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PROCEEDINGS

20-22 September, 2024 Prilep, North Macedonia

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TECHNOLOGY, POLICY AND INVESTMENTS IN THE ENERGY TRILEMMA CONTEXT: THE ROLE OF A JUST ENERGY TRANSITION OBSERVATORY HUB

Nikos Tourlis[1], Despoina Kanteler[2], Fenia Pliatsika[3], Lefteris Topaloglou[4]

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Abstract

In this paper the integration of energy technology policy and investments within the framework of the Energy Trilemma is explored. The focus is on the role of place-based governance models in achieving a fair and equitable energy transition. The study investigated how local governance structures can align with national and European energy transition goals to address energy security, environmental sustainability, and affordability. Central to this research is the concept of a Just Energy Transition Observatory at the local level, designed to provide accessible, evidence-based information to stakeholders, thereby facilitating the development, implementation, and monitoring of inclusive and resilient energy policies. The research addresses the multidimensional aspects of energy transition, including economic development, land use changes, financing, public engagement, and inclusive consultation. With the examination of case studies and employing a comprehensive methodological approach, the paper aims to establish a bottom-up strategy for local energy initiatives that can be scaled up at the European level. The findings of the literature review highlighted the potential of place-based governance models to empower local authorities and communities, ensuring that clean energy technologies contribute to a just and sustainable energy future. This study contributes to the discourse on energy policy, offering insights into the operationalization of the Just Energy Transition Observatory and its impact on advancing fair energy transformation.

Keywords: Energy trilemma, just transition observatory, place-based governance

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1. Introduction

The world energy sector is at a crucial stage, confronted with a trilemma to transition to more sustainable energy systems. This finds its conceptualization in the Energy Trilemma paradigm, trying to find a balance between three critical issues: energy security, energy equity, as well as environmental sustainability (Sovacool et al., 2011). The dynamics of maintaining balance are at the core of a difficult policy problem since, in most cases, the dimensions progress with balances that are in conflict with one another. According to Jansen and Seebregts (2010), energy security is specifically concerned with supplying energy at steady costs that the economy can sustain. This is crucial for both economic growth and stability. The objective of energy equity is to ensure universal access to affordable energy services, thus making energy policies all-inclusive with special policies to meet the needs of all the different social classes (Sovacool & Dworkin, 2015). Finally, environmental sustainability is the approach that is going to be taken to minimize the ecological costs of energy, especially in relation to the high use of fossil fuels.

From these challenges, the concept of a just energy transition has evolved. It should be realized in a just and equitable transition to sustainable energy systems (Heffron & McCauley, 2018). A just energy transition is defined as an approach towards transition that is human-centered and considers justice — both socially and intergenerationally — in the distribution of gains and the burden of costs. This requires innovative policy approaches ensuring energy security while at the same time enhancing energy equity and advancing environmental sustainability (Sovacool et al., 2020). Within this lines, place-based governance models are increasingly recognized as a prospective framework for dealing with the complexities associated with the Energy Trilemma and supporting a just energy transition. Some argue that one of the principles underpinning any suggested place-based approach to governance imposes a decision-making structure of local authorities and communities for tailoring them to meet the specific energy needs compatible with the contexts in question (Bulkeley & Betsill, 2005). Empirical studies show that such localized approaches can increase the effectiveness of energy transitions with the judicious use of local knowledge and resources (Hoppe et al., 2015). Central to this research is the concept of a Just Energy Transition Observatory at the local level, designed to provide accessible, evidence-based information to stakeholders, thereby facilitating the development, implementation, and monitoring of inclusive and resilient energy policies. Therefore, the research question that this paper addresses is: ‘*’How can place-based governance models and the establishment of a Just Energy Transition Observatory facilitate the integration of energy technology policy and investments to achieve a fair and equitable energy transition within the framework of the Energy Trilemma*?’’.

The paper is designed to systematically examine the integration of the energy technology policy and investments with the framework of the Energy Trilemma, bringing to the fore the role of place-based governance models, establishing a Just Energy Transition Observatory. It starts with an Introduction, whereby the challenges of reconciling energy security, equity, and environmental sustainability

are outlined, while developing a notion of just energy transition. The theoretical and empirical insights are provided in the Literature Review section, helping to understand the energy trilemma, place-based governance, and just energy transition. It explains the methodology, including the comprehensive literature review approach, showing the inclusion criteria, exclusion criteria, and thematic analysis. The Findings present results from a literature review and bibliometric analysis, trends, and the ranking importance of local governance. Finally, the conclusive remarks are summed up in the Conclusions & Recommendations section, in which key insights will be summarized, along with practical recommendations given to policymakers and stakeholders for the operationalization of the Just Energy Transition Observatory at the local level.

2. Literature Review

2.1 The Energy Trilemma and Fair Energy Transition

The energy trilemma is typically applied to represent three critical dimensions of energy policy: energy security, energy equity, and environmental sustainability. All of these three dimensions encompass a complex and often conflicting set of priorities. The balancing act that goes into managing these three dimensions is quite intricate and often involves trade-offs. For example, concentrating on energy security may result in greater reliance on fossil fuels at the expense of environmental sustainability. On the other hand, an increased focus on environmental sustainability with binding emission limits that continuously tighten could raise the cost of energy at the expense of energy equity. The energy trilemma is, therefore, multidimensional, and solving it demands integrated and holistic policy approaches. The concept of the energy trilemma is quite complex, as one is asked to agree on three different priorities: energy security, energy equity, and environmental sustainability. Energy security, according to Jansen and Seebregts in 2010, refers to the need to provide adequate and affordable quantities of energy, which plays a very significant role in economic stability and growth. However, energy security may, at times, make demands that are different from, and even clash with, environmental goals, which include reducing greenhouse gases and impact on the ecology central to environmental sustainability (Sovacool et al., 2020). Moreover, energy equity understood as universal access to affordable energy services may be achieved at the expense of both energy security and environmental sustainability; for example, if policy mechanisms to reduce emissions result in higher energy costs that disproportionately burden low-income segments of the population, then energy security and environmental sustainability will be promoted at the expense of energy equity (Sovacool & Dworkin, 2015). As this example illustrates, these interdependencies and tradeoffs create a multitude of challenges for policymakers seeking to effectively address all three dimensions of the trilemma simultaneously.

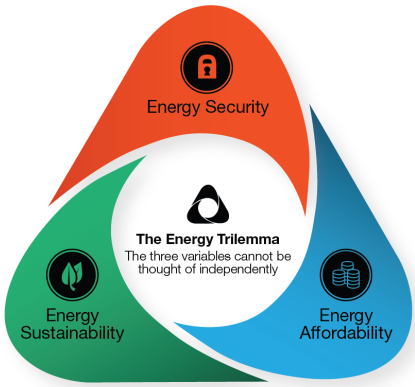


Figure 1. Energy trilemma variables. Source: ARUP.

A just energy transition means achieving a low-carbon energy system in an equitable and inclusive manner so that all sectors of society benefit from it, reducing its harmful effects on vulnerable groups to the best possible extent (Heffron & McCauley, 2018). Founded on social justice principles, it asks for fair distribution of all the benefits and loads emanating from energy transitions with respect to inequalities in access and affordability of energy so as not to add to marginalization issues. It also overlaps with the energy trilemma, in that it demands a set of policies that assures energy security, equity, and environmental sustainability. The policymakers need to adopt new strategies that can address investments in renewable technologies, ways of protecting low-income households from energy price increases and distribution of environmental benefits, as opined by Sovacool et al. 2020. This new energy policy will help solve the long-standing structural problems that have helped cause energy poverty by including social justice measures, such as targeted renewable subsidies, green job programs, and inclusive decision-making to undergird a just energy system (Jenkins et al., 2016). The energy trilemma framework will need to be driven by initiatives that consider two key priorities when securing a fair energy transition.

2.2 The Energy Trilemma & Place-Based Governance

The concept of the energy trilemma was first established by the World Energy Council, which identified that there was a requirement to maintain a delicate balance between energy security, energy equity, and environmental sustainability (Jansen & Seebregts, 2010). In 2011, a study by Sovacool et al. graded energy security performance for eighteen countries over the period from 1990 to 2010. The framework illustrated in complex ways, some of the interplay between these dimensions and presents a lesson that gains in one area are often at the expense of another, pointedly underscoring the intrinsic trade-offs within energy policy.

With place-based governance models there is an emphasis on the importance of local contexts in energy policy and implementation. In these models it is argued that local authorities and communities are better positioned to understand and address their unique energy challenges and opportunities (Bulkeley & Betsill, 2005). In addition, in place-based approaches decentralized decision-making

processes that involve local stakeholders in the planning and implementation of energy projects is advocated. Empirical studies have shown that place-based governance can enhance the effectiveness of energy transitions by leveraging local knowledge and resources. In a study by Hoppe et al. (2015), they examined community energy initiatives in the Netherlands and found that local governance structures were crucial for project success. These initiatives benefited from strong local leadership, community involvement, and tailored approaches that reflected local needs and preferences. On an EU level, Europe is currently reassessing its energy strategy with a new focus on security in relation to affordability and sustainability. Europe's challenge lies in balancing renewable integration, grid variability, and technological independence amidst geopolitical and energy sovereignty concerns, while steering towards resilient, self-reliant, and equitable energy systems (World Energy Council, 2024).

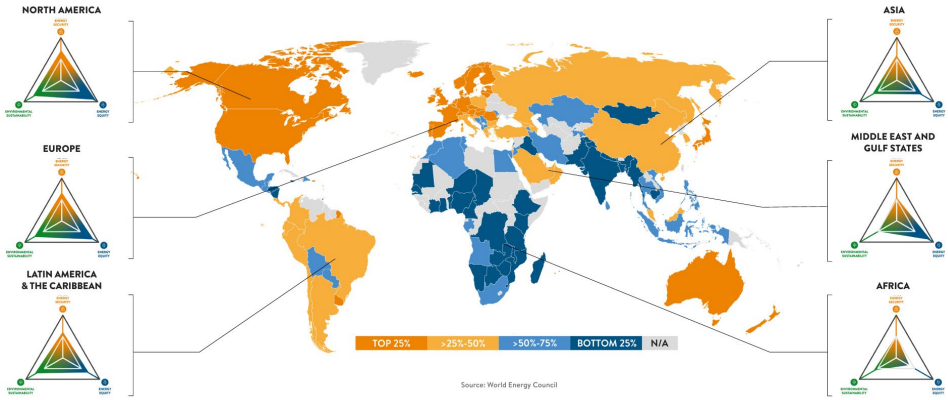


Figure 2. World energy trilemma index map. Source: World Energy Council.

2.3 Just Energy Transition and the Role of Local Governance

A just energy transition is one that merges principles of social justice into the process of energy transition, so the benefits and burdens of this transition are equitably distributed in society (Heffron & McCauley, 2018). Just transition seeks to redress socio-economic impacts arising from shifting to a more sustainable energy system, focusing on vulnerable populations. Jenkins et al. (2016) have provided a conceptual review regarding energy justice that encompasses distributive, recognitional, and participatory dimensions about energy decision-making procedures. According to these authors, energy policies cannot simply be limited by technological or economic parameters but have to be heuristically opened up to ensure the social dimensions of policy actions are considered in order to ensure inclusiveness and fairness.

This brings the aspect of local governance to the fore as very instrumental in the attainment of the objectives of the energy trilemma through tailoring and inclusive policies that allow for energy security, environmental sustainability, and affordability. It is in the capacity of local authorities to drive innovation and experimentation in energy projects, promoting bottom-up approaches to energy

transitions (Bulkeley & Castán Broto, 2013). In line with this, local-level Just Energy Transition Observatories could provide structured monitoring and evaluation of the impacts of energy policy. Evidence-based information to the relevant stakeholders through these observatories has potential to be useful in the development and implementation of inclusive resilient energy policies (Heffron & McCauley, 2018).

2.4 The Energy Trilemma and the need for a Just Energy Transition Observatory

A local Just Energy Transition Observatory would help make information more accessible to all stakeholders with evidence-based material to contribute to the development, implementation, and monitoring of policies for inclusive and resilient energy. This includes integration of social justice principles into energy policy for a just transition in energy (Heffron & McCauley, 2018). The Observatory will be a tool for securing transparency, accountability, and continuous improvement of local energy initiatives by systematic collection and analysis of data on energy projects. Best practices and lessons learned would be identified, and valuable feedback provided to both policymakers and practitioners. Such observatories could bridge local actions and the national or european energy goals in a manner in which local initiatives contribute effectively towards the attainment of broader sustainability targets set at higher levels.

An important development in this regard would be a Just Energy Transition Observatory Hub (thereafter observatory) to deal with the trilemma of challenges to energy security, environmental sustainability, and energy equity. Already in this direction runs the JT-OBSERVATORY project, funded by the Hellenic Foundation for Research and Innovation, that examines how effective and just transition governance modes are and whether they embed spatial justice and place-based elements. Spatial justice is therefore conceptualized as the fair and equitable distribution of socially valued resources and opportunities. This will provide a center for monitoring, assessment, and transition to a low-carbon energy system, with the appropriate distribution of benefits and burdens. Also, integrating social justice in the transition will mitigate the accentuation of existing inequities (Atkins, 2023). According to Baker, 2022, it is instrumental to develop and implement policies and regulations that are fair, so it does not have a disproportionate effect on the marginalized communities. The observatory could create an environment where corporate accountability is fostered in the form of corporate energy transformation plans that correspond with the principles of energy justice, hence effective contribution to the 2050 goals of energy transformation as identified by Sokołowski & Taylor, (2023). Moreover, the observatory would help in interdisciplinary research that integrates technological advancement concerns with social equity in its process, hence preventing the probable adverse consequences of new technologies like carbon capture (Baker, 2022). The assimilation of the dimensions of the energy justice framework into energy transitions would avoid economic and social inequities in various spheres and secure an all-inclusive and just transition (Graff, 2024).

3. Methodology

According to Webster & Watson, 2002, conducting a literature review involves the systematic identification, analysis and synthesis of relevant research from academic databases to provide a comprehensive understanding of the topic. This study employed a comprehensive literature review to explore the integration of energy technology policy and investments within the framework of the Energy Trilemma, emphasizing the role of place-based governance models and the establishment of a Just Energy Transition Observatory.

For the literature review a wide range of academic databases was used, including Google Scholar, Scopus, PubMed, JSTOR, IEEE Xplore, SpringerLink, ScienceDirect, Wiley Online Library, and Taylor & Francis Online. Key search terms included "Energy Trilemma," "place-based governance," "local energy initiatives," "community energy projects," "energy equity," "environmental sustainability," and "just energy transition". The study followed a structured approach to ensure a comprehensive and representative collection of literature:

1. The inclusion criteria included a variety of peer-reviewed articles, case studies, reports, and books published in English from 2000 to 2023 that addressed place-based governance, energy transitions, and community engagement in the energy sector.
2. The exclusion criteria included articles that were not published in English, literature focusing solely on technical aspects of energy technologies without discussing governance or community involvement, and publications prior to 2000.
3. In the screening process it was taken into account the titles and abstracts which were initially screened to assess relevance, followed by a detailed review of selected articles.
4. The thematic analysis included the literature analysis thematically to identify recurring themes and key insights related to energy security, equity, and sustainability.

The review aimed to provide a comprehensive understanding of how place-based governance models can empower local authorities and communities, ensuring that clean energy technologies contribute to a just and sustainable energy future. The findings will inform the development of practical recommendations for policymakers and stakeholders to support the operationalization of the Just Energy Transition Observatory at local levels.

4. Findings

The findings from this literature review emphasize the pivotal role of place-based governance models in advancing a just and sustainable energy future. This research made use of VOSviewer, a software tool for constructing and visualizing bibliometric networks, to analyze and present trends in literature on the energy

trilemma, place-based governance, and just energy transition. In the current study, the landscape was plotted based on an analysis of 523 papers downloaded from Scopus database. Using this visualization, it is possible to show shifts in focal areas over the past years and point out growing interest in multi-level governance, energy policy, energy justice, energy poverty, and sustainable development. Figure 2 provides a visualization of the analysis presenting the trends in the research on energy dilemma, place-based governance and just energy transition. The integration of energy technology policy and investments within the framework of the Energy Trilemma underscores the complexity and necessity of addressing energy security, energy equity, and environmental sustainability simultaneously. The concept of the Just Energy Transition Observatory provides a practical approach to ensuring that local initiatives align with broader national and European energy transition goals. The analysis underlined the central role of place-based governance and pointed out an important shift in research focus from technical energy aspects to multi-level governance issues pertaining to energy policy, justice, and sustainable development. This visualization process brought out that place-based governance is occupying a more central place in the literature. This may signal a shift in recognition of local governance models for energy security, equity, and sustainability and hence become part of the more general agenda in the integration of local action with national and international energy goals.

