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Factor Analysis and Principal Component of Project Delays Durign the Covid-19 Pandemic Due to Supply Chain Disruptions: Lesson Learned

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ABSTRACT
Each crisis provides food for thought concerning project management, and lessons can be drawn for the future regarding risk mitigation. In that milieu, there has been a lot of scientific discussion about the effects of the COVID-19 pandemic on project implementation. That discussion pointed to numerous factors that led to delays in the execution of projects. Thus, this study aims to identify the main factors that caused project delays during the pandemic. For this purpose, we used factor analysis, more precisely principal component analysis, to determine the main culprits that caused project delays. Factor analysis pointed to two primary causes of project delays during the pandemic, namely Epidemic-Related Disruptions and Supply chain disruptions. These findings indicate two basic groups of factors enabling a much more focused approach to project management should similar crises occur in the future.

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1. Introduction

The onset of the COVID-19 pandemic in early 2020 and the lightning speed at which it spread across the globe caught off guard individuals and businesses alike. Draconian social distancing measures, including lockdowns, were imposed almost immediately to slow the transmission of the virus which disrupted, inter alia, project workflows. Thus, the pandemic negatively impacted not only people's health but also nearly every aspect of human life, including the project management sector. Completing projects on time encountered unforeseen challenges, as supply chains were disrupted, and workforces were unable to work due to illness and quarantine or social distancing regulations.

Ergo, scholars, with the benefit of hindsight, have initiated an academic discussion to provide decision-makers input on managing crises of that magnitude. Many factors are critical to the sustainability of supply chains to ensure continuity in project supply deliveries. For instance, Puska et al. (2021) suggested using fuzzy methods in the decision-making process of selecting sustainable suppliers by applying several economic, social, and environmental criteria. Additionally, Ivanov (2022) introduced a viable supplier framework focusing on the ability of a supply chain to continue operating in a volatile environment during long-term disruptions.

Considering previous discussions in which supply chain disruptions were identified as a primary reason for project delays, this study has focused on the main components causing delays in project deliveries. In this context, this study investigates the supply disruption risks that caused significant delays in project delivery during the COVID-19 pandemic with the aim of identifying what triggered those delays. In this way, valuable lessons would be identified, facilitating effective project management in similar future crises. Understanding the intricate interplay of these supply chain exigencies is essential for project managers, decision-makers, and stakeholders who seek to enhance their preparedness for future disruptions. Moreover, this study underscores the importance of effectively assessing and addressing the risks associated with supply disruptions during times of crisis while offering a deeper understanding of the critical factors that impact project delays and consolidating the lessons learned concerning project management in similar crises.

2. Literature review

The last decade has been focused on the concept of sustainable development. Even the choice of suppliers is seen through the prism of sustainability. Puska et al (2020) argue about the importance of establishing three-dimensional supply chains, including supplier partnerships, customer relationships, and level and quality of information sharing, representing supply chain practices, flexibility, agility, and innovation as the main characteristics of supply chain performance. Puska et al. (2018) and Puska et al. (2021) contributed to creating a framework for the selection of sustainable suppliers using interval fuzzy logic in group decision-making.

However, the COVID-19 pandemic has caused significant disruptions to global and local supply chains, leading to economic slowdown and social issues (Pujawan & Bah, 2022; Sarkis, 2020; Ozdemir et al., 2022; Xu et al., 2020). Pujawan & Bah (2022) provided a significant contribution to reviewing the existing literature on supply chain disruptions during the pandemic and highlighted the importance of safety, digitalization, localization, and redefining efficiency. According to them, mitigation strategies such as redundancy and flexibility are still relevant, but there is a stronger emphasis on digitalization and supply-based localization. With this perspective, it has been revealed that existing strategies were not enough.

Shahed et al. (2021) reminded us that every organization in a supply chain experiences disruptions from manmade and natural disasters. They put focus on the inventory model to manage supply chain disruption risks. However, it is questionable whether this is enough. Sarkis (2020) emphasized the need for research on sustainability and resilience. While short-term environmental gains have been observed, the long-term effects are uncertain. The authors highlight the importance of environmental sustainability practices for organizations in managing future crises.

Ozdemir et al. (2022) argued that the COVID-19 pandemic has posed significant challenges to supply chains. Their study examines the effectiveness of existing solutions in promoting supply chain resilience. The findings indicate that pandemic-related disruptions have impacted resilience-building activities. Innovation is highlighted as a crucial factor for resilience, followed by robustness, empowerment, and risk management.

Moosavi et al. (2022) suggested solutions for building resilience into supply chains, such as regionalization and investment in digital technologies. The study concludes by emphasizing the complexity and interconnectedness of supply chain disruptions during the pandemic and the need for further research in this area.

Xu et al. (2020) showed that the COVID-19 pandemic has resulted in unprecedented disruptions to the mechanics of most GSCs such as pharmaceuticals, food, electronics, automotive industry, etc. Unlike previous major disruptions, COVID-19 has adversely affected GSCs throughout all their stages with major turbulences in manufacturing, processing, transport, and logistics, as well as significant shifts in demand. The analysis pinpointed that enhancing supply chain resilience is the main key driver to reducing vulnerability in disruptive times.

Magableh (2021) examined the impact of the COVID-19 pandemic on the supply chain, including disruptions, challenges, and trends. The study is novel as it identifies and categorizes essential factors in a comprehensive framework. Per this scholar, the impact is expected to affect businesses indefinitely; and supply chains are unlikely to resume their pre-COVID-19 status. Chowdhury et al. (2021) identified four recurring themes: the pandemic's impacts, resilience strategies, the role of technology, and supply chain sustainability. Paul et al. (2021) highlighted issues of raw material scarcity, production and transportation disruptions, and social distancing.

Since many projects were fixed, this posed a challenge for project organizations since they were not able to meet deadlines during the COVID-19 pandemic. Alfadil et al. (2022) discussed the legal aspects of project implementation. They highlighted that the force majeure clause has been associated with wars and natural disasters, while environmental risks have been connected to safety issues, pollution, and waste management. However, the COVID-19 pandemic created a unique situation that did not happen for decades, affecting individuals, societies, and countries. Al-Mhdawi et al. (2022) also highlighted that the COVID-19 pandemic had contractual implications, but also implications on financial markets, supply chains, safety, and risk management. Factors such as safety management measures, interpretation of contract language, building materials prices, risk management practices, construction materials, construction labor, and construction subcontractors have been greatly impacted.

Khalfan & Ismail (2020) discussed labor scarcity, supply chain disruption, decreased productivity, increased project financing rejection rate, and reduced foreign investment being the main challenges. Their study also highlights the increased unemployment rate and the need for active labor policies. Sutterby et al. (2023) investigated the impact of the pandemic on a large Australian construction company's daily operations and emphasized the importance of effective construction supply chain management in minimizing negative effects. The study finds that processes and maintaining relationships with stakeholders are key factors during the pandemic.

Majumder & Biswas (2021) especially highlighted safety concerns due to the COVID-19 pandemic, requiring employers to implement safety measures to protect workers, thus leading to delays. The pandemic has caused delays in construction projects and increased concerns about health and safety. It is crucial to assess the risks and implement safety measures for workers during and after the pandemic.

Alsharef et al. (2021), in their study on the U.S. construction industry, found effects of the COVID-19 pandemic such as delays, material shortages, reduced productivity, cash flow challenges, project suspensions, price escalations, and potential conflicts. However, they found new opportunities such as fast-track medical facility construction and recruitment of skilled workers, with risk management measures including safety protocols and government relief programs being widely adopted. The findings of this study will be useful for governmental agencies seeking to address the adverse effects on the construction industry.

Ogunnusi et al. (2020) argued that there are positive and negative impacts of the COVID-19 pandemic on the construction industry. The pandemic has highlighted the importance of investing in communication infrastructure and fostering local capacity in the construction industry. Furthermore, Ogunnusi et al. (2021) highlighted specifically positive and negative impacts on the construction industry, including cost reduction, remote working, and improved productivity, but also low business turnover, delays in payment, and job losses, highlighting

the need for improved health and safety measures and strategies for future-proofing the industry. One major negative impact was the increase in mental health issues due to the unexpected change in the working environment.

Sami et al. (2022) analysed the effects of Covid 19 pandemic on the construction industry in the United Arab Emirates. They highlighted the main effects such as schedule delays, disrupted cashflows, and various challenges. The main problems that they identified were delays due to international travel restrictions, lockdowns, and other preventive measures. This has resulted in financial losses, restricted resources, and invalidated contracts. For them, efforts by the government and construction industry, such as economic support programs and digitization, have proven effective in mitigating the adverse effects of the pandemic. The industry has also embraced digital tools and methods to manage projects during the pandemic.

Alajmani et al. (2023) discussed about the top five factors of delays in the United Arab Emirates including awarding projects to the lowest bidder, delay in progress payment, change orders by the owner, poor subcontractor performance, and inadequate planning and scheduling by the contractor. The paper also emphasizes the shift in perceptions of construction professionals due to the pandemic. The study fills a gap in the literature by providing insights from construction professionals on the impact of COVID-19 on delays in the UAE construction industry.

Gatenholm & Halldórsson (2023) examined how organizations have responded to disruptions in their product-based service supply chains during the COVID-19 pandemic, identifying various strategies ranging from restoration to radical change. The findings suggest that these disruptions can be categorized as external supply-side, demand-side, or interactional, and a conceptual framework combining resilience and transformation is proposed to create new service opportunities. The study provides insights into the first-response abilities and coping mechanisms of manufacturing firms during the pandemic, highlighting the importance of fostering transilience in supply chains.

Alhammadi (2022) evaluated factors affecting Riyadh's construction sector in light of the COVID-19 pandemic. The factors include managerial, economic, social, cultural, and environmental factors. The findings highlight the abandonment of talent and expertise, conflict in bidding prices, social and cultural factors, and the process of requesting raw materials as the top factors affecting the management of Riyadh's construction sector during the pandemic.

Alenezi (2020) did an extensive literature review on delays in construction projects, particularly during the COVID-19 pandemic in Kuwait. The study found that critical delays in construction projects were mainly due to COVID-19, and proper planning and communication can help reduce delays. The survey identified 17 factors of delay, which were ranked based on their importance level. Many factors cause delays in the construction project, some falling within the owner's liability and some within the contractor's liability. The COVID-19 pandemic has also highlighted additional management issues, such as the need for social distancing and increased welfare facilities for workers.

Gumusburun & Çivici (2023) provided a framework for analyzing and prioritizing weaknesses to minimize the adverse impact of the pandemic. The study found that increased costs and supply chain disruptions, as well as challenges with payment and cash flows, were the most influential factors. The research suggests that contractors, architects, and civil engineers should analyze their weaknesses and prioritize effectively to minimize the adverse effects of the pandemic.

Want et al. (2020) were very specific in identifying risks related to project delays during the COVID-19 pandemic. The specific risks related to COVID-19 in tunnel construction projects include worker availability, site accessibility, shortage of construction materials, and inadequate epidemic prevention materials. According to them, social panic and epidemic prevention requirements are key issues that need to be addressed before construction work can resume. shortage of workers, materials, machines, and site accessibility greatly hindered the schedule of the tunnel construction projects at the early outbreak of the COVID-19 epidemic in China.

3. Methodology

To understand the complex problem of the effects of supply chain disruption during Covid 19 pandemic

on project delays, this study utilized factor analysis or more precisely principal component analysis. Principal component analysis was used to identify the latent dimensions that influence the variation in the level of importance of different supply chain disruption risks associated with project delays.

The research design involves the use of a survey questionnaire. A seven-level Likert scale was used to address the respondents' perceptions of project delays. The questionnaire was distributed using Survey Sparrow online survey software. A total of 125 respondents around the globe who are engaged in project business took part in the survey over three months from January to March 2022.

This study analyzed the risks associated with the Covid-19 pandemic proposed by Wang et al. (2020). These risks are used as the variables in this study, namely:

- Dstaff: disruption of staff access to the site and shortage of workers, technicians, and operators:
- Dmat: material supply disruption
- Deq: machine supply and delivery disruption
- Dmet: disruption due to epidemic prevention methods that the company was requested to implement inside the company:
- Dpan: disruption due to panic of residents:
- Dext: Disruption due to administrative epidemic control policy outside the company:

To understand the opinion about the effects of supply chain disruption risks on project delays, the survey respondents should answer the following question for each of the 6 identified risks: How long did the interruption caused by particular risks during the COVID-19 pandemic last? The Likert scale for measuring project delays included the following response options: (1) No interruption, (2) Up to 1 week, (3) Between 1 and 4 weeks, (4) 1-3 months, (5) 3-6 months, (6) 6-12 months, (7) Interruption is still present.

The principal factor component analysis was conducted in this study. This analysis started with calculating the correlation matrix of the standardized variables to provide information about the relationships between variables. Correlations between variables should be statistically significant at the level of $p \leq 0.05$ to be considered that the data are suitable for factorial analysis. On the other hand, the correlation coefficients should not cross the threshold value of 0.09 which would suggest the existence of multicollinearity. High correlations between variables suggest multicollinearity, meaning that the variables are measuring similar aspects of the construct. In such cases, selecting one representative variable from the correlated group can help reduce dimensionality.

The Kaiser-Meyer-Olkin (KMO) test was applied to determine the extent to which the variables are related to each other. It helps to assess the adequacy of the data for factor analysis. The KMO measure ranges from 0 to 1, with values closer to 1 indicating a higher degree of intercorrelation among variables. If the f KMO value is above 0.8, this indicates a high degree of common variance, and the data is suitable for factor analysis. However, if KMO values between 0.6 and 0.8, even in this case factor analysis may be performed with caution since there is moderate intercorrelation among variables. However, if KMO values are below 0.6, in this case, factor analysis is not suitable. Furthermore, Bartlett's Test is an additional test to assess whether the variables in the dataset are uncorrelated and unsuitable for factor analysis. If the p-value is significant ($p < 0.05$), this indicates that the correlation matrix significantly deviates from an identity matrix. In this case, the data is suitable for factor analysis.

The next step in principal factor component analysis is to calculate commonalities for each variable. They determine the proportion of the total variance in each variable that can be explained by the factorial analysis. The calculation of commonalities helps in understanding the importance of each variable in the analysis. Higher communalities with a value closer to 1 suggest that the variable contributes more to the overall structure captured by the principal components. Communalities with values below 0.3 are not acceptable.

Furthermore, the total variance explained assists in determining how much of the variability in the original data is captured by the PCA-derived reduced-dimensional representation. The total variance explained enables the identification of the number of principal components to retain in the analysis. The cumulative variance explained by each component identifies the

point at which adding additional components does not contribute significantly to the overall variance explained. This is usually from 80% or 90% of the cumulative percentage which indicates that the extracted principal components are capturing a large portion of the variability in the original data. With the information that is provided by eigenvalues, it is possible to identify components that capture important patterns and structures in the data, indicating their significance in the reduced-dimensional representation. Eigenvalues measure the amount of variance explained by each component. Those eigenvalues greater than 1 indicate significant components. Additionally, the total variance is visually presented with scree plots. This step enables the extraction of factors from the original data.

After factors are extracted, they are rotated to be presented in a more interpretable factor structure. The Varimax rotation method reorients the factors to improve interpretability. Extracted factors are presented in the component matrix which serves to identify the factor loadings of each variable on the extracted factors. Factor loading shows the strength and direction of the relationship between each variable and the underlying factors. Variables with high factor loadings that are closer to 1 or -1 on a particular factor are considered to be strongly associated with that factor. In general, factor loadings above 0.4 are considered to have a reasonable level of association.

Once the principal components are identified, the final step is to explore how these components relate to each other. The component correlation matrix shows the correlations between the principal components, which provides insights into their underlying relationships. The correlation ranges from +1 to - 1. A correlation close to 1 between two components indicates that they are strongly related and capture similar information. This indicates that these components may represent the same underlying factor. A correlation close to -1 between two components indicates that they capture opposite or contrasting information. These components may represent different aspects of the dataset. A correlation coefficient close to 0 indicates a weak relationship between the components. This suggests that the components are relatively independent and capture distinct patterns of the data.

4. Research findings

This section provides the results conducted with the study. This analysis starts with the interpretation of the findings from the correlation matrix. Although there is noticeable a difference in correlation coefficients between variables, the correlation between all coefficients is statistically significant. This can be confirmed by having an insight into the p-value for each correlation which is in all cases at the level $p \leq 0.05$. Furthermore, there are no values of correlation crossing the threshold of 0.09 which would indicate the problem of multicollinearity. This is proof that these data can be used further in principal factor component analysis.

Table 1

Correlation matrix

		Dstaff	Dmat	Deq	Dmet	Dpan	Dext
Correlation	*Dstaff*	1.000	.441	.422	.633	.532	.694
	Dmat	.441	1.000	.880	.285	.228	.302
	Deq	.422	.880	1.000	.264	.314	.237
	Dmet	.633	.285	.264	1.000	.698	.612
	Dpan	.532	.228	.314	.698	1.000	.635
	Dext	.694	.302	.237	.612	.635	1.000
Sig. (1-tailed)	*Dstaff*		.000	.000	.000	.000	.000
	Dmat	.000		.000	.013	.039	.009
	Deq	.000	.000		.020	.007	.033
	Dmet	.000	.013	.020		.000	.000
	Dpan	.000	.039	.007	.000		.000
	Dext	.000	.009	.033	.000	.000	

Notes. Authors' calculation.

The second proof that the data are suitable for facto analysis comes from KMO and Bartlett's Test. Kaiser-Meyer-Olkin Measure of Sampling Adequacy value is 0.669, close to 0.7, which indicates a moderate intercorrelation among variables, thus we can proceed with factorial analysis with caution. Bartlett's Test of Sphericity supports this statement since $p \leq 0.05$. With the confirmation from these two tests, it can be confirmed that factorial analysis can be performed.

Table 2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.669
Bartlett's Test of Sphericity	Approx. Chi-Square	226.967
	df	15
	Sig.	.000

Notes. Authors' calculation.

After confirmation of suitability data for factorial analysis, the next move is to assess how variables are represented by components. This is done with the assistance of Communalities. As per the findings, variables have an extraction value above 0.3 which can be considered as an acceptable proportion of variance that can be explained by the principal components. Variables Dmat (0.938) and Deq (0.932) are well represented by the components, indicating a strong relationship between these variables and the underlying dimensions captured by the components. The lowest value of communalities has Dstaff (0.718) indicating a moderate relationship with the components.

Table 3

Communalities

	Initial	Extraction
Dstaff	1.000	.718
Dmat	1.000	.938
Deq	1.000	.932
Dmet	1.000	.758
Dpan	1.000	.722
Dext	1.000	.749

Notes. Authors' calculation.

In our analysis, we have 6 components due to 6 variables used in this research. Based on the total variance explained, two principal components have significant eigenvalues values above 1, namely component 1 with a factor loading of 3.412 with 55.86% of variance coming from this component, while the second component factor loading equals 1.405 and explains 23.42% of the variance. Thus, these two components explain 80.28% of the total variance. Other components have no significant eigenvalues values and will not be further elaborated.

Table 4

Total Variance Explained

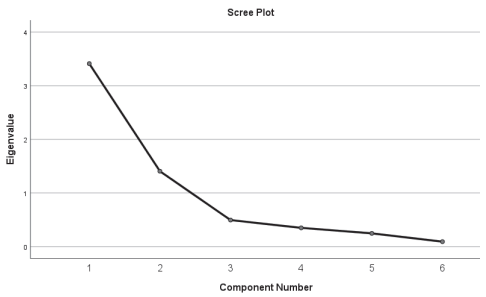
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.412	56.860	56.860	3.412	56.860	56.860
2	1.405	23.421	80.282	1.405	23.421	80.282
3	.495	8.246	88.528			
4	.349	5.822	94.349			
5	.247	4.113	98.462			
6	.092	1.538	100.000			

Notes. Authors' calculation.

The scree plot visualizes the value of eigenvalues for six different components. From the graph is visible that only 2 components have the values above 1. Thus, the data can be grouped into 2 groups.

Figure 1

Scree Plot



Notes. Authors' calculation.

The variables Dmet, Dext, Dpan, and DStaff loaded strongly on Component 1, with loadings of 0.862, 0.856, 0.843, and 0.770 respectively. The high loadings suggest that these variables are strongly associated with this component, indicating their strong influence in explaining the variance within the dataset. The variables Dmat and Deq are not highly associated with component 1. This component can be interpreted as representing a factor related to Epidemic-Related Disruptions, or Human Related factors.

When it comes to the loading factors for component 2, there is a slightly different situation. The variables Dmat and Deq loaded strongly on Component 2, with loadings of 0.953 and 0.951 respectively. Thus, only these two variables are strongly associated with component 2. In this case, component 2 can be interpreted as a factor related to Supply Chain Disruptions, or Non-human related factors.

Table 5

Rotated Component Matrix

	Component	
	1	2
Dstaff	.770	.355
Dmat	.174	.953
Deq	.169	.951
Dmet	.862	.122
Dpan	.843	.109
Dext	.856	.129

Notes. Authors' calculation.

By looking at Component Score Coefficient Matrix, we found a weak correlation of Component 1 with the variables Dext, Dmet, Dpan, and Dstaff based on correlation coefficients 0.329, 0.333, 0.327, and 0.251 respectively. The variables Deq, and Dmat show almost no correlation. With Component 2 the variables Dmat and Deq, with correlation coefficients of 0.531 and 0.532 respectively, show a moderate positive correlation.

Table 6

Component Score Coefficient Matrix

	Component	
	1	2
Dstaff	.251	.064
Dmat	-.108	.531
Deq	-.110	.530
Dmet	.333	-.091
Dpan	.327	-.095
Dext	.329	-.086

Notes. Authors' calculation.

Based on Component Score Covariance Matrix, we found covariance value between Component 1 and Component 2 equals 0.000. This result indicates that there is no linear relationship between the scores of these two components. Thus, the changes in one component's score provide no information about the changes in the other component's score. This lack of correlation suggests that these components capture different and independent aspects of the data. This result emphasizes the unique contribution of each component to the interpretation of the dataset's underlying structure.

Table 7

Component Score Covariance Matrix

Component	1	2
1	1.000	.000
2	.000	1.000

Notes. Authors' calculation.

5. Discussion and conclusions

The Covid 19 pandemic greatly affected project management over a period of two years, especially at the beginning of 2020. The special effect of this pandemic was reflected in project delays. Bearing in mind that certain companies contracted the delivery of projects in accordance with fixed contracts, as indicated by Alfadil et al. (2022) and Al-Mhdawi et al. (2022), this particularly affected them as they could not fulfil their obligations on time. During the pandemic, there was a lot of discussion about the factors affecting the delivery of projects, as well as the measures that needed to be taken. Sometimes there was no systematic approach, and the measures were very dispersed.

For this study, the identified risks causing project delays given by Wang et al. (2020) were the basic points. They identified man, material, machine, method, environment as main risks in project management causing delays during Covid 19 pandemic. However, this and similar studies recognized many different risks and factors that lead to delays, and it is difficult to manage these risks in a systematic way. Thus, this study enables a structural categorization of main components of risks that affected delays of projects during the pandemic. This can serve as a lesson learned for more systematic categorization of projects risks if and when similar situations and crisis occurs.

By analyzing the factors influencing project delays during the pandemic, we came to the discovery of two specific components: Epidemic-Related Disruptions and Supply Chain Disruptions. Epidemic-Related Disruptions refer to factors such as disruption of staff access to the site and shortage of workers, technicians, and operators, disruption due to epidemic prevention methods that the company was requested to implement inside the company, disruption due to panic of residents, and Disruption due to administrative epidemic control policy outside the company. This type of factor was somehow beyond the influence of the project companies and it was difficult to manage. Especially because at the centre of this component is a human who was directly affected by the pandemic through the possibility of infection. As per our findings, these types of factors were more influential in terms of project delays.

On the other hand, we can distinguish another component: Supply Chain Disruptions. Factors within this component refer to material supply disruption and machine supply and delivery disruption. This type of factor affecting the supply of project organizations was already known to project companies that were able to apply already known mitigation strategies. By dividing the factors into more specific groups, human related and non-human related, we are able to focus our mitigation project management strategies in future similar situations. In this way, it is possible to avoid an overly broad approach in managing pandemic-related risks. Therefore, this research can serve as lessons learned about project management during the pandemic. As we move forward, these insights will contribute to the development of more robust project management practices and the successful execution of projects in an ever-changing world.

Having in mind the findings, it is obvious that companies which quickly adapted to the new situation as suggested by Pujawan & Bah (2022), have able to respond to changes in supply chains. Especially good tactics was the one suggested by Panwar & De Marchi (2022) in which automation and digitalization play a key role in these transitions. Their role is irreplaceable in cases where the human factor is the main cause of delays. Thus, we need to acknowledge arguments given by Ogunnusi et al. (2020) that the COVID-19 pandemic has had both positive and negative driving innovation and the use of technology in project management. The pandemic has highlighted the importance of investing in communication infrastructure. Thus, lessons learned about how to deal with health and safety technologies proposed by Yand et al. (2021), such as QR code systems and AI-powered tools, and other technologies can be very effective in case that similar crisis occurs.

Keeping in mind the ideas from Selakovic et al. (2023) about the importance of small and medium enterprises (SMEs) which are carriers of the economic development of local, and regional, this requires the full attention of decision-makers in the period of similar disruptions.

At the end of the day, it can be concluded that mitigation plans should not be left only to new project

companies, but that such plans should also exist at the level of governments, which could act quickly if the situation with the pandemic happens again.

5.1. Theoretical implications

There are numerous studies that have studied the impact of the COVID-19 pandemic on the implementation of projects and the disruption of supply chains. Those studies indicated numerous factors and risks that had a negative effect on project management during this period. The theoretical contribution of this study is that, by adopting the appropriate method of factor analysis, the systematization and grouping of various factors with an impact on project management was carried out. In this way, we obtained a systematized group of factors with effects on project delays during the period of disruption caused by the COVID-19 pandemic.

5.2. Policy and managerial implications

The response of official government policies around the world to the COVID-19 pandemic, as well as the response of businesses to the disruption of value chains that affected project delays, were very different and sometimes not so expedient. This study analyzed the lessons learned from the mentioned period and gave an answer about the most important factors that should be taken into account in similar situations that may happen in the future. Bearing in mind the analysis of the importance of the factors, in future similar situations it is possible to respond more easily to the problems of project delays by focusing on the factors that have a significant impact on project management.

5.3. Limitations and suggestions for future research

This study is focused on the lessons learned from the period of the COVID-19 pandemic. Whether a similar situation will repeat itself in the future remains unknown. Therefore, the application of the results from this study can be applied to similar situations in the future. Furthermore, the number of participants in the study is limited, and by including a larger number of participants in the analysis, an even more detailed analysis can be obtained. This limitation was tried to be replaced by the inclusion of business organizations around the world in order to get as wide an insight into the research problem as possible.

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Biography

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Факторска анализа и главна компонента кашњења пројеката током пандемије Covid-19 због поремећаја у ланцу снабдијевања: научене лекције

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Кључне ријечи:
поремећај у снабдијевању пројекта, кашњења пројеката, COVID-19, поремећаји повезани са епидемијом, поремећаји у ланцу снабдијевања

САЖЕТАК

Свака криза пружа материјал за размишљање у вези са управљањем пројектима и из ње се могу извући лекције за будућност у погледу ублажавања ризика. У том контексту, било је много научних расправа о ефектима пандемије COVID-19 на реализацију пројеката. Те расправе су указале на бројне факторе који су довели до кашњења у реализацији пројеката. Стога, ова студија има за циљ да идентификује главне факторе који су изазвали кашњења пројеката током пандемије. У ту сврху, користили смо факторску анализу, прецизније анализу главних компоненти, како бисмо одредили главне узрочнике кашњења пројеката. Факторска анализа је указала на два примарна узрока кашњења пројеката током пандемије, а то су поремећаји повезани са епидемијом и поремећаји у ланцу снабдијевања. Ови налази указују на двије основне групе фактора које омогућавају много фокусиранији приступ управљању пројектима у случају сличних криза у будућности.

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The role of institutions in the digital transformation of companies in transitional countries

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ABSTRACT
The digital transformation represents a crucial factor for the competitiveness of companies both at the local and regional, and especially at the global level. The aim of this paper is to assess the adequacy of the legislative framework in Bosnia and Herzegovina (BiH) and to compare the level of digitalization in BiH with other countries in the region. In measuring the level of digitalization, the paper utilizes the DESI index, which assesses four key areas: connectivity, human capital, integration of digital technologies by the business sector, and digital public services. The author provides an overview of the literature on the impact of institutions on digital transformation in transitional countries, as well as a critical review of current and future trends on this topic. BiH has an outdated and underdeveloped legislative framework concerning the implementation of digitalization at both the systemic and company levels, which is not aligned with modern trends. Consequently, BiH ranks among the lowest countries in Europe in terms of the degree of digital transformation compared to other countries in the Western Balkans. While the legislative framework is not the sole cause of BiH's low level of digital transformation, it represents one of the significant factors. This paper also provides recommendations to policymakers and managers on the possibilities and importance of digital transformation for companies, thus making certain contributions to the field.

