS certification.

The only difference between the models is in the effect of operational environmental practices (if company is practicing waste management practices and if company introduced clean technology practices). In model a, with the barrier of high expenses of the introduction of the environmental management practices, companies that practice waste management and use clean technologies are more likely to possess ISO and EMAS certificates (coefficient significant at the 10% level). In model b, with the barrier of a lack of human resources, no such significance was measured.

The importance of the company's internal capacities

Our findings indicate that neither firm size nor productivity has a significant impact on the adoption of international environmental standards among companies. This challenges the conventional belief that larger firms are more inclined to implement advanced environmental management practices, a hypothesis that has been supported by prior research (Harangzó et al., 2010; Singh, Jain & Sharma, 2014).

One plausible explanation for the lack of significance in firm size and productivity as determinants of possession of ISO or EMAS lies in the role of exports in shaping environmental performance. Exporting firms, regardless of their size, must comply with environmental standards imposed by their target markets, particularly in regions like the European Union, where such standards are stringent. Moreover, while it is commonly assumed that larger firms have more financial resources to invest in environmental certifications, the process can become increasingly resource-intensive as the firm's size grows. Larger companies often face higher costs due to the need to certify multiple production lines, technologies, and facilities, as well as ongoing renewal fees.

When examining the relationship between companies that implement operational management practices, such as cleaner technology and waste management, and their likelihood of holding international environmental certifications like ISO or EMAS, the results are not consistently statistically significant across model a and model b. However, a clear positive association persists. This positive correlation reflects a broader pattern that environmentally proactive companies tend to pursue formal certifications. This finding is consistent with previous research (Bluffstone & Sterner, 2006), which also highlights the tendency of environmentally proactive firms to seek and obtain international certifications.

Although our findings suggest that size and productivity do not significantly influence the likelihood of obtaining ISO or EMAS certifications, these factors should not be considered unimportant. Instead, other drivers appear to play a more critical role in the environmental certification of pollution-intensive companies in Bosnia and Herzegovina as presented below.

The importance of market linkages through exports

The findings from our econometric analysis on factors influencing the environmental performance practices of companies underscore the pivotal role that market connections, through exports, play in driving environmental improvements in manufacturing firms. Specifically, our results reveal that companies exporting to the EU are significantly more likely to hold international environmental

certifications such as ISO or EMAS. Our results align with previous studies (Bluffstone & Sterner, 2006; Qi et al., 2011), which suggest that access to international markets with advanced environmental regulations, like the EU, serves as a powerful motivator for firms to enhance their environmental practices. This is likely driven by a combination of EU consumer expectations for sustainability and the regulatory frameworks in place within those markets.

This finding carries considerable weight, as it illustrates how trade dynamics can promote better environmental stewardship among companies in developing regions. By entering markets with advanced environmental regulations, pollution-intensive companies face increased pressure to align with international norms, which, in turn, propels them toward adopting more sustainable practices. This dynamic highlight the potential of trade as a tool for promoting global environmental standards, especially in regions with weaker domestic regulations.

The importance of FDI and formal linkages

Although formal partnerships are often believed to improve environmental practices, our findings show the opposite. Similar outcomes have been observed in the existing limited research analysing impact of formal cooperation of companies on environmental performance (Gallagher, 2006). Specifically, our results suggest that vertically integrated firms, those engaged in original equipment manufacturing or subcontracting in pollution-intensive sectors, are less likely to adopt international environmental standards. This outcome indicates that formal partnerships do not necessarily lead to knowledge spillover and improved environmental management practices through backward linkages in the supply chain. Moreover, these partnerships may contribute to the relocation of pollution-intensive production processes to regions with less stringent environmental regulations, such as Bosnia and Herzegovina, further complicating the environmental implications of such collaborations.

Further our analysis shows that companies with foreign ownership are less likely to possess ISO or EMAS environmental certifications, which challenges the common expectation in transition countries that foreign investment would drive advanced environmental practices. Although the sample of foreign-owned companies is small and we do not investigate the origin of FDI, the findings provide important insights, suggesting that these companies might not be focused on their environmental impact. This raises concerns about their commitment to environmental protection. Previous studies (Pargal & Wheeler, 1996; Hartman, Huq & Wheeler, 1997) have already shown that foreign ownership does not always lead to improved environmental performance, reinforcing the idea that foreign capital in pollution-heavy industries may be motivated by cost-efficiency or lax environmental regulations rather than environmental protection.

Our results underscore the complex relationship between market connections and environmental performance in Bosnia and Herzegovina's pollution-intensive manufacturing sectors. While export activities to the EU, clearly incentivize the adoption of international environmental standards such as ISO and EMAS, formal partnerships with foreign companies and foreign ownership tell a more nuanced story. The results indicate that foreign ownership and formal partnerships, especially in vertically integrated OEM or subcontracting firms, do not always lead to better environmental management practices and may even contribute to the relocation of pollution-intensive activities to regions with weaker environmental regulations supporting the PHH.

Our analysis challenges the widespread expectation in transition economies that foreign investment and formal cooperation with foreign companies automatically foster modernization, knowledge and technology spillover and better environmental performance. Instead, it highlights the need for a more critical evaluation of the environmental impact of foreign capital and formal cooperation with foreign companies particularly in pollution intensive industries.

The importance of external barriers

The results further suggests that high costs associated with the adoption of international environmental standards as well as a lack of human capital present important barriers to improved

environmental management, as expected. This highlights that the financial burden of compliance with environmental regulations can be overwhelming for many firms, particularly those operating in pollution-intensive industries. Furthermore, the absence of skilled personnel capable of implementing and maintaining effective environmental management systems exacerbates these challenges. Effective environmental management often requires a workforce equipped with specialized knowledge and skills, which may be lacking in many organizations.