The Just Energy Transition Observatory will act as a tool for transparency, accountability, and continuous amelioration of local energy initiatives, best practices, and areas tasked with improvement identified through systematic data collection and analysis. There is a need to recognize the potential role for observatories that can bridge the gap between local actions and national or European goals through effective contributions toward contributing to broader sustainability targets in the energy sector. The literature discussed herein in respect to the energy trilemma, place-based governance, and just energy transitions underlines the complexity and interrelatedness of these issues. Security of supplies, equity, and environmental sustainability of energy are issues that must be balanced in the face of comprehensive integrated approaches that consider local contexts and promote social justice. Recent research trends based on results from 523 papers indicate a move away from technical aspects of energy to multilevel governance emphasizing energy policy, transition, justice, poverty, and sustainable development. Future studies will have to continue working in this direction of interconnectivity because it will only help serve policy and practice.

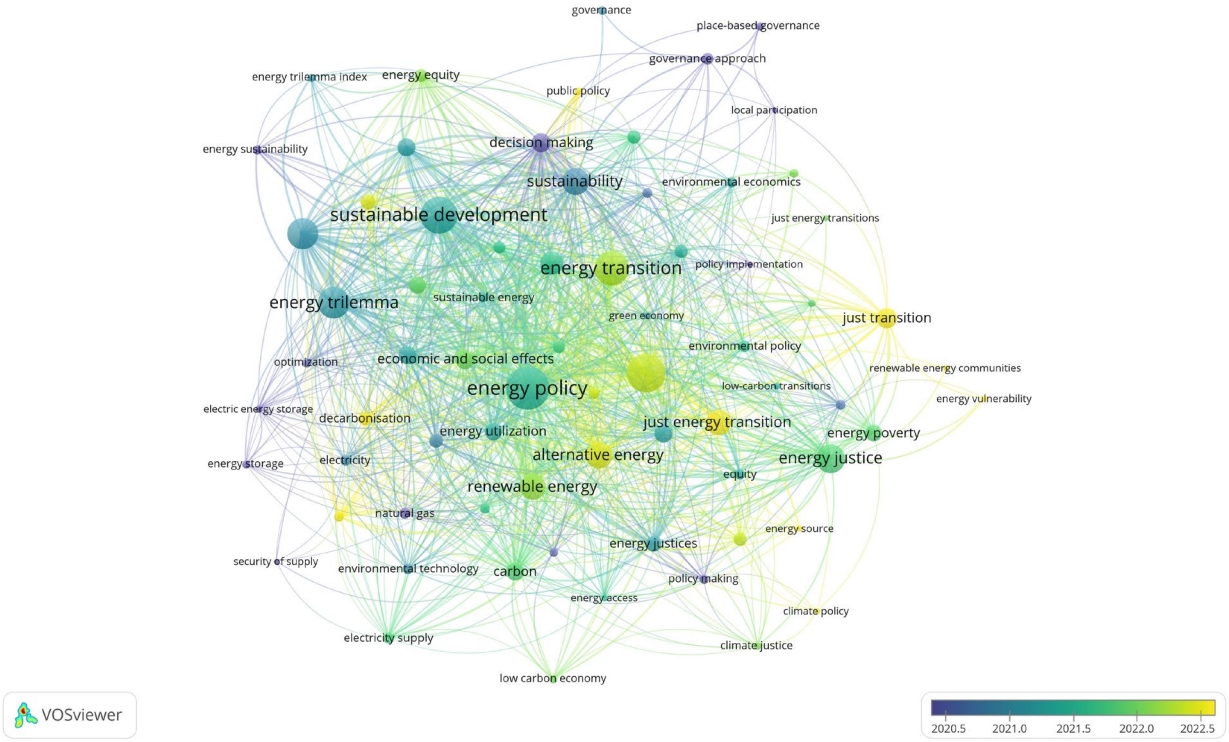


Figure 3. Network data of 523 papers on energy dilemma, place-based governance and just energy transition.

5. Conclusions & Recommendations

Place-based governance models can be operationalized in very robust ground when working within the frame of the Energy Trilemma for an energy transition that is equitable and sustainable. Through the Just Energy Transition Observatory, a base with a variety of key roles modeling their integration, policies are now inclusive, resilient, and aligned with broader goals for sustainability. Further research in this direction is awaited to tease out the interlinkages between local governance, energy equity, and environmental sustainability with a lot of empirical evidence and hands-on experience that can inform policy and practice. The findings of the previous section emphasize the importance of multi-level governance, energy policy, energy justice, energy poverty, and sustainable development in the energy transition. The shift in research focus over the past years underscores the need for integrated approaches balancing the Energy Trilemma dimensions—energy security, equity, and environmental sustainability. Place-based governance models supported by the Just Energy Transition Observatory could help resolve the current local socio-economic and environmental challenges with a robust data collection and monitoring system to back it up and ensure that policies are inclusive and resilient. Capacity building at all levels and stakeholder engagement were considered pivotal, while the Observatory may contribute to both with technical and financial means, development of partnerships, and more efficient knowledge sharing. These

models and tools will be very important in a fair and sustainable energy future, as they are capable of furnishing the observatory with cohesive and effective policies to pursue during the energy transition process, given that it aligns local initiatives to the sustainability goals of national and European ambition.

Acknowledgment

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OPTIMIZING INVESTMENT UTILIZATION IN ENERGY TRANSITION REGIONS VIA DECISION-MAKING TOOLS

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Abstract

This paper aims to identify optimal investment opportunities in regions undergoing energy transitions, emphasizing their resilience to climate change. It explores the integration of geospatial data to support investment decisions within a framework of fair, inclusive, sustainable, and climate-resilient development. The paper addresses challenges and constraints arising from the use of geospatial data to guide investment decisions and strategic land use planning. A significant component of this research involves the development and application of a decision-support tool methodology. Through comprehensive methodological approach, based mainly on geospatial analysis, this paper seeks to introduce a decision support tool that integrates climate data, land use information, and investment scenarios. This tool aims to empower local communities, policymakers, and stakeholders to achieve balanced economic, social, and environmental outcomes in the context of just transition. The methodology includes also a detailed examination of regional vulnerabilities to climate change, the application of GIS tools, and the incorporation of multi-criteria decision analysis. The outcomes of this elaboration might enrich policy recommendations and investment strategies, fostering a resilient and sustainable transition for regions historically dependent on fossil fuels.

Keywords: Energy transition, climate change, geospatial analysis, energy investments

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1. Introduction

The global sift towards climate neutrality and energy transformation is not simply a technological transition but an essential reformation of economic, social, and environmental paradigms. Regions historically dependent on fossil fuels face unique challenges in this transition (Wiseman, 2018). These areas often possess entrenched industrial infrastructures and labor forces tied to fossil fuel economies, necessitating significant changes to pivot towards sustainable energy sources. This shift requires substantial financial investments to develop new technologies, infrastructure, and training programs for workers transitioning to new industries (Castro & Abdallah, 2019).

Additionally, the shift to sustainable energy systems must be inclusive and fair, guaranteeing that all communities reap the benefits of the emerging opportunities (Mundaca et al, 2018). Social dimensions involve community acceptance of new technologies, the social impacts of closing traditional industries, and the equitable distribution of new economic opportunities (Walker & Devine-Wright, 2008). Environmental considerations focus on reducing greenhouse gas emissions, preserving natural ecosystems, and enhancing resilience to climate change impacts (Adams & Ghaly, 2007).

Climate change resilience adds another layer of complexity. Investments must simultaneously facilitate the transition to sustainable energy, bolster the region's growth prospects, and enhance its resilience. Achieving this requires a comprehensive approach to planning and investment that incorporates climate data, risk assessments, and resilience-building strategies into the decision-making process (Dell & Sheffer, 2019).

Identifying optimal investment opportunities in regions undergoing energy transitions is a multifaceted challenge. Traditional investment decision-making processes often fall short as they typically prioritize immediate economic returns without fully considering the socio-economic and environmental ramifications (Bazilian & Pielke, 2013). These processes can overlook the long-term benefits of sustainable development and climate resilience, leading to investments that may not provide lasting positive impacts for the community or the environment (Turoff & Hiltz, 1995).

This paper tackles these challenges by developing and implementing a decision-support tool that merges geospatial data with investment scenarios. The tool is designed to empower policymakers with comprehensive and actionable insights, enabling them to identify strategic investment opportunities that advance sustainable energy transitions and strengthen climate resilience. In this context, the paper seeks to answer the critical research question: how can geospatial data and decision-support tools be combined to identify optimal investment opportunities that align with sustainable development goals and enhance climate resilience in regions undergoing energy transitions?

The paper is based on the following structure: Section 2 discusses the existing literature on energy transition and climate resilience, highlighting the role of geospatial analysis and decision-support tools in optimizing investment decisions. Section 3, presents the methodology used in developing the decision-support tool.

Section 4, presents decision-support tool analysis. Finally, Section 6, provides conclusions.

2. Literature Review

2.1 Energy Transition and Climate Resilience

The shift to sustainable energy systems is recognized as a pivotal strategy in the fight against climate change. The rapid expansion of renewable energy sources—primarily solar, wind, and hydropower—has led to a significant reduction in greenhouse gas emissions compared to fossil fuels. This progress has been instrumental in advancing global efforts to achieve the climate targets set be the Paris Agreement, underscoring the vital role of renewable energy in combating climate change. (Bazilian & Pielke, 2013).

Regions with a long history of reliance on fossil fuels confront a dual challenge: phasing out existing fossil fuel infrastructure while simultaneously developing new sustainable energy systems. This transition brings unique challenges, including potential job losses in traditional energy sectors, the need for retraining workers, and substantial capital investments in new technologies and infrastructure (Castro & Abdallah, 2019). Yet, it also opens the door to significant opportunities, such as the creation of new industries and job markets, improved air quality, and enhanced energy security (Adams & Ghaly, 2007).

Incorporating climate resilience into investment essential for ensuring the long-term sustainability of energy transition projects. In this context, climate resilience outlines the capacity of an economy, society and ecosystem to adapt to and recover from the adverse effects of climate crisis (Al-Humaiqani & Al-Ghamdi, 2022).

For energy systems, this means designing renewable energy infrastructure to withstand extreme weather events, integrating energy storage solutions to manage variability in renewable energy supply, and developing adaptive policies and practices that respond to evolving climate conditions (Dell & Sheffer, 2019). Empirical evidence demonstrates that investments in climate resilience can significantly reduce the costs associated with climate crisis damages, making it a critical consideration in the planning and implementation of energy transition projects (Pearce, 2019).

2.2 Geospatial Analysis in Investment Decision-Making

Collecting, analyzing, and visualizing spatial data are key elements of geospatial anlalysis which levereages Geographical Information Systems (GIS).This approach provides valuable insights for investment decision-making by identifying regional characteristics that influence the viability and impact of various investment strategies across multiple applications (Li, 2023).

Additionally, geospatial analysis can identify the areas with high potential in terms of renewable investments and sustainability. For example, solar radiation maps can identify regions ideally suited Geospatial analysis plays a critical role in pinpointing areas with high potential for renewable energy investments and sustainability.for solar farms, while wind speed maps can highlight optimal locations for wind turbines (Adams & Ghaly, 2007). By integrating socio-

economic indicators with climate data in the assessment of potential investments, geospatial analysis can also identify areas that are particularly vulnerable to climate change impacts. This information is vital for planning resilient infrastructure and prioritizing investments that enhance adaptive capacity (Dell & Sheffer, 2019).

Moreover, geospatial tools are invaluable for assessing the impact of potential investments on land use and local ecosystems. This includes evaluating the compatibility of energy projects with existing land uses, such as agriculture or conservation areas, and identifying strategies to minimize environmental disruption (Bazilian & Pielke, 2013). Geospatial analysis also supports the strategic planning of energy infrastructure by optimizing the placement of energy projects and facilities, ensuring efficient energy distribution, and minimizing transmission losses (Pearce, 2019).

The integration of geospatial analysis into investment decision-making enhances the ability to make data-driven, informed choices that account for the spatial distribution of resources, vulnerabilities, and potential impacts (Walker & Devine-Wright, 2008). By providing detailed insights into regional characteristics and the potential investment impacts, geospatial analysis forms a crucial component of modern decision-support frameworks. These insights are further strengthened when combined with decision-support tools, which provide a structured approach to evaluating complex investment scenarios.

2.3 Decision-Support Tools

Building on the foundational work of Roesch-McNally et al (2021) we propose a Decision-support tool (DST) by integrating diverse data sources, analytical models, and stakeholder inputs. The primary aim of this DST is to assess the feasibility, cost-effectiveness, and sustainability of various investment options in a context of just energy transition.

The DST is designed to be user-friendly, enabling decision-makers to evaluate multiple investment options across a range of economic, social, and environmental criteria, particularly in relation to climate change and resilience. This holistic approach ensures that decisions are made with a balanced consideration of competing priorities (Thrippleton, 2021). The tool is enriched by contributions from a wide array of stakeholders, including local authorities, policymakers, business experts, and NGOs. This participatory approach ensures that diverse perspectives and values are integrated, enhancing both the legitimacy and acceptance of investment decisions (Papapostolou, 2022).

DSTs have the capability to model different investment scenarios and simulate their outcomes under various conditions. This allows decision-makers to explore the potential impacts of different strategies, identify trade-offs, and make evidence-based choices (Dell & Sheffer, 2019). In its advanced form, DST can incorporate real-time data feeds to provide up-to-date information for decision-making, thereby enhancing the ability to respond to changing conditions and optimize investments accordingly (Pearce, 2019). On this basis, visualization is a key featue of the DST, offering simplified representations of complex data through story maps, graphs, and user-friendly dashboards. This functionality

facilitates communication of outcomes and supports consultations among stakeholders (Bazilian & Pielke, 2013).

The application of DSTs in energy transition and climate resilience is well-documented in the literature, with empirical evidence underscoring their effectiveness in enhancing public engagement, inclusivity, and the robustness of decision-making processes. This, in turn, leads to more sustainable and resilient outcomes (Chang, 2021). Within the context of a just energy transition and the broader challenge of combating climate change, the literature hignlights the critical importance of incorporating climate resilience into investment decisions.

3. Methodology for developing a Decision-Support Tool

Data collection is the foundational step in developing the DST, serving as the critical groundwork upon which the entire system is built (Chang, 2021). This process involves the systematic gathering of diverse geospatial data types -such as climate, land use, and socio-economic indicators- from multiple sources as illustrated in Figure 1.

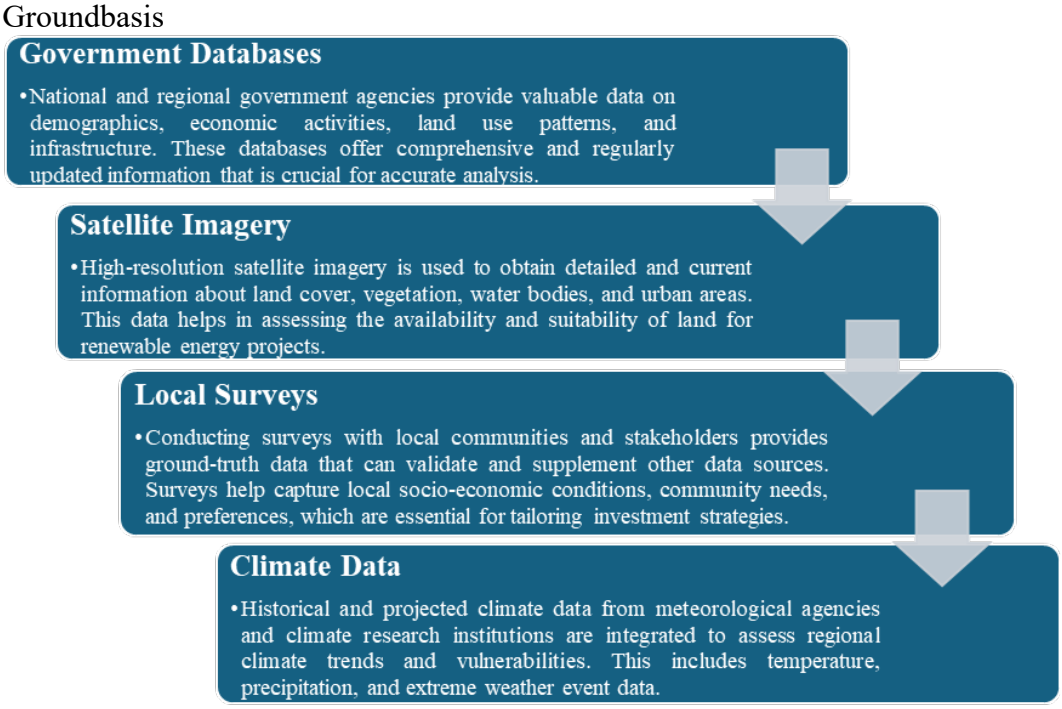


Figure 1. Types of geospatial data for the Decision-Support Tool

During the DST's specification and development, the tool will embed advanced Geographic Information System (GIS) technology alongside Multi-Criteria Decision Analysis (MCDA). By integrating geospatial data with various investment scenarios, the DST is designed to facilitate informed decision-making. The development process involves several key steps, as shown in Figure2.