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1. Introduction

Digital technologies have a comprehensive impact on all aspects of human life, from work and communication to social interactions. Digital transformation refers to profound changes brought about by the introduction and integration of digital technologies into all spheres of society (Shams et al., 2021). Given the significance of digital transformation for economic competitiveness, it has emerged as a strategic policy area, necessitating an assessment of its impact and identification of areas requiring policy intervention. Digital transformation represents a new, fourth industrial revolution that brings about radical changes in business models and their performance (Lorenc et al., 2020). Governments cannot ignore the immense potential of digital technologies and their progressive integration with unprecedented societal dynamics. Specifically, new technologies provide innovative tools for enhancing communication, coordination, and participation in social and political life, and their effective use will indeed shape the future of governance and democracy in the years to come (Barbosa, 2017).

Digital business transformation is included in the plans and programs of government institutions worldwide. To better understand the drivers, barriers, and determinants of the current state we are in, it is necessary to understand the regulatory, or legal framework governing this area. The fact is that seven out of eight positions of the most valuable public companies in the global capital market are occupied by digitally transformed enterprises. These are all very young companies that started as startups and today represent IT giants like Microsoft, Amazon, Facebook (Meta), Google (Alphabet), etc. (Srića, 2019).

Governments are transforming the traditional system of providing services to citizens into a digital format using information and communication technologies (ICT). ICT tools tend to increase the efficiency and effectiveness of service delivery processes. However, transitioning to digital transformation and integrating ICT with government services requires in-depth analysis and strategy to ensure a clear path for successful implementation. It is important to note that digital inclusion and providing services in electronic format involve not only the application of ICT but also other aspects that must be taken into account, primarily the reform of relevant laws. Therefore, addressing legal issues is crucial to ensure the existence of necessary regulatory frameworks that enable digital transformation while protecting citizens' rights (Nyman-Metcalf, 2017, 2019) and defining standards of "what can and cannot be done" (United Nations, 2018). ICT laws regulate citizens' interaction with ICT by providing a framework for the use, operation, and storage of information in electronic transactions, increasing citizens' trust in the validity of transactions, and protecting their privacy and security (Bhattacharjee et al., 2018).

Given that digital transformation is a crucial factor for the competitiveness of companies and economies as a whole, the European Union (EU) has prioritized the development of digital transformation (European Commission, 2023), developing policies that support the adoption of digital technologies, empowering businesses and consumers, promoting the development of digital skills, and modernizing public services.

On the other hand, there is no relevant report in Bosnia and Herzegovina (BiH) that would present the state of business digitization. The Foreign Trade Chamber of BiH has set digital transformation as one of the priorities in the upcoming period (European Commission, 2023) because it is a precondition for enhancing the competitiveness of the economy and improving a range of other processes crucial for BiH on its European path.

BiH is in the early stages of digital transformation. There are several factors that have contributed to this trend, including an unfavorable legislative framework for digital transformation. The subject of this research is the role of institutions in the digital transformation of companies in BiH. The research aims to identify key institutional factors that have the greatest impact on the implementation of digital transformation at the company level.

The author provides an overview of the literature on the impact of institutions on digital transformation in transitional countries, as well as a critical review of current and future trends on this topic. As an indicator of the degree of digital transformation of a particular country, the author used the Digital Economy and Society Index (DESI index) (European Commission, 2023). We expect this research to contribute to the literature on digital transformation and the importance of institutions in digital transformation, as well as recommendations on how to create a more favorable

institutional framework for digital transformation.

The first contribution is the analysis of the degree of development of the legislative framework on digitalization in Bosnia and Herzegovina (BiH) and its alignment with European Union (EU) regulations. A detailed analysis of the legislative frameworks at all levels of government in BiH, as well as a comparison with countries in the Western Balkans and the EU, confirms that BiH lacks a sufficiently developed legislative framework that systematically addresses the digital transformation of companies.

The second contribution is the identification of the influence of state and entity institutions on digital transformation through the reshaping of policies and regulations, promoting inclusivity and reliability, and improving the quality of governance and public services. The analysis of current laws and regulations in BiH reveals certain deficiencies in the regulatory framework that hinder digital transformation.

The third contribution is the proposal of specific measures that BiH can take to improve its performance on the DESI index, including increased investment in digital skills education, improvement of digital infrastructure to provide faster and more accessible internet, and the development of digital public administration. These measures would facilitate the use of public services by citizens and businesses, thus promoting digital transformation at both systemic and company levels.

The remainder of this paper is organized as follows. In the next section, we provide a literature review on the role of institutions in digital transformation. The following section explains the research methodology. The section after that presents empirical results followed by main conclusions, limitations, and ideas for future research.

2. Literature Review and Hypothesis Development

Industries and companies worldwide are increasingly influenced by digital transformation (Broekhuizen et al., 2021; Fitzgerald et al., 2014; Ferraris et al., 2019). It is even considered to have a positive impact on social development (Popkova et al., 2022). For this reason, digital transformation has attracted the interest of numerous researchers and practitioners over the last decade, who have sought to understand its nature and characteristics.

Vial (2019) described digital transformation as a process that generates strategic and operational changes in companies due to the opportunities and threats arising from digital technologies. Other authors highlight how digital transformation involves the adoption of the latest technologies by agile organizations, aiming for radical improvements in their performance and expanding horizons (Bresciani et al., 2021a; Kraus et al., 2021; Westerman et al., 2011). Similarly, Fitzgerald et al. (2014) present digital transformation as the practical implementation of digital technologies to improve user experience and engagement, streamline operations, strengthen business models, or generate new business opportunities. On the other hand, Apio et al. (2021) argue that providing a comprehensive definition of digital transformation is challenging because it is a multidimensional phenomenon. Despite these challenges, it is worth exploring some of these dimensions.

From a strategic perspective, Mat et al. (2015) and Broekhuizen et al. (2021) highlight the inherent complexity of digital transformation and its potential to reshape the company from organizational, operational, and business perspectives. Hess et al. (2016) examine the fundamental strategic dimensions of digital transformation and the fundamental, company-wide, strategic issues arising from digital transformation programs. In a comprehensive literature review, Kraus et al. (2021) suggested that a strategy focused solely on digital transformation is clearly insufficient, emphasizing the strategic nature of digital transformation and its inherent connections to the broader strategic ecosystem of the company.

Accordingly, digital transformation is seen as a strategic priority for most companies, prompting organizations to become more agile and rethink their business models and operational approach (Hess et al., 2016; Bresciani et al., 2021a; Ferraris et al., 2021; Kraus et al., 2021; Shams et al., 2021).

From a market perspective, digital transformation is seen as a tool for dealing with disruptions or creating disruptions - through the use of digital technologies. As a result, companies value propositions are redefined, entry barriers are lowered, and digital and physical products coexist in the market, with more or less alignment (Mithas et al., 2013; Barrett et al., 2015; Bresciani et al., 2021b). There is a clear

mutual relationship between business model innovation and digital transformation, with digital transformation leading to the reformulation and adaptation of companies' business models in various industries (D'Ippolito et al., 2019). And while digital transformation clearly changes competitive dynamics, it also generates profound changes in consumer behavior and expectations (Correani et al., 2020; Fitzgerald et al., 2014; Khanra et al., 2021; Schwertner, 2017). Therefore, although changes driven by digital transformation are naturally associated with the adoption of digital technologies and the digitization of organizations (Westerman et al., 2011; Khanra et al., 2020; Verhoef et al., 2021), its implications are not strictly limited to this aspect (Tabrizi et al., 2019; Vial, 2019).

Digitalization brings new sources of prosperity to all citizens (Deloitte, 2021), enables entrepreneurs to innovate, start, and expand businesses regardless of where they live, opens up markets and investments across Europe and the world, and creates new jobs in a period when more and more Europeans feel threatened in their economic security or environment. Government agencies and public institutions positively influence digital transformation by reshaping policies, laws, and regulations related to various public, social, regional, and national issues.

Government institutions influence digital transformation by promoting inclusivity, reliability of software infrastructure, and implementing more transparent and accountable public institutions (Barbosa, 2017).

Some Western Balkan countries have begun to implement digital transformation in healthcare, aiming to improve clinical management, enhance the quality of care, and increase patient satisfaction (Rosalia et al., 2021). Western Balkan countries have experienced increased convergence in digital transformation, but still lag behind the EU in the use of digital technologies (Baturac et al., 2020; Shahini, 2021;).

The challenge of responding to the aforementioned technological trends and remaining competitive in the face of increasing penetration of digital technologies necessitates the need for business digital transformation. Digital transformation refers to the process that begins when an organization starts thinking about introducing digital technologies in all areas of business and lasts until their full integration.

The Global Center for Digital Business Transformation defines business digital transformation as an organizational change through the use of digital technology and business models to enhance business performance (Wade, 2015). It is a continuous process that is not always straightforward, but without which business in today's world gradually becomes impossible. Popović-Pantić et al. (2019) define digital transformation as a complex, dynamic, continuous process of transforming all organizational aspects, supported by strategically designed integral application of modern digital technologies, aiming to create a new business model and position the customer at the center of all activities and decisions made by the organization, all with the goal of creating conditions for innovation improvement, better market position, and consequently, overall business performance enhancement. Similarly, Ismail et al. (2017) define digital transformation as a process through which companies converge multiple new digital technologies with the intention of achieving superior performance and sustainable competitive advantage, transforming various business dimensions, including business models, customer experience, and business operations. Numerous examples of organizations intensively using digital technologies with the aim of creating new value for customers, such as General Electric, Nike+, Netflix, Uber, Airbnb, Booking, PayPal, etc., have led to disruptive changes in many sectors of the economy, ranging from agriculture and industry, through trade, tourism, hospitality, banking and financial services, to education, science, culture, information, and healthcare.

Highlighting the importance of business digital transformation, many authors emphasize that digital technologies such as mobile devices, social networks, cloud computing, Internet of Things (IoT), and big data analytics (BDA) are used to improve customer experience, operational processes, and business models (Fitzgerald et al., 2013; Rogers, 2016). Bone et al. (2021) supplements this classification with employee experience transformation and business model transformation. As a result, customers have become the primary force driving the digital transformation of all industries (Berman et al., 2011). Bone et al. (2021) discuss experiential design, consumer intelligence, and emotional engagement as dominant elements of customer experience transformation. Transformation of enterprise operational processes covers automation of production processes, research and development, as well as distribution.

Digital technologies such as cloud computing, Internet of Things (IoT), big data analytics, increase employee capacity (Khanra et al., 2020).

Li and Wang (2021) concluded that the legal and regulatory framework can significantly promote digital transformation, while outdated or restrictive frameworks can hinder it. In their research, they also found that the specific impact of the legal and regulatory framework varies from country to country, depending on the specific laws and regulations in force.

With recent advances in ICT tools and the rapid spread of digital transformation, reform of relevant laws has become a primary condition for easier introduction of e-government and improvement of efficiency and use of government services (Sarantis, 2017). Therefore, technological tools are not the only factor in government transformation. Hence, laws relevant to ICT are needed to regulate the availability and usability of technologies in providing government services in electronic format, give legal validity to electronic communications, and ensure the success of e-government adoption (Albrecht & Novak, 2021; Garad & Qamari, 2021). A United Nations study from 2018 focused on the legal framework for digital transformation. The study also touched on cybercrime laws and explained them as legal measures that enable governments and other interested parties to define basic mechanisms for responding to cyber-attacks, including e-government systems (United Nations, 2018).

Lentner and Parycek (2016) explored the e-government component from a technical perspective and considered that electronic identity (eID) and electronic signature are key factors for identifying subjects in the digital environment. However, laws ensuring the authenticity and legal validity of subjects and signatures during online communication are necessary to be adopted and implemented. Khan et al. (2020) analyzed 83 countries and found that the existence of ICT laws is significant for achieving broader diffusion of ICT and their use among citizens and improving welfare. They concluded that since ICT law regulates and protects against misuse during electronic transactions through ICT standards, it increases citizens' trust in using ICT and online services over the internet, ensuring the protection of their data, privacy, and security. They also noted that more mature ICT laws positively impact ICT diffusion in the country and increase citizens' intention to use them (Khan et al., 2020).

Glyptis et al. (2020) noticed that the existence of a legal framework ensures the success of e-government adoption by the country, as laws define the legal basis and way of implementing the digital transformation process. Also, Wierzbowski et al. (2021) claimed in their work that the implementation of the regulatory framework in practice is a key aspect that governments must improve when transforming into an e-state and providing government services in digital formats and implementing e-government systems. With the digital revolution and the introduction of digital currencies, blockchain, and distributed ledger systems, Silva (2020) argues that the legal framework is crucial for providing "legal certainty of the process" and mitigating relevant issues for data integrity, data protection, data privacy, and information security in the digital environment. Based on the above, we have come to the following research question:

RQ: To what extent are the institutional factors in Bosnia and Herzegovina favorable to fostering digital transformation among companies and the entire society, and how does this impact the competitiveness of the country?

3. Methodology

The research was implemented through the following steps:

1. Relevant laws and regulations in the country were identified. This includes laws and regulations related to electronic communications, electronic commerce, electronic signatures, data protection, and other relevant areas.
2. The laws and regulations were analyzed to determine the extent to which they support the digital transformation of businesses and society. This involves considering factors such as the clarity of the laws, the level of regulatory burden, and the extent to which the laws promote innovation.
3. Next, the frequency of internet usage, the percentage of individuals making online purchases, the number of businesses with functional websites, and the percentage of individuals with basic or average digital skills in Bosnia and Herzegovina

were analyzed, and these data were compared with data from Western Balkan countries and the European Union (EU) average.

To monitor the progress of digital performance and digital competitiveness of EU member states, the European Commission launched the Digital Economy and Society Index (DESI) in 2014 (European Commission, 2023). DESI measures four key areas: connectivity, human capital, integration of digital technologies by the business sector, and digital public services. As candidates or potential candidates for EU membership, Western Balkan economies are required to use the Digital Economy and Society Index (DESI) indicators to measure progress achieved (European Commission, 2023). The Regional Cooperation Council has published a report providing an overview of the implementation of the DESI index methodology in the Western Balkans, as well as the availability of data sets for calculating all DESI indicators and identifying responsible institutions for data collection (European Commission, 2023). It is also important to note that it is necessary to harmonize the methodology of a certain number of indicators with EU methodologies (Jordanoski et al., 2021).

The European Commission has developed a set of indicators to measure progress towards these goals. These indicators include:

- Connectivity: Percentage of households with access to fixed and mobile broadband internet, percentage of households with gigabit internet connection;
- Digital Skills: Percentage of population aged 16 to 74 with at least basic digital skills;
- Business Use of Digital Technologies: Percentage of enterprises using cloud computing services, percentage of enterprises using artificial intelligence (AI);
- Digitalization of Public Services: Percentage of key public services available online, percentage of users of public services using online services. (European Commission, 2022, p. 4)

Table 1
DESI Index Indicators

DESI	**DESI Index Indicators**
Connectivity	Gigabit for All (Coverage of very high-capacity fixed network).
	Coverage of 5G network.
Digital Skills	Basic digital skills
	ICT specialists.
	Female ICT specialists
Integration of Digital Technologies	SMEs with basic level of digital transformation
	AI
	Cloud
	Big Data
Digitalne javne usluge	Digital services for citizens
	Digital services for businesses

Notes: The table lists elements and indicators of the DESI index (European Commission, 2023).

Progress in the field of electronic communications and information society in Bosnia and Herzegovina is monitored by three institutions:

- The Agency for Statistics of Bosnia and Herzegovina (BHAS);
- The Regulatory Agency for Communications of Bosnia and Herzegovina (RAK);
- The Ministry of Communications and Transport.
- There is no identified overlap or gap regarding the jurisdiction of entity authorities and joint-level authorities in Bosnia and Herzegovina, as all DESI indicators are assigned to the responsible institution for monitoring and data collection.

The Agency for Statistics of Bosnia and Herzegovina (BHAS) conducts international representation and collaboration with organizations and other bodies and fulfills Bosnia and Herzegovina's international statistical obligations. It also collects, processes, and distributes statistical data for Bosnia and Herzegovina in accordance with internationally accepted standards. As the statistical agency of Bosnia and Herzegovina, BHAS is responsible for collecting data for 27 DESI indicators. For this purpose, BHAS closely cooperates with the Federal Institute of Statistics (FIS) and the Republic Institute of Statistics of Republika Srpska (RIS).

Progress in the field of electronic communications and the information society is monitored by BHAS through four statistical operations:

- Survey on the use of ICT in households and by individuals;
- Survey on the use of ICT in enterprises;
- Labour Force Survey (LFS); and
- Administrative data on education.

BHAS is responsible for collecting data related to electronic communications and the information society. These data are used to monitor Bosnia and Herzegovina's progress in these areas and to assess its alignment with the EU acquis. BHAS has achieved a high level of alignment with Methodological Guides and Model Questionnaires (MQ) for surveys on the use of ICT in households and by individuals and surveys on the use of ICT in enterprises. Data for both surveys are transmitted and available in Eurostat's database and can be used in the context of calculating DESI for Bosnia and Herzegovina.

BHAS has reported that the harmonization process with EU-LFS is not yet completed, and data for Bosnia and Herzegovina are not transmitted to Eurostat. To fill this gap, BHAS has included DESI indicators for ICT professionals in employment in the survey on the use of ICT in enterprises.

The national regulator, the Communications Regulatory Agency of Bosnia and Herzegovina, is responsible for monitoring and collecting data for seven DESI indicators, all in the connectivity dimension. RAK also collects data for indicator 1a1, but the data used for calculating DESI are those collected by BHAS and reported to Eurostat. There is no overlap between RAK and BHAS because the DESI methodology clearly defines which data are used to calculate DESI for each indicator. RAK publishes annual reports on the development of the electronic communications market.

Regarding the Connectivity dimension, RAK has achieved a high level of alignment with the data collection process and methodological alignment for three DESI indicators. Currently, RAK is unable to collect data for these indicators due to limited resources, capacity, and methodological challenges (Regional Cooperation Council, 2021)..

According to the Policy for the Development of the Information Society of Bosnia and Herzegovina 2017-2021, the Ministry of Communications and Transport is authorized to coordinate and monitor the development of the information society and to collect data for four DESI indicators. Unfortunately, Bosnia and Herzegovina was not included in the eGovernment Benchmark Report 2020 and the Open Data Maturity Report 2020 (Regional Cooperation Council, 2021). Since the Ministry of Communications and Transport in the Council of Ministers of Bosnia and Herzegovina is obliged to monitor the development of the information society, it expresses readiness to participate in both studies at the European or regional level.

Regarding the availability of statistical data on digital performance and digital competitiveness in the context of DESI, Bosnia and Herzegovina is moderately prepared, with data available for 73% of DESI indicators aligned with the DESI methodology. However, data for 27% of indicators are still not available (Regional Cooperation Council, 2021).

Connectivity

Data collection and monitoring the development of Connectivity dimension is the responsibility of BHAS (one indicator) and RAK (seven indicators). Full alignment with DESI Methodology is achieved for four

of eight indicators. Data for three of these indicators (1a2, 1c1, and 1c2) are collected by RAK and are fully aligned with DESI define tions and methodology. Data for 1a1 indicator is collected by BHAS and is already published in the Eurostat database. Data for 5G readiness indicator (1c3) is not avail - able as the process for review and adoption of new regulations for 2020-2022 has not been finished yet. The inclusion of three spectrum bands will set a base for the calculation of 5G readiness indicator.

Data for four indicators (1b1, 1b2, 1c3 and 1d1) are not available as neither Bosnia and Herzegovina is included in the Commission ad hoc studies nor RAK collects data for these indicators. As all of them derive from the Commission ad hoc studies, RAK expressed readiness to participate in these studies (on a European or regional level). Currently, RAK is not in a position to collect data for these indicators due to its limited resources, capacities and methodological difficulties.

Digital Skills

Data collection for Human Capital dimension is the responsibility of BHAS (six indicators). Full alignment with DESI Methodology is achieved for five of six indicators. Data for three indica - tors (2a1, 2a2 and 2a3) derive from the ICT us - age in households and by individuals survey and are available on Eurostat for the last reported year (2019).

Data for two indicators (2b1 and 2b2) are also available but are not collected through the LFS. To fill the gap, BHAS collects data for these indicators through the ICT usage in the household survey using the International Standard Classification of Occupations (ISCO) classification (ISCO-08) on which occupations will be treated as ICT specialists.

Data for the ICT Graduates indicator (2b3) is not available neither in the BHAS database nor the Eurostat. As administrative data, it is available only at the entity level. The data could be available at the BHAS request to the entity statistical institutions, which will take further action to collect data from administrative sources.

Internet Use

Data collection for the dimension of Internet use is the responsibility of BHAS (for eleven indicators). Domestic methodology and questionnaire are aligned with Eurostat's methodological manual and guidelines for surveys on the use of ICT in households and by individuals, and are adjusted annually.

Full compliance with the DESI methodology has been achieved for all eleven indicators. Data for all indicators for the last reported year (2020) have been transmitted and are available in Eurostat's database.

Digital Public Services

Data collection and monitoring of the development of the dimension of Digital Public Services is the responsibility of BHAS (for one indicator) and MKT (for four indicators). Full compliance with the DESI methodology has been achieved for one out of five indicators.

Data for one indicator (5a1), for the last reported year (2020), are collected by BHAS and stem from surveys on the use of ICT in households and by individuals. Data for this indicator for the last year (2020) have been transmitted and are available in Eurostat's database.

Data for the other four indicators (5a2, 5a3, 5a4, and 5a5) are not available because Bosnia and Herzegovina was not included in the latest eGovernment Benchmark Report 2020 and Open Data Maturity Report 2020. Since MKT is authorized to monitor four DESI indicators in the dimension of Digital Public Services, MKT has expressed readiness to participate in the study at the European or regional level. Currently, due to limited capacity, MKT is unable to collect data for these indicators.

4. Results of the Research

Legislative Framework of Bosnia and Herzegovina

Bosnia and Herzegovina (BiH) has a very complex governance system, consisting of two entities (Republika Srpska - RS and the Federation of Bosnia and Herzegovina - FBiH), ten cantons within the FBiH, and one autonomous district (Brcko District), each with its own laws and jurisdictions. This complexity can sometimes lead to situations where different laws exist for the same issue at different levels of authority. For example, in the case of electronic signatures and electronic documents, there are laws enacted at the state level, entity level, and Brcko District level. This complexity can be challenging for citizens and entrepreneurs who need to know which law applies in their case. It can also hinder the process of enacting and implementing new laws.

By adopting the Policy for the Development of the Information Society of Bosnia and Herzegovina for the period 2017–2021 (2017), BiH clearly defined its strategic commitment to the development of the information society and the improvement of information security within its territory. Despite its highly complex structure, BiH has enacted a number of laws and strategic documents aimed at promoting and improving e-business. However, the implementation of these documents and laws is proceeding very slowly, significantly limiting the digitalization and e-business of small and medium-sized enterprises. The reason for this is the complexity of BiH's legal system, characterized by unclear jurisdictions between different levels of government. This leads to the enactment of different laws for the same area at different levels of government, making it difficult for citizens and businesses to know which law applies in their case.

Regarding jurisdictions, the Ministry of Communications of BiH is responsible for enacting legislation in the field of digitalization. Although this ministry is responsible for enacting laws in the field of digitalization, the application of enacted laws is often limited or not possible due to the complexity of BiH's governance system, as exemplified by the Law on Electronic Signature in BiH and the Law on Electronic Document in BiH.

The following laws have been enacted at various levels of government in recent years, pertaining to the degree of digital transformation in BiH:

- Law on Electronic Signature in BiH ("Official Gazette of BiH" No. 91/06);
- Law on Electronic Legal and Business Transactions in BiH ("Official Gazette of BiH" No. 88/07);
- Law on Electronic Document in BiH ("Official Gazette of BiH" No. 58/14);
- Law on Electronic Business of Republika Srpska ("Official Gazette of Republika Srpska" No. 59/09);
- Law on Electronic Document, Electronic Identification, and Trust Services in Electronic Business in Republika Srpska ("Official Gazette of Republika Srpska" No. 94/2017);
- Law on Critical Infrastructure ("Official Gazette of Republika Srpska" No. 87/2018);
- Law on Information Security ("Official Gazette of Republika Srpska" No. 70/2011);
- Law on Tax Procedure ("Official Gazette of Republika Srpska" No. 78/2020);
- Law on Electronic Document of FBiH ("Official Gazette of FBiH" No. 55/2013);
- Law on Electronic Signature of FBiH (draft adopted in the House of Peoples of FBiH on 27.02.2020).

Subsidiary regulations governing the above are as follows:

At the BiH level:

- Regulation on the Payment of Indirect Taxes and Other Revenues and Fees Collected by the Indirect Taxation Authority of BiH ("Official Gazette of BiH" No. 21/20 of April 30, 2020);
- Decision on Determining the Price of Services for Issuing and Using Qualified Electronic Certificates ("Official Gazette of BiH" No. 78/20 of December 4, 2020).

At the level of the Federation of Bosnia and Herzegovina:

- Regulation on the Procedure for Submitting Tax Returns ("Official Gazette of FBiH" No. 66/02, 54/03, 74/04, 38/09, 7/11, 53/12, and 87/20);
- Regulation on the Application of the Law on Corporate Income Tax ("Official Gazette of FBiH" No. 88/16, 11/17, 96/17, 94/19, and 87/20);
- Regulation on the Submission of Applications for Registration and Changes in Registration in the Unified System of Registration, Control, and Collection of Contributions ("Official Gazette of FBiH" No. 73/09, 38/10, 77/10, 9/11, 1/13, 83/14, 1/15, 48/16, 25/17, 53/19, and 93/19).

At the level of Republika Srpska:

- Regulation on the Procedure for Registration and Identification of Taxpayers ("Official Gazette of Republika Srpska" No. 94/2017).

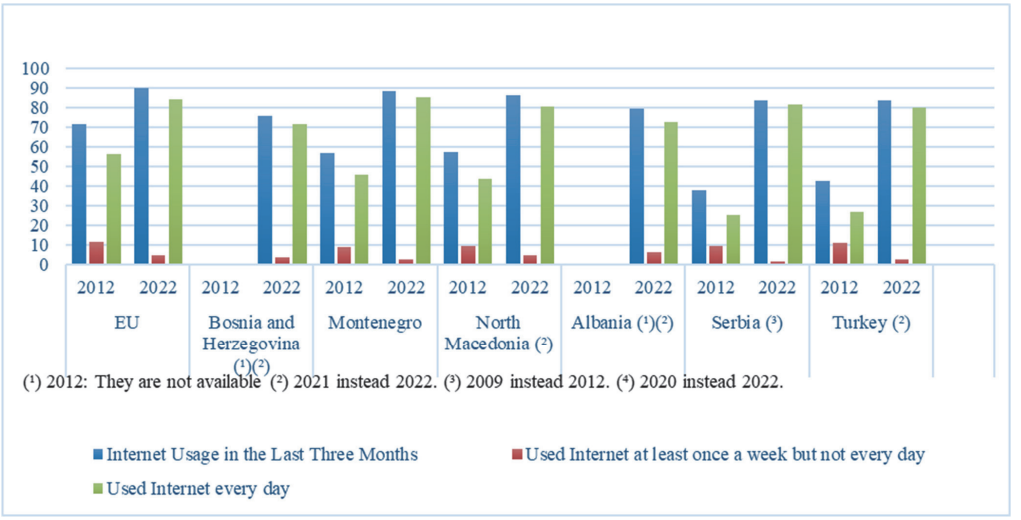
Strategic documents at the level of Bosnia and Herzegovina include:

- Policy for the Development of the Information Society of BiH for the period 2017–2021 ("Official Gazette of BiH" No. 42/17);
- Policies for Information Security Management in BiH Institutions for the period 2017–2022 ("Official Gazette of BiH" No. 38/17);
- eSEE Agenda + (Directorate for Economic Planning, Council of Ministers of BiH, 2015);
- Strategic Framework for BiH (Directorate for Economic Planning, Council of Ministers of BiH, 2015).

Results of the Level of Digitalization of Western Balkan Countries with a Special Focus on Bosnia and Herzegovina

Graph 1

Frequency of Internet Usage, 2012 and 2022 (% of individuals aged 16 to 74)



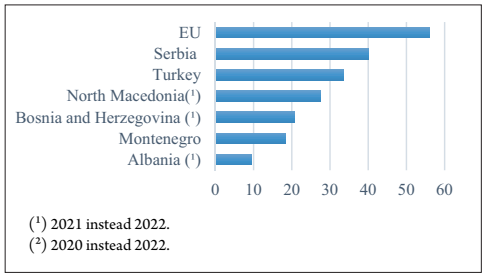
Notes. Eurostat (online data codes: isoc_ci_ifp_iu and isoc_ci_ifp_fu).

As shown in Graph 1, the frequency of internet usage among individuals aged 16 to 74 has significantly increased between 2012 and 2022. The results shown in the graph indicate that Bosnia and Herzegovina has made significant progress in the area of internet usage over the past ten years. However, there is still room for improvement, as the share of individuals using the internet is lower than the European average. In the context of Bosnia and Herzegovina, there are several key factors that have contributed to the increase in the proportion of individuals using the internet across all age groups. One of the most important factors is the development of information and communication technologies (ICT) in the country. Over the past decade, there has been a significant improvement in internet availability in Bosnia and Herzegovina, both in urban and rural areas. Additionally, the costs of internet access have decreased. Another important factor contributing to the increase in internet usage is the raising of awareness about the benefits of internet usage.