Conclusion

Our study brings forth several notable contributions. Our conceptual framework lies on the foundations of the comprehensive review of existing literature that informed the development of each of its components, namely, links with foreign markets, environmental management performance, and the associated motives and barriers. This conceptual framework subsequently guided the creation of a targeted questionnaire for collecting firm-level data from manufacturing companies in Bosnia and Herzegovina. Given the scarcity of firm-level data in this region, particularly in Bosnia and Herzegovina and the broader Western Balkans, this represents a significant contribution to the field.

Further, our research is built upon established macroeconomic theories linking these broader economic concepts to the behaviour and environmental performance of individual companies. By grounding the conceptual framework in macroeconomic theory, the research provides a robust theoretical basis for understanding the environmental management performance of firms and offers means for a comprehensive examination of how macroeconomic factors, such as trade and foreign direct investment, shape the environmental performance of businesses.

The results of econometric analysis provide a novel insight into determinants of environmental management practices in the specific context of less developed transition economy. Notably by examining the relevance of foreign market linkages in determining environmental management practices of pollution intensive enterprises in an integrated framework, the results of this dissertation contribute to understanding the importance of trade effects, relative to foreign partnership and foreign ownership in acquiring international environmental standards. The results show that exporting to the EU positively influences the environmental management performance of pollution-intensive manufacturing firms, supporting existing research that finds access to markets with stringent environmental standards incentivizes firms to improve their practices. Such dynamics illuminate the importance of robust regulatory frameworks in fostering demand for sustainable practices, thereby suggesting that trade mechanisms can act as a powerful impetus for elevating global environmental standards, especially in regions characterized by less stringent domestic regulations.

In contrast, formal linkages with foreign companies measured through original equipment manufacturing and substitution as well as foreign ownership, show that they have a negative effect on environmental standardisation practices of companies. Contrary to expectations, rather than fostering improved environmental practices, the data suggests that FDI and vertically integrated companies are less likely to possess international environmental standards, indicating that these forms of formal partnership are not conditional to improved environmental management of collaborating partners through backward linkages. The absence of spillover of knowledge and technology transfer underscores the fact that such collaborations may primarily serve the interests of foreign investors looking to reduce costs without bearing the environmental responsibilities typical in their home countries. This dynamic suggests that Bosnia and Herzegovina may serve as a pollution haven, where foreign investments in high-pollution industries continue unsustainable practices without sufficient regulatory oversight, raising critical implications for policymakers. The implications highlight the necessity for more robust environmental policies and enforcement

mechanisms in Bosnia and Herzegovina to counter the adverse environmental impacts of foreign investments focused on low-cost, high-pollution production.

Important to highlight is that, while our findings suggest that firm size and productivity do not significantly affect the likelihood of obtaining ISO or EMAS certifications, these factors remain relevant as the lack of significance could be explained by the role of export. The firms engaged in export activities, regardless of the size, must comply with environmental standards.

Limitations of this analysis are mainly associated with the small sample size, which prevented us from drawing strong conclusions when it comes to the relevance of foreign ownership in enhancing EMPs, given the limited number of foreign owned companies in the sample. Small sample size inhibited deeper analysis of industry specific determinants of EMP. In view of this, it is worth mentioning that the methods of investigation used in this analysis are suitable for small sample sizes which allow for interpretation of the obtained results and present important contribution to knowledge. The results need be interpreted with cautiousness and while paying attention to the context of investigation that is country and industry-content specific. Further research may explore the comprehensive data sat on environmental management obtained by the survey.

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SUSTAINABLE CONSUMPTION BEHAVIOR AMONG GENERATION Z IN CROATIA: UNDERSTANDING ACTIONS AND ATTITUDES IN THE CONTEXT OF GLOBAL ECOLOGICAL CHALLENGES

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Abstract

Amid the escalating global ecological crises, both the public and the business sector are under increasing pressure to adopt environmentally sustainable practices. In this context, studying the behavior of young consumers is particularly significant, as they not only constitute a substantial portion of the world's population but are also on the brink of becoming the primary drivers of the global economy. This research focuses on analyzing the sustainable consumption behavior of young consumers, exploring how their environmentally sustainable actions are reflected through various aspects of consumer behavior.

The primary objective of the study was to assess and analyze sustainable consumption behaviors among young consumers, with a specific emphasis on identifying prevailing patterns within this targeted demographic group. The analysis included a sample of 125 young consumers, specifically Generation Z in Croatia. Correlation analysis methods were used to explore the relationships between environmental sustainability behavior (ESB) and three key variables: unneeded consumption, saving orientation, and product reusability. These variables were measured using the four-dimensional Sustainable Consumption Behavior scale.

The research findings indicated that while unneeded consumption was not significantly related to ESB, there was a moderate but significantly positive correlation with saving orientation and product reusability. The results suggest that despite the presence of sustainable practices, there is considerable room for aligning the actual behavior of young people in Croatia with their environmental attitudes. This discrepancy highlights the need for further research to investigate the deeper causes and potential strategies for encouraging more consistent environmentally sustainable behavior.

The importance of the research is particularly grounded in the context of the current economic climate, marked by climate change and geopolitical situations that further strain economies worldwide. Such an environment negatively impacts the prices of eco-friendly products, which are traditionally more expensive than conventional ones. Therefore, understanding how to motivate young consumers towards more consistent sustainable practices is crucial for developing

effective strategies that could increase their engagement in environmentally sustainable consumption. These initiatives are essential for achieving sustainability goals at the European Union level and contributing to global sustainability objectives. The conclusions of the research can serve as a basis for shaping policies and interventions aimed at young people, ensuring a long-term sustainable future.

Keywords: sustainable consumption, Generation Z, attitude-behavior gap, product reusability, unneeded consumption, saving orientation

JEL classification:

1. Introduction

In the contemporary era, humanity faces an array of profound challenges that impact the economy and business sectors. These challenges include environmental degradation, public health crises, demographic shifts, and other significant global issues. As these factors intertwine, they pose a complex influence on economic stability and business operations worldwide, necessitating a strategic response that aligns with sustainable development principles.