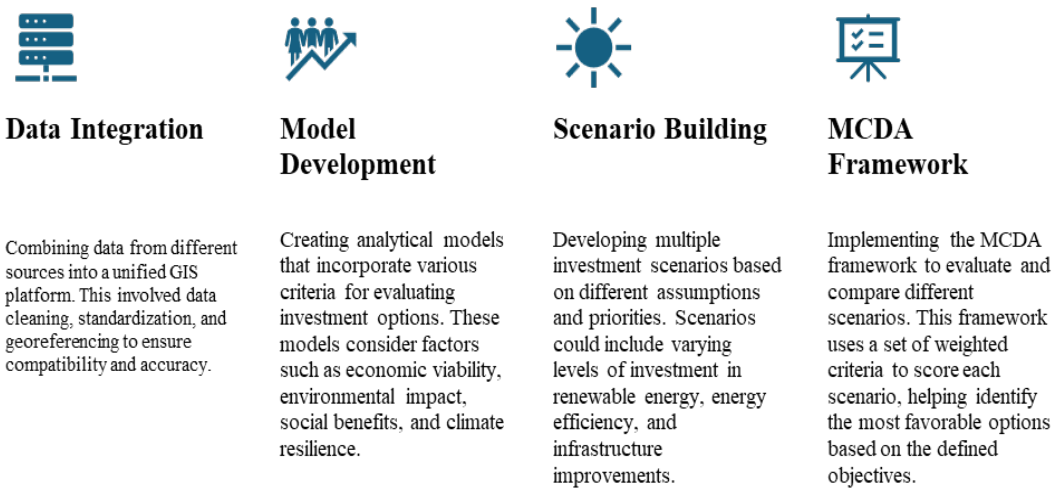


Figure 2. Key steps the Decision-Support Tool development

A crucial element of the methodological framework is the close collaboration with local communities, government agencies, NGOs, and businesses Harrahill & Douglas, 2019). This participatory approach ensures that the tool remains relevant and user-friendly, aligning with the needs and priorities of all stakeholders. Insights and feedback from a broad spectrum of participants are gathered and integrated, as highlighted in Figure 3.

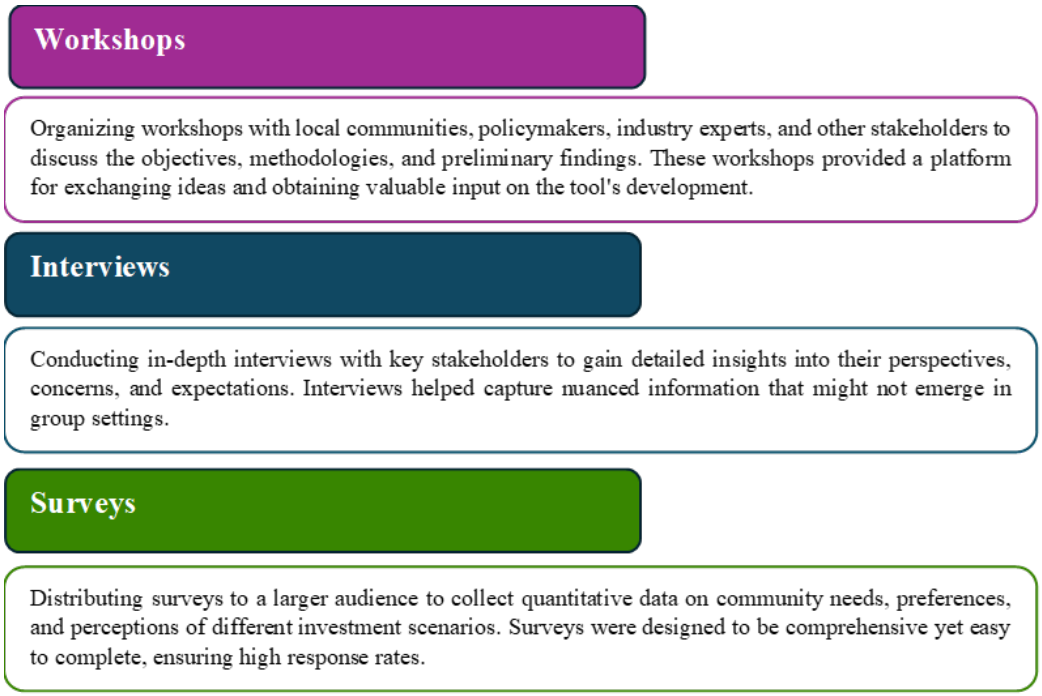


Figure 3. The participatory approach in the Decision-Support Tool development

The participatory approach guarantees that the tool's models and scenarios are firmly rooted in real-world contexts, thereby enhancing the applicability and acceptance of the outcomes within the communities involved.

4. Decision-Support Tool Analysis

The potential of geospatial analysis to reveal overlaps between regions vulnerable to climate change and those rich in high renewable energy potential, underscores the need for strategic investment prioritization (Ashraf et al, 2024). Effectively managing these trade offs is crucial for maximize socio-economic and environmental benefits. On this basis, several investment scenarios can be elaborated and analyzed to assess their impacts on economic growth, social inclusion, and environmental sustainability, as depicted in Figure 4.

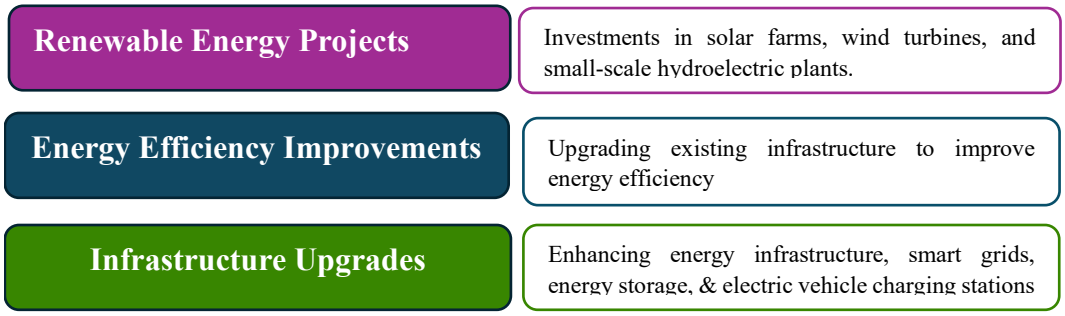


Figure 4. Investment Scenarios & Potential Impact

The particular analysis of Investment Scenarios will be focused on the following three areas as shown in Firgure 5.

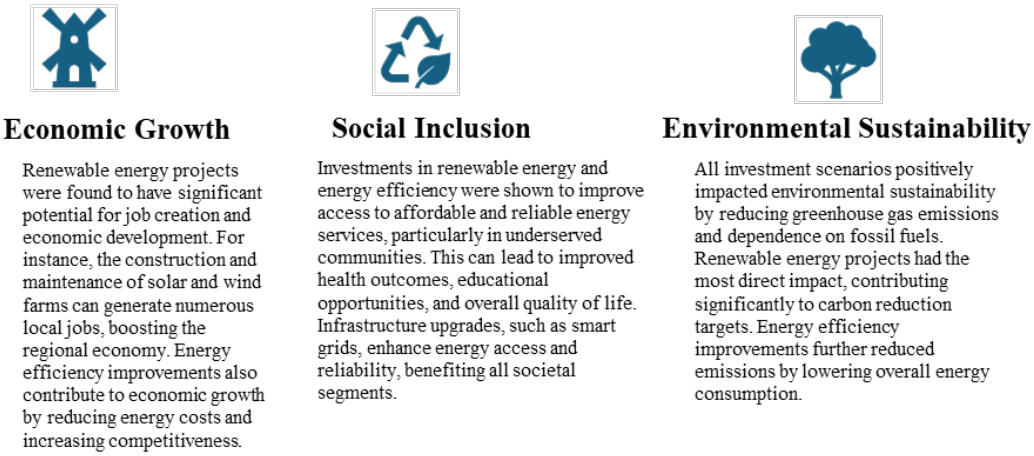


Figure 5. The key areas of Investment Scenarios

Given this context, the DST can serve as a vital mechanism, offering actionable insights to policymakers, local authorities, NGOs, and investors. The tool's analysis will produce key outcomes across four critical dimensions, as illustrated in Figure 6.

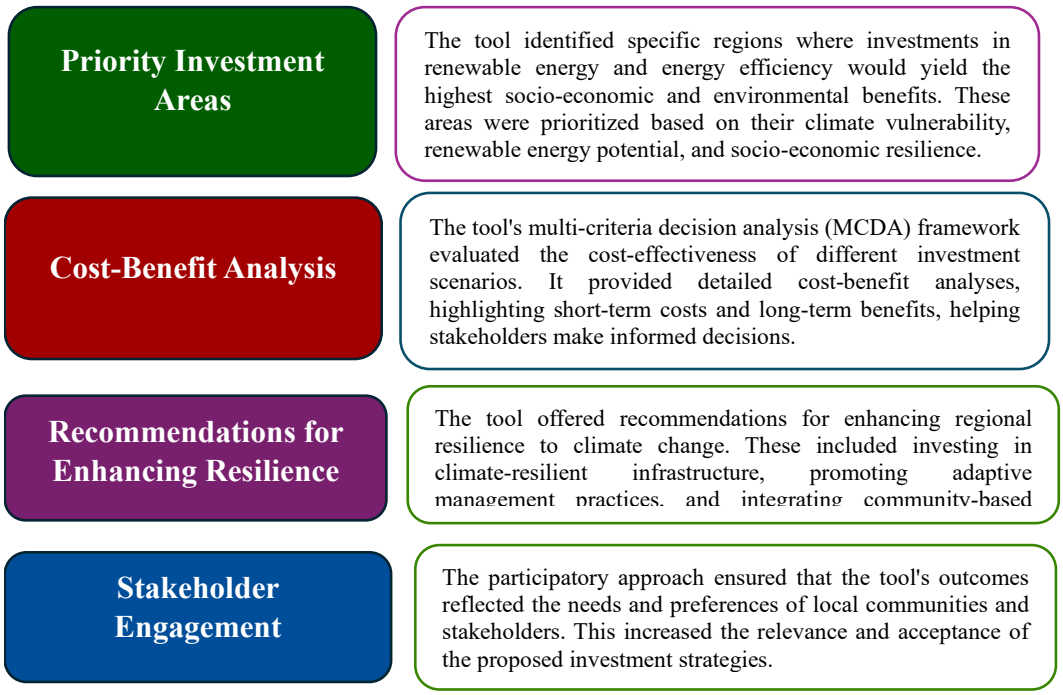


Figure 6. The key dimenstions of Investment Scenarios

In summary, the DST has provided a comprehensive and actionable set of insights that cater to both the short-term and long-term needs of regions vulnerable to climate change. It has empowered policymakers, local authorities, NGOs, and investors with the knowledge and resources to make strategic investments that will foster sustainable development, bolster resilience, and promote socio-economic prosperity.

5. Conclusions

This paper introduces a methodological approach centered on a decision-support tool (DST) designed to integrate geospatial data with investment scenarios, optimizing investment allocation in regions undergoing energy transitions. The DST is developed to support decision-making processes by providing comprehensive, data-based insights that address economic, social, and environmental dimensions, particularly in relation to just transition goals and climate resilience. In this perspective, the geospatial analysis emerges as a comprehensinve methodological approach for identifying renewable energy potential, socio-economic resilience, and climate vulnerabilities in each particular regions. These insights are crucial for prioritizing investments that maximize socio-economic and environmental benefits. Various investment scenarios, including renewable energy projects, energy efficiency improvements, and infrastructure upgrades, were created and analyzed to assess their potential impacts on economic growth, social inclusion, and environmental sustainability.

The tool aims to deliver actionable insights for policymakers, local authorities, and investors, highlighting the most promising investment opportunities, offering

recommendations for enhancing regional resilience, and supporting strategic planning and policy development. The analysis carried out here, underscores the value of such a tool for guiding investment decisions, enabling stakeholders to leverage its comprehensive analysis to ensure balanced economic, social, and environmental outcomes. Moreover, the DST could support policy makers in setting priorities, allocating resources efficiently, and aligning interventions with long-term sustainability goals. This targeted approach maximizes the benefits of sustainable energy projects and enhance regional resilience to climate change, with a particular focus on regions identified by the tool as having high renewable energy potential and significant socio-economic needs.

However, several challenges and limitations arise when implementing the DST. Firstly, access to high-quality, comprehensive data is a significant hurdle with variations in data availability, accuracy and completeness impacting the analysis. Ensuring reliable data sources and improving data collection methods are critical for enhancing the tool's effectiveness. Secondly, integrating geospatial information from diverse data sources, while also incorporating various climate projections and socioeconomic indicators, presents technical and methodological challenge. Thirdly, the inherent dynamism and uncertainties of climate change must be accounted for in the models and scenarios processed by the tool, necessitating continuous data enrichment and adaptation to maintain the relevance and accuracy of the analysis. Finally, the tool's applicability to a wide range of regions is complicated by differences in institutional, political, economic, and social contexts, as well as variations in data availability, which may limit its scalability. Future research should focus on enhancing the tool's adaptability to different geographic and socio-economic environments.

In summary, this paper highlights the critical role of data-driven decision-support tools in optimizing investment strategies for energy transition regions. By fostgering fair, inclusive, sustainable, and climate-resilient development, the tool provides a valuable framework for guiding investments and supporting regional development. However, empirical evidence and research through case studies are essential to validate the tool's effectiveness in optimizing investments.Ongoing research and collaboration are necessaty to refine the tool and expand its impact on sustainable energy transitions, ensuring it meets the practical needs of diverse regions.

Acknowledgment

Funding for the development of this paper has been received by the European Union – Next Generation EU, National Recovery and Resilience Plan Greece 2.0, HFRI within the project "JT-OBSERVATORY The impact of a Just Transition Observatory on energy transition. Exploring synergies with spatial justice and place-based governance through a comparative perspective".

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OPPORTUNITIES FOR USING ARTIFICIAL INTELLIGENCE IN SMALL BUSINESS

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Abstract

In recent years, high-tech companies' investment in the development and promotion of artificial intelligence applications has generated high volumes of interest from both consumers and businesses. While consumer groups perceive AI applications as sources of entertainment and information, enterprises prioritize their integration in their respective businesses. Some of the key factors driving the adoption of Artificial Intelligence in business are: the aggressive marketing of AI tools specialized in solving highly specific problems, its ability to maintain high speed and timeliness in customer service, its potential to increase revenues and reduce costs, and the positive results experienced by businesses that already employ AI tools. This report outlines the primary applications of artificial intelligence in small businesses as part of their digitalization efforts. It explores the potential benefits and risks associated with various applications and emphasizes the future role of AI in the digitalization of small businesses.

Keywords: Artificial intelligence, applications of AI, small businesses, advantages, problems and risks.