Over the past ten years, more and more people in Bosnia and Herzegovina have become aware of the benefits that the internet can offer, such as access to information, communication, education, and employment. Although Bosnia and Herzegovina has made significant progress in internet usage across all age groups, there is still room for improvement. One of the priorities in this area should be improving internet availability in rural areas. Additionally, efforts should continue to raise awareness about the benefits of internet usage, especially among the age group of 65 and older. The following graph shows the percentage of individuals purchasing goods and services online in the last three months prior to this survey, in six countries in the Western Balkans region in 2022.

Graph 2

Individuals purchasing goods and services online, 2022 (% of individuals aged 16-74)



Notes. Eurostat (online data code: isoc_ec_ib20).

As shown in Graph 2, the percentage of individuals aged 16 to 74 purchasing goods and services online in 2022 is significant. The main trends identified in the graph are as follows:

The highest percentage of individuals purchasing goods and services online in the Western Balkans is in Serbia, at 40%.

The lowest percentage of individuals purchasing goods and services online in the Western Balkans is in Albania, below 10%.

In Bosnia and Herzegovina, 20.7% of surveyed individuals bought goods and services online, significantly lower than the EU average of 56.1%.

The results depicted in the graph indicate that e-commerce is evolving in all countries in the Western Balkans region. However, there is still room for improvement, as the share of individuals purchasing goods and services online in Bosnia and Herzegovina is lower than the European average.

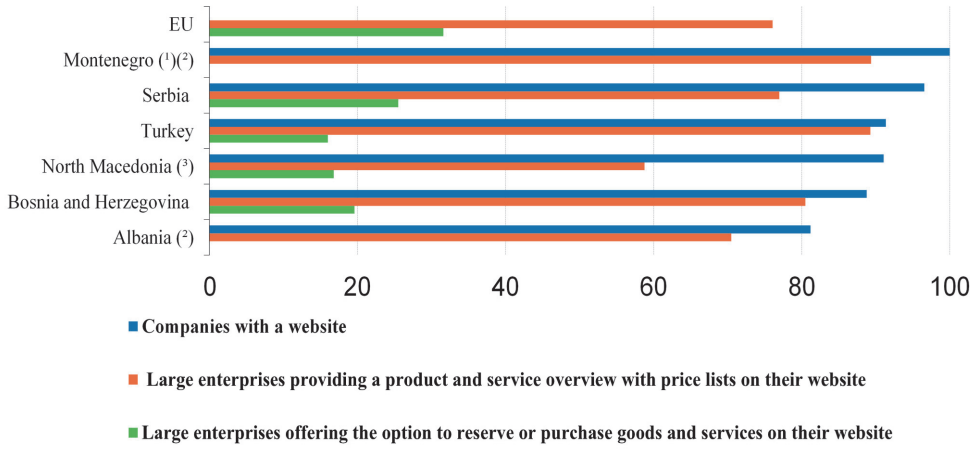
An important factor that could contribute to increasing the share of individuals purchasing goods and services online is raising awareness about the benefits of e-commerce. Over the past decade, more and more people in Bosnia and Herzegovina have become aware of the advantages that e-commerce can offer, such as access to a wider range of products and services, competitive prices, and the convenience of shopping from the comfort of their homes.

Although Bosnia and Herzegovina has the potential for e-commerce growth, certain measures need to be taken to harness this potential. One priority in this area should be improving internet accessibility in rural areas. Additionally, efforts to raise awareness about the benefits of e-commerce need to continue.

The following graph depicts the percentage of businesses with a functional website in six countries in the Western Balkans region in 2021.

Graph 3

Businesses with a functional website in 2021 (%)



(1) Large enterprises where the website provided description of goods or services, price lists: 2019 instead 2021.
(2) Large companies that offer the possibility of booking or purchasing goods and services on the website are not available
(3) Large companies that provide the possibility to reserve or purchase goods and services on their website: 2020 instead of 2021.

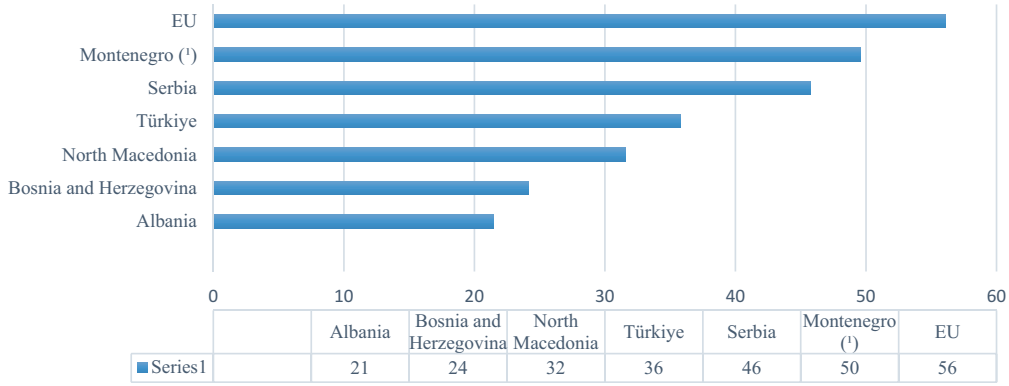
Notes. Eurostat (online data code: isoc_ciweb).

As shown in Graph 3, the percentage of businesses with a functional website in 2021 is noteworthy. All Western Balkan countries lag behind the EU in the percentage of companies that have the option of booking or purchasing goods and services on their website. One of the reasons that follows from the previous ones is the unregulated legal framework.

The following graph shows the percentage of individuals with basic or average digital skills in six Western Balkan countries in 2019.

Graph 4

Individuals with basic or average digital skills, 2019 (%)



		Albania	Bosnia and Herzegovina	North Macedonia	Türkiye	Serbia	Montenegro (1)	EU
Series1		21	24	32	36	46	50	56

Notes. Eurostat (online data code: isoc_sk_dskl_i).

As shown in Graph 4, the percentage of individuals with basic or average digital skills in 2019 is significant. In all countries in the Western Balkans region, the percentage of individuals with basic or average digital skills exceeds 20%. The highest percentage of individuals with basic or average digital skills is recorded in Montenegro, while the lowest is in Albania.

Currently, Serbia is the best-prepared economy in the Western Balkans that can provide data for all 37 DESI indicators, followed by Montenegro and North Macedonia (34 indicators), Albania (32 indicators), and BiH (27 indicators). In the context of DESI, the alignment of available data with DESI and other methodologies is also crucial. Serbia is also a leader among Western Balkan economies capable of providing methodologically aligned data for 36 out of 37 DESI indicators, followed by North Macedonia (32 indicators), Montenegro (28 indicators), Albania, and BiH (27 indicators).

However, the analysis has shown that data is still missing for five out of six Western Balkan economies, while all six economies need to make additional methodological adjustments. Montenegro, with a score of 35.1, has the highest DESI index, followed by Serbia with 34.9 points, Albania with 32 points, followed by North Macedonia with 27.4 points, Kosovo* with 26.1 points, and BiH with 23.2 points.

5. Discussion

It can be concluded that the state of digitalization - or digital transformation in Bosnia and Herzegovina (BiH) is such that it lags behind both EU countries and countries in the region. Although digital technologies are transforming the global economy, BiH has not yet experienced all the developmental benefits of digital technologies, such as inclusive and sustainable growth, improved governance, and rapid delivery of services. BiH is at risk of slow or poor adoption of these innovations, which can have adverse consequences for the economy, government, non-governmental sectors, and individuals, or the country as a whole. A faster and better response from regulators and all levels of government and entities is expected to stimulate, rather than slow down - or even halt - technological progress. The legislature needs to make additional efforts and work to improve regulations related to the use of digital signatures, the use of cloud services, data protection, access to data registries, and the like, all with the aim of aligning the regulatory framework with global trends.

The transformation of customer experience regarding products and services of an organization indicates that digital technologies are changing the way companies create value for their customers. In the digital era, customers are networked and interact with each other, thus changing their relationship with a particular business, as well as with each other. Customers today are constantly connecting with each other and influencing each other, shaping the reputation of different businesses and brands. Their use of digital tools changes how they discover, evaluate, purchase,

and use products, as well as how they share, interact, and stay connected with brands. With increasing access to online information, along with numerous choices and channels available to them, customers have become more powerful and their expectations higher. These studies suggest that government institutions influence digital transformation by reshaping policies and regulations, promoting inclusivity and reliability, and improving the quality of governance and public services, considering various organizational, legal, and social factors.

BiH and Serbia have a similar legislative framework for digital transformation. Both countries have laws and regulations that support electronic communications, e-commerce, electronic signatures, and data protection. However, there are some key differences between the legal frameworks of the two countries. BiH has a fragmented legislative framework, with different laws and regulations applying at the state, entity, and district levels. This can make it difficult for businesses and individuals to use digital technologies across borders. Serbia, on the other hand, has a more centralized legislative framework, making it easier for businesses and individuals to use digital technologies throughout the country.

Despite differences in legislative frameworks, BiH and Serbia have similar levels of digitalization, according to the DESI index. This suggests that the legislative framework is not the sole factor determining the level of digitalization in a country. Other factors, such as the availability of infrastructure, the level of education and skills, and the cultural acceptance of digital technologies, also play an important role.

BiH is a candidate for EU membership, as are other Western Balkan countries. As a candidate country, it is constantly under monitoring by the European Commission, which has also noticed that BiH is in the early stages of preparation in the field of the information society and audiovisual media (Chapter 10), recommending the adoption of laws on electronic communications and electronic media in line with the EU acquis (Regional Cooperation Council, 2021); completing the second phase of digital transition and adopting a strategic framework for access to broadband internet network; and adopting laws on electronic identity and trust services for electronic transactions with a single supervisory authority for the entire economy in line with the EU acquis (Regional Cooperation Council, 2021).

In order to simplify the legal system and promote e-business, it is necessary to consolidate all regulations in BiH into a single database, regardless of the level of government. This database should be available online so that citizens and businesses can easily find relevant regulations.

Globally, information and communication technologies (ICTs) have become a strategic tool and enable innovations in the public sector, companies, and productivity growth. Digital technologies enable governments to operate efficiently and effectively, providing user-oriented services and public value, but also fundamentally transforming the way the public sector operates. Digital transformation brings both socio-economic opportunities and challenges.

BiH has the potential for further improvement in its DESI index score. This can be achieved through further development of digital skills of the population, investment in digital infrastructure, and improvement of digital public administration. If BiH takes these measures, it can significantly improve its DESI index score and move closer to the European average.

6. Conclusion and Implications

Digitalization, as a modern phenomenon, impacts all segments of society, bringing various opportunities as well as challenges. The aim of this study was to determine the role of state and entity institutions in the digital transformation of companies. In this paper, the degree of development of the legislative framework on digitalization in Bosnia and Herzegovina (BiH) and its alignment with EU regulations were analyzed. After a detailed analysis of the legislative frameworks at all levels of government in BiH and comparison with countries in the Western Balkans and the EU, the hypothesis was confirmed that BiH lacks a sufficiently developed legislative framework that addresses digital transformation at the systemic level and within companies. State and entity institutions influence digital transformation by reshaping policies and regulations, promoting inclusivity and reliability, and improving the quality of governance and public services, taking into account various organizational, legal, and social factors. The analysis of current laws and regulations in BiH identified certain deficiencies in the regulatory framework that hinder the digital transformation of BiH. The current Law on Electronic Signature in BiH is aligned with Di-

rective 1999/93/EC, but it needs to be harmonized with Regulation 910/2014 of the European Parliament and Council. Since the EU recognizes only supervisory authorities at the state level, regulations need to be harmonized at lower levels of government as well; otherwise, an electronic signature issued based on entity laws would not be usable beyond the borders of BiH.

6.1. Theoretical Implications

Research on the impact of institutions on digital transformation in developing countries, with a special focus on Bosnia and Herzegovina, has led to new theoretical insights. Effective legal and institutional frameworks regulate and protect against misuse during electronic transactions, increase citizens' trust in the use of digital technologies, as well as the protection of their data, privacy, and security. Quality legal frameworks also contribute to faster development and e-governance by providing the legal basis and implementation processes for digital transformation. Transition countries, including those in the Western Balkans, need to strengthen their level of digital transformation to enhance competitiveness at both national and regional levels.

6.2. Implications for Policies and Managers

Research has shown that digital transformation can improve the efficiency, transparency, and accountability of governments, as well as stimulate innovation and economic growth. However, it can also affect social inequalities, workforce displacement, and security risks. Bosnia and Herzegovina, in particular, need to work on improving the efficiency and transparency of regulatory and legislative bodies to enhance digital transformation. Specific measures that Bosnia and Herzegovina could take to improve its performance on the DESI index include increased investment in digital skills education, improvement of digital infrastructure to provide faster and more accessible internet access to the population and economy, and the development of digital public administration to facilitate the use of public services by citizens and businesses. The results of the research imply that governments in transition economies, including institutions in Bosnia and Herzegovina, need to continue promoting support for digital transformation at both systemic and company levels through tax and customs incentives for companies that digitize, as well as through the promotion and support of digital transformation for companies transitioning from linear to circular economy models.

A higher level of digital transformation in companies improves customer experience and engagement, streamlines operations, innovates components or entire business models, increases efficiency and cost-effectiveness, and generates new business opportunities. While a strong connection between the level of digital transformation and company profitability has not yet been established, there is a strong correlation between the level of digital transformation and the value of those companies, as seen in the case of the world's most valuable companies.

6.3. Limitations of the Study and Recommendations for Future Research

Digital transformation is a relatively new research topic, and there is still much we do not know about this process. Theoretical frameworks for understanding digital transformation are still evolving. Research on digital transformation is very specific due to its multidisciplinary nature. It usually involves various interactions between technology, society, economy, and legal frameworks. Understanding these interrelationships can be challenging and may require deeper analysis. Data availability is always a challenge for all researchers in Bosnia and Herzegovina, and in this case, data related to digital transformation are mostly unavailable and incomplete. The study has identified shortcomings in the existing legal framework that, among other factors analyzed, hinder further development of digital transformation. This primarily refers to the harmonization of regulations with new EU directives. Measuring the degree of digital transformation can be a very complex and time-consuming process, making it difficult to measure as a variable. As we have mentioned, digital transformation is a new concept and poorly researched in the Western Balkans. Accordingly, recommendations for further research suggest that researchers should explore the impact of digital transformation on specific industries such as agriculture, the financial sector, healthcare, education, etc. It is recommended to apply the Community Innovation Survey questionnaire, in which a relatively large number of companies of all sizes would participate, providing insights into the possibilities and limitations of implementing digitalization and its impact on, for example, the innovation of companies, as well as the comparability of data with identical surveys in Europe.

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Biography

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Улога институција у дигиталној трансформацији компанија у транзиционим земљама

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Кључне ријечи:
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САЖЕТАК

Дигитална трансформација представља кључни фактор за конкурентност компанија како на локалном и регионалном, тако и на глобалном нивоу. Циљ овог рада је да процијени адекватност законодавног оквира у Босни и Херцеговини (БиХ) и да упореди ниво дигитализације у БиХ са другим земљама у региону. У мјерењу нивоа дигитализације, аутор користи DESI индекс, који процјењује четири кључне области: повезаност, људски капитал, интеграцију дигиталних технологија у пословном сектору и дигиталне јавне услуге. Аутор пружа преглед литературе о утицају институција на дигиталну трансформацију у транзиционим земљама, као и критички преглед актуелних и будућих трендова на ову тему. БиХ има застарио и неразвијен законодавни оквир у вези са имплементацијом дигитализације на системском и на нивоу компанија, који није усклађен са савременим трендовима. Као посљедица тога, БиХ се сврстава међу земље са најнижим степеном дигиталне трансформације у Европи у поређењу са другим земљама западног Балкана. Иако законодавни оквир није једини узрок ниског нивоа дигиталне трансформације у БиХ, он представља један од значајних фактора. Овај рад такође пружа препоруке доносиоцима одлука и менаџерима о могућностима и значају дигиталне трансформације за компаније, чиме даје одређене доприносе овој области.

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The Impact of Macroeconomic and Environmental Factors on Household Debts in G7 Countries

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ABSTRACT
This article aims to study the influence of macroeconomic and ecological factors on household debts. The quantitative method of OLS multiple Regression is applied to the data used for this research from the period 2003 to 2021. To establish the macroeconomic factor, the metrics are the real house price index with the base year 2015, unemployment as % of the labour force, and short-term interest rate per annum. Research shows that house price and unemployment have a noteworthy relationship with the dependent variable, while trade in goods significantly adversely affects household debt. In respect to the climate change factors, results reveal that annual surface temperature and annual emissions of CO2 have a favourable and notable impact on household debt. The only insignificant effect on household debts had been shown by the short interest rate. The beneficiaries of this research can include policymakers, economists, and financial institutions who are interested in understanding the factors that affect household debts. The significant relationship between household debt and factors such as house prices, unemployment, export trade, climate change factors, etc. reflect underlying economic disparities in these countries. The results of this research could benefit policymakers and economist in farther understanding the environmental factors that influence household debts.

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1. Introduction

Macroeconomic and environmental factors in G7 countries affect investment and saving of the economy. The premise of this research is that household debts effect financial soundness of the nation and automatically that has negative impact on the economic growth. If we want to study more about progress and the growth of the economy, it is very important to understand the nature of these variables. Lower investment and consumption are the results of rising interest rates (Blanchard, 2023). Household debt in many countries harms fiscal stability. Some economists believe that financial debt was one of the main triggers of the fiscal meltdown in Cyprus, the United States, and Greece Mian and Sufi (2014). Private household debt become a debate in the last two decades. According to Koo (2011), Japan experienced a balance sheet recession in the 1990s, whilst the world economy experienced a recession as a result of a drop in interest charges, and the non-government sector was attempting to shrink debt. A rise in the number of households causes the economy to enter a recession. Household debts are controlled by the central bank and international organizations for monitoring household debts. Fernandes and Mota (2011) examined financial markets in European countries. They concluded that these countries have been affected by the increase in sovereign debt.

Few post-Keynesian economists studied the macroeconomic effect of household debt while using the formal model. In his research, Palley (1994) worked on buyer debt as a linear multiplier-accelerator model where he investigated the cyclic facets of consumer credit during the economic cycle. The objective of the research is to understand relationship between household debt, Export Trade of Goods and Climate change dynamics. This study shows that an increase in consumer obligation causes an increase in consumption level and stimulates development. The negative side of this is it would result in a dramatic increase in the level of debt. Automatically, we can conclude that there would be an allocation of income from debtors to rentiers. Household debt will decrease the consumption level of the economy, creating a credit-driven output process. Similar research has been done by Dutt (2006) who incorporated household debt with neo-Kaleckian growth. Results show that an increase in household debts will affect the increase in growth rate but as a temporary effect only. The long-term effect of a rise in household debt will impact the shift of income distribution to the rentiers and push them to save more for the future. The main objective of this paper is finding the way of influence of macroeconomic and ecological factors on household debts. We use the quantitative method of OLS multiple Regression from the period 2003 to 2021. After all findings shows that house price and unemployment have a noteworthy relationship with the dependent variable, while trade in goods significantly adversely affects household debt. In respect to the climate change factors, results reveal that annual surface temperature and annual emissions of CO2 have a favourable and notable impact on household debt. At the end, insignificant effect on household debts had been shown by the short interest rate.

The incorporating environmental factors such as mean surface temperature and CO2 levels, this research expands the traditional macroeconomic models of household debt which contributes to theoretical knowledge. The findings of this research can inform policymakers about the macroeconomic and environmental factors that impact household debt, which can guide them in formulating policies aimed at addressing the issue of household debt

The paper is systematized as follows: the next section provides the literature review. Section 3 describes the research methodology. Section 4 provides an interpretation of the data. Finally, Section 5 concludes the research.

2. Literature Review

G7 countries are the most advanced economies in the world, and they can be used as a benchmark for other economies. Household debt has an essential element in evaluating financial security and controlling market risk. A significant decrease in accommodation/ markets can lead to the deterioration of household balance sheets, and the lending of money from the banks. There is a lot of research that is done on the housing market. The study of Alter et al. (2018) examined that home loan debt divides lower socioeconomic households – as a measure of unequal approach to financial markets which impacts household debt and growth.

Interest rate plays an important role in private borrowing. The decrease in the interest rate will support

households in taking care of their mortgage and funding current consumption. Regional house price shocks play a significant role in determining home equity and the effectiveness of the refinancing channel of monetary policy, due to the localized nature of housing markets Baro (1972).

Mian and Sufi (2016) have studied household debt and housing prices and found that a fall in consumption occurs after a decline in housing prices that is concurrent with a decrease in household incomes. The capacity of households to withstand shocks like rising interest rates and income declines, which have the effect of reducing private consumption, is impacted by high household debt. In order to influence household wealth, it is crucial to pinpoint the primary factors influencing housing prices.

Agnello and Schuknecht (2011) demonstrate how several macroeconomic and structural elements are related to housing price valuation. Real interest rates and supply factors have the strongest correlations with housing prices. Many variables, including housing demand, financing availability, and balance sheet effects, have a significant impact on home prices. A study by Atalay et al. (2020) found that house price shocks asymmetric impact household indebtedness, with households responding to increases in housing wealth by significantly increasing their debt. Dumitrescu et al. (2022) investigates the macroeconomic determinants of household debt in developed economies using a sample of 26 OECD countries from 2002 to 2020. The results show that economic growth, inflation, house prices, investments, mortgage credit interest rates, unemployment rate, and public expenditures all have significant impacts on household debt. However, the strength and direction of these relationships vary depending on the level of household debt. Mian et al. (2017) research states that an increase in household debt to GDP ratio predicts lower GDP growth and higher unemployment.

The Low mortgage spreads are associated with an increase in household debt to GDP ratio and a decline in subsequent GDP growth. Economic forecasters overpredict GDP growth at the end of household debt booms, and the negative relation between household debt to GDP and subsequent output growth is stronger for countries with less flexible exchange rate regimes. It examines household debt levels amplifying effects of economic downturns and contributes to the asymmetry in the impact of business cycles on different segments of the population.

Furthermore, Jordà et al. (2014) indicate that household debt to asset ratios have risen significantly in many countries. Real estate lending booms have been increasingly associated with financial stability risks and are often followed by deeper recessions and slower recoveries. Thus, housing finance has become a crucial factor in the modern macroeconomy. The paper suggests that the rise in mortgage lending and household debt may have contributed to disparities in access to credit and homeownership among different groups or regions.

Peek and Wilcox (1991) study demonstrates that one of the major factors influencing home values is the unemployment rate. Their findings demonstrate that the decline in interest rates and low unemployment rates in 1980 were responsible for the recovery in home values. In his research Pinter (2018) demonstrates that between 1985 and 2013, there was an 80% association between actual house price components and separation rates in the UK. According to his research, unexpected changes in housing prices can predict changes in output by 10–20 percent, unemployment rates by 20–30 percent, and employment severance rates by 10–30 percent.

A similar study has been done by Geerolf and Grjebine (2014). They investigated the 40-year causal link between shifts in home prices and employment trends in 34 different countries. Employing real estate taxes as a gauge of home prices, their findings show a strong correlation between changes in unemployment and home prices. Based on these results, the unemployment rate decreases by 3.4% for every 10% increase in home costs. Research shows how non-residential investment and consumption are impacted by overall employment. Housing growth has a considerable effect on the employment situation in the tradable industry. These all support an increase in the real exchange rate, which is advantageous to the industrial sector.

The research in the area of the Fiscal Theory of Price Level (FTPL) supports the premise that monetary policy determines the price level and that fiscal policy mainly serves to maintain debt sustainability. Those

who carry out this kind of study include Leeper, (1991). The FTPL model's impact on high inflation can be discussed primarily in terms of central bank policy and budget policies. In the event that government spending policy does make it possible to sustain debt levels with adequate primary surpluses, central bank policy will focus on boosting inflation in order to reduce the public debt, which will lower inflation.

Reinhart and Sbrancia (2011) have done research on the debt of developed economies in the period from 1945 to 2014. Their research shows that inflation contributes to a significant decrease in debt, especially in the period till the 1970s. The fiscal positions of the country affect long-term interest rates in many situations. Gruber and Kamin (2012) One of these ways is through default risk premium, in which the appearance of private debt seeks an increase in interest rates from the other side investors could opt for a hold of government debt only if they receive a significant interest on this debt. Finally, inflationary expectations are a significant factor as debt monetization leads to a growth in an interest rate proportionally to an escalation in the expected inflation. A high increase in the debt will crowd out private investment which will affect interests' rate and the higher marginal product of capital.

Kandikuppa-Gray (2022) examines the impact of abnormal weather on household debt across rural India. The study looks at the broader impact of weather anomalies, years 5, abnormal weather effects on several dimensions of household debt Abnormal temperatures are associated with higher household debt. The study also shows that climate change interacts with existing socioeconomic disparities such as race and land ownership, exacerbating the size and depth of debt in rural households In terms of income inequality, the paper argues that climate change could exacerbate existing inequality by disproportionately affecting vulnerable households and businesses. For example, households in arid and semi-arid regions may be more vulnerable to climate change impacts and may have fewer loans to cope with these impacts.

Sengupta (2021) discusses the challenges confronted via international locations struggling to manage both dazzling debt and mounting climate screw ups. The article highlights the growing reputation that debt obligations can stand inside the manner of assembly the immediate desires of human beings and the investments required to shield them from climate failures. In phrases of financial asymmetries, the object suggests that nations facing each high levels of debt and sizable weather dangers may conflict to satisfy the desires in their populations and spend money on measures to defend them from weather failures. This can exacerbate current disparities in get right of entry to resources, income, and opportunities amongst exceptional groups or areas. The vulnerable populations can be disproportionately affected by climate disasters and might have confined get admission to resources and guide to address those impacts.

With intensive literature review to our knowledge, we find that the literature is devoid of research on the relationship between household debt, Export Trade of Goods and Climate change dynamics.

3. Methodology

This study analysed how household debts are affected by macroeconomic and environmental factors. The parameters are taken from G7 countries as they contribute to approx. USD 42 trillion to the world Gross Domestic Product (GDP) of USD 92 trillion in 2022 (World bank, 2022) indicating that these countries have a combined GDP that represents a significant portion of the world's total GDP. These developed economies are considered stable and combined have a large impact on the world economy.

Initially, we provide descriptive analysis for the G7 Countries to understand the overall data structure. To understand the association of Household debts with macroeconomic factors and environmental factors we employ the quantitative method of OLS multiple Regression.

The information was gathered from numerous secondary sources between the years of 2003 and 2021. For establishing the macroeconomic factor, we have used the real house price index with the base year 2015, unemployment as % of the labour force, and short-term interest rate% per annum. For measuring environmental factors annual surface Temperature change and annual carbon emission were considered for the model under study.

Table1

The summary of research variables is as follows

	Parameters	Measures	Source
Dependent Variable			
	Household debt	Household debt, all instruments	IMF
Independent Variables			
Macroeconomic	Real house prices	Real house prices, Base year 2015=100	OECD
	Unemployment rate Total	Total Unemployment rate % of the labor force,	OECD
	Short-term interest rates,	rates of interest for short-term debt percent p.a.	OECD
	Trade in goods	Trade in goods- Exports, Percentage change, previous period	OECD
Climate Change	Annual Surface Temperature Change	Temperature change concerning a baseline climatology, corresponding to the period 1951-1980	IMF
	Annual Carbon dioxide (CO_2) emissions	CO_2 emissions from fossil fuels and industry excluding Land use change.	Our world of data

Notes. Author's calculation.

In Table 1, Household debt ( ) - The total stock of household debt liabilities, including all debt instruments, is considered to compute the household debt, all instruments' percentage of GDP. Real house prices (V2_House Price) - reached with Base Year 2015=100, and the index is determined by the OECD National Accounts Database's comparison of the nominal housing price index to the consumers' spending deflator in an individual country. These indices are adjusted for seasonality. Unemployment rate (V3_UNE)- Rate of unemployment % of the workforce overall. Those of working age who lack a job but are eager to work and have made a conscious attempt to find one are regarded as unemployed. This indicator calculates the percentage of the workforce that is unemployed and is seasonally adjusted. The labour force is made up of both people who are employed and those who are unemployed.

Short-term interest (V4_STR) - the market charges at which short-term sovereign debt is issued, or the charges at which short-term loans are taken between financial organizations.

Trade in goods (V5_Trade) - exchange of goods Exports, percentage change from the prior timeframe. The trade in goods (export), which is indicated in USD million, includes all goods that add to or deplete a nation's stock of material resources by crossing its borders (imports) or leaving it (exports). The term "commodity" refers to produced, tangible items over which legal claims to ownership may be made and whose title may be transferred through transactions from one institutional entity to another. The exclusions are a) goods for internal or external processing, b) goods being transported across a country, temporarily admitted, or temporarily withdrawn.