The United Nations' Sustainable Development Goals (SDGs) emphasize the urgent need to address global challenges, with almost half out of the 17 goals directly related to environmental sustainability. These goals call for a systemic transformation in resource consumption and production, highlighting the broader imperative of aligning economic growth with environmental stewardship (UN, 2015). In this context, the European Union has embraced global sustainability initiatives. The European Green Deal, which sets ambitious targets for climate neutrality by 2050, underscores the importance of creating a framework that supports a sustainable transition across all member states, aligning with the UN SDGs on environmental sustainability and beyond (European Commision, 2024). Croatia, as an EU member, has implemented a range of sustainability measures aligned with EU and UN initiatives, focusing on renewable energy, energy efficiency, and waste management, while also enhancing sustainable across all sectors of economy to mitigate climate change (Knez, Štrbac & Podbregar, 2022).

To achieve the ambitious goals set forth by the UN and the EU, it is imperative that all segments of society, including the economy, public institutions, and the general population, actively participate in sustainability efforts. Engaging a broad spectrum of stakeholders, from businesses to individuals, is essential for fostering a culture of sustainability that supports long-term environmental and economic resilience. The involvement of young consumers is particularly crucial, as their choices and behaviors can significantly influence the success of sustainability initiatives (Aceleanu, Serban & Burghelea, 2015; Gajović, Bjelica, Pavlović & Vukmirović, 2023; Tewari, Mathur, Srivastava & Gangwar, 2022). This influence is particularly salient given that younger generations of consumers have the potential to shape the pro-environmental behaviors of their peers and family members, thereby amplifying the impact of sustainability efforts across broader social networks (Muralidharan & Xue, 2016).

Generation Z constitutes 40% of the global population (Andruszkiewicz, Grzybowska-Brzezińska, Grzywińska-Rąpca & Wiśniewski, 2023), and as they increasingly enter the workforce and assume specialist, expert, and leadership roles within the business sector, they are poised to become a pivotal force in driving the global economy. Compared to previous generations, Generation Z’s technological savviness makes them more inclined toward ethical consumerism, showing a stronger preference for green products and a deeper commitment to environmental sustainability (Djafarova & Foots, 2022; Francis & Hoefel, 2018; Lavuri, Jusuf & Gunardi, 2021; Robichaud & Yu, 2021). However, despite their stated environmental values, there is often a discrepancy between their expressed attitudes and actual behaviors regarding sustainability (Aschemann-Witzel & Niebuhr Aagaard, 2014; Nguyen et al., 2018; Lisboa, Vitorino & Antunes,

2022), also observed when comparing Generation Z to older generations (Ham, Chung, Kim, Lee & Oh, 2022).

This phenomenon aligns with research identifying five consumer segments based on attitudes and actions toward ethical issues (Cowe & Williams, 2000): even though 30% of consumers express the intention to buy ethical products, only a small fraction (3%) actually follows through with such purchases - a widely recognized issue known as the 'attitude-behavior gap' (Campbell, 1963; Wiegel, 1983). Research further suggests that the alignment between attitudes and behaviors is stronger when individuals hold specific attitudes toward engaging in particular environmentally friendly actions, such as recycling, rather than toward general environmental concerns (Gupta, 2021). This attitude-behavior gap highlights the need for further research into strategies for promoting consistent eco-friendly behavior among young people, especially in today's challenging economic context where motivating sustainable consumption is crucial.

1.1. Research goal

The primary objective of the research was to assess and explore sustainable consumption behaviors among young consumers. The analysis is based on a sample of 125 Generation Z consumers in Croatia. Correlation analysis methods were used to examine the relationships between environmental sustainability behavior (ESB) and three key variables: unneeded consumption, saving orientation, and product reusability. The variables were measured using a four-dimensional Sustainable Consumption Behavior scale (Doğan, Bulut & Kökalan Çımrin, 2015).

Given the importance of aligning Croatia's practices with the European Union's sustainability goals, understanding the sustainable consumption patterns of young consumes, Generation Z, is essential for shaping effective strategies (Fischer, Böhme & Geiger, 2017; Ziesemer, Hüttel & Balderjahn, 2021) at both national and EU levels. As this demographic group is poised to drive future economic trends, their consumption habits and the potential alignment, or discrepancy, between their attitudes and behaviors are critical areas of investigation. Therefore, this study not only contributes to a more comprehensive understanding of sustainable consumption within the Croatian context but also provides valuable insights for broader sustainability initiatives aimed at fostering long-term environmental and economic resilience.

2. Theoretical framework and research hypothesis

2.1. The Multi-Faceted Nature of Sustainability and Sustainable Consumption

The concept of sustainability is broad and evolving, defined across various fields in ways that reflect its multi-dimensional nature. The most widely recognized definition, introduced by the Brundtland Report in 1987, emphasizes intergenerational equity in resource use, describing it as a development approach that meets current needs without compromising the ability of future generations to fulfill their own (Hajian & Kashani, 2021). Sustainability is also viewed as a balance encompassing environmental, health-related, ethical, and economic dimensions (Reisch, Eberle & Lorek, 2013).

Furthermore, the concept is increasingly approached through systems thinking, focusing on maintaining the resilience and health of ecological and social systems amid growing pressures from human activities (Olsson, Galaz & Boonstra, 2014). From a business perspective, sustainability involves practices that promote long-term economic growth while preserving natural resources and avoiding irreversible environmental damage, thereby aligning profitability with ethical responsibility (Rausch, Baier & Wening, 2021). These perspectives converge on a core principle: achieving development that harmonizes environmental, social, and economic goals to secure well-being now and in the future (Booi-Chen & Teck-Chai, 2009), while also encompassing the

continuous delivery of adaptable programs, interventions, and behaviors that maintain benefits over time (Moore, Mascarenhas & Straus, 2017).