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1. Introduction

In recent years, there has been a surge in the use of artificial intelligence (AI) among companies and consumers. Several factors have contributed to this increase. First, there is significant progress in the capabilities and functionality of various products, which are moving from experimental phases to being applied across multiple business fields. Second, AI products have become more accessible to businesses and consumers, both in terms of ease of use and pricing. Third, the undeniable benefits of using AI are being communicated, which has sparked additional interest from companies and the public. Fourth, labor shortage has driven companies to partially or fully replace certain tasks with automated solutions. Fifth, there is a growing trust in AI-based solutions when it comes to searching for information, acting as a strong driver for utilizing AI-generated results. Sixth, the large volume of information that accompanies both business activities and consumers' daily lives necessitates the introduction of new technologies for more efficient process organization and obtaining better results based on current data.

Particular attention is being paid to patent activity in AI, which has shown steady growth in recent years. For example, in 2022, the total number of AI-related patents was 62,264 (Visualcapitalist, 2024), with more than half registered in China (35,315), followed by the US (12,077), and the EU and UK (1,173). Visual Capitalist summarized that in the U.S., AI patenting is concentrated among large companies, including IBM, Microsoft, and Google. On the other hand, AI patenting in China is more distributed across government organizations, universities, and tech firms.

Investments in AI tools are also acting as a driver for increasing interest among companies and end consumers in applying these technologies. Research (SBE Council, 2023) shows that the key drivers or reasons small business owners adopted AI include: their own research, peer influence, and comfort with technology (54%), time and cost savings (51%), competitive pressures (29%), and inflationary pressures (26%). Additionally, high labor costs (25%), augmenting skilled labor, or lack of access to skilled labor (19%) also drove AI adoption among small business owners.

Small businesses are not indifferent to the use of artificial intelligence (AI). On the contrary, they rely on new technologies to remain competitive and gain better positions in various markets.

In practice, small businesses that have implemented AI products have experienced significant positive effects, which are also seen as opportunities: reducing costs, improving speed, better inventory management, achieving higher marketing efficiency, and making more appropriate offers. Another key advantage is the ability to overcome subjectivity in decision-making within these businesses.

Expanding the scope of AI use is among the EU's priorities and is aimed at boosting research and industrial capacity while ensuring safety and fundamental rights through:

1. Enabling the development and uptake of AI in the EU.
2. Becoming the place where AI thrives from the lab to the market.

3. Ensuring that AI works for people and is a force for good in society.
4. Building strategic leadership in high-impact sectors (EC, 2024).

Several countries, including Italy, Spain, France, Germany, Denmark, Sweden, and others, are encouraging investments in AI, including through government funding for universities and businesses. In EU countries, AI-related training programs are being organized, and changes are being made to school and university curricula to ensure regular teaching of AI across various levels and forms of education.

Private informal educational institutions are also turning toward offering training programs in AI, often focusing on specific functionalities and business sectors.

2. The Use of Artificial Intelligence by Small Businesses

Research conducted by MetLife & U.S. Chamber of Commerce (U.S. Chamber of Commerce, 2024) shows that four in ten small businesses have experimented with different AI tools to find out which ones best suit their needs, and almost half (49%) plan to incorporate AI soon. The study also reveals that Gen-Z and millennial small business owners are much more familiar with AI than those from Gen X or the baby boomer generation.

Popular AI tools among small businesses include chatbots, typing or writing apps, media and content creation software, image generators, and conversational software tools. There is also high interest in cloud services, knowledge management platforms, task and project management apps, scheduling apps, and digital assistants. With the increase in online product and service offerings, small businesses are investing in automation, e-commerce platforms, inventory management apps, and accounting tools. Besides software-based AI, small businesses also rely heavily on robots and automation.

A 2023 survey by BPC and Morning Consult (Garapati, 2024) poll reveals that 83% of small business owners who use AI say it has helped improve systems, increase efficiency, free time for more valuable tasks, and producing content. According to the same survey, more than half of the respondents (54%) say it has had a positive impact on business growth. The International Trade Centre (ITC, 2024), a joint agency of the World Trade Organization and the United Nations, specifically highlights the potential for AI in content creation for small businesses in the retail sector, including text generation, text-to-speech, image-to-image, and text-to-image technologies.

Research on the use of AI by small businesses worldwide sheds light on interesting results:

- A 2023 study by Bipartisan Policy Center and Morning Consult (Garapati, 2024) shows that male small business owners use AI more and have better experiences with it compared to female small business owners. Male small business owners (64%) are more likely to invest in AI over the next year than female small business owners (51%).
- Younger small business owners and executives aged 18-34 (76%) and 35-44 (70%) exhibit significantly higher rates of AI use (BPC, 2024)

compared with those aged 45-64 (44%) and 65+ (33%) . The Small Business Index (U.S. Chamber of Commerce, 2024) shows that Gen-Z and millennials are much more familiar with AI than Gen X-owned or baby boomer-owned small businesses (survey from MetLife and the U.S. Chamber of Commerce).

According to experts (Fossen et al., 2024), research in the field of artificial intelligence (AI) should aim to inform government regulation of AI, antitrust policies toward big technology companies, and discussions on support programs for small businesses (such as certain exemptions from data protection requirements) or public investments in infrastructure (such as cloud services).

In some highly developed countries, the use of AI among small businesses is encouraged through the provision of specific grants and programs targeting certain business segments. Additionally, educational programs aimed at managers are offered to promote the positive effects and clarify various applications of AI in small businesses.

In 2024, the European Commission launched an AI innovation package to support startups and SMEs in developing trustworthy AI that complies with EU values and rules through two initiatives: 'GenAI4EU' and the AI Office (European AI Office, 2024). It's expected that these initiatives will contribute to the development of novel use cases and emerging applications in Europe's 14 industrial ecosystems, as well as the public sector. Application areas include robotics, health, biotech, manufacturing, mobility, climate, and virtual worlds. The goal is to attract over 20 billion euros in total annual AI investments in the EU over this decade. This is expected to significantly enhance the level of innovation and its application in both business and the public sector.

Globally, testing and experimentation centers for AI applications will provide a highly specialized network of shared resources at the European level and support AI applications in healthcare, smart agriculture, robotics, manufacturing, smart cities, and more (Ministry of Transport, Information Technology and Communications, 2020).

In Bulgaria, there is growing interest in researching the use of AI among small businesses. Although data at this stage is limited, information is being officially gathered and published by the National Statistical Institute (NSI, 2023). Results from NSI surveys on the use of information and communication technologies among businesses in 2023 show that only 3.6% of businesses in Bulgaria have used AI technologies. In 2021, 37.4% of small businesses used resource management software (ERP). The share of small businesses using customer relationship management (CRM) applications is smaller—23.5%—as is the proportion of businesses sending electronic invoices suitable for automated processing—18.9%.

3. Advantages and Risks of Using Artificial Intelligence in Small Businesses

A new survey (Connected Commerce Council, 2024) conducted among 2,000 U.S. SMB leaders shows how small businesses use or intend to use AI tools in their operations over the next two years: save time and money (60%), help my

overall business grow (59%), boost efficiency (58%), improve customer service (57%), drive more online sales (57%), better inform decision-making (56%), uncover new business opportunities (56%), increase ad spend return on investment (54%), deter cybersecurity threats (54%), improve employee satisfaction (52%), grow my workforce (50%), and train my employees (48%). It is noteworthy that companies focused primarily on cutting costs or improving efficiency are not taking full advantage of AI (Deloitte, 2018).

The advantages associated with the use of artificial intelligence are numerous and can be systematized in a table 1.

Table 1. The Advantages of Using Artificial Intelligence in Small Businesses

Advantages	Specific Features
Speed increase	Enhancing the speed of business processes: analysis, decision-making, implementation of decisions, evaluation of results, etc.
Cost reduction	By employing various automation approaches, costs for marketing, management, accounting, finance, statistics, and other areas are reduced.
Increasing efficiency, including more effective use of information.	This is achieved by improving revenue while reducing costs. It's relied on more effective use of information collected from various sources.
Improving customer service	By using various AI applications to offer support to the customers through different stages of the purchasing process.
Achieving better offer accuracy	Applying algorithms that take specific characteristics of the users as input and produce a tailored offer as an output which is essential for businesses that offer products.
Reducing the impact of subjectivity in decision-making	Employees in small businesses often encounter subjectivity when making specific decisions, and AI tools help overcome this subjectivity.
Reducing risks for customers and businesses	Using AI tools significantly mitigates the risks that arise between businesses and their customers, and vice versa.
Achieving continuous processes	The complexity of the environment and working with data compiled from various sources requires consistency and ensuring integration in processes through artificial intelligence.
Transparency and traceability	Providing tracking and proof through AI systems.

With advancements in AI tools, additional benefits are expected for small businesses, affecting a wide range of functions—from product/service design to sales and customer service during the consumption phase. It is anticipated that some of these advantages will be related to the integration of AI systems, such as those involving business and the public sector.

In addition to the positive effects of applying AI in business, a number of issues and risks are also reported.

According to BCG (Ransbotham et al., 2017), the data and algorithms constituting AI cannot simply be accurate and high-performing; they also need to satisfy privacy concerns and meet regulatory requirements.

Table 2 presents some of the issues and risks associated with the implementation of artificial intelligence in small businesses.

Table 2. Problems and risks associated with the use of artificial intelligence by small businesses

Problems/Risks	Characteristics
Problems	
Lack of trained personnel	The lack of trained personnel in businesses leads to delays in adopting new technologies.
Lack of initiative	Some entrepreneurs do not consider the use of artificial intelligence to be a priority.
High initial costs	Implementing certain AI tools requires significant investments.
Use of facial recognition and biometric data in real time without authorization	The use of some AI tools may be subject to special regulations, requiring constant monitoring of legislative changes.
Risks	
Protecting sensitive personal and company data	Small businesses are vulnerable to data leaks. they do not always use reliable protection, which exposes them to risk.
Criminal infringements on the property of businesses and their clients. Threat to society.	The possibility that new technologies could be used to cause harm and incur losses should not be eliminated.
Risk of manipulating information in favor of certain entities. Potential to cause corporate and large-scale economic crises	The risk of manipulation when using artificial intelligence is high and largely depends on the developed algorithms and how they change over time.
Excessive control over economic entities and individuals	Some businesses and consumers fear the imposition of excessive control by institutions or companies..
Use of data for discriminatory purposes	Access and use of real-time data may lead to discrimination against a particular subject and/or entity.
Opaque algorithms that disrupt	Automation in marketing can lead to

competition	practices that disrupt competition.
Loss of control over AI tools	There is still a risk of encountering unexpected results when using artificial intelligence.

Despite the challenges associated with implementing artificial intelligence during the introduction phase, expectations remain optimistic. PwC research shows (PWC, 2017) that global GDP could increase up to 14% ($15.7 trillion) by 2030 as a result of the integration of AI, making it the biggest commercial opportunity in today's rapidly changing economy.

4. Conclusion

Existing research reveals the potential of using artificial intelligence across various sectors and functionalities. Although small businesses are currently lagging in its adoption, it is expected that decreasing costs and increased access to various applications will boost their interest in utilizing AI for key functional areas. The shortage of labor and decreased productivity will also push small businesses to seek alternative sources to traditional labor and work processes. Additionally, AI will help address critical issues related to subjectivity in decision-making and contribute to higher standardization and speed in specific activities and processes.

Even if some small businesses do not recognize the need for AI adoption, they will still use it through integrated systems that support their operations, particularly global distribution systems and trading platforms.

The shared experience and results of the use of artificial intelligence among small business enterprises show the indisputable advantages of its implementation. Despite the identified problems at this stage, the work on the legal regulation of individual sensitive topics of AI and the improvement of its functionalities will contribute to increasing interest in business implementation. Staff training on AI capabilities will also facilitate its implementation.

Acknowledgment

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APPLICATION OF THE CIRCULAR ECONOMY PRINCIPLES IN THE MACEDONIAN BUSINESS SECTOR - OPPORTUNITIES AND CHALLENGES

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Abstract

The linear economy system and increasing consumerism coupled with the world population doubling in size – from 4 billion in 1975 to 8 billion today contributed to overusing the planet's resources and increasing the environmental degradation. The current situation has created worldwide awareness of the necessity of transition from the traditional, linear model of production and consumption to a circular economy model. This transition is a complex process that involves various stakeholders. Considering business sector as one of the key stakeholders for acceleration the transformation process of the economy and society towards circular economy through adoption of new technologies, development of circular business models and circular business practices, increasing resource efficiency and green jobs creation, in this study we focused on the assessment of business climate and practices for application of the circular economy principles in the Macedonian business sector. The empirical research done within this paper is based on survey conducted on the enterprises operating in North Macedonia (N=45) in the period February-March 2024. The survey provides data on awareness among enterprises regarding the circular economy concept and the existing opportunities and challenges in the process of applying circular economy practices. Hence, this study aims to give answers on three questions: 1. What is the level of awareness among enterprises regarding the circular economy concept 2. What are the key barriers for applying CE practices in the Macedonian business sector? and 3. How to accelerate the implementation of CE principles in enterprises for moving towards more competitive and greener business sector and society?

Keywords: Circular economy, business sector, circular business models and circular business practices, competitiveness.

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1. Introduction

The Circular Economy (CE) Concept refers to a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended, which in practice implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling. These can be productively used again and again, thereby creating further value. This is a departure from the traditional, linear economic model. Hence, the CE model breaks the linear economic model of take-make-use-dispose into a sustainable process of make-use-collect-transform-reuse (Fig. 1).

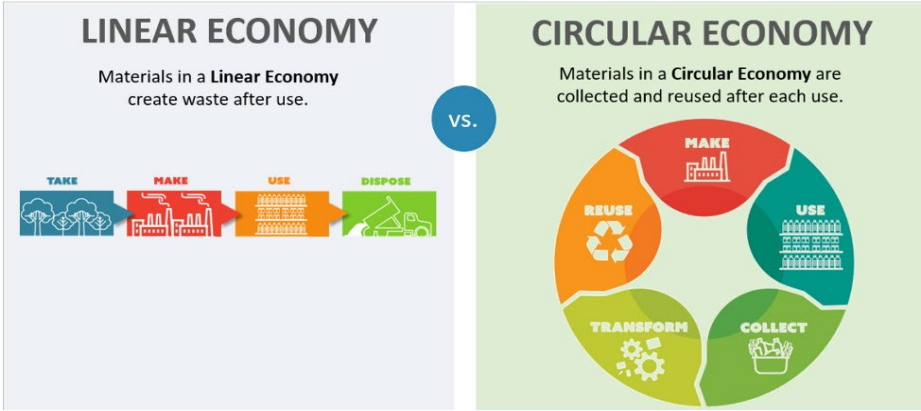


Figure 1. Linear Economy vs. Circular Economy

The CE is considered as a recent concept (Murray et al., 2017). The first Asian countries that adopted CE at the national level were Japan and China. Within the EU for the first time CE was integrated in the national law of Germany in 1996 under the Closed Substance Cycle and Waste Management Act (Su et al., 2013). Denmark, Germany, the Netherlands and the UK are the major European countries implementing CE initiatives, policies and pilot programs.

The key benefits of switching to a circular economy, summarized by European Parliament (2024), are listed below:

- Protecting the environment.
- Reduction in total annual greenhouse gas emissions.
- Reducing energy and resource consumption through creating more efficient and sustainable products.
- Reducing raw material dependence.
- Creating new jobs.
- Saving money.

The linear model, which has proven to be very effective in stimulating economic growth, on the other side creates endless waste, continuous demand for raw materials and unsustainable consumption patterns. Hence, moving to a circular economy where products and materials can be used longer and made into new products after use becomes the new reality. The transition from linear to

circular economy is a necessity, in order to ensure sustainability for future generations, but also for ourselves. Integrating CE into society and into the global economy requires complex and dynamic (systemic) changes in technical and behavioural aspects (Bertassini et al., 2021).

Moving to a circular economy means moving away from linear production and consumption models**,** where things are used for a short time and thrown away after use, toward a more circular process.

The transition from linear to circular economy requires a joint effort by stakeholders from all levels and sectors of the society, including policy makers, academia, business, consultants etc., because the transition process is dependent on how individuals and organisations learn to innovate and apply what they have learned in the real world.

Business sector is one of the main sectors that should enable the linear economy model to be replaced by the circular economy model. Although the transition to a circular economy initially represents a significant financial cost for enterprises, this cost should be seen as an investment in developing technologies that will lead to a multiplication of revenues in the future. Funds for the development of circular business models and circular business practices in enterprises can be provided by various development funds that support the transition to a circular economy, which are particularly present in Europe.