Annual Surface Temperature Change (V6_Temp) - Yearly estimations of average surface temperature change assessed in relation to a baseline climatology, pertaining to the years 1951–1980. Over the years 1961 through 2021, estimates of changes in the global mean surface temperature are given, expressed in degrees Celsius. The time series temperature change at a site is determined using the weighted average of the GISTEMP data over all stations within a specified radius, with the closest stations weighted most significantly.

Annual carbon dioxide (CO2) emissions (V7_CO2) Emissions from fossil fuels and industry except from land use is measured in tonnes

3.1. Research model

To determine the most appropriate panel regression approach to be used in analysing the relationship be-

tween household debt and various factors in G7 countries, a test was conducted. The three-panel regression models were considered for the Ordinary Least Square (OLS). The Diagnostic test results (detailed below) indicated that the most appropriate model for the analysis was the Fixed Effect Model from the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). As a result, the Fixed Effect Model was employed in the OLS regression analysis to examine the factors affecting household debt in G7 countries.

This model permits individuality or heterogeneity among several cross-sections, allowing each cross-section to have its unique intercept. The intercept may differ for the cross sections, but it is still constant over time, meaning that it does not change over time (Andesite, 2017). In a fixed effect model, the error term is presumptively different for each entity and every year. There are qualities about people that remain constant over time and have a correlation with unrelated variables the following particular FEM equation (Brooks, 2008):

$$y\_it=\alpha+\beta\text{^*}\ x\_(it)+\mu\_(i)+\varepsilon\_(it) \quad (1)$$

Where,

y= represents the dependent variable; α = constant /Intercept for each regressor; β = coefficient representing the common effect in cross-section x= regressor; μ = within-cross section error term and are correlated with the regressors for fixed effect model ε it = remainder disturbance

i= 1,2… …N; N= cross-section count; t = 1, 2,… …T;T= time period count

The following equation describes our panel model with fixed cross-section effect.

V1_Household Debt = C(1)*V2_House Price + C(2)*V3_UNE + C(3)*V4_STI + C(4)*V5_Trade + C(5)*V6_Temp + C(6)*V7_CO2 + C(7) + [CX=F] (2)

Where,

CX=F, fixed cross-section effect

The mathematical model applied for the panel is:

V1_Household Debt= 0.379711163571*V2_House-Price + 3.08664229455*V3_UNE - 0.474028951393*V4_STI-0.109027908238*V5_Trade + 1.71250255122*V6_Temp + 2.10626342123e-08*V7_CO2 - 14.8135770784 + [CX=F] (3)

4. Results

4.1. Descriptive statistics

In Table 2, the variables' Means, Medians, Maximums, and Minimums are used to describe the features of the variables.

Table 2
Summary of Descriptive Statistics

	V1_Household Debt.	V2_House Price	V3_UNE	V4_STR.	V5_TRADE	V6_Temp	V7_CO2.
Mean	74.39914	102.9726	6.769361	1.251374	4.568792	1.205271	1.34E+09
Median	70.09025	100.6761	6.775000	0.693822	7.091085	1.193000	5.73E+08
Maximum	115.5834	145.8611	12.82500	6.002207	32.18758	2.928000	6.14E+09
Minimum	39.72724	57.43922	2.350000	-0.548767	-30.66164	-0.054000	2.80E+08

Notes. Author's calculation.

To sum up, the mean score is highest for V7 CO2 (1.34E+09) and lowest for V6 Temp (0.918). The high mean score for V7_CO2 (1.34E+09) indicates significant CO2 emissions, highlighting environmental concerns. The low mean score for V6_Temp (1.205271) suggests relatively stable temperature changes. This disparity emphasizes the urgent need for addressing high CO2 levels despite stable temperature trends.

Table 3 presents the relationship between the research variables, and an examination of the matrix in-

dicates that none of the independent variables has a value less than 0.7 (Osmanovic& Alvi, 2022), which suggests that there is no evidence of multi-collinearity among the explanatory variables used in the model. Each box in the matrix represents the Coefficient (Coeff.) between two variables, with a value of 1 = perfect + ve correlation, -1 = perfect - ve correlation, and 0 = no association between the variables.

V1_Household Debt (explained variable) has a negative correlation with V2_House Price, V3_UNE, V5_Trade, and V6_Temp, however, has a positive correlation with V4_STR and V7_CO2.V2_House Price has a small negative correlation with V3_UNE, and V4_STI, and has a moderate positive correlation V5_Trade, V6_Temp, and V7_CO2. For, V3_UNE has a negative association with V4_STI, V5_Trade, and V7_CO2 and a positive association with V6_TEMP.It is also observed that V5_Trade has a small adverse relationship with V6_TEMP and an affirmative relationship with V7_CO2. On the other hand, V6_Temp is negatively affiliated with V7_CO2. The matrix indicates that the highest correlation with other variables is -0.181898 (V6_Temp, V7_CO2) and the lowest correlation is -0.008513 (V1_Household Debt, V5_Trade)

Table 3
Pearson Correlation Matrix

	V1_Household Debt.	V2_House Price	V3_UNE	V4_STR.	V5_Trade	V6_Temp	V7_CO2.
V1_Household Debt.	1.000000	-0.061592	-0.119133	0.179003	-0.008513	-0.106812	0.278090
V2_House Price		1.000000	-0.158018	-0.115752	0.033793	0.124044	0.071808
V3_UNE			1.000000	-0.030578	-0.026105	0.087338	-0.201149
V4_STR.				1.000000	0.305053	-0.094119	0.066432
V5_TRADE					1.000000	-0.052068	0.044536
V6_Temp						1.000000	-0.181898
V7_CO2.							1.000000

Notes. Author's calculation.

4.2. Empirical results and discussion

The cross-section fixed effects test equation is used to study the nexus between the measured variable in Table 4, household debt % GDP (V1_Household Debt), and 7 independent variables, including house cost (V2_House Price), unemployment rate (V3_UNE), short-term interest (V4_STR), trade in goods (V5_Trade), annual Surface temperature (V6_Temp), and annual CO2 emissions (V7_CO2). The model uses cross-section fixed effects, meaning that each cross-section (country) has a dummy variable and the model adjusts for differences between the countries. The outcomes of the test in Table 3 demonstrate that V2_House Price and V3_UNE have a positive and significant correlation with the measured variable, with coefficients of 0.379711 and 3.086642, respectively, and p-values of 0.0000. This implies that a 1% upsurge in Real house prices will direct to a 0.3797% growth in household debt % of GDP. Correspondingly, it is seen that a one percent rise in the unemployment rate will result in a 3.086% surge in household debt % of GDP. On the other hand, trade in goods (p-value = 0.0042) has a significant adverse effect on household debt, the coefficient of -0.109028, infers that a 1% growth in trade in goods will cause a 0.1090% decrease in household debt % of GDP. Furthermore, the only macro factor variable which is insignificant is V4_STR (p-value = 0.1476)

Analysing the effect of climate change factors, it is witnessed that Annual surface temperature (p-value = 0.0496) and annual CO2 emissions (p-value = 0.0000) also have a progressive and significant effect on household debt with the 1-degree increase in annual temperature and annual CO2 emissions is associated with a growth of 1.71%, 0.02% in household debt % of GDP respectively.

Table 4

Independent Variables	Coeff.	SE	t-Stats.	Prob.
V2_House Price	0.379711	0.033078	11.47912	0.0000
V3_UNE	3.086642	0.294194	10.49185	0.0000
V4_STR	-0.474029	0.325243	-1.457459	0.1476
V5_Trade	-0.109028	0.037385	-2.916391	0.0042
V6_Temp	1.712503	0.863567	1.983058	0.0496
V7_CO2	2.11E-08	2.97E-09	7.091188	0.0000
C	-14.81358	6.538237	-2.265684	0.0253

Cross-section fixed (dummy variables)

R-squared i	0.937626	Mean independent var	74.39914
Adjusted R-squared i	0.931389	S.D. dependent var i	18.17065
S.E. of regression i	4.75958	Akaike info criterion i	6.050827
Sum squared resid i	2718.432	Schwarz criterion i	6.333342
Log likelihood i	-389.38	Hannan-Quinn criter.	6.165631
F-statistic i	150.3233	iDurbin-Watson stat	0.385745
Prob(F-statistic) i	0.000000		

Notes. Authors' calculation.
Measured Variable: V1_Household Debt Total
panel (balanced) observations

With an R-squared of 0.937626, the explanatory variables can account for 93.76% explanation of in household debt. After accounting for the number of factors included in the study, the adjusted R-squared value of 0.931389 demonstrates that the explanatory variables can account for 93.14% of the variation in household debt. An excellent match between the model and the data is indicated by the high R-squared value. The model is statistically significant, as evidenced by the F-statistic of 150.3233 and p-value = 0.000000. There is no discernible autocorrelation in the residuals, according to the F-statistic, which is significant at $p < 0.05$ and the Durbin-Watson statistic, which is very near to 2.

4.3. Diagnostic tests

We conducted Walt test for for heteroskedasticity which indicat Chi-square(7) = 14.5638, with p-value = 0.042016. Therefore, based on this test, we reject the null hypothesis of homoskedasticity (where errors have constant variance across observations) at the 5% significance level. This suggests that there is evidence to indicate that the errors in the model exhibit heteroskedasticity. Further Pesaran CD test for cross-sectional dependence Test statistic: z = 0.529929,with p-value = P(|z| > 0.529929) = 0.596 Emphasize the high p-value (0.596) from the Pesaran CD test, indicating no significant cross-sectional dependence.

The 'Redundant Fixed Effect test' is the first test to identify the best model between common or fixed effects. A cross-section fixed effects test was conducted to test for the presence of fixed effects in a panel data analysis. The results shown in Table 4 evidence that both the cross-section F-statistic and the cross-section chi-square statistic are statistically significant at the 0.0000 level, strong evidence of the presence of fixed effects.

The cross-section F-statistic tests the null hypothesis that all cross-sectional unit effects are equal to zero, while the alternative hypothesis is that at least one of the effects is non-zero. The large F-statistic value of 262.76 and the associated p-value of 0.0000 suggest that the null hypothesis can be rejected, providing evidence that the cross-sectional unit effects are not all equal to zero. The cross-section chi-square statistic tests the null hypothesis that there are no fixed effects across cross-sectional units, while the alternative hypothesis is that there are fixed effects. The large chi-square value of 352.30 and the associated p-value of 0.0000 also suggest that the null hypothesis can be rejected, providing further evidence that there are fixed effects in the panel data (Table 5).

Overall, these results indicate that it is appropriate to include cross-section fixed effects in the panel data analysis to control for unobserved heterogeneity across the cross-sectional units. Therefore, it is accepted that there is a country effect.

Table 5

Redundant Fixed Effects Tests- Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	262.755558	-6,120	0.0000
Cross-section Chi-square	352.297116	6	0.0000

Notes. Authors' calculation.

The Hausman Test is performed for assessment the Endogeneity (Greene, 2003, p. 301). The null hypothesis: *the preferred model is random effects as the model assumes the error term is uncorrelated with the predictor variables.*

Table 6 indicates that the p-value is less than 0.05, resulting in the alternative hypothesis being accepted. Therefore, the fixed model is applicable.

Table 6

Hausman Test - Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1576.533345	6	0.0000

Notes. Authors' calculation.

Household debt and macroeconomic elements can play a function in shaping monetary asymmetries, the relationship among those factors is complicated and multifaceted. The research results indicate that household debts which are asymmetric even in developed nations of G7 individually are affected by the degree of macroeconomic factors and sustainable factors.

The findings from the hypothesis testing underscore the intricate relationship between various factors and household debt. While house prices and unemployment show a positive impact on household debt, as indicated by studies such as Atalay et al. (2020) and Dumitrescu et al. (2022), respectively, trade exhibits an inverse effect, as noted by Xu et al. (2023). Moreover, the inclusion of environmental factors, particularly changes in temperature and CO2 levels, as highlighted by Kandikuppa-Gray (2022), introduces a novel dimension to the discourse, suggesting that climate conditions may exert a significant influence on household financial behaviour. Surprisingly, the insignificance of short-term interest rates challenges conventional economic wisdom, prompting a revaluation of the factors driving borrowing decisions. In light of these findings, there is a compelling need for the development of a comprehensive multi-factor model that integrates economic and environmental variables to better elucidate their combined effects on household debt dynamics. This model could offer valuable insights into the underlying mechanisms and interactions shaping borrowing behaviour, thereby informing more nuanced and effective economic policies. Additionally, longitudinal studies focusing on the long-term impact of environmental factors on household debt, alongside behavioural analyses of how households navigate debt during periods of unemployment, could provide deeper insights into the complex dynamics at play. Ultimately, such research endeavours hold the potential to contribute significantly to the theoretical understanding of household debt and offer practical implications for policymakers and stakeholders alike.

5. Conclusions and implications

The economy of G7 countries is the most advanced economies in the world, and they can be used as a benchmark for future research on these topics. Household debt has a very important role in evaluating

financial stability and controlling systemic risk (Gray et al., 2007). Interest rate plays important role in private borrowing here. The study shows the relationship between Household debts, macroeconomic factors, and environmental factors by employing the quantitative method of OLS multiple Regression. The hypothesis testing shows that Household Debt was impacted positively by House Prices, Unemployment, and environmental factors. However, Trade had an inverse effect on household debt. We investigated the relationship and found that the strongest effect on household debt is unemployment and then the environmental factors represented by variable changes in the mean surface temperature. However, what seems very interesting is the short-term interest rate remained insignificant to household debts. Furthermore, its thought-provoking to see a progressive and significant effect on household debt by environmental factors temperature and CO2 on household debts.

The beneficiaries of this research can include policymakers, economists, and financial institutions who are interested in understanding the factors that affect household debts. The findings of this research can inform policymakers about the macroeconomic and environmental factors that impact household debt, which can guide them in formulating policies aimed at addressing the issue of household debt. Financial institutions can also benefit from this research by using the insights gained from this study to develop products and services that are tailored to the needs of consumers who are struggling with debt. This research could be directive for other studies to examine the impact and influence of macroeconomic factors on the different environmental factors in the economy. The study provides insights into the relationship between these factors and household debt, the further research to examine the underlying causes and factors that contribute to these economic disparities.

5.1. Theoretical contributions

This study brings fresh theoretical insights into the understanding of household debt by incorporating environmental factors such as mean surface temperature and CO2 levels into macroeconomic models of household debt. It finds a significant link between these environmental factors and household debt, suggesting that environmental changes can indeed influence economic behavior. This opens up a new avenue in economic theory, integrating environmental variables with conventional economic indicators.

Moreover, the study challenges the conventional belief about the role of interest rates in household borrowing. Contrary to common assumptions, it finds that short-term interest rates do not significantly impact household debt levels. This result requires a rethinking of how monetary policy affects household debt and suggests the need for new theoretical frameworks to capture the complexities of household financial behavior

Furthermore, the research highlights the impact of unemployment on household debt, reaffirming its critical role in financial stability. By quantitatively assessing the influence of house prices and trade, the study provides a comprehensive understanding of the of the diverse factors influencing household debt. This contribution enhances the theoretical discourse on the interplay between macroeconomic conditions and household financial decisions, offering a more holistic view of the factors driving household indebtedness.

5.2. Policy and managerial implicatons

The insights gained from this study have significant implications for policymakers and financial managers. Policymakers can leverage these findings to design more effective interventions aimed at mitigating household debt. The positive relationship between environmental factors and household debt suggests that addressing climate change and promoting environmental sustainability could also have economic benefits. For example, investing in green technologies and infrastructure might not only help the environment but also stabilize household finances. Furthermore , strong influence of unemployment on household debt, policymakers should prioritize labor market policies that promote job creation and economic stability. Additionally, understanding that interest rates are less influential on household debt can help financial institutions design more flexible lending criteria that better reflect the broader economic context.

5.3. Limitations and suggestions for future research

The study is based on data from G7 countries, which are advanced economies with specific charac-

teristics. The findings may not be generalizable to developing countries or economies with different structural conditions. Future research should investigate the relationships between household debt, macroeconomic factors, and environmental factors in a diverse set of countries.

Finally researh or further expolaration about relationship between haousehold debts and other environmental factors could be very usefull in this domain. For example, some possible studies could be done about deep investigation of macroeconomic and ecological factors on household saving and consumtions. In that regard authors could focus on these two varibles saving and consumtion from different perspectives. Beside this suggestions, further research could focus on detailed investigations how household debt is effected in different climate zone in some specific countries. Having in the mind that this suggestions would be very usefull for the future reasearch in this filed.

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Biography

Nasiha Osmanović, PhD, is, an educationist by profession, has been associated with the education industry for the past 13 years. She holds a PhD in Economics and Finance and has held various managerial administrative positions, including Deanship and Director of the MBA Program of universities in UAE. Dr. Osmanović demonstrates a high level of intellectual curiosity, research independence, and self-motivation. She is well-organized, highly structured in her research, and fully oriented towards adopting new research and empirical methods. She is a creative individual with the ability to visualize new concepts, and her intellectual curiosity makes her multilingual.

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Утицај макроекономских и еколошких фактора на дугове домаћинстава у земљама Г7

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Кључне ријечи:

Земље Г7, Дугови домаћинстава,
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САЖЕТАК

Овај чланак има за циљ проучавање утицаја макроекономских и еколошких фактора на дугове домаћинстава. Квантитативна метода вишеструке регресије OLS је примјењена на податке коришћене за ово истраживање у периоду од 2003. до 2021. године. За утврђивање макроекономског фактора, метрике укључују индекс реалних цијена некретнина са базном годином 2015, незапосленост као % радне снаге и краткорочне каматне стопе на годишњем нивоу. Истраживање показује да цијене некретнина и незапосленост имају значајан однос са зависном промјењивом, док трговина робом значајно негативно утиче на дугове домаћинстава. У погледу фактора климатских промјена, резултати откривају да годишња површинска температура и годишње емисије CO2 имају повољан и значајан утицај на дугове домаћинстава. Једини незнатан утицај на дугове домаћинстава показала је краткорочна каматна стопа. Корисници овог истраживања могу укључивати доносиоце политика, економисте и финансијске институције које су заинтересоване за разумијевање фактора који утичу на дугове домаћинстава. Значајан однос између дугова домаћинстава и фактора као што су цијене некретнина, незапосленост, извозна трговина, фактори климатских промјена, итд., одражава основне економске разлике у овим земљама. Резултати овог истраживања могу користити доносиоцима политика и економистима у даљем разумијевању еколошких фактора који утичу на дугове домаћинстава.

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Holistic Performance Assessment: Research on the Relationship between Sustainability Reporting and Financial Performance of MBI10 Companies in R. N. Macedonia

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ABSTRACT
The complex interaction between sustainability indicators and financial performance shapes a company's resilience and long-term value creation, guiding the path toward a sustainable future in the global business world. This paper attempts to explore the relationship between sustainability reporting, measured through the ESG index (ESGIn), and the financial performance (FP) of high-ranked companies listed on the Macedonian Stock Exchange and part of the MBI10 Index. Through the analysis of ten high-ranked companies, including five banks and five companies from the real business sector, over a period of 11 years (2013-2023), the research reveals intriguing insights into the complex relationship between sustainability efforts and financial success. When analyzing the entire sample, no significant correlation between ESGIn and FP was generally observed, except for a moderately positive correlation between ESGIn and the ROE indicator. Additional sector-specific analyses reveal different patterns in the sectors. In the case of companies from the real business sector, there is a moderate positive correlation between ESGIn and the ROA and ROE indicators, while in the financial sector (banks) there is a weak positive correlation between ESGIn and the ROA and ROE indicators and a weak negative correlation between ESGIn and YPS. The analysis did not reveal a correlation between ESGIn and EPS. These results have implications for strategic decision-making in the Macedonian market and beyond, highlighting the need for tailored approaches to effectively integrate sustainability practices. The study contributes to the ongoing dialogue on the relationship between sustainability indicators and FP, providing a basis for further research and practical applications.

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1. Introduction

In a time when business and the economy are in constant transformation, and companies are directly exposed to various challenges, transparency regarding their performance is gaining increasing significance. To achieve the level of transparency required by current and potential investors, companies need to report on their activities, including the concept of sustainability in every organizational decision (Azam et al., 2011). The relationship between sustainability and financial performance (FP) of companies is a topic that has been discussed and researched globally for decades, or more specifically, as noted by Friede et al. (2015), since 1970. In Macedonian practice, this is a concept that has recently become relevant and increasingly significant. This impetus is due to the increased global attention to matters related to the environment, climate change, social matters, diversity and inclusion, and the Covid-19 crisis. Companies must address all current matters in the context of the ongoing evolution of the international economy to ensure the long-term success of their operations, which requires a solid connection with stakeholders (Ştefănescu et al., 2021). Manes-Rossi et al. (2018) emphasize that, informed by the last financial crisis, companies are now more responsible and transparent with their stakeholders, including their partners, customers, the community, and beyond. As a result, one of the biggest current "problems" for companies is creating an integrated and concise report that presents both financial and non-financial information about their operations. To analyze the past and future performance of a company, stakeholders need more information than can be provided by the standard financial reporting model (Flower, 2015). The publication of integrated reports is a strategic move that significantly improves the company's ability to communicate with its stakeholders, secure investments, capital projects, and long-term success. Less than 1/3 of professional investors often consider extra-financial information in their investment decisions, and only about 20% of professionals globally have received formal training on how to consider sustainability concept in investment analysis (CFA Institute, 2023).

The compatibility of sustainability criteria with corporate FP has been a central topic of debate among practitioners and academics for over 40 years (Friede et al., 2015). In the available relevant literature, numerous studies can be found about the relationship between sustainability, expressed through the ESG concept, and the FP of companies. From a financial perspective, the positive relationship suggests that companies should be socially responsible as it improves profitability (Servaes & Tamayo 2013), while the negative relationship supports the trade-off theory, which states that being socially responsible is expensive and exceeds the financial benefits (Baird et al., 2012; El Khoury et al., 2023). There are various opinions and findings on the positive or negative, as well as strong or weak, correlation of the aforementioned aspects, making this research question current and challenging, especially for a country like R.N. Macedonia, where sustainability/non-financial reporting is still on a voluntary basis.

This paper presents qualitative and quantitative research aimed at exploring the relationship between ESG and FP in high-ranked companies that are part of the MBI10 index, and solid represent for market movements on the capital market in R.N. Macedonia. The aim of this research is to provide a holistic assessment of the performance of high-ranked companies listed on the Macedonian Stock Exchange (MSE) over a period of 11 years (2013-2023) and to explore the correlation between sustainability, i.e., the ESG index, and FP indicators.

The paper is divided into six conceptual parts. After the introduction, a brief overview of the concept of integrated reporting is provided, with a special focus on R.N. Macedonia. The section on Theoretical Background and Previous research presents the results of existing global research on this topic. This is followed by the applied Research Methodology, Results and Discussion sections, which delve into the findings. Finally, the Conclusion summarizes the results of the research, identifies limitations, and offers ideas and directions for further in-depth research.

This research has the potential to generate new hypotheses and research questions, open new research opportunities, and contribute to the academic and practical field of overall business performance analysis and assessment.

2. Literature Review

2.1. Concept of Integrated Reporting (IR) in North Macedonia

The framework for IR represents a shift towards integrated thinking and reporting, where companies disclose both FP and NFP metrics (IIRC, 2013).

The goal is to provide stakeholders with a comprehensive understanding of the business model, including how the business strategy creates value for them in the short, medium, and long term (CAQ, 2020). In response to this integrated aspect, corporate boards must recognize their responsibility, prioritize, and oversee the collection and disclosure of information on environmental impact, social matters, and governance (the three components of the ESG concept).

The growth of self-initiated charitable initiatives and social responsibility as one of the most discussed topics worldwide is crucial for the long-term success of companies. By improving the overall corporate image and reputation, ESG helps companies compete more effectively, consolidate markets, and build trust among stakeholders (Gardiner et al., 2003; Worcester, 2009). In other words, ESG is a type of marketing and strategic action (McWilliams et al., 2006). The principles of ESG matters refer to a set of factors that companies consider when managing their business and presenting the image of their organization to the public (Damnjanović, 2021).

In the past, sustainability reporting was mainly voluntary, but today, with the increased interest of stakeholders in this type of information, efforts are increasing for certain standardization and regulation of this type of reporting by companies. The disclosure of ESG data is strongly encouraged in Europe through several recent initiatives. Therefore, public interest entities in EU are required to publish a "Non-Financial Report" that addresses environmental and social matters, respect for human rights, and the fight against corruption (EU, 2014) and its adaptation to the specific characteristics of each member state (Sierra-Garcia, et al., 2018). On 5th January 2023, the Corporate Sustainability Reporting Directive (CSRD) came into force in the EU (EU Commission, 2023). The directive is the latest EU initiative to improve the quality, comparability, and continuity of the information disclosed by companies and represents minimum legislation that must be respected.

In R.N. Macedonia, integrated reporting through Corporate Social Responsibility (CSR) as a concept was first introduced in 2002 through the activities of international organizations such as the World Bank, UNDP, and USAID (Stamenkova, 2011). The first published study on the state of CSR in North Macedonia is the "Baseline Study" in 2007, which concluded that the concept of CSR is insufficiently and incompletely understood by companies, resulting in low proactivity in CSR activities, insufficient knowledge, and low awareness (Line & Braun, 2007).

Many large Macedonian companies, according to Mrsik & Kostovski (2015), do not disclose CSR/ESG matters in their annual reports, so sustainability reporting is left to the discretion of companies, their management, and their perception of the need to update key stakeholders and the most appropriate method for doing so. Trpeska et al. (2021) in their research on the disclosure of non-financial information as part of annual reports and/or separate reports in 14 banks actively operating in R.N. Macedonia for the period from 2017 to 2019 indicate that the size of the banks, measured by the value of total assets, positively affects CSR reporting, while, on the other hand, profit, measured by the value of net profit, does not affect it.

According to domestic regulations, companies in R.N. Macedonia are still not required to prepare and publish an integrated report. On the path to EU accession, R.N. Macedonia needs to align national regulations and market practices with the new EU sustainability framework and raise awareness among companies for quality disclosure of integrated reports. To encourage the adoption of solid corporate governance standards and increase the level of ESG disclosure, the MSE has published two important documents that should be taken into account: the new "Corporate Governance Code" published in October 2021, and the "ESG reporting Guidelines" published in January 2022 (MSE, 2022).

Recent initiatives in R.N. Macedonia aim to amend the Law on accounting to include sustainability reporting, aligning with the EU's CSRD, and involve working groups to ensure compliance with international standards like IFRS and IFAC (Unique National Electronic Register of Regulations of the Republic of North Macedonia, 2024).

2.2. Theoretical Background and Previous Research

The relationship between ESG indicators and FP has been extensively researched through both theoretical frameworks (Sancak, 2023) and empirical studies (Chaudhry et al., 2021). Stakeholder theory posits that a company holds responsibilities to a broad range

of stakeholders, including customers, suppliers, employees, the government, and society at large (Ferrell et al., 2010). For these diverse stakeholders, sustainability reporting is a critical concern, as ESG information is believed to confer long-term benefits that surpass the interests of shareholders alone (Khlif et al., 2015). According to stakeholder theory, companies across various sectors customize their sustainability reporting to align with the expectations of their stakeholders (Reverte, 2009; Sweeney & Coughlan, 2008), while agency theory suggests that managers aim to maximize company profits to gain recognition and rewards, and owners prioritize cost reduction to boost profitability (Youssef & Diab, 2021; Gutiérrez-Ponce & Wibowo, 2024).

Buallay et al. (2020) explore the link between CSR disclosure and the operational, financial, and market performance (measured by ROA, ROE, and Tobin's Q) of firms in Mediterranean countries. Their study employs a quantitative approach, utilizing cross-sectional and time-series analyses covering 210 listed firms across six Mediterranean nations over a decade from 2008 to 2017, totaling 1,689 observations. The empirical findings indicate that CSR disclosure has a negative impact on firms' operational and market performance. Interestingly, the study does not find a significant influence of CSR disclosure on FP.

Furthermore, Gutiérrez-Ponce & Wibowo (2024) address the need for deeper research on the impact of corporate ESG indicators on the FP of banks. This study analyzes the ESG-FP relationship in 19 banks from five Southeast Asian emerging economies from 2010 to 2020. Using Thomson Reuters ESG data, parametric correlations, and regression models, the study measures FP through ROA, ROE, and Tobin's Q. Findings indicate a significant negative effect of ESG on all FP measures, though individual ESG pillars show varied impacts on FP. The research also highlights differences in ESG reporting across countries due to distinct economic characteristics.

Friede et al. (2015) analyze and summarize the findings of approximately 2,200 studies on the relationship between ESG and FP to provide generalized conclusions. Their results indicate that most studies show a positive correlation between ESG and FP, with about 90% of the studies indicating no negative correlation. This suggests a strong empirical link and consistent stability over time, leading to the conclusion that "investing in ESG is financially rewarding" (Friede et al., 2015). The study also highlights that more relevant results are obtained when samples consist of companies from the same region, market development stage, or industry.

Using a similar research methodology, Whelan et al. (2021) analyzed over 1,000 studies on the relationship between ESG and FP from 2015 to 2020. Their findings reveal a positive relationship between ESG and FP in 58% of the studies focusing on operational indicators such as ROA, ROE, or share price. Additionally, 13% of the studies show a neutral impact, 21% report mixed results (finding positive, neutral, or negative outcomes within the same study), and only 8% indicate a negative relationship (Whelan et al., 2021). The authors also emphasize that research on ESG and FP often employs inconsistent terminology, nomenclature, and methodology.