When it comes to consumer behavior, sustainable practices involve consumption patterns that minimize negative environmental, social, and economic impacts while still satisfying personal needs and desires. According to Carrero et al. (2020), sustainable consumption includes purchasing environmentally friendly products, reducing consumption by simplifying lifestyles, and engaging in activism to promote societal change. Such behavior is influenced by intrinsic factors like personal values and ethics, as well as extrinsic factors such as social norms, available infrastructure, and economic incentives (Lisboa et al., 2022), and it can also result from anti-consumption practices, where intentionally limiting or avoiding consumption reduces environmental impact (Ziesemer, Hüttel & Balderjahn, 2021).

Despite the increasing awareness and intentions of consumers to act sustainably, there remains a significant gap between these attitudes and actual behaviors, often driven by perceived trade-offs in convenience, cost, and product quality (Rausch et al., 2021). Addressing this gap necessitates effective interventions like improved education, transparent labeling, and incentive structures to better align consumer choices with sustainable outcomes.

2.2. Sustainability Perceptions and Behavioral Patterns of Generation Z

Generation Z, born roughly between the mid-1990s and early 2010s, is recognized as a cohort of digital natives who are highly informed about global issues and deeply aware of the importance of sustainability (Chen, Yan & Liew, 2023; Ewe & Tjiptono, 2023). As tech-savvy individuals with constant access to digital platforms (Ninan, Roy & Cheriyan, 2020), they are particularly engaged with environmental and social issues through digital channels, which significantly shape their attitudes and expectations toward sustainability (Silveira, Sandes, Xara-Brasil & Menezes, 2024). Their relationship with sustainability is driven by a mix of personal values, social influences, and growing demands for companies to adopt ethical practices. This is reflected in their support for brands that prioritize corporate social responsibility (CSR), with many actively rewarding such companies through their purchasing choices (Narayanan, 2022; Wang, Liao, Wu & Lee, 2021). The consumer behavior of this cohort signals a shift toward more value-driven and ethical consumption patterns, influencing both market trends and societal norms (Bogueva & Marinova, 2022).

While this generation expresses a strong preference for eco-friendly products and sustainable practices, factors such as convenience, cost, and the availability of green alternatives continue to pose significant barriers (Liang, Li & Lei, 2022; Ziesemer et al., 2021). Research also indicates that many young consumers have a limited understanding of broader sustainability concepts like the circular economy, which restricts their ability to fully engage in sustainable consumption (Gazzola, Pavione, Pezzetti & Grechi, 2020).

In Croatia, these global trends are similarly observed. Croatian Generation Z consumers are digitally savvy and active online (Perić, Mamula & Delić, 2020). While they acknowledge the significance of sustainability, they often prioritize career growth in the early stages of their professional development, viewing sustainability more as a responsibility of those in leadership positions (Krstinić Nižić & Butković, 2023). Financial constraints, limited information, and perceived inconveniences related to sustainable choices are among the significant barriers to sustainable consumption (Nikolić, Paunović, Milovanović, Lozović & Đurović, 2022; Šebek, Sarajlić & Jurković, 2022), aligning with global research findings (Dąbrowski, Środa-Murawska, Smoliński & Biegańska, 2022; Sheoran & Kumar, 2020).

2.3. Expanded Theoretical Framework and Research Hypotheses

The relationship between consumer behavior and environmental sustainability has been extensively studied across various dimensions. This study further explores these dynamics by focusing on three

key aspects: unneeded consumption, saving orientation, and product reusability within the context of ESB.

Unneeded consumption and ESB. Unneeded consumption, characterized by impulsive or excessive purchasing, often contradicts sustainable behavior. This phenomenon is well-documented in studies highlighting the negative environmental impact of overconsumption. Consumers engaging in unneeded consumption prioritize immediate gratification over long-term sustainability, resulting in higher levels of waste and resource depletion (Klug & Niemand, 2021). Research reveals that younger generations, particularly Generation Z, generally show lower tendencies toward unneeded consumption compared to older generations, as they are more attuned to sustainability concerns (Bulut, Kökalan Çımrin & Doğan, 2017). However, other studies indicate that Generation Z's strong online presence makes them susceptible to impulsive purchasing behaviors driven by digital platforms, leading to overconsumption (Ah Fook & McNeill, 2020). The ease of access to online shopping options and tailored marketing strategies significantly influence their impulsive buying behavior (Xiong, 2020; Yusak, Mohd & Yusran, 2022). This duality within Generation Z highlights the complexity of their consumption habits and the tension between their sustainability aspirations and behaviors influenced by digital convenience. In this study, we lean toward the perspective that their strong online orientation makes them more prone to unneeded consumption, driven by the convenience and incentives offered through digital platforms. The concept of unneeded consumption is thus essential in understanding the barriers to sustainable consumer behavior, therefore the following hypothesis is proposed:

H1: ESB is negatively correlated with unneeded consumption.

Saving orientation and ESB. A saving mindset is closely linked to optimizing resource use, aligning with sustainability goals by promoting behaviors like purchasing energy-efficient products and effectively managing electricity consumption (Bulut, Kökalan Çımrin & Doğan, 2017). Future-oriented consumers are especially inclined to prioritize long-term savings by investing in pro-environment products like energy-efficient appliances, recognizing that these choices benefit both financial savings and pro-environmental goals (Tangari & Smith, 2012). This suggests a strong correlation between saving orientation and environmentally sustainable behavior, with those who are saving-oriented more likely to adopt sustainable practices focused on resource management and energy-saving devices (Chiu, Kuo & Liao, 2020; Gadenne, Sharma, Kerr & Smith, 2011; Shrestha, Tiwari, Bajracharya, Keitsch & Rijal, 2021; Tan, Ooi & Goh, 2017). Based on this reasoning, the following hypothesis is proposed:

H2: ESB is positively correlated with saving orientation.