In addition, adoption of the principles of the circular economy, through minimizing waste and pollution, smart management of resources, promotion of sustainable products, with the aim of smart use of energy, become one of the main prerequisites for accessing and maintaining the competitiveness on international and especially on European markets. Hence, the fulfillment of requirements, regulations and standards in the area of circular economy and environmental protection become a significant determinant of the competitiveness of enterprises and part of the current activities of export-oriented enterprises.

Despite the numerous benefits that CE offers to businesses, in North Macedonia enterprises that have invested in circular economy are not very often found. As a result of the energy crisis, last year companies from the Macedonian business sector began to invest more intensively in renewable energy sources, with the aim of reducing energy dependence and/or reducing of energy bills. In the next period, businesses are expected to commit to implementing circular business practices, especially related to the raw materials they use and the amount of waste they emit with their operations. Through incorporating the CE as a way of forthcoming economic growth, the Macedonian business sector could increase the economic profit through implementation of eco-friendly technologies, stimulating new innovative production processes, creation of new jobs related to the implementation of CE model, etc. According to UNDP study (2021) the implementation of circular practices in the waste management sector in North Macedonia, in line with European Green Deal and the EA Action Plan on CE can create 2 740 new jobs and 47.17 million EUR of economic benefits by 2030. In the Green Agenda for the Western Balkan the CE is identified as one of the five pillars enabling the transition to green economy of the countries. Implementing CE is important for rebuilding North Macedonia to become more resilient after

the COVID-19 and the energy and price crisis through the creation of green jobs and achievement of green growth. The transformation to CE is opportunity to transform our economy, to create new jobs and to create sustainable competitiveness and growth.

In order to investigate the current situation in the Macedonian business sector regarding CE, we conducted a survey which covered 45 enterprises. The obtained results of the research are elaborated further in the paper.

2. A survey on business climate and practices for application of the circular economy principles in the Macedonian business sector

2.1 Structure and the results of the survey

The survey consists of 16 questions, divided into three sections. First section contains *enterprise basic information*, related to the size, age, regional location, sectorial distribution and job position of the interviewees. The second section, covers questions related to the *business climate in the enterprises for circular economy concept implementation.* This section includes issues related to awareness among enterprises' representatives regarding circular economy concept, plans for introduction of CE activities in the next period and the most significant benefits of applying the circular economy principles for the businesses. The third section of the survey contains aspects related to the *application of the circular economy concept among the enterprises.* This section includes questions related to the existing business models in the enterprises and the key challenges that enterprises face in the process of innovation or transition to the practices based on CE. The questionnaire consists of nominal, ordinal and interval (Likert scale) questions. The questionnaire was delivered to the reporting units (enterprises) through Google forms questionnaire.

2.2 Enterprise basic information

From the total of 45 analyzed enterprises, according to the number of employees, 28.9% are micro, 35.6% are small, 17.8% are medium and 17.8% are large enterprises (Fig. 2).

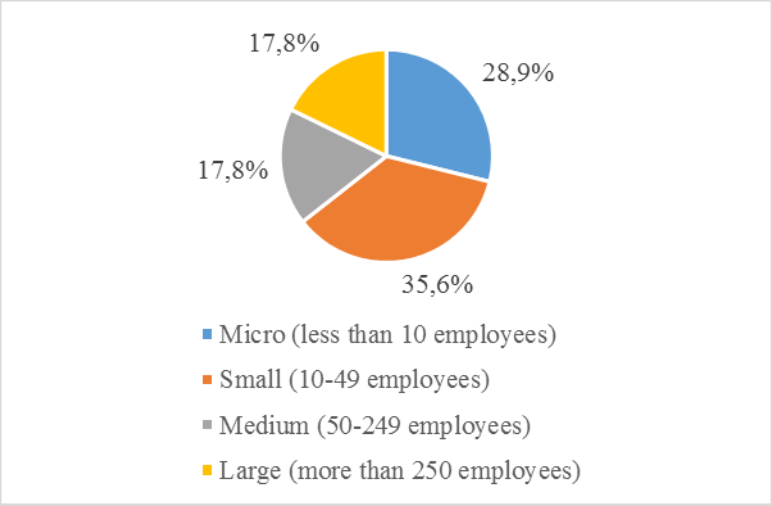


Figure 2. Size of the enterprise by number of employees

Enterprises from the Manufacturing (20%), Information and communications (15.6%) and Wholesale and retail trade; repair of motor vehicles and motorcycles have a dominant participation in the research (11.1%) (Fig. 3).

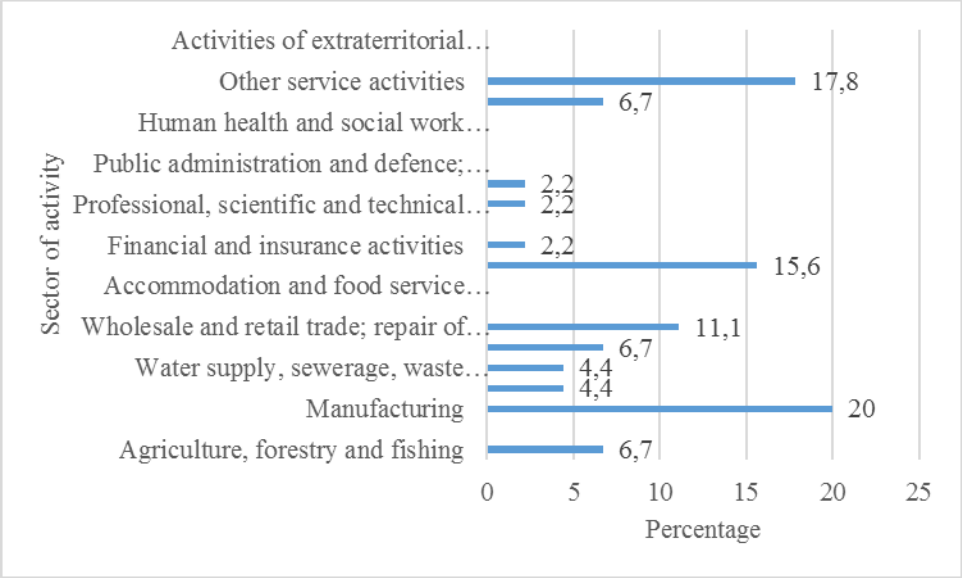


Figure 3. Sectors of activity according to the NKD Rev. 2

2.3 Business climate for CE concept implementation

Almost 65% of the respondents stated that they are familiar with the concept of circular economy (17.8% completely agree and 46.7% agree with this statement). Around 27% have a neutral attitude about this issue, and 8.9% of the respondents stated that they are not familiar with this concept (Fig. 4). Such data indicates a relatively high level of awareness of the respondents regarding the CE concept.

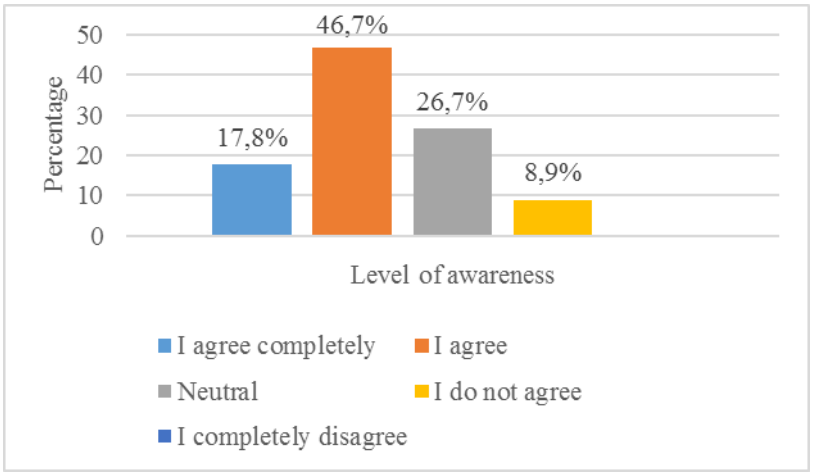


Figure 4. Level of awareness of the enterprises' representatives on the CE concept

The majority of the respondents are considering the introduction of the following activities in the domain of CE in the next period: improved ability to recycle the enterprise's products (40%), extending the life of the products so they can be used longer (31.1 %) and reduced usage of single-use packaging materials (28.9%). On the other hand, 17.8% of the respondents do not plan to implement any of the above mentioned activities in the next period (Fig. 5).

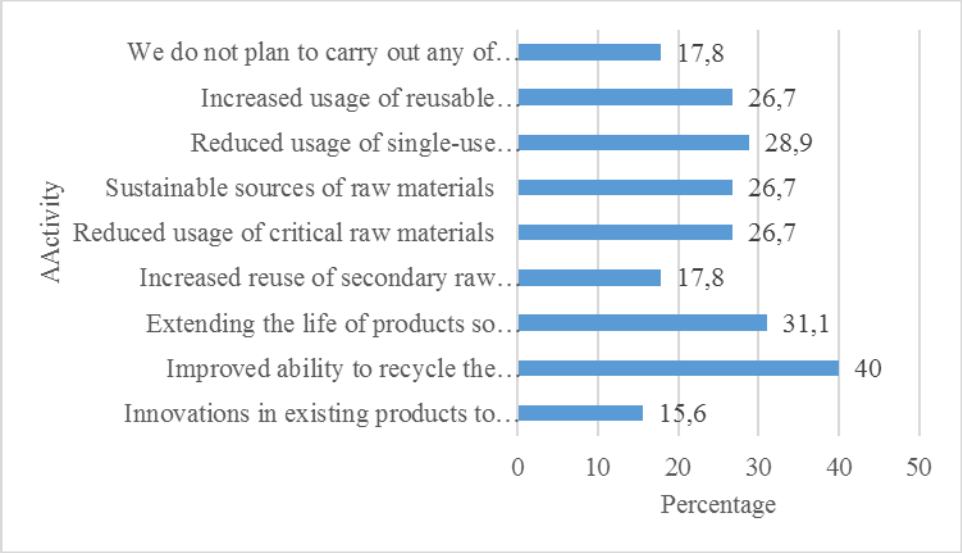


Figure 5. Activities in the domain of CE that would be implemented by the enterprises in the next period (Multiple answers)

According to the data shown in Fig. 6, for almost 60% of respondents the circular economy is important for the business activities of their enterprises (for 17.8% it is very important, and for 40% it is important). Over 33% of respondents have a neutral attitude about the importance of CE for their enterprises. For 6.7% and 2.2% of the respondents, CE is not important or it is not important at all, respectively, for carring out business activities.

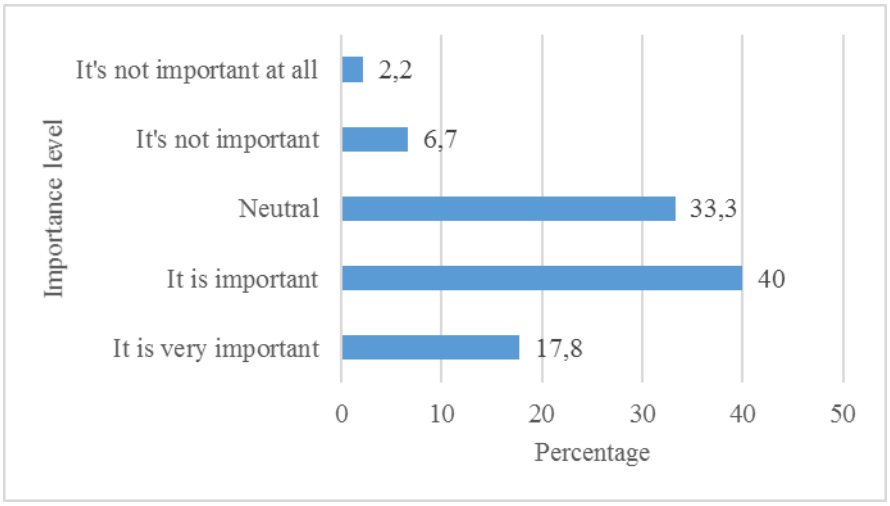
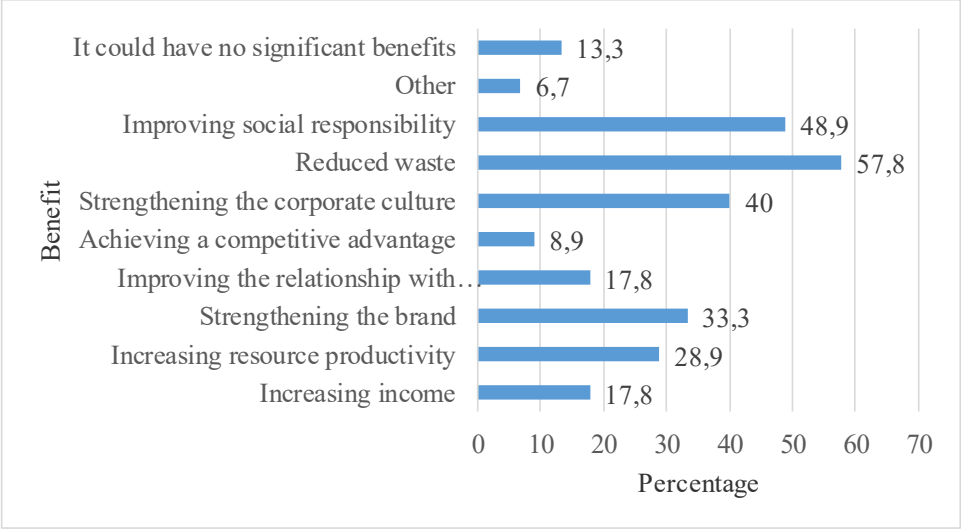


Figure 6. Importance of CE for the enterprises

According to the data presented in Fig. 7 as the most significant benefits of applying the CE concept for their businesses, respondents state the following: reduced waste (57.8%), improved social responsibility (48.9%) and strengthening of corporate culture (40%). For about 13% of the respondents, applying of this concept could not have significant benefits for their businesses.



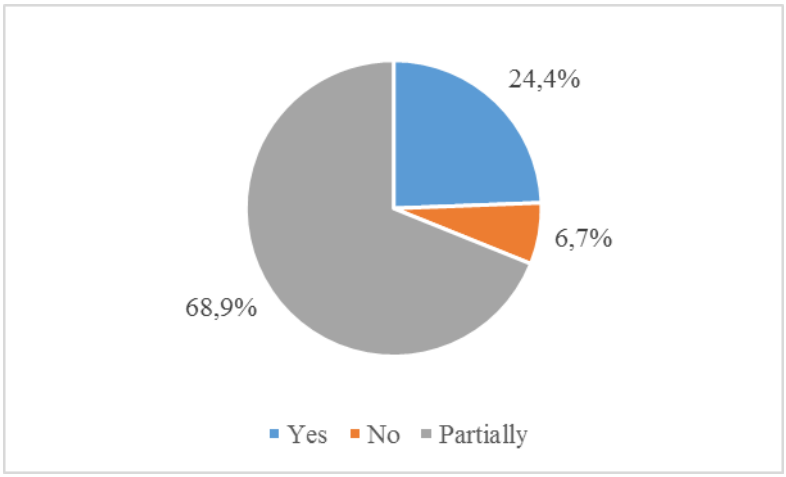
Fifure 7. Benefits for the business from applying the CE concept (Multiple answers)

2.4 Application of the CE concept in the Macedonian business sector

This part of the survey is related to the practical application of the CE principles in the business activities of the enterprises.

The respondents stated that in almost 70% of the enterprises the existing business model partially allows them to move / moving towards the CE model, in 24.4% of the enterprises the existing business model allows them to move towards the CE model, while according to 6.7% of the respondents, the existing business model is one of the barriers to move towards the CE model. Such data show that

in more than 90% of enterprises the existing business models fully or partially enable the movement towards the CE model (Fig. 8).



Fifure 8. Compatibility of existing business model for transitioning to CE model

The most common activities in the domain of CE carried out by enterprises in the past period are: reduced energy consumption (71.1%), reduced waste generation (68.9), increased recycling of generated waste and improvement of employees' knowledge and skills through training for sustainable business practices with 28.9%, respectively, etc. (Fig. 19).