In his research on companies listed on the German Prime Standard Stock Exchange (DAX30, TecDAX, MDAX), Velte (2017) confirms the financial benefits of ESG, finding that the combined ESG index positively impacts the ROA metric. Examining the three separate components of the ESG concept, Velte (2017) highlights that corporate governance has the most significant influence on FP compared to environmental and social aspects. Notably, no relationship was found between the ESG index and Tobin's Q (Velte, 2017).

Ahmad et al. (2021) investigated the relationship between the ESG index and FP by analyzing 351 companies listed on the London Stock Exchange, part of the FTSE350 index, over the period from 2002 to 2018. The study's static and dynamic results indicate a generally positive and significant impact of the combined ESG index on market value and earnings per share (EPS) (Ahmad et al., 2021). However, the results are mixed when examining the individual segments of ESG and their impact on the company's FP.

Bruna et al. (2022) used a panel regression model with time lags to analyze a sample of 350 European listed companies from 2014 to 2019. They provide evidence of a positive and significant impact of ESG on operational FP, measured by ROA, ROE, current liquidity, and financial leverage, especially under mandatory non-financial reporting conditions. Similarly, Aybars et al. (2019) confirm the empirical link between the combined ESG index, and the performance of the largest U.S. companies listed on the S&P 500. They

emphasize that "ESG data is becoming as important as financial data". Their study, spanning 11 years (2006-2016), found a one-way positive and significant relationship between the combined ESG index and ROA, but no significant relationship between the ESG index and Tobin's Q.

Chen & Xie (2022) examine the relationship between the ESG-related disclosures, and FP among Chinese corporations listed on the stock exchange from 2000 to 2020. Their findings indicate that disclosing ESG data has a positive effect on corporate FP. In their detailed analysis, they highlight two conclusions: firstly, that disclosing ESG data attracts investors, and secondly, that investors also moderately positively influence the relationship between the ESG index and FP (Chen & Xie, 2022).

As previously discussed, the literature presents varied perspectives and empirical results regarding the positive or negative relationship between ESG and FP. Saygili et al. (2022), through their analysis of companies listed on Turkish stock exchanges and part of the XKURY index from 2007 to 2017, reveal a negative effect of disclosing ESG information, particularly within the environmental segment, on FP. They measured this impact using multiple indicators including ROA, ROE, share price and current liquidity, among others. The authors point out that despite this overall negative trend, their detailed segmented analysis identified specific activities that have a slight positive influence on FP. These include involving stakeholders in operational decision-making and enhancing shareholder and board rights and benefits (Saygili et al., 2022).

Landi & Sciarelli (2019) conducted a study focusing on the 40 largest companies listed on the Italian stock exchange, part of the FTSE MIB index, to examine whether ESG is a significant factor for investors in terms of market risk and return, and its impact on investment decisions. Through panel regression analysis, their empirical results indicate that there are no statistically significant findings linking ESG with abnormal returns for high-ranked Italian companies. Instead, investors continue to focus on traditional risk factors such as EBITDA and financial leverage, suggesting that other variables may be considered under control in managing risk.

Nirino et al. (2021) investigated whether corporate controversies, strongly associated with ESG considerations, influence corporate FP. Using data from 356 European listed companies, their linear regression models confirmed a significant negative relationship between corporate controversies and FP. However, the authors did not find evidence to support a positive effect of ESG practices on mitigating the relationship between controversies and FP in their study. In terms of managerial implications, Nirino et al. (2021) emphasize that disputes are detrimental to company performance and suggest that ESG practices should not merely serve as a means to mitigate the negative effects of controversies, but rather as mechanisms to avoid disputes altogether.

Severo et al. (2017) found that cleaner production and environmental management practices have a positive impact on sustainable product innovation. Their study indicated that firms involved in sustainable product innovation outperformed their counterparts financially. They emphasized the strong correlation between cleaner production and environmental management practices. Therefore, FP serves as a crucial indicator for management decision-making regarding the adoption of sustainability programs, leading to enhanced financial benefits through sustainable product innovations.

At the end, this year Rahi et al. (2024) conducted a thorough critique of the existing literature on corporate sustainability and FP (CSFP), identifying overlooked issues and gaps. They argue that while CSFP generally demonstrates a positive relationship, this connection often emerges gradually over time. The authors highlight the uncertainty surrounding the impact of sustainability on FP in economically rational capitalist countries. They suggest that while initial institutional and legitimacy requirements can encourage positive corporate behavior, these measures may not be sustainable in the long term, especially if companies relocate operations to less regulated areas (referred to as pollution havens).

In this regard, the following research question (RQ) is posed:

RQ: Is it financially profitable to be a socially responsible company in North Macedonia?

3. Empirical Analysis

3.1. Sample

The sample for this research consists of 10 high-ranked companies listed on the MSE, all of which are part of the MBI10 index, according to the most recent revision conducted on 15.12.2023 (MSE, 2024). The

research includes 110 observations, i.e. 10 companies were analyzed over a period of 11 years, from 2013 to 2023. The analysis took into account the audited consolidated financial statements, annual reports, separate non-financial/sustainability reports (if any), and the official websites of the companies. It is important to note that all reports are usually published in March of the current year and refer to the previous year. All reports were downloaded from the official website and from the electronic information system for listed companies on the MSE, available at the following link: https://www.seinet.com.mk/. The reports were analyzed in detail, and all relevant data were extracted. For the purposes of the research, data on share prices was retrieved from the official website of the MSE, available at the following link: https://www.mse.mk/mk/stats/symbolhistory/Symbol.

3.2. Variable Definition and Methodology

Table 1 shows a description of the variables used in the research.

Table 1
Description of variables

Variable	Acronim	Measurement
Yield per Share	YPS	Yield per share measured through earnings yield. Calculated as the earnings per share (EPS) divided by the share price (last transaction in the current year), expressed as a percentage. It shows the return on investment for the shareholders.
Earnings per Share	EPS	Earnings per share in the relevant year as disclosed in the consolidated audited financial statements.
Return of Assets	ROA	ROA as a relative measure of a company's profitability. It is calculated as net profit/total assets.
Return of Equity	ROE	ROE as a relative measure of a company's profitability. It is calculated as net profit/shareholder's equity.
ESG Index	ESGIn	Generated ESG index through content analysis methodology in accordance with the requirements of the European Directive on non-financial reporting (2014/95/EU). Detailed view in Table 2.

Notes. Authors' text.

Sustainability reporting is still on a voluntary basis in North Macedonia and the companies are not included in the analysis carried out by renowned international companies specialized in generating ESG/Sustainability index and ranking. Therefore, a detailed content analysis of all the above-mentioned reports was carried out and the binary scoring method (1 and 0) was used to generate the ESG index (ESGIn), which is expressed as a relative indicator (calculated as points awarded/maximum possible points).

The generation of ESGIn was carried out according to the methodology applied by Ali et al. (2017), Hinson et al. (2010), Branco & Rodrigues (2006) and key performance indicators (KPIs) defined in the EU (2014) Directive 2014/95/EU on non-financial reporting: 1 point for disclosing qualitative data, 1 additional point if this information is supplemented by quantitative data, 1 each point if a separate section in the report is dedicated to the following segments: (1) environment, (2) social and employee matters, (3) human rights, (4) anti-corruption and bribery, and (5) other matters. Table 2 shows a detailed representation of ESGIn generation:

Table 2
Methodology for generating the ESG Index (ESGIn)

Describtion	„Yes" Max. points	„No" Min. points
1. Availability of non-financial data:		
- **Qualitative** (Qual.) ESG data	1	0
- **Quantitative** (Quant.) ESG data	1	0
2. Disclosure of information referring to the environmental matters (EnvM): (KPIs: Corporate focus on environmental matters, management and reduction of pollution, energy saving measures, waste management, creation of eco-friendly products and services, etc.)	1	0
3. Disclosure of information referring to the social and employee matters (Soc&EmpM): (KPIs: Employment matters, diversity initiatives, occupational health and safety protocols, HR management, customer relationships, community engagement, etc.)	1	0
4. Disclosure of information referring to the human rights (HRi): (KPIs: Dedication to upholding human rights, including the rights of children, women, indigenous populations, individuals with disabilities, human trafficking victims, workers' rights, etc.)	1	0
5. Disclosure of information referring to anticorruption and bribery (AC&B): (KPIs: Anticorruption strategies, policies, and standards, internal control systems, utilization of reporting mechanisms, etc.)	1	0
6. Disclosure of information referring to other matters (OM): (KPIs: Supply chains, conflict minerals, etc.)	1	0
Total points per company for 1 year	**7**	**0**
Total points for the observed period of 11 years (2013-2023)	**77**	**0**

Notes. Authors' calculation.

To investigate the relationship and influence between the variables, the following tests were conducted:

1. Descriptive statistics for general summary of results;
2. Trend analysis to see the trends and changes of all variables over a 11 year period
3. Covariance and correlation tests to measure the strength of the linear relationship between variables.

The annual panel data consists of 110 observations that are the initial basis and subject to adjustment in the research. In order to achieve a relevant analysis, when conducting covariance and correlation tests, the EPS variable was transformed into a logarithmic form, denoted by the acronym Ln_EPS. EViews software was used for statistical data processing.

4. Empirical Results and Discussion

The sample consists of 10 high-ranked companies listed on the MSE, evenly divided between the financial and real business sectors. Specifically, it includes 5 banks from the financial sector and 5 companies from various industries within the real business sector—namely, pharmacy, construction, oil derivatives, telecommunications, and hospitality, with one company representing each industry. To effectively summarize the panel data, including the ESGIn, the results of the companies' rankings in Sustainability reporting were initially presented (see Table 3).

Table 3
ESG Index (ESGIn)

Sector	No. of com.	1a. Qual. ESG data	1b. Quant. ESG data	2 EnvM	3 Soc&Emp M	4 HRi	5 AC&B	6 OM	**Total ESGIn**	**Avrg. ESGIn per comp. per year**
Real Business	5	30	13	27	30	2	0	25	**127**	**2.3**
	-50%	-55%	-24%	-49%	-55%	-4%	0%	-45%	**-33%**	**-33%**
Financial	5	51	11	26	47	8	17	22	**182**	**3.3**
	-50%	-93%	-20%	-47%	-85%	-15%	-31%	-40%	**-47%**	**-47%**
Total	10	**81**	**24**	**53**	**77**	**10**	**17**	**47**	**309**	**2.8**
	-100%	**-74%**	**-22%**	**-48%**	**-70%**	**-9%**	**-15%**	**-43%**	**-40%**	**-40%**

Notes. Authors' calculation.

The results indicate that high-ranked companies in R.N. Macedonia generally report minimally on their sustainability initiatives (combined ESGIn = 0.4). It's crucial to recognize that there is no legal mandate in the country to disclose on ESG, which contributes to the lesser emphasis on non-financial information compared to the EU and other regions where such disclosure is obligatory. Additionally, the ESGIn metric is based on publicly disclosed information, which does not rule out the possibility that a company may be socially responsible without this being reflected in available data sources.

Sector-specific analysis shows that banks are more forthcoming about sustainability than firms in the real business sector, resulting in a higher combined ESGIn score (0.47 vs. 0.33). Regarding the nature of the disclosed information, companies predominantly share qualitative details of their actions (0.74) rather than quantitative, measurable data (0.22). The bulk of this information pertains to social and employee matters (0.7), with the least amount of disclosure concerning human rights (0.09). Table 4 displays the descriptive statistics of the unadjusted panel data.

Table 4
Descriptive statistics, unadjusted annual panel data (2013 – 2023)

	ESGIn	**EPS**	**YPS**	**ROA**	**ROE**
Mean	0.401273	951.5627	0.107388	0.034319	0.092210
Median	0.428571	178.0400	0.095844	0.021606	0.091540
Maximum	1.000000	13939.00	0.338889	0.173307	0.223220
Minimum	0.000000	-2019.200	-0.079968	-0.025328	-0.064402
Std. Dev.	0.302565	2270.237	0.077067	0.033387	0.055467
Skewness	0.176561	3.949310	0.807712	1.316711	0.033297
Kurtosis	2.234718	20.22696	3.938525	5.131726	3.015494
Observations	110	110	110	110	110

Notes. Authors' calculation.

The analysis reveals significant variation in the minimum and maximum values of each variable, reflecting the diverse nature and operations of the companies within the MBI10 index. It is noted that some companies even recorded negative indicators during the analyzed period. Overall, an investor holding an equal number of shares across these companies would see an average EPS of approximately MKD 951 (around 15 EUR), with an average YPS of 10.7%, a ROA of 3.4%, a ROE of 9.2%, and an average ESGIn of 40%. The median values of the financial indicators are notably lower than the mean values, indicating that a few high-ranked companies skew the average upwards, whereas the majority exhibit lower performance during the analyzed period.

The distribution of the data, characterized by high skewness and kurtosis, suggests it is non-normal with "heavy tails". For further statistical analysis, the EPS values were transformed into logarithmic scale, referred to as Ln_EPS in subsequent discussions. Despite initial attempts to fit the data with a Unit Root test for panel regression, the assumptions of normality and homogeneity were not met, leading to the adoption of non-parametric tests.

In subsequent covariance and correlation analyses, the original panel data were used for the ESGIn, YPS, ROA, and ROE variables, whereas the logarithmically transformed EPS (Ln_EPS) was employed. The linear relationships were examined using 107 observations out of a total of 110, excluding three observations with negative EPS values from two companies in the real business sector, which were not suitable for logarithmic transformation. Table 5 presents the results from the conducted covariance and correlation tests among the variables.

Table 5
Covariance and Correlation tests

Covariance	ESGIn	Ln_EPS	YPS	ROA	ROE
ESGIn	0.088615				
Ln_EPS	0.292450	4.617830			
YPS	-0.001369	0.065041	0.005364		
ROA	0.001085	0.018675	-0.000238	0.001055	
ROE	0.006447	0.068869	0.001721	0.000517	0.002630
Correlation					
ESGIn	1. 000000				
Ln_EPS	0.457171	1. 000000			
YPS	-0.062786***	0.413253*	1. 000000		
ROA	0.112243***	0.267515**	-0.100042***	1. 000000	
ROE	0.422262***	0.624857*	0.458168***	0.310284***	1. 000000

Notes. Authors' calculation. *** Significant at 1%, ** Significant at 5%, и * Significant at 10%.

The p-value in the covariance matrix indicates the statistical significance of the correlations identified among the variables. This information, along with the correlation matrix, provides key insights into the relationships between the analyzed variables. Our primary research question (RQ1) explores whether being a socially responsible company in R.N. Macedonia is financially beneficial. Specifically,

we investigate whether companies that engage in robust sustainability reporting experience enhanced profitability and operational success, potentially earning greater trust and loyalty from customers, suppliers, the community, investors, and other stakeholders.

The analysis reveals a moderately positive correlation between the ESGIn and ROE, suggesting that companies focused on sustainability reporting tend to achieve higher profitability relative to their capital investments. This indicates a possible alignment between sustainable practices and financial performance. Additionally, there is a weak positive correlation between ESGIn and ROA. Our results are in line with the research of Friede et al. 2015; Whelan et al. 2021; Bruna et al. 2022, and contrary to the research results of Buallay et al. (2020), Gutiérrez-Ponce & Wibowo (2024). On the other hand, there is an almost negligible negative correlation with YPS. The correlation matrix also highlights relationships among financial indicators, including a strong positive correlation between Ln_EPS and ROE, a moderate positive correlation between Ln_EPS and YPS, and a weak positive correlation between Ln_EPS and ROA. Further, moderate and weak positive correlations exist between YPS and ROE, as well as between ROA and ROE, respectively, with a weak negative correlation between YPS and ROA.

Although correlation tests do not establish direct causality, they provide a solid foundation for understanding the complex interplay between financial indicators and the ESG index, reflecting company performance. The results concerning ESGIn's relationship with ROE, ROA, and YPS suggest that while sustainability reporting is aligned with profitability (ROE), it seems less impactful on asset efficiency (ROA) and market measures (YPS and EPS), influencing shareholder decisions to a lesser extent.

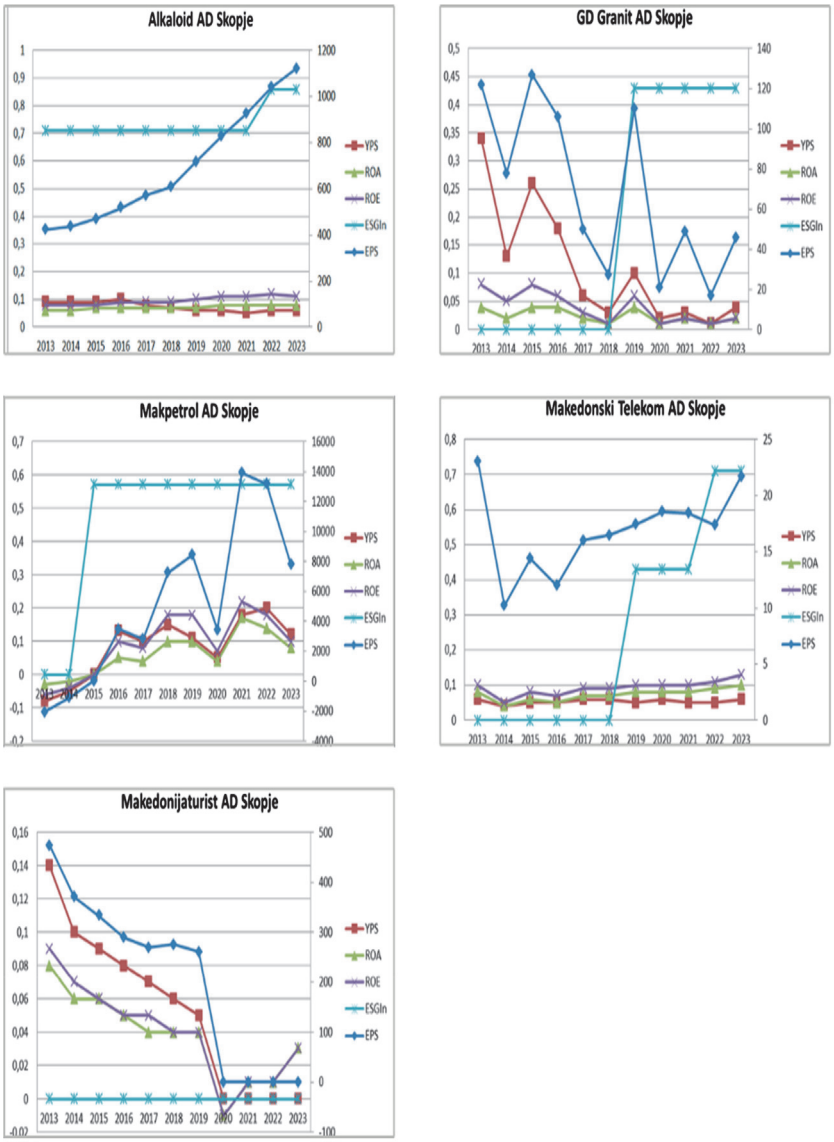
This analysis indicates that the concept of sustainability is still not fully embraced or understood by companies, stakeholders, or the public, leading to little or no correlation between sustainability reporting and key FP metrics.

Further research by authors such as Buallay et al. (2020), Galletta et al. (2022), and Gutierrez-Ponce et al. (2022) highlights the importance of the industry sector in shaping stakeholder expectations and the pressures of sustainability. Companies in sectors closely linked to societal and community resource utilization face heightened scrutiny and public expectations. In this study, additional analyses were conducted to assess the impact and connection between sustainability reporting and FP from a sectoral perspective, comparing the financial and real business sectors. To better visualize the trends and relationships among the variables, trend analyses were conducted alongside the covariance and correlation tests.

- **Real business sector** (pharmacy, construction, oil derivates, telecommunications and hospitality)

Figure 1 presents data and trends for each of the companies from the real business sector over an 11-year period. The graphs feature both primary and secondary axes: EPS is plotted on the secondary axis, while the other variables are displayed on the primary axis. These visualizations help illustrate the growth and decline of the analyzed variables, highlighting their reciprocal or proportional movements throughout the timeframe.

Figure 1
Trend analysis – real business sector companies



Notes. Authors' calculation.

Although classified within the same sector, the companies operate across different industries and under varied conditions, leading to distinct trends in the movements of the analyzed variables. Notably, the ESGIn shows a continuous growth in four out of the five analyzed companies, indicating a positive trend towards sustainability practices.

The most significant fluctuations are observed in

the EPS, where three companies exhibit a decreasing trend, while two show an increasing trend. A similar pattern is evident with the YPS, suggesting variability in market returns across these companies. Regarding the ROA and ROE indicators, the trends differ slightly, with three companies showing an increasing trend, indicative of improving asset efficiency and profitability relative to equity, respectively. Conversely, the remaining two companies display a decreasing trend in these metrics.

Table 6 provides a summary and displays the results of the conducted descriptive statistics, covariance, and correlation tests specifically for companies from the real business sector, offering a detailed view of the financial and sustainability performance across different industries within the sector.

Table 6

Descriptive Statistics and Covariance and Correlation Tests - Real Business Sector Companies

	ESGIn	EPS	YPS	ROA	ROE
Mean	0.348901	1369.418	0.080868	0.058141	0.078073
Median	0.428571	193.8450	0.061174	0.060860	0.081251
Maximum	0.857143	13939.00	0.338889	0.173307	0.218955
Minimum	0.000000	0.050000	1.03E-05	0.000280	0.000611
Std. Dev.	0.318074	3110.555	0.063334	0.034134	0.046531
Skewness	-0.019698	2.895253	1.859726	0.697828	0.664898
Kurtosis	1.324104	10.66675	7.575529	4.373094	3.789119
Observations	52	52	52	52	52
Covariance	ESGIn	Ln_EPS	YPS	ROA	ROE
ESGIn	0.099226				
Ln_EPS	0.429346	7.332382			
YPS	-0.000867	0.085549	0.003934		
ROA	0.004577	0.051918	0.000722	0.001143	
ROE	0.006898	0.078589	0.001334	0.001475	0.002124
Correlation					
ESGIn	1.000000				
Ln_EPS	0.503353	1.000000			
YPS	-0.043901***	0.503702*	1.000000		
ROA	0.429849***	0.567196*	0.340351***	1.000000	
ROE	0.475185***	0.629807*	0.461586***	0.946986***	1.000000

Notes. Authors' calculation. *** Significant at 1%, ** Significant at 5%, и * Significant at 10%.

The analysis of covariance and correlation tests for real business sector companies involved 52 observations, after excluding 3 instances where 2 companies had negative EPS. The findings from the correlation tests reveal a moderately positive correlation between the ESGIn and both the ROA and ROE. Additionally, a strong positive correlation exists between ROA and ROE, indicating that improvements in asset efficiency often coincide with increased profitability relative to equity.

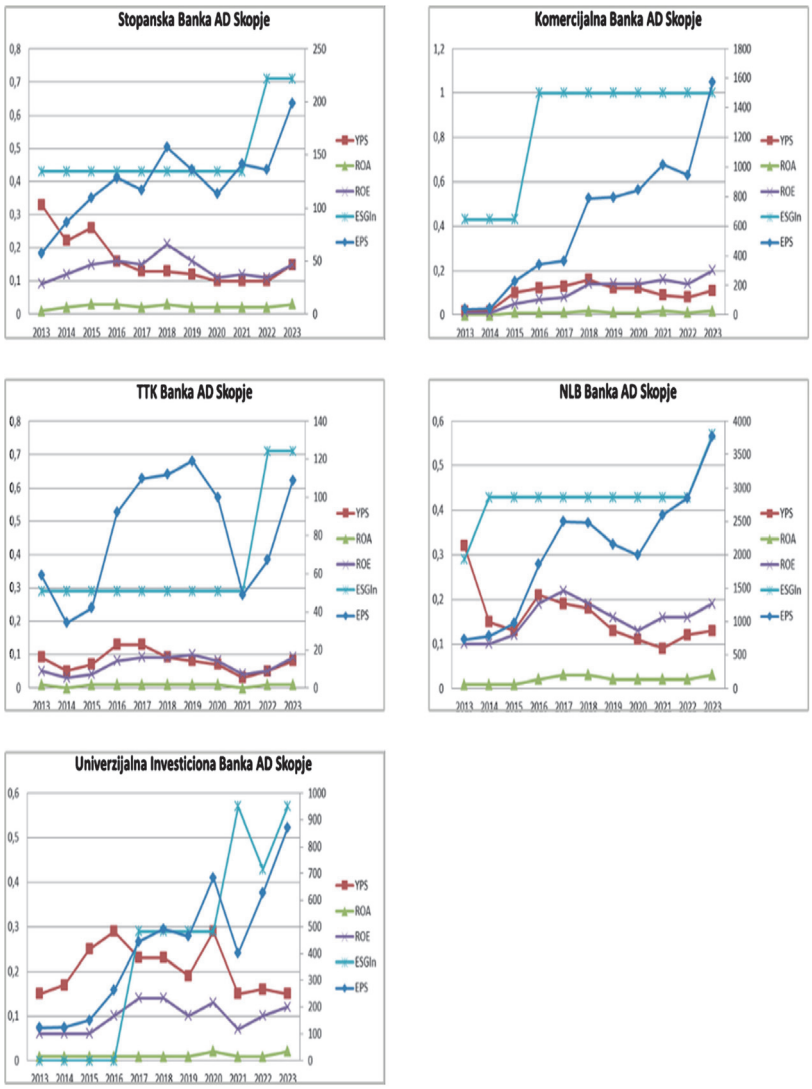
This analysis suggests that within the real business sector, sustainability reporting plays a notable role and is linked to some of the key financial indicators, albeit with minimal significance. However, the results also show that there is no significant linear relationship between ESGIn and EPS, and only a very slight, almost negligible negative correlation between ESGIn and YPS. These findings indicate that while sustainability initiatives may influence overall financial health and efficiency, their impact on market measures

such as EPS and YPS is limited. This highlights the varying influence of sustainability practices across different financial metrics within the sector.

- **Financial sector** (banks)

Figure 2 shows the movements and trends of the analyzed variables at the banks that are part of the MBI10 index. As in the case of Figure 1, the graphs show primary and secondary axes, where EPS, as a variable, is shown on the secondary axis, while the other variables on the primary axis.

Figure 2: *Trend analysis – financial sector companies*



Notes. Authors' calculation.

The graphs above illustrate a consistent increase in all analyzed variables for the banks, including the ESGIn, with the sole exception of the YPS variable, which experienced either stagnation or a slight decline during the analyzed period. To examine the relationship between ESGIn and FP in banks, descriptive statistics, along with covariance and correlation tests, were conducted (see Table 7).

Table 7

Descriptive Statistics and Covariance and Correlation Tests – Financial Sector Companies

	ESGIn	EPS	YPS	ROA	ROE
Mean	0.472675	665.2200	0.140686	0.014659	0.112700
Median	0.428571	229.0000	0.127270	0.013231	0.113919
Maximum	1.000000	3766.550	0.329651	0.030332	0.223220
Minimum	0.000000	34.00000	0.020112	0.000943	0.008683
Std. Dev.	0.269176	868.9929	0.071203	0.007417	0.050736
Skewness	0.686581	1.784052	0.820712	0.248299	0.032614
Kurtosis	3.051526	5.457100	3.352436	2.183067	2.470278
Observations	55	55	55	55	55
Covariance	ESGIn	Ln_EPS	YPS	ROA	ROE
ESGIn	0.071138				
Ln_EPS	0.113281	1.719044			
YPS	-0.005441	0.021613	0.004977		
ROA	0.000399	0.004719	0.000118	5.400832	
ROE	0.003938	0.045765	0.001080	0.000342	0.002527
Correlation					
ESGIn	1.000000				
Ln_EPS	0.323938	1.000000			
YPS	-0.289158***	0.233657**	1.000000		
ROA	0.203948***	0.489777***	0.228881***	1.000000	
ROE	0.293707***	0.694327**	0.304597***	0.927916	1.000000***

Notes. Authors' calculation. *** Significant at 1%, ** Significant at 5%, и * Significant at 10%.

Among the analyzed banks, there is a weak positive correlation between ESGIn and financial indicators such as ROA and ROE. Additionally, these financial indicators themselves show a strong positive relationship. Compared to companies in the real business sector, ESGIn has a weaker correlation with ROA and ROE in the banking industry. However, ESGIn is weakly negatively correlated with YPS in banks. The weak negative correlation between ESGIn and YPS in the banking industry can be explained by the initial costs of implementing ESG practices, short-term investor focus, market perception, regulatory costs, changes in business models, investor skepticism, etc. These factors can individually or collectively lead to a temporary decrease in profitability and lower YPS for banks investing in ESG practices.

This difference between the real business sector and the banking sector is due to the unique characteristics and operating environments of these industries, as well as the nature of their business activities.

5. Conclussions and Implications

In an era of growing global emphasis on sustainability, this study examines the link between sustainability reporting and FP in R.N. Macedonia over an 11-year period. The research includes 10 highly-ranked companies, evenly divided between the real business sector and financial sector. It focuses on key financial

metrics such as EPS, YPS, ROA, and ROE, along with a combined ESGIn.