Product reusability and ESB. Product reusability is a key component of sustainability, emphasizing the importance of extending product lifecycles and reducing waste. In the context of this research, product reusability encompasses both the reuse of products or their components after their originally intended lifecycle and the practice of borrowing instead of purchasing new products. Consumers who prioritize reusability are more likely to adopt sustainable practices, seeking to maximize the value of products while minimizing environmental impact (Muranko, Tassell, Zeeuw van der Laan & Aurisicchio, 2021). Additionally, there is broad consumer support for product reuse, with second-hand products generally being well-accepted (Cao, Lu & Zhu, 2022). This is particularly relevant for Generation Z, who are increasingly aware of the environmental consequences of disposable products but still consume fewer sustainable goods compared to other generations (Park & Lin, 2018), therefore encouraging greater engagement in reuse practices among this cohort is critical. By focusing on product reusability, consumers can significantly reduce resource consumption and environmental degradation, thereby aligning their behavior with broader sustainability goals (Narayanan, 2022). Given this connection between reusability and sustainable practices, H2 is as follows:

H3: ESB is positively correlated with product reusability.

In the following section, the research methods used in the study are presented, as well as the statistical analyses that were used to test the aforementioned hypotheses.

3. Data and methodology

Quantitative research was used to collect the data from respondents regarding their attitudes about environmental sustainability behavior and how this behavior is correlated with unneeded consumption, saving orientation, and product reusability. The questionnaire was distributed in the period from July 28th to August 11th 2023 through various channels, including WhatsApp, Instagram Story, Reddit, Discord, and Facebook groups. Snowball sample was used for data collection, which refers to a non-probability sampling technique in which participants are initially selected based on specific criteria, and then additional participants are recruited through referrals from the initial participants. Parallel to this, initial base was also selected from graduate students of digital marketing at the Algebra University College. The snowball distribution method was used on WhatsApp, where the participants were requested to forward the questionnaire to their own contacts.

Sample size was 125 respondents, age 18-24. Questionnaire had 17 questions about ESB based on the Sustainable Consumption Behavior Scale (SCBS) developed by Doğan et al. (2015). The SCBS is a tool for assessing sustainable consumption practices across four dimensions: ESB, unneeded consumption, saving, and reusability. It consists of 17 items, rated on a five-point Likert scale (1 = never, 5 = always). Higher scores in ESB, saving, and reusability reflect stronger sustainable consumption behavior, while unneeded consumption functions inversely, requiring reverse coding for overall scoring. Each dimension captures a specific aspect of consumption behavior: ESB assesses eco-conscious purchasing, unneeded consumption reflects impulsive or excessive shopping, saving measures resource conservation efforts (e.g., energy efficiency), and reusability evaluates the tendency to reuse products rather than discard them. The validity and reliability of the scale were confirmed through both exploratory and confirmatory factor analysis, while Cronbach's Alpha values above 0.70 indicated high internal consistency. The findings confirmed that the scale reliably measures different aspects of sustainable consumption behavior and can serve as a relevant tool for future research on sustainable consumption.

Before the hypothesis testing, Cronbach's Alpha coefficients were checked for each scale used in the analysis (Table 1).

Table 1: Cronbach's Alpha coefficients

Composite Variables	Cronbach Alpha	Number of Questions
ESB	0,668	5
Unneeded consumption	0,820	5
Saving orientation	0,774	4
Product reusability	0,555	3

Source: Quantitative Research

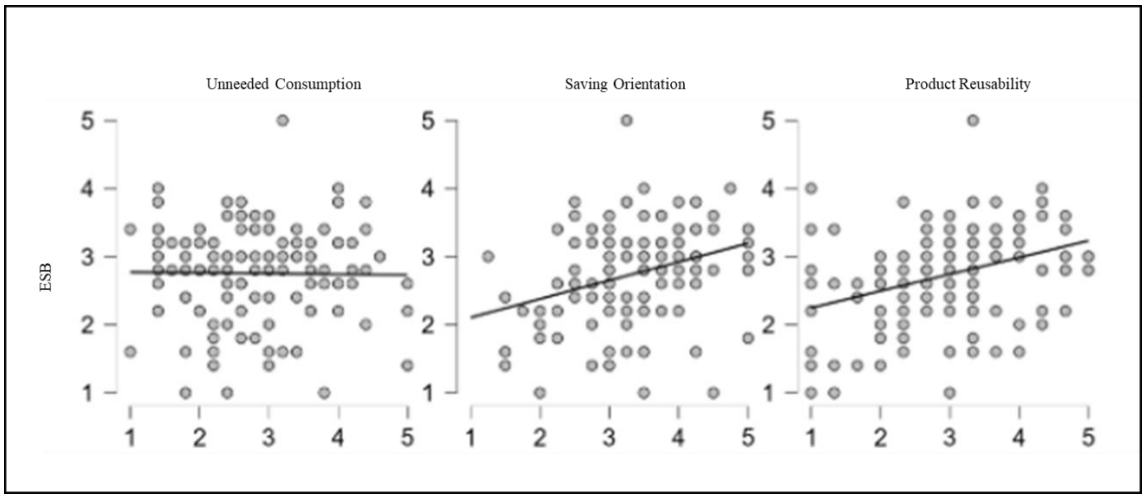
All variables were measured on a five-point Likert scale, and value for each composite variable was calculated as a means of all questions for that variable. All scales have acceptable Cronbach's alpha values. The "weakest" scale is the Product reusability scale, which has three

items/questions and a Cronbach's alpha of 0.55, which is on the borderline of acceptability (Table 1).

Before calculating the correlation coefficients, scatter plots were constructed for pairs of variables. The diagrams suggest that the relationship between certain variables is not nonlinear, which is an important prerequisite for conducting correlation analysis that is met here.

The diagrams also show a large dispersion around the interpolated line for all pairs of variables, indicating that the correlations will be relatively low (Picture 1).

Picture 1: Scatter plot diagrams



Source: Quantitative Research

The line for the combination of ESB and unneeded consumption is almost nonexistent, indicating that there will be no correlation between these two variables. Between ESB and both saving orientation and product reusability, the line is sloped in a positive direction (higher values in one variable relate to higher values in the other) which means that correlation will be positive.