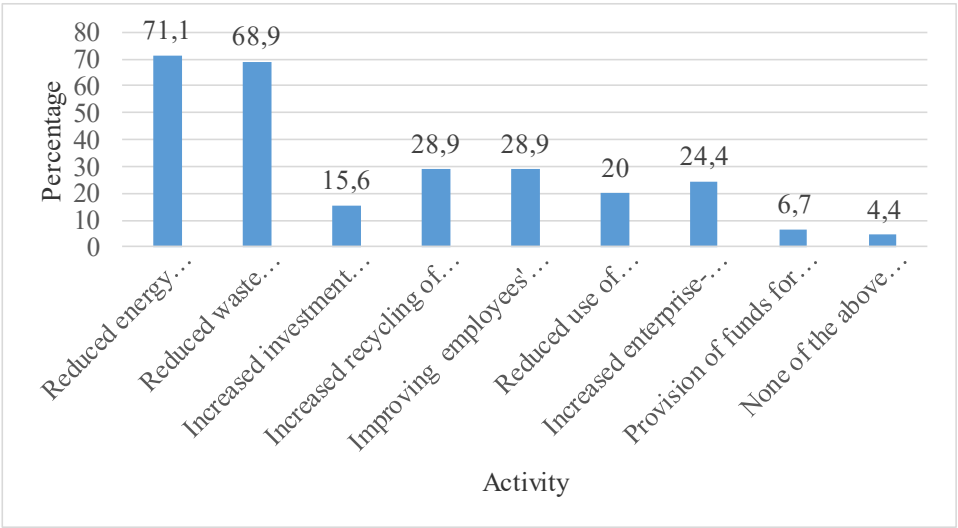


Figure 9. Activities that enterprises carry out? (Multiple answers are possible)

The most common challenges that enterprises face in the process of innovation or transition to a business model or practices based on CE, according to the respondents' answers, are: lack of knowledge, practices and competencies (49.9%), consumer awareness (31.1 %) and financial or economic barriers (26.7%) (Fig. 10).

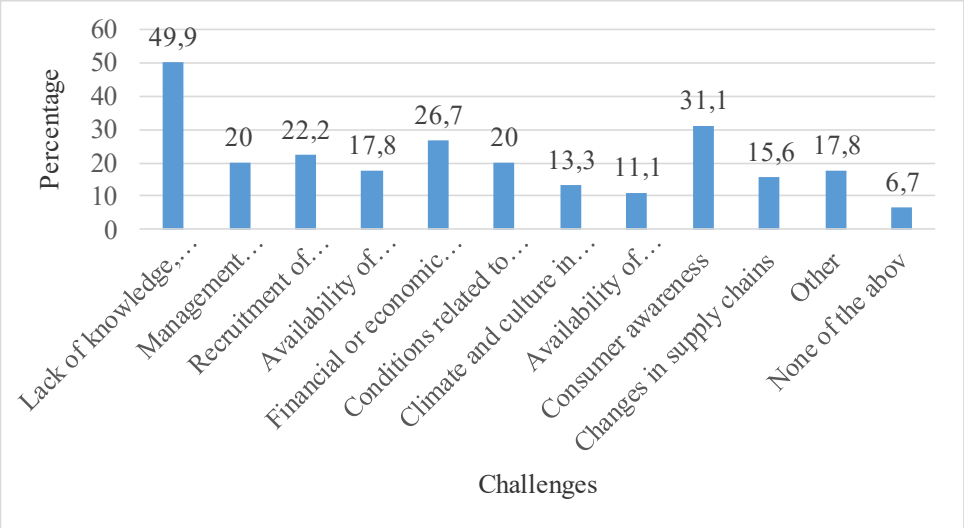


Figure 10. Challenges that enterprises face in the process of innovation or transition to a business model or practices based on CE? (Multiple answers are possible)

3. Conclusion and recommendations

In this study, business climate and practices for application of the circular economy principles in the Macedonian business sector were analyzed through a survey covering 45 enterprises with different size, geographical location and sectors of activity.

In terms of business climate the study has shown relatively high awareness of the enterprises' representatives regarding the CE concept (65% are familiar with this concept). At same time the importance of CE for the enterprises is highly rated (for almost 60% of respondents the circular economy is important for the business activities of their enterprises).

Related to the practices for application of the circular economy principles, more than 90% of the enterprises have carried out some activities in the domain of CE in the past period and in more than 90% of enterprises the existing business models fully or partially enable the movement towards the CE model. The most common challenges that enterprises face in the process of innovation or transition to CE practices are: lack of knowledge, practices and competencies (49.9%), consumer awareness (31.1 %) and financial or economic barriers (26.7%).

Accelerating the implementation of CE principles in enterprises is crucial for advancing a more competitive and environmentally sustainable business sector and society. To achieve this, businesses should focus on several key strategies:

- Strong commitment from top management is essential. Leaders must champion CE principles, integrating them into the company's core values and long-term vision.
- Equipping employees with the knowledge and skills necessary to implement CE practices. Regular training and awareness programs can drive innovation and adoption across all levels of the organization.

- Investing in research and development to create new products and processes that support circularity. Embrace technologies that enhance resource efficiency and waste reduction.
- Fostering partnerships with suppliers, customers, and other stakeholders to build a circular supply chain. Collaboration can lead to shared resources, reduced costs, and collective problem-solving.
- Engaging with policymakers to support regulations that incentivize circular practices and remove barriers. Advocacy for supportive policies can create a more conducive environment for CE adoption.
- Developing and using robust metrics to measure the impact of CE initiatives. Transparent reporting can track progress, highlight successes, and identify areas for improvement.

By focusing on these areas, enterprises can not only enhance their competitiveness but also contribute to a greener economy, ultimately driving systemic change towards a more sustainable future.

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KANTIAN ECONOMICS, IMPURE ALTRUISM, BERGE EQUILIBRIUM, ARROW-LIND PRINCIPLE, WITH LINEAR-COST EQUILIBRIUM

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Abstract

In this paper we will review s-ome results in Kantian economics, (im)pure altruism (warm-glow model), Berge equilibrium altruism and social welfare Arrow-Lind principle and a linear-cost-share equilibrium which is a special case of a Lindahl equilibrium. A strategy profile is a Kantian equilibrium if no player would like all players to alter their contributions by the same multiplicative factor. We study Kantian equilibrium here in Laffont,1975 setting of macroeconomic constraints. Simulations show Kantian equilibrium is in the upper part of efficiency curve, while the ethics utility is maximized, meaning that Kantian equilibrium is efficient but with ethics taken into consideration. Also, as in the case of Nash equilibrium individual utility is more maximized than societal. In a setting with money neutrality as macroeconomic constraint, impure altruism equilibrium or warm-glow equilibrium is at the same point as Berge equilibrium and that is the highest point of efficiency utility line. Kantian and Nash equilibrium are on the same point in this setting while modified Lindahl equilibrium (linear-cost share equilibrium) is as efficient as Pareto equilibrium, other equilibriums are all settled on the efficiency line except for the Kantian, Nash that also are on the warm glow utility line. Pareto equilibrium together with Kantian-Nash equilibrium are on warm glow, and ethics utility line. In the second simulation Kantian is same as Pareto and modified Lindahl equilibrium, impure altruism remains the most efficient equilibrium, Berge equilibrium now is the second most efficient. If marginal cost (Arrow-Lind principle) line crosses sum of marginal benefits (Samuelson condition), then the best equilibrium based on welfare is Nash Equilibrium

Keywords: Kantian equilibrium, warm-glow model, Arrow-Lind principle, Linear-Cost equilibrium, ethics in economics

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1. Introduction

This paper is about cooperation in economics, and (im)pure altruism. Cooperation may be the only means of satisfying one's own self-interested preferences, see Roemer (2019). Altruism and cooperation are frequently confounded in literature. Economic theory has focused on the competitive tendencies of economic agents instead of cooperative. Indeed, the two great theoretical contributions of microeconomics are both models of competition: the theory of competitive or Walrasian equilibrium, and game theory, with its associated stability concept, Nash equilibrium. But there is growing attention to the claim that humans are a cooperative species, see Bowles,S. and Gintis,H.(2011), and Henrich, N., and J. Henrich.(2007). The basic idea behind Kantian equilibrium is that in a cooperative situation everyone asks: 'What would be best for me if everyone were to do it?' When everyone answers in the same way, then that is what everyone does, see Sher,I.(2020). In Nash equilibrium, one chooses one's own strategy to maximize one's own utility holding others' strategies fixed at the equilibrium. In contrast, in Kantian equilibrium, one chooses the common strategy to be adopted by everyone to maximize one's own utility.Impure altruism or Warm-glow giving is an economic theory describing the emotional reward of giving to others. Such warm-glow giving has been acknowledged in the literature, see Arrow (1975), Sen (1977), Sudgen (1982),Sudgen (1984),Hartmann et al.(2017).

2. Kantian equilibria and efficiency (due to Roemer (2010), Roemer (2019))

Under classical behavior, at least in large economies, individuals ignore the externalities induced by their choices. This behavior can be called autarkic and can be contrasted with behavior that can be called interdependent. The equilibrium associated with this behavior is caled Nash equilibrium.[4] Formally there is a set of n agents with payoff function $V_i: \mathbb{R}^n_+ \to \mathbb{R}$,We define effort also as: $\mathcal{L}^{-1} = (\mathcal{L}^1, \dots \mathcal{L}^{1-1}, \mathcal{L}^{i+1}, \mathcal{L}^n)$, and payoff function V_i is strictly monotone and decreasing in $\mathcal{L}^{-1}$ $\forall i$. This set-up describes the fisher's problem, where $V_i(\mathcal{L})$ is the utility of fisher i if the vector of labors expended by all fishers is $\mathcal{L}$.The production function is strictly concave in labor. We can also represent this problem by a collection of functions $\{V_i \mid i = 1, \dots, n\}$ defined on the domain $\mathbb{R}^n_+$;

Definition *1*: A vector of strategies $\boldsymbol{\mathcal{L} = (\mathcal{L}^1, \dots, \mathcal{L}^n)}$ is a multiplicative Kantian equilibrium of the game $\boldsymbol{G = S(V^1, \dots, V^n)}$ for $\boldsymbol{\forall i = 1, \dots, n}$

[4] For example a classic tragedy of commons example**:** A set of fishers must expend labor on a lake to catch fish, but there is a congestion problem, so the fish caught per unit of time decreases with the number of total hours expended in fishing by the community. Each fisher has a utility function over fish caught and labor expended.In the Nash equilibrium of the game where each fisher's strategy is a labor choice, there is over-fishing: the equilibrium is Pareto inefficient, and everyone would gain in welfare from a small decrease in labor expenditures, Some kind of cooperation is necessary to solve the problem.See Roemer (2010)

$$\arg_{\alpha\in\mathbb{R}_+} \max V^i(\alpha\mathcal{L}) = 1 \quad (1)$$

Proposition 1 : Kant's categorical imperative: one should take those actions and only those actions that one would advocate all others take as well. Thus, one should expand one's labor by a factor $\boldsymbol{\alpha}$ if and only if one would have all others expand theirs by the same factor. Kant's categorical imperative is a cooperative norm. The contrast is with the non-cooperative concept of Nash equilibrium, where the counterfactual envisaged by the individual is that one changes one's labor while the labor of all others remains fixed.

Proposition 2 : $\boldsymbol{\mathcal{L} = (\mathcal{L}^1, .., \mathcal{L}^n) \in S^n}$ is a multiplicative Kantian equilibrium of the game $\boldsymbol{G = S(V^1, \dots, V^n)}$ if :

$$(\forall i = 1, .., n)(\forall \alpha \in \mathbb{R}_+)(V^i(\mathcal{L}) \geqq V^i(\alpha\mathcal{L}) \quad (2)$$

In previous S is a common strategy space.

Definition 2:$\boldsymbol{\mathcal{L}}$ is $\boldsymbol{G}$ -efficient if $\boldsymbol{\nexists \mathcal{L}' \in S^n}$ that Pareto dominates $\boldsymbol{\mathcal{L} \in G}$.

Definition 3: Some game $\boldsymbol{G = S(V^1, \dots, V^n)}$ is monotone increasing (decreasing) if $\boldsymbol{(\forall i = 1, .., n)(\mathbf{V^i}(\cdot)}$ is strictly increasing (decreasing) in $\boldsymbol{\mathcal{L}^{-i}}$.

Theorem 1: Suppose that $\boldsymbol{G = S(V^1, \dots, V^n)}$ is monotone increasing (decreasing).And let $\boldsymbol{\mathcal{L}^*}$ be Kantian equilibrium of $\boldsymbol{G}$ with $\boldsymbol{\mathcal{L}^i > 0, \forall i = 1, .., n}$,then $\boldsymbol{\mathcal{L}^*}$ is $\boldsymbol{G}$ efficient.

Proof: Now, let V^i be monotone increasing. Suppose now that $\mathcal{L}^*$ is Kantian but is not G -efficient and is Pareto dominated by allocation $\hat{\mathcal{L}}$ then:

$$r = \max_i \frac{\hat{\mathcal{L}}_i}{\mathcal{L}_i^*} \quad (3)$$

$\exists j, r > \frac{\hat{\mathcal{L}}_j}{\mathcal{L}_j^*}$; for if not then $\mathcal{L}^*$ is not Kantian equilibrium, because all agents would weakly prefer to change to $r\,\mathcal{L}^*$ and some would prefer the change ,and let i^* be an agent for whom $r\mathcal{L}_i^* = \hat{\mathcal{L}}_i$ .So now $r \neq 1$ or else agent i^* would be worse of at $\hat{\mathcal{L}}_i$ than $\mathcal{L}_i^*$ by V^i as monotone increasing. Now by vector $\mathcal{L} = r\mathcal{L}^*$ and we have:

$$V^{i*}\left(r\mathcal{L}^{i*}\right) > V^{i*}\left(\hat{\mathcal{L}}\right) \geq V^{i*}\left(\mathcal{L}^{i*}\right) \quad (4)$$

The first inequality follows from the fact that in $r\,\mathcal{L}^*, i^*$ expends the same labor as the agent does in $\hat{\mathcal{L}}$, while some other agents expend strictly more labor, and none expends less labor than in $\hat{\mathcal{L}}$; the second inequality follows by Pareto domination. Previous This contradicts the assumption that $\alpha^{i*}(\mathcal{L}) = 1$, which proves the claim. About the effort similar argument applies for $V^i(\cdot; e)$ and is monotone decreasing, $r = \min \frac{\hat{\mathcal{L}}_i}{\mathcal{L}_i^*}$ ■ . So If the game G is monotone increasing (decreasing), then there are positive (negative) externalities to individual effort. In Nash equilibrium, these are not taken into account by individuals, and so, unsurprisingly, equilibriums are

often inefficient. By this theorem Roemer (2010) names Kantian equilibrium to be cooperative solution.

Theorem 2 : Now let $\boldsymbol{V^i|i=1,..,n}$ be concave real valued payoff functions defined in $\mathbb{R}^{\boldsymbol{n}}_{+}$ and $\forall \boldsymbol{\mathcal{L}} \in \mathbb{R}^{\boldsymbol{n}}_{++}$ it is defined $\boldsymbol{\alpha_i(\mathcal{L})=\{a|argmax_a V^i(a\mathcal{L})\}}$ and $\exists \boldsymbol{b} \in \mathbb{R}^{\boldsymbol{n}}_{++}, \exists \boldsymbol{B} \in \mathbb{R}^{\boldsymbol{n}}_{++}$ so that $\boldsymbol{b \leqq \mathcal{L} \leqq B \Rightarrow (\forall i=1,..,n)(b \leqq \alpha_i(\mathcal{L})\mathcal{L}^i \leqq B)}$. Then there exists a strictly positive Kantian equilibrium for the game $\boldsymbol{V^i|i=1,..,n}$.

Proof: $\alpha_i(\mathcal{L})$ is convex set $\forall i, \mathcal{L}$, and by the mapping $\mathbb{R}^n_{++}: \Theta(\mathcal{L}^1,..,\mathcal{L}^n) = (\alpha_1(\mathcal{L})\mathcal{L}^1,..,\alpha_n(\mathcal{L})\mathcal{L}^n)$ and by $\exists b \in \mathbb{R}^n_{++}, \exists B \in \mathbb{R}^n_{++}$ Θ maps the rectangle $R = \{b \leqq \mathcal{L} \leqq B\}$,Θ is upper-hemicontinuous[5], and by Kakutani fixed point theorem fixed point of Θ exists in R and at fixed point $\mathcal{L}^*$ we have $(\forall i=1,..,n)(1 \in \alpha_i(\mathcal{L}^*)$ so $\mathcal{L}^*$ is Kantian equilibrium ■.