Financially, companies in the real business sector generally report higher EPS and ROA, while banks exhibit better YPS and ROE. Banks also report more comprehensively on sustainability, as reflected in higher ESGIn scores.

The findings indicate no substantial correlation between ESGIn and overall FP, except for a moderate positive correlation with ROE. This suggests that sustainability reporting alone does not significantly influence financial outcomes, particularly in market valuation. However, sector-specific analyses reveal nuances. In the real business sector, a moderate positive correlation between ESGIn and both ROA and ROE suggests that strong sustainability practices may enhance asset utilization and capital returns. Conversely, no significant links were found between ESGIn and EPS or YPS, highlighting the complexity of sustainability's impact on market performance.

In the financial sector (banks), ESGIn shows a weaker correlation with ROE and ROA but maintains a weak negative correlation with YPS, with no significant connection to EPS. These distinctions suggest that sustainability impacts financial metrics differently across sectors, highlighting the need for tailored sustainability strategies to guide resource allocation and risk management.

5.1. Theoretical implications

The findings of this study are in line with stakeholder theory to some point, highlighting that robust sustainability practices can fulfill diverse stakeholder expectations and potentially enhance FP metrics like ROA and ROE (in the case of the real business sector). From the perspective of agency theory, the mixed impacts of ESG reporting on FP suggest that managerial incentives and ownership priorities play a significant role in shaping the outcomes of sustainability initiatives.

5.2. Policy and managerial implications

In conclusion, this research makes a significant contribution to the ongoing discussion about the interplay between sustainability indicators and financial performance. As R.N. Macedonia aims for EU membership, aligning its directives and legislation with European standards becomes crucial. The new national Law on accounting needs to be complemented with the new EU CSRD and also there is a need for providing training for better and easier practical implementation. The insights from this study provide a solid foundation for further research and practical implementation, urging stakeholders to navigate the complex relationship between sustainable practices and financial outcomes.

5.3. Limitations and suggestions for future research

The limitations in this study include the manual generation of ESGIn, which may be at risk of subjectivity, and reliance on voluntary sustainability reporting, complicating comparisons. Additionally, the exclusion of three observations due to negative EPS in the real business sector could slightly skew the correlation analysis. The limitation in terms of publicly available information limited us to calculate the Tobins Q indicator of all companies and it was not considered in the analysis, which is extensively used in the research literature.

There is a clear need for more comprehensive research involving a wider array of companies with publicly accessible data and larger samples categorized by sector or industry. Future studies could also enhance their analysis by incorporating a broader range of FP indicators and by collecting primary data through interviews and surveys with company executives, shareholders, brokers, and other relevant parties. These expanded methodologies could provide deeper insights and foster a more nuanced understanding of the dynamics at play.

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Холистичка процјена перформанси: Истраживање о односу између извјештавања о одрживости и финансијских перформанси компанија МБИ10 у Републици Северној Македонији

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САЖЕТАК

Комплексна интеракција између индикатора одрживости и финансијских перформанси обликује отпорност компаније и стварање дугорочне вриједности, водећи ка одрживој будућности у глобалном пословном свијету. Овај рад покушава да истражи однос између извјештавања о одрживости, мјереног кроз ESG индекс (ESGIn), и финансијских перформанси (FP) високо рангираних компанија које су котиране на Македонској берзи и дио су индекса MBI10. Кроз анализу десет високо рангираних компанија, укључујући пет банака и пет компанија из реалног сектора, у периоду од 11 година (2013-2023), истраживање открива занимљиве увиде у комплексни однос између напора у одрживости и финансијског успјеха. При анализи целокупног узорка, генерално није уочена значајна корелација између ESGIn и FP, осим умјерене позитивне корелације између ESGIn и показатеља ROE. Додатне анализе специфичне за секторе откривају различите обрасце у секторима. У случају компанија из реалног сектора, постоји умјерена позитивна корелација између ESGIn и показатеља ROA и ROE, док у финансијском сектору (банке) постоји слаба позитивна корелација између ESGIn и показатеља ROA и ROE и слаба негативна корелација између ESGIn и YPS. Анализа није открила корелацију између ESGIn и YPS. Ови резултати имају импликације на стратешко доношење одлука на македонском тржишту и шире, истичући потребу за прилагођеним приступима ради ефикасног интегрисања пракси одрживости. Студија доприноси текућем дијалогу о односу између индикатора одрживости и FP, пружајући основу за даља истраживања и практичне примјере.

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Does market orientation of small and medium enterprises make differences in the market?

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ABSTRACT
In market-oriented businesses, market orientation holds a significant position as a business concept focused on recognizing and meeting customer needs (the market). Given the interest in this subject, it is essential to identify and analyze the factors influencing the development of market orientation dimensions (market orientation - MO), conceptualized according to the model proposed by Kohli and Jaworski (1990), and their impact on increasing MO. Based on available literature and previous empirical research, the following factors have been identified to assess their influence on market orientation: professionalization of management in SMEs, quality of communication/dissemination of market information within the company, performance measurement of management staff in SMEs, and their material rewards. This research was conducted on a sample of 26 SMEs in Split-Dalmatia County, Republic of Croatia, using statistical methods of descriptive statistics, correlation, statistical testing, and clustering. Non-parametric statistics were used to overcome certain limitations of the small sample size. The results are discussed in the context of developing entrepreneurial infrastructure and public policies to support entrepreneurship.

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1. Introduction

Small and medium enterprises (SMEs) in the Republic of Croatia constitute the largest share of businesses (over 99%), have the largest share in total revenues, employment, and export activities, and significantly contribute to economic growth and development (CEPOR, 2020, pp. 6-7). SMEs are often highlighted as generators of new ideas, recognizing and better exploiting entrepreneurial opportunities in the market compared to larger companies, thus contributing to the growth and prosperity of the national economy and creating additional capital (Nichter and Goldmark, 2009; Buli, 2017). However, it is a fact that SMEs are the most vulnerable group, operating in an environment of uncertainty and risk, leading to a high rate of growth and failure (Buli, 2017). Throughout their lifecycle, SMEs face numerous challenges: limited access to financing and markets, limited access to appropriate technologies and lack of technical knowledge and skills, insufficient understanding of international markets and production technologies, low productivity, lack of entrepreneurial competencies, and poor product quality. According to GEM research results (Singer et al., 2021), several components of the entrepreneurial environment in Croatia do not encourage the strengthening of entrepreneurial capacities in society, particularly an inadequate legislative framework, barriers to entering new markets, insufficient collaboration between science and business practice, and inadequate representation of entrepreneurship programs at the formal levels of primary and secondary education. Two components that are assessed as encouraging are the development and quality of physical infrastructure.

A significant problem in overcoming the lack of capabilities and environmental constraints requires more outstanding commitment from SMEs to understand customer needs and the potential for their satisfaction, as well as the ability to exploit good business opportunities in their environment (Buli, 2017, p. 13). This strategic/business concept focuses on the customer and fulfilling their needs, known as market orientation (MO). To better understand the business philosophy and market behavior of many successful companies applying the MO concept, Jaworski et al. (2000) propose two approaches to MO: *a market-driven approach and a market-driving approach*. According to the same authors (Jaworski et al., 2000), the market-driving approach refers to discovering market needs and aligning internal capabilities to satisfy them based on generating innovations. In contrast, the market-driven approach is based on a more radical application of innovations in products, creating unique systems or models, channels, and services (Kumar et al., 2002). Indeed, to be market-driven strategic is seen when a specific enterprise's operational resources such as market orientation, competitive intensity and technological dynamics equip entrepreneurs or managers with market information, such fits the strategic process for SMEs to attain high growth (Halliru, 2016). However, it is difficult to expect that SMEs in Croatia or the wider region will focus on market driving given the numerous issues mentioned above. Therefore, the first step in researching their market orientation (MO) is determining how SMEs apply a customer-oriented concept based on existing customer needs. A higher level of market orientation in SMEs should result in better performance, facilitating survival and development.

The literature over the past thirty years is rich with findings from many authors focused on the relationship between market orientation and business performance (Chen-Ho Chao and Spillan, 2010), as well as those that have not shown reliable assessments of the observed variables, for example, Jaworski and Kohli (1993). The concept of market orientation (MO) has significantly evolved recently, reflecting the dynamic challenges faced by SMEs. Recent studies highlight the key role of digital transformation in enhancing MO, emphasizing the use of information technology tools, especially big data analytics (Orero-Blat et al., 2024). In addition, there is a need to include the concept of sustainability to the MO theoretical framework, as SMEs are increasingly evaluated based on their social and environmental responsibility. For instance, Hanaysha and Al-Shaikh (2024) found that entrepreneurial orientation and market orientation significantly influence business sustainability and corporate reputation in SMEs.

This empirical study was conducted on a sample of 26 SMEs from Split-Dalmatia County in the Republic of Croatia, aiming to determine which group of factors contributes to increasing the market orientation of small and medium enterprises (SMEs) in various market environments in the broader region of Southeast Europe, representing a specific problem of this research.

This paper analyzes the factors influencing the development of market orientation dimensions (MO) conceptualized according to the model of Kohli and Jaworski (1990) in SMEs in Split-Dalmatia County, Republic of Croatia. The factors considered are: a) professionalization of management in SMEs, as a critical factor in the growth and development of small compared to medium and large enterprises, as predicted by the SME lifecycle model; b) quality of communication/dissemination of market information within the company, as a critical determinant of potential marketing success in SMEs, derived from the chosen theoretical orientation of Kohli and Jaworski (1990), i.e., Jaworski and Kohli (1993), based on market information; c) performance measurement of management staff in SMEs; and d) their material rewards, as potentially significant factors for attracting competent management staff and motivating them, which is directly related to the potential for professionalizing management.

The results of the empirical research can provide valuable and concrete information to entrepreneurs and managers in the observed SMEs and those in the broader region to be more competitive in the market and to policymakers to create an environment that encourages providing adequate support to SMEs.

The following sections present a literature review (on the development of marketing concepts and market orientation, various approaches in defining these terms, and, based on previous theoretical and empirical findings, the relationship and impact of market orientation on SME success. Small and medium enterprises are defined, an analysis of the situation, perspectives, and entrepreneurial environment in Croatia is presented, as well as the specifics of SME operations in the observed sample of enterprises), the research methodology is outlined, the obtained research results are presented, followed by a discussion, conclusion and implications, and a review of the literature used.

2. Literature review

2.1. Marketing concept and market orientation in SMEs

The marketing concept gained significant attention in the mid-20th century. The demands of the business environment, increasing competition, and turbulent changes, including customer perception and behavior since the 1950s and 1960s, form the basis for the emergence of the marketing business concept, which focuses on customers and satisfying their needs and desires (Grbac and Lončarić, 2010). The literature presents various viewpoints on marketing as a business concept. Felton (1990) defines the marketing concept as a way of thinking or acting in a company that requires the integration and coordination of all marketing activities, including their connection to all business functions in the company, to achieve maximum profits. McNamara (1972) offers a broader view, defining marketing as a business philosophy that emphasizes customer orientation, profit orientation, and the importance of marketing in communicating market needs with all business departments. According to Kohli and Jaworski (1990), the traditional definitions imply that the marketing concept can be explained through three constructs: a) customer orientation, b) coordinated marketing, and c) profitability. However, Barksdale and Darden (1971) argue that traditional marketing thinking has limitations and needs to arrive to a more operational definition of the marketing concept, further laying the foundation for the theoretical construct of market orientation.

Until the early 1990s, little attention was given to implementing the marketing concept and the relevant implementation factors (Felton, 1959; Lear, 1963; Webster, 1988). The marketing concept at that time was exclusively linked to the marketing function, and the term "marketing orientation" was used for such an approach to business. However, this approach had its conceptual limitations, leading to a newer approach that focused more on implementing the marketing concept in a company. This new business approach was called market orientation. Most authors consider this construct to represent the implementation of the marketing concept (Kohli and Jaworski, 1990; Dlačić, 2005).

From a terminological standpoint, the term "market orientation", as opposed to "marketing orientation" has several distinct advantages. The most important is that the concept of market orientation does not focus solely on the marketing function, but includes the importance and responsibility of all departments for generation, dissemination and responding to market information. The idea of „market orientation“ emphasizes the importance and responsibility of departments for satisfying customer need and acknowl-

edges the primary orientation toward the customer needs and preferences. Nevertheless, those needs and demands change over time, and a market-oriented company continuously monitors all market changes to deliver products and services of superior value (Jaworski and Kohli, 1993). This view is supported by Slater et al. (2010), who emphasize the inclusion of market information about competitors, which is used to undertake activities aimed at creating value for customers through continuous improvement of product and service quality and the development of innovative products.

In the theoretical discussion on market orientation, Hadcroft and Jarratt (2007) highlight four schools or approaches, based on the following common characteristics:

- □ recognition of the importance of all stakeholders, as well as an organizational culture focused on satisfying customer needs and comparing with competitors;
- □ focusing on creating and delivering superior benefits for customers;
- □ emphasizing collection, distribution, and response to market information, reliance on employee behavior norms, organizational systems and processes and
- □ coordination of business functions (departments), adaptive organizational structures, and top management support.

On Lafferty & Hult (2001), in their theoretical discussion of market orientation, suggest that there are five schools or approaches that explain the construct of market orientation differently:

- □ the decision-making approach;
- □ the market information approach;
- □ the behavior-based organizational culture approach;
- □ the strategic approach;
- □ the customer orientation approach.

The first approach in the theoretical consideration of market orientation, proposed by Shapiro (1988), emphasizes the importance of spreading information about markets and customers among different functions (departments) in the company. It highlights that clear communication, collaboration, and coordination among functions (departments) result in a more significant commitment to making and implementing strategic and tactical decisions. Poor coordination in a company can lead to incorrect decisions regarding resource allocation and the exploitation of business opportunities in the market, which applies not only to customer orientation but also to competitor orientation.

Perhaps the most significant theorists of market orientation, Kohli and Jaworski (1990), explain market orientation in terms of generating market information about current and future customer needs, disseminating it among departments, and responding to that information. This theoretical consideration focuses on market information, which also includes information about competitors and all exogenous factors in the external environment that may affect purchasing preferences and tendencies.

In the approach proposed by Slater and Narver (1995), organizational culture is considered inherent to market orientation, due to the significance of the behavioral component in customer orientation. Organizational culture represents a system of values, beliefs, and norms that determine and guide organizational behavior within the company (Deshpande and Webster, 1989). This school of market orientation identifies three behavioral components: a) customer orientation, b) competitor orientation, and c) interdepartmental coordination within the company. The first two components emphasize the importance of gathering market information, focused on customers and competitors. The third component emphasizes the dissemination of market information among functions (departments) in the company. This approach assumes that organizational culture determines behavior, ultimately affecting business performance.

Ruekert (1992) approaches market orientation from a strategic perspective, utilizing specific dimensions of market orientation proposed by Kohli and Jaworski (1990), as well as Narver and Slater (1990). Ruekert argues that a company's level of development of market orientation should be viewed in terms of how business units acquire and utilize market information about customers, create and develop strategies, and implement strategies in response to the gathered customer information. According to this approach, the level of market orientation development should be considered

concerning strategy choice and resource allocation.

Deshpande and Webster (1989) discuss market orientation exclusively in the context of customer orientation. They argue that market orientation should be viewed as part of the company's overall corporate culture, which prioritizes customer interests. They stress that the importance of other stakeholders (such as owners, managers, and others) should not be sacrificed to profitability. A company's corporate culture represents the values and beliefs the company aspires to, while its behavioral component is directed toward undertaking specific activities within the company (Jerčinović, 2019).

This paper will use Kohli and Jaworski's (1990) approach to market orientation. According to these authors, market orientation relies on the previously mentioned dimensions that are equally applicable to marketing and market orientation concepts. The explanation of the customer orientation should include actions related to gathering information about customers and their needs. Coordinated marketing emphasizes the importance of integrated and coordinated action among all departments, aimed at understanding and addressing customer needs, to be achieved through the appropriate dissemination of market information across an organization. The ultimate activity of the market information-based approach relates to the response to the collected and disseminated market information, implying the active role and focus of all departments on the customers' needs.

However, upon implementing the market orientation concept, the issue of company profitability arises, which is regularly observed as a consequence of effective marketing and market orientation (Levitt, 1960). Kotler et al. (2014) also emphasize that a company can achieve its organizational goals by understanding consumer needs better than its competitors, thereby finding the right products for its customers. This indicates that the predominant focus of market orientation is on customer orientation and the coordination of marketing activities based on market information (Kohli and Jaworski, 1990, p. 3). In other words, market orientation involves generating, disseminating, and responding to market information at all levels of the company.

Jaworski and Kohli (1993, p. 54) discuss three organizational factors within the company, which might facilitate or hinder the market orientation implementation. They hierarchically divided these organizational factors into top management, interdepartmental dynamics, and organizational systems. Along with the need for top management support for market orientation, there is a need for interdepartmental dynamics (Kohli and Jaworski, 1990, pp. 9-10; Jaworski and Kohli, 1993, pp. 55-56), which is observed through interactions and relationships among the departments. Conflict is one of the factors that can disrupt communication and collaboration among departments, thus hindering the implementation of market orientation of an entire organization. In contrast, integration and coordination of all departments facilitates communication and collaboration, enabling the organization to function as a cohesive whole, which is a prerequisite for implementing market orientation. Jaworski and Kohli (1993, p. 63) observe organizational systems through three structural dimensions: formalization (the existence of standardized rules and procedures), centralization, and departmentalization (the number of departments). Their results indicate that formalization, centralization, and departmentalization do not affect market orientation. It is suggested that market-oriented companies strive for standardized rules and procedures, decentralized decision-making, and good mutual communication and cooperation. Reducing conflicts among functions is also emphasized, which can be achieved through various activities, such as training programs and aligning interests within the company.

The system for measuring and rewarding employees (Jaworski and Kohli, 1993, p. 63) is also explored as an essential organizational factor in the market orientation of companies. Webster (1988) focuses on the criteria for evaluating and rewarding managers, noting that inappropriate reward systems are primarily based on (short-term) profitability and sales rather than relevant market criteria, such as customer satisfaction. Therefore, it can be expected that market-oriented companies with a well-developed system for evaluating and rewarding managers will be more proactive in generating and distributing market information and responding to it.

2.2. The impact of market orientation on SME performance

The literature over the last thirty years is rich with various findings from many authors who have focused on the relationship between market orientation and the business performance of enterprises (Chao and Spillane, 2010; Jaworski and Kohli, 1993; Narver and

Slater, 1990). Although a positive relationship among those variables can be expected at all times, a study by Jaworski and Kohli (1993, pp. 63-64) showed mixed empirical findings concerning this relationships. These authors found a significant relationship between market orientation and overall business performance, using subjective performance measures. However, they found no direct link between market orientation and performance, when assessing performance using measures based on specific (objective) indicators, such as market share. These findings can be viewed in broader research on the impact of various managerial tools on business performance. Specifically, the literature identifies two criteria for measuring business performance: based on managerial judgment and objective indicators, such as those, based on accounting metrics. In this context, it can be expected that a conversion from subjectively to objectively measured performance will be observed (Venkatraman and Ramanujam, 1987). Additionally, it can be stated that there is a critical level after which nonfinancial performance, often measured by using the subjective judgment, begins to convert into financial performance (Ittner and Larcker, 1998).

Since most of those studies have been conducted on large enterprises samples, specific characteristics can be expected for the relationship of the observed constructs in small and medium enterprises (SMEs). Pelham and Wilson (1995) believe that market orientation can be crucial for SMEs, provided that they rarely possess the necessary financial and other resources. Narver and Slater (1990) concluded that specific strategic units of large enterprises are successful, regardless of a lower level of market orientation, because they have a competitive advantage of lower costs. This could lead to the conclusion that market orientation is essential but that in the case of large enterprises, its absence can be compensated by other resources not necessarily available to SMEs.

A comparative study conducted by Chao and Spillane (2010) on a sample of US and Taiwanese SMEs shows the limited application of the marketing concept and its impact on business performance. The findings highlighted the significance of only one component of market orientation—responsiveness (reaction to market information), which may indicate that the agility of SMEs in responding to market information is a crucial aspect of their marketing capabilities.

Buli (2017, p. 14) analyzed a sample of manufacturing SMEs and confirmed a significant impact of market orientation on SMEs' business performance and competitiveness. Similar findings were supported by Raju et al. (2011) and Renko et al. (2005). Jaworski and Kohli (1993) argue that the relationship between market orientation and business performance should be viewed independently of the environmental influences, since they are characterized by market and technological changes and the intensity of competitive struggle. On the other hand, Narver and Slater (1990, p. 27) conclude that the relationship between market orientation and business performance is more robust in markets, characterized by lower growth rates and a strong impact of competition. They conclude that enterprises should begin developing market orientation promptly, i.e., while there are still no threats from external environmental factors. According to Kohli and Jaworski (1990), for a more effective implementation of market orientation as a business strategy, it is crucial to understand the market environment in which the enterprise operates, ultimately resulting in better customer satisfaction (Spillane et al., 2009, p. 141). In this context, Pelham and Wilson (1995) posit that SMEs should leverage their potential advantages over large enterprises, which include flexibility, greater adaptability to market needs, good customer relationships, and other. Buli (2017, p. 14) also shows that four out of five observed dimensions of entrepreneurial orientation (autonomy, competitive aggressiveness, proactivity, and risk-taking) have a direct, but partial impact on business performance. In a study of manufacturing SMEs (Pelham, 1999), it is suggested that market orientation has a positive and significant relationship with business performance, measured by both financial and nonfinancial indicators, such as marketing effectiveness, sales growth, market share, and profitability.

2.3. Definition of SMEs in the Republic of Croatia

The criteria for defining SMEs in the Republic of Croatia are determined by the *Accounting Act* and the *Act on Encouraging the Development of Small Business.* The *Accounting Act*[4] classifies entrepreneurs/companies based on size. It divides them into micro, small, medium,

[4] Accounting Act NN 85/24, in effect since 27 July 2024, https://www.zakon.hr/z/118/Zakon-o-ra%C4%8Dunovodstvu

and large enterprises, depending on the threshold values of total assets, total revenue, and average employment achieved during a specific business year. According to this law, SMEs meet two out of three criteria during a specific business year, related to the value of total assets, total revenues and the maximum number of employees.

The Act on Encouraging the Development of Small Business[5] defines entrepreneurs/companies as business entities (natural and legal persons) that are autonomous in their operations and engage in specific economic activities primarily to generate economic benefits (profit or income) in the market. According to this law, entrepreneurs/companies are defined as legal and natural persons who do not employ more than 250 workers during a specific business year, are autonomous in their operations, achieve average revenues equivalent to up to 50 million EUR, and have total assets equivalent to up to 43 million EUR.

However, the criteria for total revenue and total assets in these two laws are still not aligned, particularly in the Accounting Act, according to the recommendations provided by the European Commission. Following Croatia's accession to the EU, there is an agreement on using categorization criteria based on the size of SMEs.

3. Methodology of empirical research

3.1. Research questions and hypotheses

The research problem of this study is formulated in terms of analyzing the factors that influence the development of the dimensions of market orientation (MO), conceptualized according to the model of Kohli and Jaworski (1990) in SMEs in the Split-Dalmatia County of the Republic of Croatia. Considering the logic of the life cycle of SMEs (Smith et al., 1985), it can be realistically assumed that the key challenges of implementing and developing the dimensions of MO relate to factors that prove to be critical determinants in the transition toward more matures business lifecycle stages. In the context of transition from the entrepreneurial to the formalization and professionalization lifecycle stages, the role of introducing professional management in SMEs should be considered concerning the development of MO.

Assuming that the professionalization also affects the quality of communication and information dissemination, there should also be significant consequences for improving MO. The additional factors, considered in this study, also concern the formalization of business practices through the introduction of systems for formal performance measurement and material reward for management performance, which can also be expected in the transition toward the more mature organizational lifecycle stages. Therefore, the following research questions are posed:

- How does introducing professional management in SMEs in Split-Dalmatia County affect the performance and development of MO dimensions?
- How does the quality of communication and information in SMEs in Split-Dalmatia County affect the performance and development of MO dimensions?
- Is introducing a formal performance measurement system in SMEs in Split-Dalmatia County impacting the performance and development of MO dimensions?
- Does introducing a reward system for management performance in SMEs in Split-Dalmatia County impact the performance and development of MO dimensions?

We also wanted to examine the level of management orientation toward other organizational stakeholders, which could be considered a measure of a broader understanding of MO in SMEs, taking into account not only the customers' needs, but also stakeholder expectations. Through this dimension of a broadly defined MO, it could be argued that it relates to the interest in "leading the market". Therefore, an additional research question is also posed:

- What is the orientation of SMEs in Split-Dalmatia County toward other stakeholders (besides customers), and how does it affect the performance and development of MO?

Following the theoretical expectations arising from the logic of the SME life cycle (Smith, Mitchell,

[5] Act on the Promotion of Small Business Development NN 29/02, 63/07, 53/12, 56/13, 121/16, in effect since 31 December 2016, https://zakon.hr/z/527/Zakon-o-poticanju-razvoja-malog-gospodarstva

and Summer, 1985) and the extended orientation toward external stakeholders, the following research hypotheses are formulated:

□ *Hypothesis H1:* Introduction of management professionalization significantly affects SME MO performance in Split-Dalmatia County.
□ *Hypothesis H2:* The quality of communication/information flow in the company significantly affects SME MO performance in Split-Dalmatia County.
□ *Hypothesis H3:* Performance measurement of management in the company significantly affects SME MO performance in Split-Dalmatia County.
□ *Hypothesis H4:* Establishing a reward system in the company significantly affects SME MO performance in Split-Dalmatia County.
□ *Hypothesis H5:* There is a significant difference between SMEs regarding their level of MO, which determines the orientation of SMEs toward customers and other key stakeholders of the company.

3.2. Empirical methodology and sample

The empirical research was conducted on a convenience sample of SMEs in Split-Dalmatia County, by using an online research instrument—a survey set up on Google Forms. The survey link and an invitation for cooperation were sent to company emails, using a database of registered SMEs in Split-Dalmatia County, available through the Croatian Chamber of Economy (HGK), as well as through personal contacts. The total number of 26 questionnaires were received, constituting the final sample of respondents'/business entities. Given the convenience type and a small size of the sample, non-parametric tests are used, since the statistical assumption of normal distributions is not met.

Table 1 shows the sample structure by legal form. Most surveyed companies are limited liability companies (d.o.o.) - 22 or 84.6%. This is followed by simple liability companies (j.d.o.o.) - 2 or 7.7%. A negligible number of companies (1 business entity or 3.8%) are crafts and joint-stock companies (d.d.).

Table 1
Sample structure by legal form

	Frequency	%	Valid %	Cumulative %
Crafts	1	3,8	3,8	3,8
Simple limited liability companies (jdoo)	2	7,7	7,7	11,5
Limited liability company (doo)	22	84,6	84,6	96,2
Stock ownership company (dd)	1	3,8	3,8	100,0
Total	26	100,0	100,0	

Notes. Research results.

As demonstrated by Tables 2 and 3, regarding the criteria for defining small business entities, the average number of employees and annual total business revenues, most surveyed companies belong to the group of *small entrepreneurs.*

Table 2
Sample structure by the number of employees

		Frequency	%	Valid %	Cumulative %
	10-49	21	80,8	84,0	84,0
	50-249	4	15,4	16,0	100,0
	Total	25	96,2	100,0	
	Without response	1	3,8		
Total		26	100,0		

Notes. Research results.

Table 3
Sample structure by total revenue

		Frequency	%	Valid %	Cumulative %
Valid	-50 mil. Kn	25	96,2	96,2	96,2
	50-100 mil. Kn	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Notes. Research results.

Data on economic activity shows that just under half of the business entities in the sample come from the manufacturing industry (11 or 42.3%). At the same time, a third of the companies operate in other sectors, such as hospitality (4 or 15.4%), construction (3 or 11.5%), and professional, scientific, and technical activities (3 or 11.5%). A negligible percentage of companies are engaged in real estate activities (1 or 3.8%), financial insurance (1 or 3.8%), and agriculture, fishing, and livestock (2 or 7.7%) (see Table 4).

Table 4

Structure of the sample by industry	Frequency	%	Valid %	Cumulative %
Agriculture and fishing	2	7,7	7,7	7,7
Manufacturing	11	42.3	42.3	73.1
Construction	3	11,5	11,5	61,5
Transport and storage	1	3,8	3,8	65,4
Hospitality	4	15,4	15,4	80,8
Financial and insurance activities	1	3,8	3,8	84,6
Real estate activities	1	3,8	3,8	88,5
Professional, scientific, and technical activities	3	11,5	11,5	100,0
Total	26	100,0	100,0	

Notes. Research results.

The data highlights that the majority of surveyed business entities are 100% owned by a single individual (69.2%), while a slightly smaller number are in majority ownership by multiple individuals with varying ownership shares (19.2%). The sample includes a small number of business entities that are 100% owned by another business entity (7.7%), as well as those with majority ownership (75% or more) by an individual (3.8%). Most surveyed companies fall into small businesses (80.8%), while a significantly smaller proportion pertains to medium-sized enterprises (15.4%). The average age of the companies is 19.22 years (see Table 5).