Table 2: Variable loadings

Standardized loadings for ESB	
Item	Standardized loading
I buy cleaning products that do not harm the environment.	0.303
I buy clothes made from natural materials.	0.286
I buy products from companies that support ecological responsibility.	0.280
I do not buy single-use packaged products.	0.273
I encourage my family and friends not to buy products that harm the environment.	0.351
Standardized loadings for Unneeded consumption	
Item	Standardized loading
I replace technological devices like phones even when unnecessary.	0.263
I buy new clothes even when I do not need them.	0.268
I buy products without prior thought or when they are unnecessary.	0.247

I buy new products even when I already have similar ones.	0.249
I buy food and drinks even when they are not necessary.	0.260
Standardized loadings for Saving orientation	
Item	Standardized loading
In my household, we buy energy-efficient appliances.	0.306
In my household, we buy electronic devices that consume less energy.	0.297
In my household, we are mindful of electricity consumption.	0.324
In my household, we use energy-saving bulbs.	0.300
Standardized loadings for Product reusability	
Item	Standardized loading
I reuse product packaging like glass or cardboard instead of throwing it away.	0.415
I borrow or rent products instead of purchasing them.	0.445
I reuse paper for taking notes or other purposes.	0.455

The standardized loadings for individual items within each composite variable were calculated to ensure construct validity. All loadings were significant and above the acceptable threshold of 0.2, indicating that each item contributes meaningfully to its corresponding latent variable. These findings support the usage of the measurement model. The calculation of standardized loadings for individual items on their corresponding composite variables was conducted using multiple linear regression analysis. This involved generating regression coefficients for each item and testing their statistical significance. VIF values were calculated to detect potential multicollinearity issues, and they are in range from 1,039 to 1,785. The significance of each item's loading was tested using p-values, with all reported loadings being statistically significant ($p < 0.05$).

4. Results

For hypothesis testing Pearson correlation analysis was used. It is a statistical method used to measure the strength and direction of the linear relationship between two continuous variables. The Pearson correlation is sensitive to outliers and assumes that the variables are normally distributed and have a linear relationship (Newbold, Carlson & Thorne, 2013). The following correlation matrix was obtained through correlation analysis (Table 3).

Table 3: Pearson correlation matrix

		Unneeded consumption	Saving orientation	Product reusability	Hypothesis
ESB	Pearson Correlation	-0,014	0,325	0,361	
	Sig. (2-tailed)	0,878	0,000	0,000	Not accepted
	n	125	125	125	
Unneeded consumption	Pearson Correlation		-0,155	-0,211	
	Sig. (2-tailed)		0,084	0,018	Accepted
	n		125	125	
Saving orientation	Pearson Correlation			0,357	
	Sig. (2-tailed)			0,000	Accepted
	n			125	

Source: Quantitative Research

ESB is not associated with unneeded consumption, meaning that respondents show different patterns of this kind of consumption, regardless of their ESB. On the other hand, there is a slight association between ESB and saving and the tendency to reuse. The correlations are statistically significant and positive but low (0.32 and 0.36). The coefficients of determination show an overlap in variances of 11% and 13% (Table 4). As can also be seen from the scatter plots, despite the general trend of association, there are significant deviations from the correlation line for individual responses (which makes the correlation relatively low).

Table 4: Correlation coefficients, coefficients of determination with the variable ESB, and % of shared variance

Variables	r	r^2	% of shared variances
H1: Unneeded consumption	-0,014	0,0002	0,02
H2: Saving orientation	0,325	0,106	10,6
H3: Product reusability	0,361	0,130	13,0

Source: Quantitative Research

Since there are statistically significant correlations between the variables product reusability and unneeded consumption and product reusability and saving orientation, it is that these inter-correlations between the variables have influenced the correlation with ESB. Although the correlations are low, they are statistically significant, and a partial correlation analysis was also conducted.

Table 5: Summary of partial correlation coefficients

Variables	Zero correlation	Partial correlation	Difference
H1: Unneeded consumption	-0,014	0,091	0,11
H2: Saving orientation	0,325	0,232	-0,09
H3: Product reusability	0,361	0,289	-0,07

Source: Quantitative Research

The partial correlation analysis did not significantly change the correlation coefficients, and the conclusion of the hypothesis testing remains the same. Since the inter-correlations between the variables are relatively low, a significant change in the partial correlations was not expected (Table 5). Based on hypothesis testing, the following conclusions can be drawn.

H1: ESB is negatively correlated with unneeded consumption.

Pearson coefficient of correlation is r=-0,014 and p=0,878 which indicates that Unneeded Consumption is not connected to ESB. Research has identified a phenomenon known as the Green Consumption Paradox, where individuals who engage in environmentally friendly behaviors in some contexts do not necessarily reduce their overall consumption or may even engage in more unnecessary consumption in other contexts (Longoni, Gollwitzer & Oettingen, 2014; Gupta, 2021; Ham et al., 2022). This difference in motivation can mean that a person might engage in both behaviors independently - someone might frequently buy unnecessary items due to social pressure while still recycling or conserving energy because of environmental awareness.

H2: ESB is positively correlated with saving orientation.

For this hypothesis coefficient of correlation is r= 0,325 and it is significant on p<0,05. It means that in their daily life respondents try to reduce unnecessary consumption, and consume less by purchasing only what they need, thus reducing the demand for new products and the resources required to produce them.

It involves choosing products that are energy-efficient, durable, and made from sustainable materials. It can also include behaviors like turning off lights when not in use, reducing water usage, and choosing modes of transportation that use less fuel (Bulut et al. 2017). One of the reasons why saving orientation is connected with ESB and unneeded consumption is that saving is a behavior that is more widely accepted and practiced across various cultures and social groups. This social acceptance makes people feel more comfortable adopting saving-oriented behaviors compared to reducing unneeded consumption, which might be perceived as restrictive or counter to mainstream consumer culture, especially among Gen Z (Ewe & Tjiptono, 2023).