3. Macroeconomics constraints, efficiency, ethics (due to Laffont, 1975)

This model assumes that as in Akerlof (2002),by near-rational rules of thumb: losses to individuals (individual firms) are small (second-order),but the effect on economy is large. Here rules of thumb involve money illusion. For example if money supply increases by fraction $\varepsilon = 0.05$,losses are approximately $\varepsilon^2 = 0.0025$,agents adjust prices slowly, but a change n money supply alters real balances $\frac{M}{P}$ by a first rder amount causing firs-order changes in output and employment. In Laffont (1975) paper it is introduced a concept of a new ethics, we postulate that a typical agent assumes (according to Kant's moral) that the other agents will act as he does and he maximizes his utility function under this new constraint. Instead, money illusion this paper uses money neutrality. In this model all agents have the same differentiable, increasing, concave utility function. Measurable space of agents is: $A = [0,1]$ endowed with Lebesque measure μ .There are two commodities in this economy with initial endowments $(1,1)$.The two goods can be transformed $X \to Y$ by $y \leqq \alpha x$. The $p(Y) = 1/\alpha$. The optimization problem is :

$$\begin{gathered} maxU(x,y) \\ s.t.\,(x + \left(\tfrac{1}{\alpha}\right)y = 1 + \left(\tfrac{1}{\alpha}\right)1 \end{gathered} \tag{5}$$

Where $\frac{U_2}{U_1} = \frac{1}{\alpha}$.The only macroeconomic constraints in this model are additive resource constraints : $\int_A x d\mu = 1$; $\int_A y d\mu = 1$. In this framework it is fruitless in terms of economic efficiency for consumers to go beyond their selfish behavior, since equilibrium price is $p = \frac{1}{\alpha}$. If agents act Kantian, they will only realize

[5] $\boldsymbol{f: X \to Y}$ $\boldsymbol{f}$ is upper hemicontinuous if for for every open set $\boldsymbol{U \in Y}$ the set $\{\boldsymbol{x \in X: f(x) \in U}\}$ is upper semicontinuous, meaning that its closure is contained in the preimage of $\boldsymbol{U}$ i.e.: $\overline{\boldsymbol{x \in X: f(x) \in U}} \subseteq \boldsymbol{f^{-1}(U)}$. This condition essentially means that the preimage of any open set in the codomain$\overline{\boldsymbol{Y}}$ has a "nice" behavior with respect to the topology of the domain $\overline{\boldsymbol{X}}$

equilibrium without tâtonnement process. Now this model is modified by externality of consumption. This is done by adding another argument to the utility function: $\int_A y d\mu 1$.So, now the optimization problem is given as: $maxU\left(x, y, \int_A y d\mu\right)$,and $s.t.\left(x + \left(\frac{1}{\alpha}\right) y = 1 + \left(\frac{1}{\alpha}\right) 1\right.$so now FOC is : $\frac{U_2}{U_1} = \frac{1}{\alpha}$. But here marginal conditions of the Pareto optimum with equal distribution are:$\frac{U_2}{U_1} = \frac{1}{\alpha} - \frac{U_3}{U_1}$.Since when agent he choose quantity y from Y it is assumed that: $\int_A y d\mu = y$ .Maximization problem here is:max $U(1 + \frac{1}{\alpha} - \left(\frac{1}{\alpha}\right) y, y, y)$.Marginal conditions again are: $\frac{U_2}{U_1} = \frac{1}{\alpha} - \frac{U_3}{U_1}$. This Kantian behavior realizes the optimum that would be attained with selfish behavior only if appropriate taxes $\tau = -\frac{U_3}{U_1}$ were imposed on the consumption of good Y.This model then is transformed in OLG setting with identical agents that live in two periods: young, and old, while the total population is constant. In the first period consumer bears no uncertainty but there are S states of nature in second period. Now let $w_s > 0$ be the endowment of good 0 in period 1,and $s = 1, \dots, S$.Now, $x \in \mathbb{R}^L$ is a consumption vector for a consumer in period 1. And probability of being in any state is Π_s .In period 1 consumer buys insurance at price q_s against states $s = 1, \dots S$, now z_s is the amount of claims against the state s bought (if positive) or sold short (if negative) by a representative consumer.Technology is $l = 1, \dots, L$ with price p_l.Now te maximization problem is:

$$\begin{gathered} \max \sum_{s=1}^{S} \Pi_s(x_0) U(x_0, x_s) \\ s.t. px_0 \leqq w_0 - \sum_{s=1}^{S} q_s z_s; px_s \leqq w_s + z_s, s = 1, \dots S \\ x_s \geqq 0, s = 0,1, .., S \end{gathered} \tag{6}$$

Model assumes insurance company with zero profit constraint, made possible by having the number of consumers go to infinity so that frequencies in all states of nature converge to probabilities. The price of insurance at inefficient stationary equilibrium will be :$q_s = \Pi_s(x_0)$.This is variable insurance premium, and is strictly equivalent in this model to a form of Kantian behavior. With the neutrality of money now in first period consumers receive wage w and transfers t in first period of their life. They can consume c_1 or hold money m with a real return r_m , or to hold an asset a with a return r which is stochastic. In the second period they consume c_2, their receipts from money $r_m m$ and from their asset holdings ra.Maximization problem now is:

$$\begin{gathered} \max U(c_1) + EU(c_2) \\ s.t. c_1 = w + t - a - m \\ c_2 = r_m m + ra \end{gathered} \tag{7}$$

M is nominal per capita money, r is real money per capita. Now, by definition: $r_m - 1 = -\frac{\Delta P}{P} = \frac{\Delta m}{m} - \frac{\Delta M}{M}$,and when $\frac{\Delta m}{m} = 0$ implies that $\frac{\Delta M}{P} = m(1 - r_m)$.There is a macroeconomic constraint that relates the per capita transfer to young consumers

t to the amount of real money created by the government:$t = \frac{\Delta M}{p} = m(1 - r_m)$. Neutrality of money is defined as the impossibility of the government affecting the long-run equilibrium. Now maximization problem will be: $\max U(c_1) + EU(r_m m + ra)$ s.t. $c_1 + a + r_m m = w$. Then the real yield of money turns out to be 1, whatever the government does. Money is neutral.

4. A theory of warm glow giving: Impure altruism by Andreoni (1991)

Warm-glow giving is an economic theory describing the emotional reward of giving to others. This warm-glow model was developed by Andreoni (1989),and Andreoni(1990).Warm glow-represents the selfish pleasure derived from "doing good", regardless of the actual impact of one's generosity. Impurely altruistic maximization for all except for individual $G_{-i} = \sum_{j \neq i} g_j$ in Andreoni(1990) is given as:

$$\max_{x, g_i, G} U_i(x, g_i, G) \quad s.t. \, x_i + g_i = w_i; G_{-i} + g_i = G \tag{8}$$

Where G is public good,U_i is utility strictly quasi-concave,g_i is gift of public good, $i = I, \dots n$ individuals,w_i is individual endowment with wealth. Total amount of public good is :$G = \sum_{i=1}^{n} g_i$ .When $U_i = U_i(x_i, G)$ he individual cares nothing for the private gift and is purely altruistic. But when $U_i = U_i(x_i, g_i)$ the individual is motivated to give only by warm-glow and is purely egoistic. When G and g_i are arguments in the utility function individuals are impurely altruistic. If we substitute $g_i = G - G_{-i}$ the maximization problem will be:$\max_G U_i(w_i + G_{-i} - G, G, G - G_{-i}$. Differentiating with respect to G and solving yields a donations function that takes as arguments the exogenous parts of the maximand:

$$G = f_i(w_i + G_{-i}, G_{-i}) \quad g_i = f_i(w_i + G_{-i}, G_{-i}) - G_{-i} \tag{9}$$

The derivative with respect to public good is f_{ia} marginal propensity to donate for altruistic reason and if charity and public good are normal $0 < f_{ia} < I$. Second argument comes from the private goods dimension of the utility function and is called f_{ie} marginalpropensityto donate for egoistic reasons. Assuming that both warm glow and the private good are normal, then some of the new dollar of wealth w_i will go towards increasing consumption of each. Nash equilibrium is stable when: $0 \leqq f_{ia} + f_{ie} \leqq I$.Now, w_i and G_{-i}will be perfect substitutes in the individual's donations function so $\frac{\partial f_i}{\partial G_{-i}} = I$, $f_{ia} + f_{ie} = 1$.And or the case of impure altruism :$\frac{\partial f_i}{\partial w_i} < \frac{\partial f_i}{\partial G_{-i}} < I$. So the altruism coefficient is defined as:

$$\alpha = \frac{\frac{\partial f_i}{\partial w_i}}{\frac{\partial f_i}{\partial G_{-i}}} = \frac{f_{ia}}{f_{ia} + f_{ie}} \tag{10}$$

Where $0 < \alpha_i \leqq I$ .For pure altruists $f_{ie} = 0$ $\alpha_i = 1$ and for pure egoists $f_{ia} + f_{ie} = I$ sp $\alpha = f_{ia}$. For impure altruists $f_{ie} > 0$ and $f_{ia} < \alpha < I$.

Proposition 3. The change in total giving resulting from a transfer between any two people, say person $\boldsymbol{I}$ and 2, such that $\boldsymbol{dw_1 = -dw_2 = dw}$:

$$\frac{dG}{dw} = c(\alpha_1 - \alpha_2) \tag{11}$$

Where $0 < c < I$. Hence, the income transfer will increase(decrease, or not change)the total provision of the public good if and only if the income gainer is more altruistic than (less altruistic than, or equally as altruistic as) the income loser. Now let $\mathcal{T} = \sum_{i=1}^{n} \tau_i - s_i g_i$ where $\mathcal{T}$ are net government receipts and $Y = G + T$, τ_i are the lump-sum taxes, The impure altruism preferences are:$U_i = U_i(x_i, Y, g_i)$ .Now let $y_i = g_i(I - s_i) + \tau_i$represent i's total contribution to the public good. Assume that the government subsidizes private giving at a rate s_i, and pays for this subsidy by levying lump sum taxes,τ_i .Since $Y = \sum_{i=1}^{n} y_i$ then $Y_{-i} = Y - y_i$. and write the budget constraint as:$x_i + Y = w_i + Y_{-i}$.now the maximization problem and FOC'S are:

$$\begin{gathered} \max_{Y} U_i(w_i + Y_{-i} - Y, Y, \frac{Y - Y_{-i} - \tau_I}{I - s_i} \\ -\frac{\partial U_i}{\partial x} + \frac{\partial U_i}{\partial Y} + \frac{\partial U_i}{\partial g}\frac{I}{I - s_i} = 0 \end{gathered} \tag{12}$$

Solving previous yields : $y_i = f_i\left(w_i + Y_{-i}, \frac{Y_{-i} + \tau_I}{I - s_i}, s_i\right) - Y_{-i}$ .Altrusim coefficient now is: $\alpha = \frac{\frac{\partial f_i}{\partial w_i}}{\frac{\partial f_i}{\partial G_{-i}}} = \frac{f_{ia}}{\frac{f_{ia} + f_{ie}}{I - s_i}}$.

Proposition 4 : Now given the preferences $\boldsymbol{U_i = U_i(x_i, Y, g_i)}$ and an interior equilibrium, any increase (decrease) in the lump sum tax $\boldsymbol{\tau_i}$ will increase (decrease) the total provision of the public good if and only if $\boldsymbol{\alpha_i \leqq I}$ and $\boldsymbol{\alpha_j \leqq I}$ for some $\boldsymbol{j}$.That is: $\boldsymbol{dY = c\sum_{i=1}^{n}(I - \alpha_i)d\tau_i}$, where $\boldsymbol{0 \leq c \leq}$1.Now any increase (decrease) of subsidy rate $\boldsymbol{s_i}$ will increase (decrease) the total provision of public good if and only if $\boldsymbol{\alpha_i \leq I, \forall i, \alpha_j < I}$ for some $\boldsymbol{j}$, that is: $\boldsymbol{dY = c\sum_{i=1}^{n}\left(\alpha_i \frac{f_{is}}{f_{ia}} + (I - \alpha_i)\frac{Y_{-i} + \tau_I}{I - s_i}\right) ds_i}$. It can be seen that the distribution of income as well as government tax policies are crucial in determining the total supply of the public good. By totally differentiating donations giving functions we get:

$$\begin{gathered} dy_i = \left(f_{ia} + \frac{I}{I - s_i} f_{ie} - I\right) dY_{-i} + \frac{I}{I - s_i} f_{ie} d\tau_i + \left[\frac{Y_{-i} + \tau_i}{(I - s_i)^2} f_{ie} + f_{is}\right] ds_i \\ dY = c\sum_{i=1}^{n}(I - \alpha_i)d\tau_i + c\sum_{i=1}^{n}\left(\alpha_i \frac{f_{is}}{f_{ia}} + (I - \alpha_i)\frac{Y_{-i} + \tau_I}{I - s_i}\right) ds_i \end{gathered} \tag{13}$$

Where in the last term $\frac{dY}{d\tau} + \frac{dY}{ds} > \frac{dY}{d\tau}$. And for any given level of taxes collected, the taxes will have a bigger impact on total giving if they are spent on subsidizing gifts rather than on direct grants. Unlike in Feldstein (1980) result does not depend on

theprice elasticity of giving. In this formulation, all that is required is that the $\alpha_i < 1$ .One application of this theorem is under Rotten kid theorem by Becker (1974).

Theorem 3: Rotten kid : If a head exists, other members also are motivated to maximize family income and consumption, even if their welfare depends on their own consumption alone. Or each beneficiary, no matter how selfish, maximizes the family income of his benefactor and thereby internalizes all effects of his actions on other beneficiaries, see Becker (1981).

Proof: To derive the Rotten Kid Theorem with impure altruism, we introduce the concept of impure altruism, where parents derive utility not only from their children's consumption but also from their own consumption. Maximization problem here is:

$$\max_{W_p, W_c} U_{total}(W_p, W_c) = U_p(W_p) + U_c(W_c) \quad s.t. W_p + W_c = Y \tag{14}$$

Where W_p, W_c are wealth allocated by parents for themselves. And Wealth allocated by parents for their children, respectively. We define Lagrangian as:

$$\mathcal{L}(W_o, W_c, \lambda) = U_p(W_o) + U_c(W_c) + \lambda(Y - W_p - W_c) \tag{15}$$

Taking partial derivatives of $\mathcal{L}$ and setting them to zero we get:

$$\begin{aligned} \frac{\partial \mathcal{L}}{\partial W_p} &= \frac{\partial U_p}{\partial W_p} - \lambda = 0 \\ \frac{\partial \mathcal{L}}{\partial W_c} &= \frac{\partial U_c}{\partial W_c} - \lambda = 0 \\ \frac{\partial \mathcal{L}}{\partial \lambda} &= Y - W_p - W_c = 0 \end{aligned} \tag{16}$$

$Y - W_p - W_c = 0$ is constraint representing that the total wealth allocated by parents does not exceed their lifetime income. Solving these equations simultaneously gives us the optimal allocation of wealth for parents and children, maximizing their total utility while considering impure altruism■.