Table 5
Ownership structure of surveyed SMEs

	Frequency	%	Valid %	Cumulative %
Person	18	69,2	69,2	69,2
Other company	2	7,7	7,7	76,9
Majority ownership of an individual	1	3,8	3,8	80,8
Multiple individuals	5	19,2	19,2	100,0
Total	26	100,0	100,0	

Notes. Research results.

3.3. Research instrument

The research instrument used was a survey questionnaire, developed based on previously conducted empirical studies, consisting of three parts. The first part contained demographic variables, which included questions about the essential characteristics of the companies, such as legal form and type of business, average number of employees, annual sales revenue, age of the company, and ownership structure.

The second part of the research instrument (questionnaire) included 13 items measuring respondents' attitudes towards SMEs' level of market orientation implementation. The items were adapted from the MARKOR research instrument (Kohli et al., 1993). To form attitudes toward marketing orientation, the items were divided into three groups, according to the market information MO framework (see Appendix for exact wording of the items). All items were measured using a traditional 5-point Likert scale *(1 = strongly disagree, 3 = neutral, 5 = strongly agree)*.

The third part of the research instrument (questionnaire) consisted of eight items analyzing the characteristics of SMEs in terms of market orientation and management through phases of business development. Relevant items measured respondents' perceptions regarding the delineation of the roles of entrepreneurs and professional management, formal evaluations of management performance, and reward systems for achieved business performance, following the logic of SME progression through the life cycle.

3.4. Data analysis

Data processing was conducted using the SPSS 25 software package. Statistical methods include descriptive statistics, correlation, statistical testing, and clustering. Non-parametric statistics were utilized to overcome limitations posed by the small sample size.

4. Results

4.1. Descriptive statistics

The level of market orientation implementation in SMEs was calculated for all items (see Appendix), adapted from the MARKOR instrument, and measured by using the standardized, 5-point Likert scale, following the recommendations of Kohli et al. (1993). There is an average level of market information collection and generation in the observed SMEs (mean value of 3.7143 and standard deviation of 0.83983) and market information response (mean value of 3.7308 and standard deviation of 0.81524), and a lower than average value foe market information dissemination (see Table 6).

Table 6
Mean values of MO components

		Market information collection and generation	Market information dissemination	Market information response
N	**Total respondents**	26	26	26
	Missing responses	0	0	0
Average value		3,7143	3,3846	3,7308
Median		3,9286	3,7500	4,0000
Standard deviation		,83983	1,07989	,81524
Minimum		1,00	1,00	1,00
Maximum		5,00	5,00	5,00

Notes. Research results.

By quantifying the responses from respondents, a quantified measure of overall MO was calculated (mean value of the three MO components values). The mean value of the overall MO indicator was 3.6099, with a standard deviation of 0.80524 (see Table 7).

Table 7
Mean MO construct value

	N	Min.	Max.	Average value	Stand. dev.
MO	26	1,00	5,00	3,6099	,80524
Valid N (listwise)	26				

Notes. Research results.

Analysis of key variables correlations used the Pearson's linear correlation coefficient (see Table 8). There is a significant linear (positive) relationship among all three observed MO components, which indicates a relationship among the marketing activities of SMEs, concerning marketing research and generation of marketing information, internal communication, and generating appropriate market response through marketing management activities.

Table 8
Pearson's correlations among MO components

		Market information collection and generation	Market information dissemination	Market information response
Market information collection and generation	Pearson's coefficient	1	,558**	,864**
	Sig.		,003	,000
Market information dissemination	Pearson's coefficient		1	,628**
	Sig.			,001
Market information response	Pearson's coefficient			1
	Sig.			

**** Correlation is significant at the 1% level (2-tailed test).**

Notes. Research results.

The normality of the distribution of quantitative variables was tested using the non-parametric Kolmogorov-Smirnov test. As shown by Table 9, two out of the three observed components of market orientation do not meet the normality assumption (likely due to the small sample size), with a test reliability of 1% ($p < 0.01$).

Table 9

Normality distribution (Kolmogorov-Smirnov) test

		Market information collection and generation	Market information dissemination	Market information response
N		26	26	26
Normal parameters[a,b]	Average value	3,7308	3,3846	3,7143
	Standard deviation.	,81524	1,07989	,83983
The largest differences	**Absolute**	,178	,216	,154
	Positive	,178	,169	,113
	Negative	-,168	-,216	-,154
Empirical value		,178	,216	,154
Asimp. Sig. (2-sided)		,033[c]	**,003[c]**	,116[c]

Notes. Research results.

Therefore, further analysis used the non-parametric statistics (Mann-Whitney and Wilcoxon Z tests). As previously mentioned, the research questions are grounded in the logic that observes the development and growth of businesses through their life cycle (Smith et al., 1985). It is interesting to examine the characteristics of these businesses in terms of changes in market orientation and management, when transitioning to the next stage of the life cycle, especially concerning the professionalization of management.

4.2. Testing hypotheses

We first tested the hypothesis H1. Results of the Mann-Whitney U test (Z = -2.104, p = 0.35) indicate that for the third MO component (marketing response to disseminated market information), there is a significant difference between businesses regarding the presence of professional management, which is a clear sign of increased business maturity (Table 10). Although empirical results show that introducing professional management enhances all MO components, transitioning toward a higher stage of maturity (life cycle) is significantly associated with market information response. This result is logical, since this phase involves the mature marketing management activities. However, despite companies with professional management achieving better results in marketing research and collecting market information (first MO component), as well as in disseminating/communicating this information within the company (second MO component), no significant differences exist for these MO components between businesses at lower and higher life cycle stages.

While this may result from research limitations, particularly regarding sample selection, statistical test results indicate that *hypothesis H1 is partially accepted.*

Table 10

MO differences based on SME management professionalization

	Low vs. high professionalization scores	N	Middle rank	Sum of ranks
Market information collection and generation	Differentiated	7	9,07	63,50
	Undifferentiated	16	13,28	212,50
	Total	23		
Market information dissemination	Differentiated	7	10,57	74,00
	Undifferentiated	16	12,63	202,00
	Total	23		
Market information response	Differentiated	7	7,64	53,50
	Undifferentiated	16	13,91	222,50
	Total	23		

a. Grouped by: Professionalization score: entrepreneur vs. manager.

b. Not corrected for tied values.

Notes. Research results.

Testing of the second working hypothesis (H2) is conducted based on the Mann-Whitney U test for all three MO components (Component 1: Z = -2.330, p = 0.020; Component 2: Z = -2.841, p = 0.004; Component 3: Z = -2.634, p = 0.008), considering the self-assessment of the quality of internal communication and information flow. Empirical results, presented in Table 11, indicate a significant impact of internal communication on all three MO components.

The obtained results are logical, as internal communication can theoretically be linked to a better understanding customer needs and a marketing response to them. Employees in companies with better communication possess the necessary information, find it easier to coordinate and make decisions, and focus on satisfying customers and their needs. Based on the empirical results, it can be concluded that hypothesis H2 is accepted.

Table 11
MO differences based on the quality of communication/information flow

	Quality of communication/ information flow	N	Middle rank	Sum of ranks
Market information collection and generation	Satisfactory	19	15,61	296,50
	Unsatisfactory	7	7,79	54,50
	Total	26		
Market information dissemination	Satisfactory	19	16,00	304,00
	Unsatisfactory	7	6,71	47,00
	Total	26		
Market information response	Satisfactory	19	15,84	301,00
	Unsatisfactory	7	7,14	50,00
	Total	26		

	Market information collection and generation	Market information dissemination	Market information response
Mann-Whitney U	26,500	19,000	22,000
Wilcoxon W	54,500	47,000	50,000
Z	-2,330	-2,841	-2,634
Exact Sig. (2-sided)	**,020**	**,004**	**,008**
Exact Sig. [2*(1-sided Sig.)]	**,018**[b]	**,004**[b]	**,008**[b]

Grouped by: Quality of communication (information flow).
b. Not corrected for tied values.
Notes. Research results.

Statistical testing of the third hypothesis (H3) was conducted using the Mann-Whitney U test again. The results indicate that for all three components of market orientation (Component 1: Z = -2.198, p = 0.020; Component 2: Z = -2.099, p = 0.036; Component 3: Z = -2.499, p = 0.012), there are significant differences in the MO performance among the groups of companies, based on the existence of a formal system for measuring managerial performance (see Table 12). Based on the empirical results, it can be concluded that *hypothesis H3 is accepted.*

Table 12

MO based on existence of managerial performance measurement

	Measurement of managerial performance	N	Middle rank	Sum of ranks
Market information collection and generation	Yes	9	17,28	155,50
	No	16	10,59	169,50
	Total	25		
Market information dissemination	Yes	9	17,00	153,00
	No	16	10,75	172,00
	Total	25		
Market information response	Yes	9	17,78	160,00
	No	16	10,31	165,00
	Total	25		

	Market information collection and generation	Market information dissemination	Market information response
Mann-Whitney U	33,500	36,000	29,000
Wilcoxon W	169,500	172,000	165,000
Z	-2,198	-2,099	-2,499
Asimp. Sig. (2-sided)	**,028**	**,036**	**,012**
Exact Sig. [2*(1-sided Sig.)]	**,027**[b]	**,043**[b]	**,014**[b]

a. Grouped by: existence of managerial performance measurement.
b. Not corrected for tied values.
Notes. Research results.

When examining the impact of a performance-based system for rewarding management to MO values (H4), the empirical findings from the Mann-Whitney U test indicate significant differences for the 01 st MO component - market information collection (Z = -2.013, p = 0.044) and the 3rd MO component - response to market information (Z = -2.896, p = 0.004). These results demonstrate significant MO differences based on implementing a performance-based reward system for managers (see Table 13).

As previously noted, it is essential to consider that the growth and maturity of SMEs through their life cycle can influence the implementation of marketing activities in various ways. However, since the empirical findings showed that the 2nd component of MO (internal communication or dissemination of market information) is not significantly different among SMEs in different life cycle phases, this is likely a result of the sample choice, where primarily small and younger companies prevail. We can conclude that hypothesis H4 is partially accepted based on the obtained empirical findings.

Table 13

MO differences based on performance-based managerial compensations

	Performance-based managerial compensation system	N	Middle rank	Sum of ranks
Market information collection and generation	Yes	15	16,07	241,00
	No	11	10,00	110,00
	Total	26		
Market information dissemination	Yes	15	15,30	229,50
	No	11	11,05	121,50
	Total	26		
Market information response	Yes	15	17,13	257,00
	No	11	8,55	94,00
	Total	26		

	Market information collection and generation	Market information dissemination	Market information response
Mann-Whitney U	44,000	55,500	28,000
Wilcoxon W	110,000	121,500	94,000
Z	-2,013	-1,450	-2,896
Asimp. Sig. (2-sided)	**,044**	,147	**,004**
Accurate Sig. [2*(1-sided Sig.)]	,047[b]	,164[b]	**,004**[b]

a. Grouped by: Existence of Material Reward System
b. Not corrected for tied values.
Notes. Research results.

The clustering method, based on the study conducted by Knežević et al. (2017), was further used to identify groups of companies with a higher and lower MO levels. Two clusters were identified. In Cluster 1, there are 13 companies with the following values of the MO components: mean value of 4.19 for market information collection, 4.21 for dissemination and 4.20 for response to market information. In Cluster 2, there are also 13 companies with mean values of 2.68 for market information collection, 3.25 for dissemination, and 3.23 for response to market information. The impact of SME orientation toward external stakeholders on the MO performance (H5) was tested, by using the cluster membership variable and the non-parametric Mann-Whitney U test.

Based on the empirical findings (see Table 14), it can be concluded that SMEs with a higher level of market orientation are more focused on achieving the interests of management (Z = -2.576 and p = 0.012). There are no statistically significant differences regarding orientation towards customers or any other stakeholder. The results indicate that managers in SMEs are more focused on their interests, prioritizing them over the satisfaction of customer needs and the interests of other stakeholders, which contradicts the foundational principles of market orientation. These findings suggest that surveyed SMEs are unaware of the importance of marketing concepts and market orientation. Additionally, owners/entrepreneurs who, for various reasons, hire professional managers tend to employ managers solely focused on their interests and compensation, as demonstrated in the previous analysis of the research results. Therefore, based on the obtained empirical results, *hypothesis H5 is rejected.*

Table 14
MO differences based on stakeholder orientation

	Cluster membership	N	Middle rank	Sum of ranks
Importance of achieving the interests of the owners	Higher importance	13	13,92	181,00
	Lower importance	13	13,08	170,00
	Total	26		
Importance of achieving the interests of the management	Higher importance	13	17,23	224,00
	Lower importance	13	9,77	127,00
	Total	26		
Importance of achieving the interests of the employees	Higher importance	13	14,12	183,50
	Lower importance	13	12,88	167,50
	Total	26		
Importance of achieving the interests of the company	Higher importance	13	13,54	176,00
	Lower importance	13	13,46	175,00
	Total	26		
Importance of achieving the interests of the customers	Higher importance	13	15,73	204,50
	Lower importance	13	11,27	146,50
	Total	26		

	Importance of achieving the interests of the owners	Importance of achieving the interests of the management	Importance of achieving the interests of the employees	Importance of achieving the interests of the company	Importance of achieving the interests of the customers
Mann-Whitney U	79,000	36,000	76,500	84,000	55,500
Wilcoxon W	170,000	127,000	167,500	175,000	146,500
Z	-,325	-2,576	-,446	-,035	-1,543
Asimp. Sig. (2-sided)	,745	**,010**	,655	,972	,123
Exact Sig. [2*(1-sided Sig.)]	,801[b]	**,012[b]**	,687[b]	1,000[b]	,139[b]

a. Grouped by: Cluster membership according to market orientation (MO)
b. Not corrected for ties.
Notes. Research results.

5. Discussion

The insufficient adoption of market orientation (MO) among SMEs is common. It can be argued that these characteristics are more closely related to the characteristics of owners/entrepreneurs, company resources, and the operational environment (Blankson et al., 2006) rather than external environmental characteristics. This is similar to achieving business results based on increased levels of market orientation (Becherer et al., 2001). However, it is essential to consider that the environments of transitional and post-transitional countries are particular, with a range of entrepreneurial motives, challenges, and success factors, including many non-market ones (Ramadani & Dama, 2013). This includes low support for entrepreneurship and often inadequate entrepreneurial infrastructure (Petković & Tešić, 2013).

These results must be viewed in light of understanding SMEs as a cornerstone of economic development and a tool for economic policy (Cepor, 2022). Financial and nonfinancial support for developing market orientation in SMEs is a compelling economic policy tool, leading to higher survival rates and business outcomes in the entrepreneurial sector, as empirically established (Petković & Berberović, 2013). Additionally, through efficient processes of building and strengthening entrepreneurial infrastructure and enhancing entrepreneurial competencies, the international competitiveness of the entrepreneurial sector and the entire national economy is also strengthened (Lall, 2000).

Therefore, it can be confidently stated that the issue of supporting market orientation in SMEs is one of the critical issues in economic policies and institutions, known to contribute to the overall standard of living and competitiveness (Trivić & Petković, 2015). This is particularly relevant for high-tech SMEs, where there is clear empirical evidence for the effectiveness of public support in this vital part of the entrepreneurial sector, especially in the case of China (Wonglimpiyarat, 2015; Xiang et al., 2021), which has shown excellent results in promoting innovation and competitiveness among Chinese SMEs.

The results of the initial empirical research, detailed in the conclusion of this paper, should, therefore be viewed in a broader context of support for SMEs, both through public policies and the construction of entrepreneurial infrastructure. Continuing research in this area can contribute to a better understanding the initial conditions and potential effects of supporting SMEs by enhancing their marketing capabilities and other factors for successful market entry.

6. Conclusion and implications

This study aimed to analyze factors affecting the development of market orientation (MO) dimensions in SMEs in Split-Dalmatia County, Croatia. The results are examined in the context of the growth and development of SMEs, conceptualized according to the life cycle model, and the orientation of management structures towards stakeholders.

To operationalize market orientation, Kohli

and Jaworski (1990) utilized the model based on components of gathering, distributing, and responding to market information. The results showed an average level of market orientation application in SMEs, with a significant positive correlation between all MO components, indicating a connection between marketing activities.

Testing the research hypotheses revealed:

□ H1: Concerning the response to market orientation, there is a significant difference concerning the presence of professional management, partially confirming the hypothesis H1.

There are significant implications of this finding for marketing practice and future research. Namely, it is possible that transitioning of SMEs through the life cycle has varying effects on different marketing activities. Observing this through the MO construct, future research could examine how the growth and development of SMEs influence marketing research and internal communication concerning the development of marketing management in SMEs. This study has shown that marketing research and other forms of collecting market information (constituting the first MO component) and the internal communication of this information (the second MO component) do not significantly differ among SMEs in various life cycle stages. Thus, these marketing activities may develop differently in SMEs than in marketing management, which could be considered critical in creating and implementing responses to market information (as the third component of MO). Whether this is true and whether different patterns exist in developing parts of marketing activities in SMEs throughout their life cycle should be determined in future research.

□ H2: The impact of internal communication is significant for all three MO components, thus accepting the hypothesis H2.

These results are logical and expected, since the high-quality communication and information flow serve as prerequisites for all MO-related activities.

□ H3: There is a significant difference in achieving all MO components based on the existence managerial performance measurement system, and the hypothesis H3 is accepted.

The empirical results are logical and comparable to previous analysis. When transitioning to the next stage of organizational lifecycle and business maturity, SMEs achieve better results, when formalizing overall management activities, which also implies a higher level of marketing management formalization. In this context, companies have recognized the importance of measuring performance, contributing to achieving desired business results.

Regarding the existence of managerial performance rewarding system, empirical results show the following:

□ H4: Significant differences exist for MO's first and third components but not for the second component, with the hypothesis H4 being partially accepted.

As their maturity increases, SMEs establishing performance-based reward systems for managers can be significantly associated with higher performance in the first and third MO component (collecting and responding to market information), while no significant differences exist for the second MO component (disseminating market information). Since these components relate to market research and the collection of market information, as well as the response to the dissemination of market information aimed at satisfying customer needs, the results indicate a relationship between the professionalization of management and, more broadly, the advancement of SMEs through the business life cycle and their MO.

This analysis provided interesting insights, but due to the limited sample, further research is needed on developing market orientation in the broader context of Southeast Europe.

6.1. Theoretical implications

This study contributes to the understanding of market orientation in SMEs, using the Kohli and Jaworski's (1990) framework in Split-Dalmatia County.

Firstly, our results suggest that professionalization of management plays a significant role in improving SME responsiveness to market information. Having professional managers helps SMEs act on that information more effectively by developing strategic decision-making and rapid market adaptation. Secondly, there is a significant impact of internal communication on all MO components. When employees communicate and share information freely, the company can better understand customer needs and respond swiftly to market changes. Thirdly, formal performance measurement systems positively influence all MO components, which suggests that organizational practices can foster market-oriented behaviors. A clear demonstration of managerial success, based on the market-related performance indicators encourages MO.

The partial acceptance of Hypothesis H4 provides insight into how reward systems influence MO. While incentives motivate managers to gather and act on market information, they may not necessarily improve internal communication processes. This indicates that some other tools are required to improve the organizational communication in SMEs.

An unexpected finding was that some SMEs with higher levels of market orientation prioritize management interests over those of customers or other stakeholders. This challenges the traditional view that customer focus is central to market orientation. It suggests that in transitional and post-transitional economies, SMEs might interpret and implement MO differently, possibly due to cultural norms or organizational priorities that emphasize internal goals.

6.2. Managerial implications

The results of this study offer practical guidance for SME owners and managers looking to improve their market orientation and competitiveness.

Firstly, introducing or strengthening professional management practices can significantly enhance a company's responsiveness to market information. As SMEs grow, bringing in professional managers with specialized skills and experience can improve strategic decision-making and help the company react more effectively to customer needs and market shifts Secondly, it is very important to support the culture of open communication. Managers should try to create an environment where information flows freely across all levels and departments. This can be achieved by regular team meetings, open communication channels, and transparent reporting systems. Thirdly, implementing formal performance evaluation systems can support managers' actions and provide a fit with company's market-oriented goals. Regular performance reviews can motivate managers to focus on activities that enhance the company's market orientation. Performance-based rewards can further encourage managers to adopt market-oriented behaviors. However, it's important to ensure that such reward systems don't inadvertently overlook the importance of internal communication, which is crucial for effective market orientation.

Lastly, the finding that some SMEs with high market orientation tend to focus more on management's own interests rather than on customers or other stakeholders serves as a caution. Managers should strive to balance pursuing internal goals with meeting customer needs. Putting too much emphasis on internal objectives can endanger the core principles of market orientation and potentially harm customer relationships and the long-term success of the business.

6.3. Limitations and suggestions for future research

First, our sample size was small, with only 26 SMEs from one specific region in Croatia, which limits the generalizability of the findings. Since we used convenience sampling, the results might not represent all SMEs in Croatia or similar transitional economies. Future studies should aim to include larger and more diverse samples from different regions and industries to make the findings more widely applicable.

Second, our study was cross-sectional, collecting data at a single point in time. This approach doesn't capture how market orientation practices might change over time as SMEs grow or adapt to new

market conditions. Conducting longitudinal studies that follow companies over a period would provide deeper insights into how market orientation evolves and its long-term effects on business performance.

Third, relying on self-reported data from managers could introduce bias. Managers might overstate positive behaviors or underreport challenges to present their companies in the best light. Including additional data sources—such as feedback from customers or employees and objective performance metrics—would provide a more balanced and comprehensive view of market orientation practices.

Moreover, our study focused primarily on internal factors within the companies and didn't deeply explore external influences like market conditions, competition intensity, or cultural factors. Future research could examine how these external elements interact with internal factors to affect market orientation. Understanding the broader context in which SMEs operate would help develop more nuanced strategies for enhancing market orientation.

An unexpected finding was that some SMEs with higher levels of market orientation focus on management interests rather than on customers' and other stakeholders' requirements. This suggests that in transitional and post-transitional economies, traditional concepts of market orientation might not fully capture the realities of SMEs. Future studies should analyze why this issues exists, by looking into cultural norms and economic pressures that shape the managerial priorities. Thus, future research can build a more complete understanding of how SMEs develop and benefit from MO, and what are the specific factors of developing and applying MO in specific, transitional and post-transitional economic environments.

CRediT authorship contribution statement

A. M. A.: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review

D. M.: Formal analysis, Writing – review

J. Č.: Methodology, Formal analysis, Writing – review

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APPENDIX: Survey items

□ Generating Market Information:

- "Our company continuously monitors changes and trends in the business environment (products/services, technology, business processes, competition, etc.)"
- "Our company frequently cares about the needs and satisfaction of our customers."
- "We are ready to react faster than the competition to changes in customer needs, always offering greater value."
- "At least once a year, we assess the potential impact of environmental changes on our customers."
- "Our company frequently conducts market research."
- "We use the Internet to gather more information about existing and potential customers."
- "To measure customer satisfaction, we use specific and measurable goals defined for each planning period."

□ Distribution (Dissemination) of Market Information:

- "Information about customer satisfaction is communicated at all levels within our company."
- "All information related to major customers or the market reaches everyone in the company as quickly as possible."

□ Response to Market Information:

- "In our company, measuring customer satisfaction is used to improve our product or service offerings, as well as to evaluate the characteristics of managers."
- "Our business philosophy is focused on continuous investment in new products or services."
- "In the last five years, we have significantly changed our product or service offerings."
- "Each year, we measure the quality of our product or service offerings based on customer satisfaction."

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Да ли маркетиншка оријентација малих и средњих предузећа прави разлику на тржишту?

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Кључне ријечи:

Мала и средња предузећа, маркетиншка оријентација, фактори који утичу на маркетиншку оријентацију, подршка развоју малих и средњих предузећа
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САЖЕТАК

У маркетиншки оријентисаним предузећима, маркетиншка оријентација заузима значајно мјесто као пословни концепт усмјерен на препознавање и задовољавање потреба купаца (тржишта). С обзиром на интересовање за ову тему, кључно је идентификовати и анализирати факторе који утичу на развој димензија маркетиншке оријентације (МО), концептуализоване према моделу који су предложили Коли и Јаворски (Kohli and Jaworski, 1990), као и њихов утицај на повећање МО. На основу доступне литературе и претходних емпиријских истраживања, идентификовани су сљедећи фактори за процјену њиховог утицаја на маркетиншку оријентацију: професионализација менаџмента у малим и средњим предузећимна (МСП), квалитет комуникације/дисеминације тржишних информација унутар предузећа, мјерење учинка менаџерског особља у МСП и њихове материјалне награде. Истраживање је спроведено на узорку од 26 МСП у Сплитско-далматинској жупанији, Република Хрватска, користећи статистичке методе дескриптивне статистике, корелације, статистичког тестирања и кластеризације. Непараметарска статистика је коришћена како би се превазишла одређена ограничења услијед мале величине узорка. Резултати су разматрани у контексту развоја предузетничке инфраструктуре и јавних политика за подршку предузетништву.

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The Importance of Soft Skills for Small and Medium-Sized Enterprises – Evidence from Bosnia and Herzegovina

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ABSTRACT
This article aims to investigate the importance of soft skills for starting and successfully running small and medium-sized enterprises (SMEs) in Bosnia and Herzegovina (BiH). Using data collected from a survey of 71 upper-level managers from enterprises operating in BiH, complemented by qualitative insights from a focus group on the same subject, the study examines the perception of the importance of skills such as leadership, communication, emotional intelligence, problem-solving, and teamwork. Statistical analyses, including descriptive analysis, Spearman correlation coefficients, Chi-square tests, and Fisher's Exact tests, reveal that most soft skills are highly valued by SMEs, with slight differences in perceived importance. Communication skills emerged as the most important, reflecting their central role in fostering productive business interactions. The conducted analyses also indicate that the desirable set of soft skills does not change with the company size, except for the leadership skill. Leadership shows a moderate positive correlation with company size, indicating its increasing importance in larger organizations. Qualitative findings confirm the importance of soft skills for starting and managing businesses, with emphasis on communication and problem-solving skills.

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1. Introduction

According to Donovan (2024), the term soft skills was first introduced in U.S. Army training courses in the early 1970s to refer to interpersonal skills rather than the skills needed for operating machinery or using weapons. During the 1980s and 1990s, the business and education sectors had begun to adopt this term, and its meaning began to evolve to include widely transferable skills of several types. Soft skills are defined as "interpersonal, human, people, or behavioral skills, and place emphasis on personal behavior and managing relationships between people", while hard skills are "associated with technical aspects of performing a job" (Rainsbury et al., 2002, p.9). Soft skills indicate personal transversal competencies such as social aptitudes, language and communication capability, friendliness and ability to work in a team, and other personality traits that characterize relationships between people (Cimatti, 2016).

This study explores the managers' perception of the importance of soft skills for small and medium-sized enterprises (SMEs), focusing on SMEs from Bosnia and Herzegovina.

According to the official European Commission definition[3], small and medium-sized enterprises are enterprises that have fewer than 250 employees and have either an annual turnover of less than EUR 50 million or a balance sheet total of less than EUR 43 million. Small and medium-sized enterprises play an important role in the European Union countries as well as in other European countries, such as Bosnia and Herzegovina. In 2022, about 24.3 million SMEs were active in the EU-27 and these SMEs accounted for 99.8% of all enterprises in the non-financial business sector (NFBS). These SMEs employed 84.9 million people in the EU-27 in 2022 or 64.4%, and accounted for 51.8% of EU-27 NFBS value added (Di Bella et al, 2023). In Bosnia and Herzegovina in 2022, small and medium-sized enterprises and entrepreneurs accounted for 99.6% of all SMEs and entrepreneurs. They employed 69.6% of all employees, and accounted for 68.3% of gross revenue (Agencija za statistiku BiH, 2024).

The objective of this article is to investigate the importance of soft skills for starting and successfully running small and medium sized enterprises (SMEs) in Bosnia and Herzegovina (BiH). Both quantitative and qualitative methods were employed in this study, to explore the importance of soft skills for small and medium enterprises. The paper uses data collected within Horizon USE IPM[4] project on the needs of the business community for entrepreneurial soft skills. The paper is systematized as follows: Section 2 provides the literature review, Section 3 describes the research methodology, Section 4 provides an interpretation of the research results, Section 5 provides discussion, while Section 6 provides conclusions and implications of the research.

2. Literature Review

2. 1. Definition and Meaning of Soft Skills

The terms hard and soft skills have developed over the years as a way of identifying characteristics and skills needed to be successful in management positions or as an employee.

Soft skills are defined as traits, attitudes, abilities, and behaviors that allow an individual to work in a team, control the environment, perform optimally, and achieve goals (Florea & Stray, 2018).

Weber et al. (2011, p. 98) define soft skills as "interpersonal, human, people, or behavioral skills needed to apply technical skills and knowledge in the workplace". According to Bailly & Léné (2012) soft skills include the ability to communicate, empathy and a sense of involvement and initiative, but also include certain physical and psychological qualities such as appearance and personality. According to Manmohan (2017) the important soft skills are: communication skills, interpersonal relationship, team building, leadership, time management, presentation skills, managing stress, thinking skills, problem solving, decision making and workplace etiquette.