H3: ESB is positively correlated with product reusability

Pearsons' coefficient of correlation for ESB and reusability is r=0,361 with p<0,05 and the hypothesis can be accepted. Product reusability focuses on extending the life of a product by using it more than once.

This can include simple practices like using a glass bottle or jar multiple times, or more complex behaviors like repurposing old clothing into rags or upcycling furniture. By reusing products, consumers reduce the need to manufacture new items, which in turn decreases resource extraction, energy consumption, and waste generation. There are five main models of reusability (Muranko et. al, 2021.). This variable has the highest correlation with ESB, perhaps because of

familiarity and convenience of these activities, but cost saving and feel-good-factor should be considered as well.

5. Discussion

Altering individuals' consumption habits, such as selecting, purchasing, and using products in environmentally friendly ways, is regarded as a crucial requirement for achieving environmental sustainability. Consequently, over the past few decades, fostering ESB has become a significant focus, gaining growing interest both in the consumer market and in academic research (Hopper & Nielsen, 1991; Schutte & Bhullar, 2017; Yusak et al., 2022). Quantitative research was done on 125 Gen Z respondents using snowball sampling methods in social media. They were asked to answer on seventeen questions about ESB and their behavior about unneeded consumption, saving orientation and product reusability.

This study offers insights into environmentally sustainable consumption behavior among Generation Z in Croatia, positioning its findings within the broader context of existing research. The results indicate that while young consumers demonstrate a certain level of environmental awareness, this awareness does not always translate into concrete actions. This observation is consistent with prior research emphasizing the attitude-behavior gap in sustainability, where individuals express environmental concern but do not necessarily alter their consumption patterns accordingly (Aschemann-Witzel & Niebuhr Aagaard, 2014; Nguyen et al., 2018). The finding that unneeded consumption does not significantly correlate with ESB further supports the notion that sustainable and unsustainable behaviors often coexist, reinforcing the Green Consumption Paradox (Ham et al., 2022). Identification of saving orientation and product reusability as strong predictors of ESB is in line with research suggesting that financial considerations play a crucial role in driving ESB (Bulut et al. 2017; Chiu, Kuo & Liao, 2020). It highlights an important distinction: while sustainable behaviors that provide financial savings (such as reusing products or reducing energy consumption) are more readily adopted, those requiring behavioral restraint, such as limiting unnecessary purchases, present a greater challenge. This distinction carries significant practical implications, suggesting that sustainability initiatives focusing on economic benefits rather than purely environmental motivations may be more effective in fostering behavioral change.

By providing empirical evidence from a Croatian context, the study contributes to the growing body of literature on ESB among young consumers, a demographic that, despite existing research, still offers significant opportunities for further exploration in sustainability studies. Moreover, the findings suggest that financial incentives may be a more influential factor than environmental concern in shaping consumption behavior, underscoring the need for further research into digital consumerism and its impact on environmental sustainability practices. Given Generation Z’s strong reliance on e-commerce and social media-driven shopping, future research should explore how digital consumption habits interact with sustainability decision-making and whether digital environments encourage or hinder responsible consumption.

While the study provides valuable insights for Generation Z in Croatia, it is not without its limitations. The reliance on self-reported data introduces the potential for social desirability bias, as respondents may have over-reported their engagement in ESB. Also, the sample does not fully represent the broader demographic landscape. Future research should aim to increase the sample size and explore additional demographic and psychographic factors such as gender, income, region, and environmental attitudes to better understand their influence on ESB.

6. Conclusion

The study examined ESB among Generation Z in Croatia, focusing on the key factors that shape their purchasing decisions. The findings indicate that environmental awareness alone is not sufficient to drive consistent ESB, as young consumers often engage in both sustainable and unsustainable consumption patterns simultaneously. Notably, unneeded consumption did not show a significant correlation with ESB, reinforcing previous research on the attitude-behavior gap in sustainability. However, the study confirms that saving orientation and product reusability are positively linked to ESB, suggesting that financial incentives may be a stronger motivator for sustainability than environmental concerns alone. These results are consistent with prior studies emphasizing the role of economic benefits in shaping consumer choices. The lack of correlation between unneeded consumption and sustainability highlights the persistent challenge of reducing overall consumption among young consumers.

The study's findings have important implications for sustainability initiatives and consumer education. The results suggest that economic incentives and targeted awareness campaigns that highlight the financial advantages of sustainable consumption could be more effective than purely environmental messaging. Additionally, given the increasing influence of digital commerce and social media on consumer behavior, further research is needed to explore how online shopping habits shape sustainable decision-making among young consumers.

By providing empirical insights into the ESB of Croatian Generation Z consumers, this study contributes to the growing body of literature on consumer sustainability. The findings offer valuable perspectives for policymakers, businesses, and educators seeking to design effective strategies that bridge the gap between sustainability awareness and action among younger generations.

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A REVIEW OF EFFECTIVE COMMUNICATION AND RESOLUTION OF CONFLICTS IN KOSOVO'S HOTEL INDUSTRY

─ ABSTRACT ─

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This study aimed to assess the relationship between conflict management and effective communication. Communication is the most important element for promotion and human development and success Much of job satisfaction depends on the quality of the relationship with others. Without effective communication and personal interaction, one cannot achieve optimal personality growth and prosperity, and any denial of proper and logical relationships with others and staying away from dynamic social life. In order to factually present the relationship between personality, effective communication and performance at work, we surveyed 344 respondents, the sample was selected randomly. The research method is the quantitative method. The results of this study show a positive and statistically significant relationship between conflict management and effective communication, as well as a positive relationship between conflict management and the overall performance of the hotel organization. However, an unexpected finding is the negative correlation between effective communication and employee satisfaction. These results emphasize the importance of conflict management and effective communication for improving organizational performance, while the unexpected link between communication and employee satisfaction requires further analysis to better understand the internal dynamics in hotel organizations. This study provides an important contribution to the literature on conflict management and communication in the context of the hospitality industry and can serve as a basis for further research on similar topics.

Key words: conflict management, effective communication, work performance, hotel business, employee, manager.

Jel classification: **M1, M12, Z3**

HOW GENERATION Z STUDENTS VALUE JOB ATTRIBUTES: A CONJOINT ANALYSIS

─ ABSTRACT ─

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The study examines the relative importance of job attributes for Generation Z students when making job selection decisions. Previous literature has measured the preferences of potential employees in various contexts, regions, and target groups (Jinadasa et al., 2021; Peters, 2017; Yasmin et al., 2016). A larger number of scientific research papers have focused on the comparative measurement of job preferences and satisfaction, mostly using isolated assessment methods. This study focuses on students from the School of Economics and Business at the University of Sarajevo, measuring five relevant job attributes (salary and material benefits, person-job fit, work-life balance, job security, and opportunities for growth and development) and their impact on deciding to choose an appropriate job. Through market segmentation, the study evaluates the preferences of Generation Z members who are currently entering or are already engaged in the labor market. By applying adaptive conjoint analysis, the relative utilities and utility matrices of various job attributes are presented, comparing fourteen different levels of the five individual attributes. Finally, a questionnaire design proposal is provided for measuring the preferences for hypothetical job offers among potential employees. This research is important for the academic community as it demonstrates the application of a new technique, of a marketing nature, in human resource management. For managers and practitioners, this research can be useful for examining the preferences of potential employees to design job positions and work environments that will attract, engage, and retain talented individuals from Generation Z.

Keywords: job evaluation, Generation Z, job attributes, conjoint analysis

ECONOMY OF WELL-BEING: ANALYSIS OF THE IMPACT OF EXCESSIVE CREDIT INDEBTEDNESS ON THE REDUCTION OF THE QUALITY OF LIFE OF THE CITIZENS OF THE REPUBLIC OF CROATIA

– ABSTRACT –

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Purpose: Modern lifestyles often put careless and reckless financial management at risk, which can lead to over-indebtedness, default, and bankruptcy. The inability of natural persons to manage their own finances is accompanied by numerous business, social, and family negative implications that are manifested through financial stress, limited spending opportunities, which are directly related to quality of life, and an increase in inequality. In the paper, the authors investigate the phenomenon of excessive borrowing in Croatia with the aim of improving the quality of life and artificially raising the standard of living, which limits the future plans of Croatian residents. The main goal of this paper is to point out the fact that the welfare economy is a continuation of the development of the capitalist system, in which the quality of life of citizens is not questioned, nor is it correlated with greater credit indebtedness.

Results: The key to achieving a welfare economy is to balance the benefit of credit with a reasonable level of indebtedness that is sustainable for individuals. In accordance with the above, research was conducted on a deliberate sample of 782 respondents who have experienced the loss of sovereignty or autonomy over their own economic policies and decisions.

Conclusion: Through the synthesis of empirical research conducted on 782 respondents, it was concluded that the availability of financial resources significantly affects the objective and subjective perception of the quality of life. The approach is based on auto-regressive models with a time lag of thirty years, when citizens did not go into debt and when the desire to buy was not as pronounced as it is today. Debts also have psychological effects, such as a feeling of helplessness, depression or a feeling of isolation due to financial problems, which makes it impossible to actively participate in the creation of a state of welfare economy.

Keywords: welfare economy, credit indebtedness, quality of life, financial literacy, debts

JEL classification: E0, E7, G4, E03

NAVIGATING DIGITAL TRUST: GEN Z'S PERCEPTIONS OF BRAND AND USER-GENERATED CONTENT

─ ABSTRACT ─

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The advent of digital media has revolutionized the marketing landscape, leading to significant changes in how brands engage with consumers. In particular, brand-generated content (BGC) and user-generated content (UGC) have emerged as pivotal elements in digital marketing strategies. This study aims to compare the perceptions of Generation Z (Gen Z) regarding these two content types, focusing on trust, perceived usefulness, and purchase intentions. Given Gen Z's substantial presence online and their distinct consumption habits, understanding their preferences is crucial for brands seeking to effectively reach this demographic.

Gen Z, characterized by their digital nativity, spends a significant amount of time on the internet, making them a vital audience. Previous research clearly shows that Gen Z has considerable influence on online spending, often relying on digital content for information and purchase decisions. This generation's behavior and preferences necessitate a closer examination of how they interact with BGC and UGC, especially in an era where vast quantities of information have diminished brands' control over consumer perceptions. Technological advancements have facilitated more interactive and engaging promotional tactics, with both marketers and consumers playing active roles in content creation and dissemination.

This research employs a qualitative methodology, utilizing two focus groups of Gen Z participants to explore their perceptions of BGC and UGC. The discussions were aimed at understanding the nuances of trust, informational utility, and the impact on purchase intentions. The theoretical framework guiding this study includes social proof theory and source credibility theory, which help elucidate the factors influencing trust and credibility in digital content.

Preliminary findings indicate distinct differences in how Gen Z perceives BGC and UGC. Trust levels lean toward the UGC, attributed to its perceived authenticity and relatability. In contrast, BGC is often viewed with skepticism due to its promotional nature. UGC is also seen as more

useful for providing relevant information and solving consumer problems, with participants valuing real-life experiences shared by peers over polished brand messages.

In conclusion, this study highlights the critical need for brands to adapt their content strategies to resonate with Gen Z. By prioritizing authenticity and leveraging the power of UGC, brands can build trust and ultimately influence purchase decisions. The implications of this research are significant for marketers aiming to connect with the digitally-savvy Gen Z, offering valuable insights for optimizing content strategies in the evolving digital landscape.

Keywords: User-Generated Content (UGC), Brand-Generated Content (BGC), Gen Z, Trust

JEL classification: M310 Marketing