[3] Commission Recommendation of 6 May 2003 concerning the definition of micro, small, and medium-sized enterprises (2003/361/EC), Official Journal of the European Union, L 124/36, 20 May 2003

[4] Up-Skilling Researches for Sustainable Entrepreneurship Based on Innovation Process Management https://useipm.com/.

2.2. Importance of Soft Skills for SMEs

Several studies have proven the link between the level of soft skills of managers and employees and their individual performance and that of the company as a whole (Howes, et al., 2017; Ibrahim, et al., 2017; Johnson, 2021). Lok et al. (2021) finds that soft skills are important for successful management and leadership of others. Communication, teamwork, problem solving and adaptability are vital soft skills for venture growth.

A study by Hodges and Burchell (2003) investigated the perceptions of business employers of the importance of different skills. It was reported that eight out of the top ten skills were soft skills. The top ten ranked competencies in order were: ability and willingness to learn; energy and passion; teamwork and cooperation; interpersonal communication; customer service orientation; order, quality and accuracy; flexibility; problem solving; achievement orientation; and, initiative. This study found that technical expertise was the competency considered less important by the employers (ranked 21st). It is likely that the lack of emphasis placed on such hard skills indicates that these are considered 'a given' and/or that any deficiencies can be 'fixed' through further training/education – whereas soft skill deficiencies may be seen as less easily overcome.

Kotsios (2023) investigated the skills and values that can be related to building resilient SMEs on the sample of 266 Greek and Polish business owners and managers. According to the results, reliability, integrity and work ethics have been pointed out as vital for the long-term viability of a business while facing crisis situations. Another set of conclusions is related to specific soft skills: the most important soft skills for business owners and managers were communication; decision making and risk identification and assessment.

Bečić et al. (2024), on a sample of 80 managers from Italy, Latvia and Croatia, analyze which soft skills firms require, and investigate whether companies offer training to improve and develop soft skills among employees. They found that majority of managers perceive soft skills as crucial assets of the firm, especially creativity, emotional intelligence, complex problem solving, critical thinking and coordinating with others.

In its research, Sarker and Albluwi (2021) explored the relation between soft skills and innovation in the SME sector in Malaysia. The results of this research have identified that communication, teamwork, leadership, critical thinking, positive attitudes, flexibility, and adaptability are the most important soft skills that help the entrepreneurs in Malaysia to be innovative.

Almeida and Devedzic (2022) explored the relevance of different soft skills for entrepreneurs, focusing on entrepreneurs from Portugal and Serbia. The findings reveal that soft skills competencies play a key role in the entrepreneur's activity, highlighting emotional intelligence, resilience, and persistence as fundamental attributes that an entrepreneur should possess. Also, the authors find that an entrepreneur's geographic area is a relevant factor in the perception of the relative importance of soft skills.

Tem et al. (2020) explored the importance of soft skills development to enhance entrepreneurial capacity. The qualitative research through in-depth interviews discovered that all informants agreed that soft skills are important for being a successful entrepreneur as they enable entrepreneurs to be good leaders. Moreover, soft skills acquisition can motivate entrepreneurs to do new things, encourage them to share their ideas and can allow them to communicate effectively with their customers and business partners. Also, the research showed that entrepreneurs with sufficient soft skills can motivate their colleagues and stakeholders to involve actively in their business activities. Critical thinking and problem-solving are the most important soft skills for majority of informants. These soft skills enable entrepreneurs to improve their capacities in a competitive business environment.

3. Methodology

The paper uses both quantitative and qualitative approaches to ensure a comprehensive understanding of the importance of soft skills for SMEs. The methodology and tools for both approaches are given below.

3.1. Quantitative Research

To explore the importance of soft skills for small and medium enterprises, this paper uses data collected

for the needs of the USE IPM project on the needs of the business community for entrepreneurial soft skills. The survey questionnaire was distributed by email to the upper-level managers in companies in Bosnia and Herzegovina that they filled out using Google Forms, collecting 71 responses in total. A five-point Likert scale was used to address the respondent's perception of the importance of different soft skills for the business and to address the best ways to develop soft skills within a company. The responses varied from 1 (not important) to 5 (very important).

Of the 71 respondents, 32 were managers in small companies (45% of the sample), 16 in medium (23%) and 23 in large companies (32%). The main criteria for choosing the participants were that they hold an upper management position within a company in Bosnia and Herzegovina, that they have direct contact with the employees and participate in the recruiting and onboarding processes, so that they have enough experience and knowledge to assess the importance of soft skills in different aspects. The gender structure is balanced within the sample, with 56% of the total respondents being males and 44% females. The structure of the companies in the sample is given in Table 1.

Table 1
The Sample Structure

Business Sector	Number of respondents
Area A: Agriculture, forestry, and fishing	2
Area C: Manufacturing industry	3
Area D: Production and supply of electricity, gas, steam, and air conditioning	2
Area E: Water supply, sewerage, waste management, and remediation activities	2
Area F: Construction	4
Area G: Wholesale and retail trade; repair of motor vehicles and motorcycles	11
Area H: Transportation and storage	4
Area J: Information and communication	10
Area K: Financial and insurance activities	9
Area L: Real estate activities	2
Area M: Professional, scientific, and technical activities	6
Area N: Administrative and support service activities	3
Area O: Public administration and defense; compulsory social security	1
Area P: Education	4
Area Q: Human health and social work activities	1
Area S: Other service activities	7
TOTAL	**71**

Notes. Authors' calculation.

The sample covers approximately 0.2% of the total of 31,983 companies in Bosnia and Herzegovina (Agencija za statistiku BiH, 2024). The sample size was determined for the 90% confidence interval with a 10% margin of error, which suggests a sample size of 68 companies. With a response rate of just above 10%, we collected 71 responses in total.

The article focuses on respondents from small and medium companies, with 48 respondents, and analyzes the soft skills they find important in general and for starting and running the business using distribution charts.

The article firstly provides a descriptive analysis of the perception of soft skills within SMEs, i.e. the skills that managers find important in general, and for starting and running the business. The relationship between the perception of soft skills and the size of the company is explored using the Spearman rank correlation. Additionally, contingency tables are tested using Chi-square test and Fisher's Exact test for Count Data to examine the relationships between the size of the company and the perceived importance of soft skills. The analyses and results are produced using the R programming language.

3.2. Qualitative Research

The quantitative research was supplemented by a qualitative method, namely focus group analysis. The focus group research was used to explore managers' opinions, attitudes, beliefs, feelings, and behaviors related to the research topic. Six experts participated in the focus group that was organized by the Faculty of Economics of the University of Banja Luka in November, 2023 within Horizon USE IPM project. Four of six experts were managers of SMEs operating in Bosnia and Herzegovina, while 2 of six experts were managers in the field of human resource management.

The aim of the focus group research was to gain a deeper understanding of the essential "soft" skills that will facilitate young people's successful integration into the workforce when seeking employment or starting their own business.

The research instrument consisted of a protocol that contained a list of discussion topics formulated in accordance with the fundamental categories of "soft" skills. For the purpose of formulating the discussion topics, referent literature regarding "soft" skills was consulted. Discussion topics included:

1. Participants' opinion regarding essential interpersonal and intrapersonal skills that are crucial for successful integration into the workforce and managing an entrepreneurial business among young people.
2. Interviewees' views on the importance of managerial skills and problem-solving skills for successful business start-up and management.
3. Interviewees' attitudes regarding the relevance of information, opportunity, and risk management skills for successful inclusion in the workforce and business start-up.
4. Participants' views on the importance of creative thinking and innovation for successful inclusion in economic flows and business start-ups.
5. Proposal and rationale for the need for other „soft" skills not emphasized by the focus group moderators.
6. Interviewees' view on the key „soft" skills that should be evaluated by the HR department during the selection process, as well as the instruments that can be used for that purpose.
7. Attitudes of interviewees regarding the development of soft skills.

The gathered data from the focus group were processed through qualitative analysis, which includes presenting the interviewees' opinions on the topics discussed during the focus group, creating criteria for grouping responses, and categorizing responses based on those criteria.

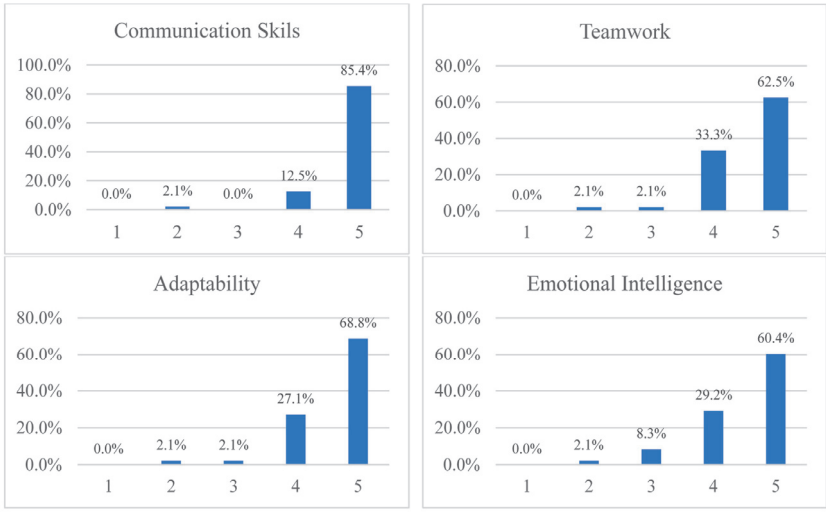
4. Empirical Results

4.1. Quantitative Research Results

In the first question the respondents were asked to rate the general importance of the following soft skills: communication skills, teamwork, adaptability, and emotional intelligence. The distribution of responses for SMEs is given in the Graph 1.

Graph 1

The Importance of Soft Skills for SMEs



Notes. Authors' calculation.

The managers within SMEs perceive communication skills as crucial, with 12.5% ranking them as important and 85.4% as very important. There is a strong consensus that communication is essential soft skill as only 2.1% of the respondents gave ratings of less than important. Among all other soft skills, communication is ranked the highest.

While teamwork is still seen as highly important (most respondents rated it a 5 or 4), there is slightly more variation in the responses compared to the communication skills - 62.5% rated teamwork as very important, but a considerable portion (33.3%) also rated it slightly lower (important), suggesting that teamwork is crucial but perhaps not universally seen as absolutely essential as communication skills.

A majority of respondents (68.8%) rated adaptability as a very important soft skill, with an additional 27.1% rating it as important. Only a small fraction (2.1% each) gave a rating of 3 or 2, and no respondents rated adaptability as unimportant (1). The overall picture shows that adaptability is regarded as essential, with more than two-thirds of respondents considering it crucial and very few as less than important.

The presence of a few lower ratings (3 and 2) might indicate that while adaptability is highly valued, there may be some respondents who place slightly less emphasis on it compared to other skills. Next, 60.4% of respondents rated emotional intelligence as very important, while 29.2% rated it as important. A larger portion (compared to other skills) rated emotional intelligence as moderately important (8.3%) and slightly important (2.1%). No respondents rated emotional intelligence as unimportant. While emotional intelligence is clearly valued (with 89.6% rating it as 4 or 5), there is more variation in the responses compared to adaptability, with a slightly higher percentage of people rating it lower. This could suggest that while most respondents recognize the significance of emotional intelligence, it is perhaps seen as somewhat less critical compared to skills like adaptability or communication, or its importance might vary depending on the specific role or industry.

The overall takeaway from the analysis is that a large majority of respondents' value soft skills as generally important, since all of the analyzed soft skills are viewed as important by the majority of respondents. Communication has a strong consensus about being the top-ranked skill among the analyzed ones, with minimal variation in responses. It is followed by teamwork and

adaptability, which exhibit a slightly more variation in responses, but still score high on important and very important scores. Slightly lower importance is attributed to emotional intelligence, having the lowest percentage of important and very important scores.

The next step in the analysis is to calculate the Spearman correlation coefficients between the company size and the perceived importance of the four soft skills described above. The respondents rated their companies as small, medium or large in terms of size, so we calculated the correlation coefficient between the size of the company (companies divided into small, medium, or large groups) and the importance ratings for each of the soft skills.

The Spearman rank correlation was used because it is a nonparametric technique for evaluating the degree of linear association or correlation between two independent variables, and it operates on the ranks of the data rather than the raw data (Gauthier, 2001). Unlike Pearson's product-moment correlation coefficient, it does not require the relationship between the variables to be linear, nor does it require the variables to be measured on interval scales, and can therefore be used for variables measured at the ordinal level (Hauke & Kossowski, 2011).

Table 2

Spearman Correlation Coefficients between Company Size and Importance of Soft Skills

Communication skills	Rho: 0.1934445
	p-value: 0.5314
Teamwork	Rho: 0.07551475
	p-value: 0.5314
Adaptability	Rho: 0.136871
	p-value: 0.8842
Emotional intelligence	Rho: 0.0176023
	p-value: 0.8842

Notes. Authors' calculation.

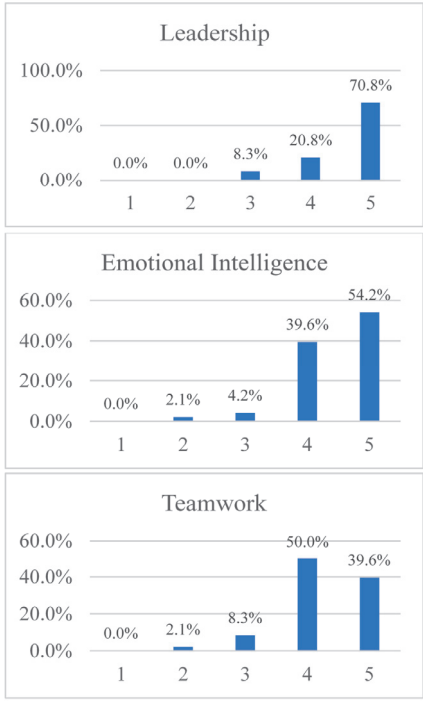
The Spearman correlation coefficients for all four soft skills are very weak and not statistically significant, with p-values well above the common significance threshold of 0.05. This suggests that company size does not appear to significantly influence how important respondents perceive communication, teamwork, adaptability, or emotional intelligence, so that any observed differences in the importance of soft skills based on company size are likely due to random chance rather than a systematic relationship.

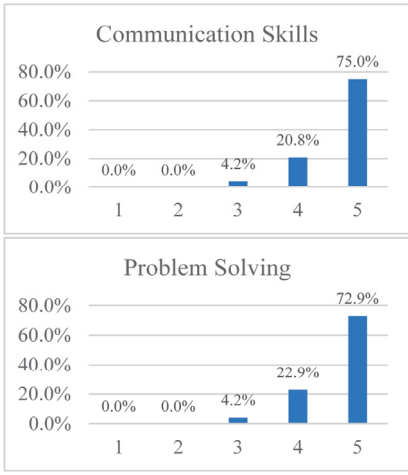
In summary, the importance of these soft skills seems to be consistent across companies of different sizes (small, medium, and large), with no strong evidence that larger or smaller companies place more or less importance on any of the skills.

The next question asked the respondents to rate the importance of soft skills for starting and successfully running a business. The soft skills in question were leadership, communication skills, emotional intelligence, problem solving, and teamwork. We extracted the answers for SMEs in order to evaluate what skills are the most desirable for starting and running a SME. The distribution charts of responses for SMEs are given on the Graph 2.

Graph 2

The Importance of Soft Skills for Starting and Successfully Running a SME





Notes. Authors' calculation.

The data collected from the survey clearly highlights the importance of soft skills for starting and running a SME. The respondents found communication and problem-solving skills to be most important, with 95.8% rating them with a 4 or 5. The communication skills are perceived as slightly more relevant, since they scored more highly important ratings than the problem-solving skills.

Leadership scores the third place, having 91.6% of the responses rating it as important or very important. It is followed by emotional intelligence and, lastly, teamwork. It should be emphasized that all the skills are perceived as important, with slight nuances differentiating them.

The next step in the analysis was to examine whether the skills required for starting and running a business differ for the companies of different sizes. We therefore calculated the Spearman correlation coefficient between the size of the company and the importance ratings for each of the soft skills analyzed. The companies were divided into small, medium, and large groups.

Table 3

Spearman Correlation Coefficients between Company Size and the Importance of Soft Skills for Starting and Successfully Running a Business

Leadership	Rho: 0.347657
	p-value: 0.002971
Communication skills	Rho: 0.05322893
	p-value: 0.6593
Emotional intelligence	Rho: 0.01286492
	p-value: 0.9152
Problem solving	Rho: -0.0202627
	p-value: 0.8668
Teamwork	Rho: -0.01294688
	p-value: 0.9147

Notes. Authors' calculation

The only statistically significant correlation coefficient is between the leadership skill and the size of the company, the coefficient being approximately 0.35 and its p-value 0.002971. The correlation is medium (Cohen, 1988, p. 77-81) and positive, suggesting that importance of the leadership skill increases with the company size.

For the rest soft skills (communication skills, emotional intelligence, problem-solving, and teamwork), the correlations with company size (small, medium, and large) are extremely weak (close to 0), and none are statistically significant (all p-values > 0.05). This means that, based on this data, company size does not appear to influence the importance of these soft skills for starting and running a business.

The results suggest that bigger companies require more leadership skills, while the rest of the soft skills are equally important regardless of the size.

An additional analysis was conducted to examine the relationship between the company size and the desired skill set to start and run it. We again took the 3 levels of company sizes and 5 levels of importance ratings to make 3x5 contingency tables. We then test the association between the observed variables using both Chi-square and Fisher's Exact test. One of the assumptions for using the Chi-square test for contingency tables is to have the expected frequencies above 5, which is not met in our tests, since ratings of 1, 2, and 3 do not meet this requirement, even after combining them into one category. Therefore, we will address the Fisher's Exact Test as the most common alternative in this case (Howell, 2011).

Table 4

Tests on Contingency Tables Between the Importance of Soft Skills for starting and Running a Business and Company Size

	Chi-square test	Fisher's Exact test for Count Data
Leadership	X-squared = 5.4798, df = 2, p-value = 0.06458	p-value = 0.07729 alternative hypothesis: two.sided
Communication skills	X-squared = 1.1512, df = 2, p-value = 0.5624	p-value = 0.787 alternative hypothesis: two.sided
Emotional intelligence	X-squared = 0.69861, df = 3, p-value = 0.8735	p-value = 0.9362 alternative hypothesis: two.sided
Problem solving	X-squared = 3.3423, df = 2, p-value = 0.188	p-value = 0.2325 alternative hypothesis: two.sided
Teamwork	X-squared = 3.3607, df = 3, p-value = 0.3393	p-value = 0.3395 alternative hypothesis: two.sided

Notes. Authors' calculation

In all conducted tests, both Chi-square and Fisher's Exact, we fail to reject the null hypothesis of variables not being associated. The results are in line with the results of the Spearman correlation coefficient, except for the leadership skill. The Spearman correlation coefficient showed a statistically significant relationship between the company size and the importance of leadership, while the contingency table tests failed to find a significant association. When comparing the Spearman correlation coefficient with different measures of association, it proves to be robust and less influenced by the distribution of categories, making it suitable for identifying consistent patterns even in the presence of ties (Brown & Benedetti, 1977). The contingency table tests, in line with the previous property, show the lowest p-values for this skill - 0.06458 for the Chi-square and 0.07729 for the Fisher's Exact test, suggesting the presence of a trend and supporting the findings of the Spearman correlation coefficient.

4.2. Focus Group Results

In order to gather information about the necessary "soft" skills that will facilitate the successful inclusion of young people in an employment process or when starting their own business, the participants were asked questions in seven segments (University of Banja Luka, 2023).

The first question aimed to determine the respondents' views on the soft skills that are important for young people to successfully enter the sphere of work and to run a business. When asked about the importance of the soft skills, four out of six respondents stated that communication skills are extremely important. One of the respondents from the field of human resource management (HRM) pointed out that communication skills are very important, especially assertive communication. The second respondent pointed out that communication differs depending on the type of profession and work performed in the organization, but it is equally important, only a different approach is necessary.

The second question related to the examination of respondents' attitudes regarding whether and which managerial and problem-solving skills are important for successfully starting and running a business. All respondents considered managerial and problem-solving skills as important for successful business management. As key managerial skills, they highlighted: motivating the team, involving all levels of managers in improving communication skills, establishing relationships and regular conversations with colleagues.

Examining the views of respondents on whether the skills of managing information, opportunities and risk are essential for successful inclusion in the sphere of work and starting a business constituted the third question. When it comes to skills of information management, opportunities management and risk management, all respondents agreed that they are of great importance for successful inclusion in the sphere

of work and for starting a business. It was pointed out that it is important to have a control of information and to be able to summarize it simply, to be able to look for opportunities and to know how to manage risks, both when starting a business and in everyday work.

The fourth question aimed to find out the views of respondents regarding whether creative thinking and innovation are important for successful inclusion in economic flows and for starting a business.

Creative thinking for the respondents implies a condition without which there is no significant progress in business. A respondent from the HRM emphasized that we live in a time of constant change and adaptation and, because of that, people within organization and the organization itself must be sufficiently flexible. Also, the respondents believe that it is necessary to give freedom to young people in those branches where it is possible. However, two respondents mentioned that in some sectors, such as the financial sector with strict procedures, there is not much room for freedom and significant creativity. In addition to flexibility, respondents attached great importance to continuous learning and education. Innovation was also highly rated. The respondents from the field of entrepreneurship especially considered the importance of innovation, pointing out that without innovation there is neither entrepreneurship nor further growth and development of the company. The respondents believe that creative and innovative employees should be motivated and rewarded: "Top results are made by top individuals".

It is important to establish a "correct value system".

The fifth topic discussed in the focus group related to proposing other soft skills that were not highlighted by the moderator of the focus group, which are important for inclusion in the sphere of work and starting a business. The respondents emphasized the importance of the following soft skills: leadership, time management, ability to solve problems, accountability, coaching, mentoring and separating the important from the non-important.

The sixth question related to examining respondents' views on the key soft skills that the HRM should evaluate during the selection process of the candidates, as well as which instruments can be used for that purpose. In addition to the classic interview that takes place after the pre-selection of candidates, the respondents stated that an intelligence test, a team role test (e.g. prof. Belbin's test), a general knowledge test and a technical knowledge test are recommended.

The last, seventh question referred to ways of developing soft skills during the educational process and, later, at work. The respondents agree that soft skills are important for the business sphere and should be developed during the educational process as well as later, during employment.

5. Discussion

The findings of this article confirm the important role of soft skills in the successful establishment and management of SMEs. The use of both quantitative and qualitative analyses provides a more comprehensive understanding of the importance of soft skills for SMEs in BiH.

The statistical analyses reveal that most soft skills are universally regarded as important across SMEs, with minimal variation based on company size. Communication skills emerged as the most important, reflecting their central role in fostering productive business interactions. These findings are in line with previous research of Lok et al. (2021), Sarker and Albluwi (2021), and Kotsios (2023).

Respondents also highly valued teamwork, emotional intelligence, and adaptability, confirming the results of previously analyzed studies (Hodges & Burchell, 2003; Howes et al., 2017; Ibrahim et al., 2017; Johnson, 2021) that soft skills are generally important for entrepreneurs and for venture growth. Also, studies on the perception of soft skills among European employers, conducted by Succi and Canovi (2019) and Andrews & Higson (2008), confirm the findings that communication skills and teamwork are ranked as the most important soft skills.

The importance of soft skills did not change with the increase of the company size, with one exception. Leadership was the only skill to exhibit a statistically significant correlation with company size, indicating that as organizations grow, the importance of strong

leadership becomes more pronounced. The contingency table tests failed to confirm a significant association, suggesting that the observed correlation may not translate into categorical differences detectable through frequency-based tests. This discrepancy highlights the sensitivity of Spearman correlation to trends that may not result in large deviations across categorical data. With a statistically significant Spearman correlation coefficient and p-values of Chi-square and Fisher's Exact tests close to the reference point of 0.05, it is sensible to say that a certain association between the leadership skill and the company size does exist. This is in line with the findings of Succi and Canovi (2019), who confirm that leadership ranks among the least important soft skills for graduate employability, suggesting that this skill may be more important for higher positions in larger companies.

Other skills, including emotional intelligence, teamwork, and problem-solving, showed no significant relationship with company size, suggesting they are equally important across all organizational sizes.

The focus group findings add depth to the quantitative results, emphasizing communication and problem-solving as universally critical for SMEs.

Participants highlighted the importance of assertive communication, creative thinking, and adaptability in addressing the dynamic challenges faced by businesses. Interestingly, leadership was also identified as vital, with respondents stressing its role in motivating teams, fostering innovation, and ensuring strategic direction. This qualitative emphasis on leadership aligns with the results of the quantitative analysis, further supporting its growing importance in larger organizations.

Additionally, the qualitative analysis revealed the need for other soft skills not explicitly covered in the quantitative survey, such as time management, accountability, and coaching abilities. These skills contribute to the broader capacity of managers to lead effectively and navigate the complexities of modern business environments.

6. Conclusions and implications

In conclusion, soft skills represent an indispensable element of entrepreneurial and managerial success in SMEs, and their importance is recognized across companies of all sizes.

6.1. Theoretical Contributions

This article reinforces the theoretical perspective that soft skills are essential for entrepreneurial success and the growth of SMEs. It confirms previous findings that emphasize communication skills, teamwork, emotional intelligence, leadership, adaptability, and problem-solving as crucial components of entrepreneurial competence. However, this study places special emphasis on the importance of soft skills for SMEs, and analyzes the differences in perception of soft skills' importance between SMEs and large enterprises. Additionally, by focusing on SMEs in Bosnia and Herzegovina, the article contributes valuable, context-specific theoretical insights, situating soft skills research within particular geographic and cultural settings.

6.2. Policy and Managerial Implications

The theoretical findings of this study have practical implications, particularly for the development of training programs and policies aimed at strengthening soft skills in SMEs. Recognizing the importance of soft skills can drive to the incorporation of soft skills training in education and vocational programs. Also, managers must recognize the importance of soft skills when recruiting new employees. While technical expertise is important, managers should place equal emphasis on interpersonal skills during the hiring process. Assessments of candidates' communication abilities, teamwork aptitude, and emotional intelligence can ensure that the team is not only skilled but also capable of working harmoniously in a collaborative environment.

As the study emphasizes, leadership becomes more critical as organizations grow, suggesting that scaling SMEs should focus on cultivating leadership competencies alongside other soft skills. This insight contributes to the human resource management, advocating for continuous leadership strengthening as organizations expand.

6.3. Limitations and Suggestions for Future Research

The limitations of this study include the small sample size, obtained for a 90% confidence interval

with a 10% margin error, which may be at risk of producing biased results and type II errors in statistical tests, and the lack of relevant studies on the topic of soft skills' importance. Additionally, the structure of the respondents in the sample deviates from the overall structure of companies in Bosnia and Herzegovina in terms of the business sector structure, which could affect the representativeness and generalizability of the findings. To prevent potential errors, we complemented the quantitative results with the qualitative insights from the focus group.

Future research could involve a larger and more appropriate sample in terms of structure. The research encompassing neighboring countries would enable the researchers to analyze how the perception of soft skills' importance differs between different countries and different cultural and socio-economic contexts. The sector-specific analysis could also be a useful tool to investigate the role of soft skills within specific industries. Moreover, differentiating between the skills needed for different management levels within organizations would provide a guideline for employees on what soft skills they need to develop to advance to a higher position. Finally, the research focusing on the effectiveness of soft skill development programs for SMEs could provide valuable insights into strategies for enhancing these competencies and their impact on organizational performance.

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Biography

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Значај меких вјештина за мала и средња предузећа – докази из Босне и Херцеговине

Јадранка Петровић, Милица Марић

Универзитет у Бањој Луци, Економски факултет, Мајке Југовића 4, 78 000 Бања Лука, Босна и Херцеговина

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ЈЕЛ класификација: L26, J24, C1

САЖЕТАК

Циљ овог рада је да истражи значај меких вјештина за покретање и успјешно вођење малих и средњих предузећа (МСП) у Босни и Херцеговини (БиХ). Уз коришћење података прикупљених путем анкетирања 71 менаџером на вишим нивоима из предузећа која послују у БиХ, допуњених квалитативним увидима из фокус групе на исту тему, студија испитује перцепцију важности вјештина као што су лидерство, комуникација, емоционална интелигенција, рјешавање проблема и тимски рад. Статистичке анализе, укључујући дескриптивну анализу, Спирманове коефицијенте корелације, хи-квадрат тест и Фишерове егзактне тестове, откривају да су већина меких вјештина високо цијењене у МСП-овима, уз мање разлике у перципираној важности. Комуникацијске вјештине су се показале као најважније, што одражава њихову централну улогу у подстицању продуктивних пословних интеракција. Спроведене анализе такође указују да пожељан сет меких вјештина не варира са величином предузећа, изузев лидерских вјештина. Лидерство показује умјерену позитивну корелацију са величином предузећа, што указује на његову растућу важност у већим организацијама. Квалитативни налази потврђују значај меких вјештина за покретање и управљање предузећима, с посебним нагласком на комуникацијске и вјештине рјешавања проблема.

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