5. Berge equilibrium (due to Berge (1957))

Definition 4: We are considering normal form of a game $\boldsymbol{G} = \langle \boldsymbol{N}, \boldsymbol{S_i}, \boldsymbol{u_i} \rangle$, where $\boldsymbol{N} = \{\boldsymbol{1}, \boldsymbol{2}, .., \boldsymbol{n}\}$ the set of $\boldsymbol{n}$ players,$\boldsymbol{S_i}$ is non-empty strategy set of player $\boldsymbol{i}$ and $\boldsymbol{i} \in \boldsymbol{N}$, and $\boldsymbol{u_i}$ is that player's utility function. Strategy profile here is $\boldsymbol{s} = \{\boldsymbol{s_1}, \boldsymbol{s_2}, \dots, \boldsymbol{s_n}\} \in \boldsymbol{S}$ and denote and incomplete strategy profile:$\boldsymbol{s_{-i}} = (\boldsymbol{s_1}, \boldsymbol{s_2}, \dots, \boldsymbol{s_{i-1}}, \boldsymbol{s_{i+1}}, \dots, \boldsymbol{s_n})$ .A strategy profile $\boldsymbol{s^*} \in \boldsymbol{S}$ is called **Berge equilibrium** if for any player $\boldsymbol{i} \in \boldsymbol{N}$and any $\boldsymbol{s_{-i}} \in \boldsymbol{S_{-i}}$ the strategy profile satisfies $\boldsymbol{u_i}(\boldsymbol{s_i^*}, \boldsymbol{s_{-i}}) \leq \boldsymbol{u_i}(\boldsymbol{s^*})$

Definition 5: Consider this game $\boldsymbol{G} = (\boldsymbol{x_i}, \boldsymbol{u_i})_{\boldsymbol{i} \in \boldsymbol{I}}$ where $\boldsymbol{X} = \boldsymbol{\Pi_{i \in I}} \boldsymbol{X_i}$ and $\boldsymbol{I} \in (\boldsymbol{1}, .. \boldsymbol{n})$ is the set of strategy profiles in the game$\boldsymbol{X_i} \subset \boldsymbol{E_i}$,subset of vector space,and let $\boldsymbol{R} = \{\boldsymbol{R_i}\}_{\boldsymbol{i} \in \boldsymbol{M}}$ is a set of subsets of $\boldsymbol{I}$.A feasible strategy $\overline{\boldsymbol{x}} \in \boldsymbol{X}$ is an

equilibrium point for the set $\boldsymbol{R}$ relative to the set $\boldsymbol{S}$ or a coalitional Berge equilibrium if $\boldsymbol{u_{rm}(\bar{x}) \geq u_{rm}(\bar{x} - S_m, xS_m), \forall m \in M}$, $\forall \boldsymbol{r_m \in R_m, x_{S_m} \in X_{S_m}}$

6. Arrow-Lind theorem (due Arrow-Lind (1970))

Expected payoff of the project is $\Pi = \bar{\bar{\Pi}} + X$ where $\bar{\bar{\Pi}} = E(\Pi)$ и $E(X) = 0$.For the individual households $0 \leq s \leq 1$ where s is their share of projects return.Now, $k(s)$ -is risk premium and $\mathrm{E}\left[U\left(M + s\bar{\bar{\Pi}} + sX\right)\right] = U\left(M + s\bar{\bar{\Pi}} - k(s)\right)$.Where $k(s)$-are the risk bearing costs for projects ,M-is medial income.

Theorem 4 :Arrow-Lind : Suppose $\boldsymbol{cov(M, \Pi) = 0}$ and $\boldsymbol{s = \frac{1}{H}}$ .Total risk bearing costs are , $\boldsymbol{Hk(s) = Hk\left(\frac{1}{H}\right) = Hk(H)}$, and they move to zero as $\boldsymbol{H \to \infty}$

Proof: by differentiation of expected utility with respect to s we get

$$\frac{\partial}{\partial s}\mathrm{E}\left[U\left(M + s\bar{\bar{\Pi}} + sX\right)\right] = \mathrm{E}\left[U'\left(M + s\bar{\bar{\Pi}} + sX\right)\left[\bar{\bar{\Pi}} - X\right]\right] \quad (17)$$

If $s = 0$ and $cov(M, \Pi) = 0$, in turn implies that $cov(M, X) = 0$ it follows: :

$$\mathrm{E}\left[U'(M)\left[\bar{\bar{\Pi}} + X\right]\right] = \bar{\bar{\Pi}}E[U'(M)]$$

$$\lim_{s \to 0} \frac{\mathrm{E}\left[U\left(M + s\bar{\bar{\Pi}} + sX\right) - U(M)\right]}{s} \to \bar{\bar{\Pi}}E[U'(M)] \quad (18)$$

Or equivalent by the assumption $s = \frac{1}{H}\lim_{H \to \infty} HE\left[U\left(M + \frac{\bar{\bar{\Pi}} + \bar{X}}{H}\right) - U(M)\right] = \bar{\bar{\Pi}}E[U'(M)]$ it follows: $\lim_{H \to \infty}\left[\frac{\bar{\bar{\Pi}}}{H} - k(H)\right] = \bar{\bar{\Pi}}$; $\lim_{H \to \infty} Hk(H) = 0$ ■

7. Linear-cost share equilibrium

Definition 6: A linear cost-share equilibrium is a vector of shares $\boldsymbol{b \in (b^1, .., b^n) \in [0, 1]^n}$such that $\boldsymbol{\sum b^i = 1}$ and acontribution vector $\boldsymbol{(E^1, .., E^n)}$ and a public good l evel $\boldsymbol{y}$, which is feasible, such that: $\boldsymbol{(\forall i)(E^i = bC(y)}$ and $\boldsymbol{y}$ maximizes $\boldsymbol{u^i\left(y, b^i C(y)\right)}$. A linear-cost-share equilibrium is a special case of a Lindahl equilibrium, $\boldsymbol{E^i}$ is i's contribution to the public good, and the cost function is $\boldsymbol{C(y) = E}$,the production function $\boldsymbol{G}$ is inverse cost function.The payoff function for each individual is:$\boldsymbol{u^i(G(E^s), E^i}$ multiplicative Kantian equilibrium is:

$$\frac{d}{dr}|_{r=1} u^i\left(G(rE^s)rE^i\right) = 0, u_1^i(G'(E^s)E^s + u_2^i E^i = 0 \Rightarrow -\frac{u_1^i}{u_2^i} = \frac{E^i}{E^S}\frac{1}{G'(E^S)}$$

(19)

Since $\frac{1}{G'(E^S)} = C'(y)$ by adding previous we can write $\sum \frac{1}{MRS^i} = C'(y)$ which Samuelson condition for provision of public goods. Where $E^S = \sum E^i$.If $b^i = \frac{E^i}{E^S}$, these equations are identical to $\frac{u_1^i}{u_2^i} = \frac{E^i}{E^S}\frac{1}{G'(E^S)}$, and so Kantian optimization decentralizes the Lindahl equilibrium, see Roemer (2019).

8. Simulations of the Kantian equilibrium result

In this section we will simulate Kantian equilibrium result. First, we will plot Kantian Economics: Individual vs. Societal Utility, next we will plot a global graph Macroeconomics Constraints, Efficiency, and Ethics, And Macroeconomics Constraints, Efficiency, Ethics, Warm-glow Giving, Nash Equilibrium, Money Neutrality, Arrow-Lind Principle, and Linear Cost-Share Equilibrium will be the last plot. All the simulations and plots re coded in Python. These simulations are done with artificial data they do not use real observations. Their main purpose and sole one is to depict graphically this economy described in previous sections.

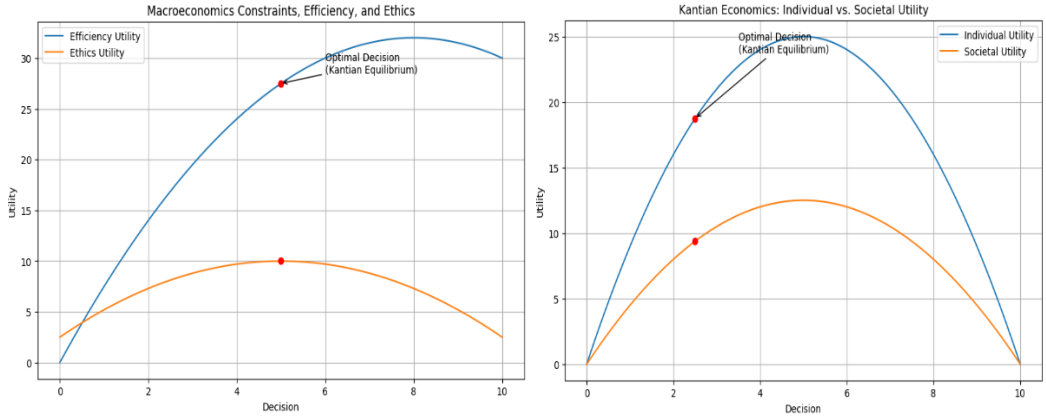


Figure 1 Macroeconomics Constraints, Efficiency, and Ethics; Kantian Economics: Individual vs. Societal Utility

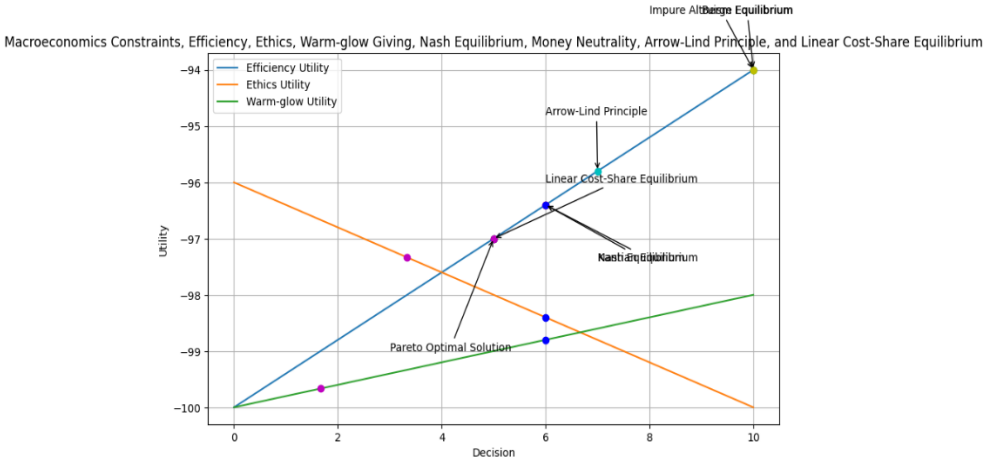


Figure 2 Macroeconomics Constraints, Efficiency, Ethics, Warm-glow Giving, Nash Equilibrium, Money Neutrality, and Arrow-Lind Principle

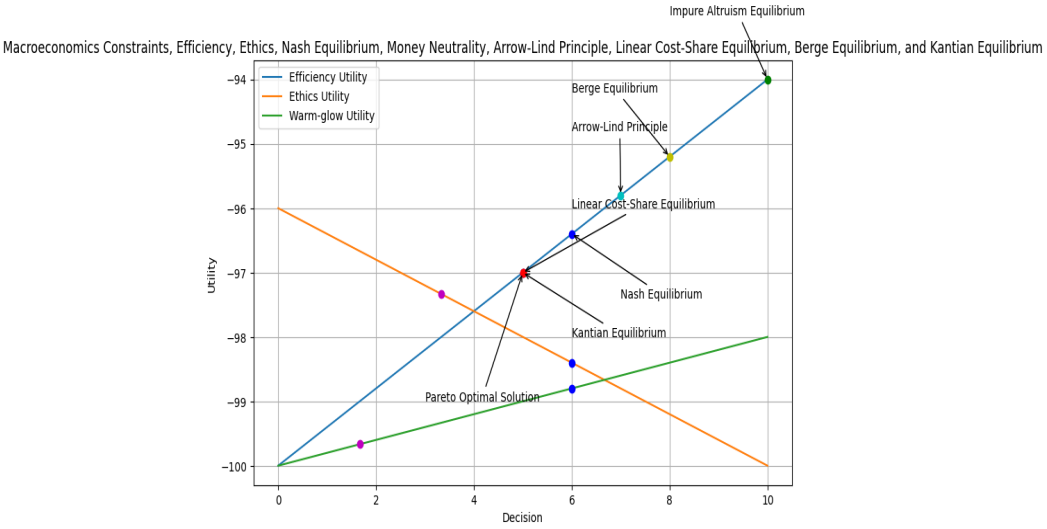


Figure 3 second simulation of the whole model

In previous examples: Kantian Equilibrium is calculated based on the balance between efficiency and ethics. Nash Equilibrium and Impure Altruism Equilibrium are specific points on utility curves. Pareto Optimal solution and Arrow-Lind Principle are specific points chosen to illustrate these concepts. Linear Cost-Share Equilibrium is derived by sharing the decision proportionally according to the importance of each factor. Berge Equilibrium is marked at a specific decision point as an example. Next, we will show two examples of the usage of these equilibria in the provision of public goods.

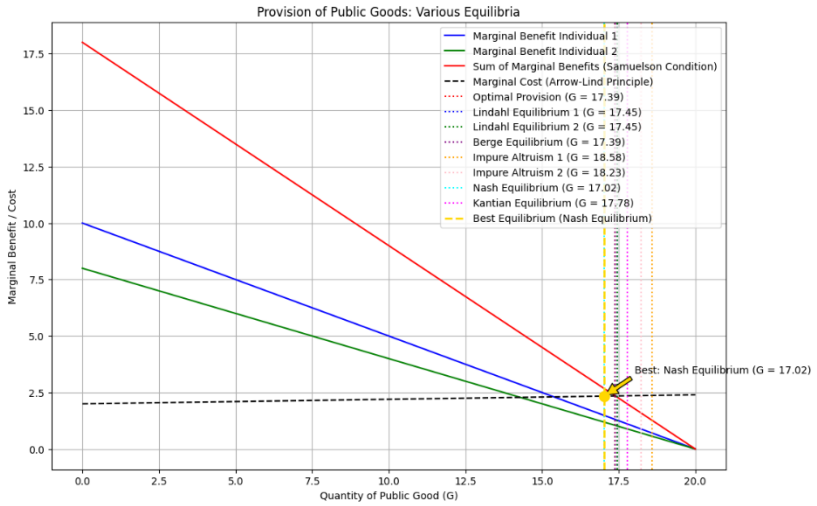


Figure 4 Provision of public goods: Various equilibria.

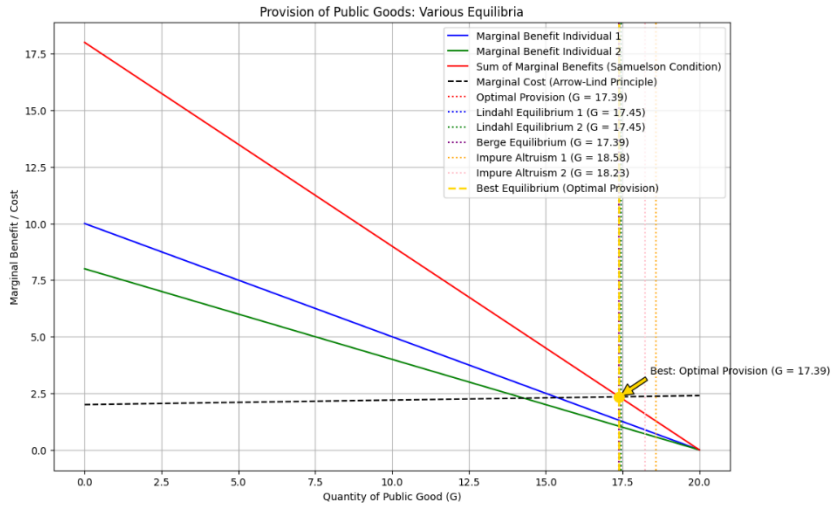


Figure 5 second simulation of the whole model.

Optimal provision of public goods is:

$$\sum_{i=1}^{n} MB_i(G) = MC(G) \qquad (20)$$

For two individuals:$(a_1 - b_1 G) + (a_2 - b_2 G) = c + \frac{d}{\sqrt{n}} G$.Solving for G: $a_1 + a_2 - \left(b_1 + b_2 + \frac{d}{\sqrt{n}}\right) G = c \Rightarrow G_{optimal} = \frac{a_1 + a_2 - c}{b_1 + b_2 + \frac{d}{\sqrt{n}}}$.Where c is a fixed component of the marginal cost, independent of the quantity G of the public good. This term $\frac{d}{\sqrt{n}} G$ represents the variable part of the marginal cost, which increases with the quantity G of the public good. Where n is the number of individuals and $\sqrt{n}$ is used to distribute the cost among individuals. So, d could be interpreted as the sensitivity of the marginal cost to the provision level of the public good.Also, a_i represents marginal benefit when $G = 0$.And b_i is a coefficient that reflects how the marginal

benefit (marginal disutility) decreases as more of the public good is provided marginal benefit function can usually be expressed as:$MB_i(G) = a_i - b_i G$. In **Lindahl equilibrium**, each individual pays a price proportional to their marginal benefit, i.e. $P_i = MB_i(G)$. For two individuals:$P_1 = MB_1(G); P_2 = MB_2(G)$. Where the total cost for each individual must sum to the marginal cost:$P_1 + P_2 = c + \frac{d}{\sqrt{n}} G$.And solving for G:

$$G_{Lindahl_1} = \frac{a_1 - \lambda_1 c}{b_1 + \lambda_1 \frac{d}{\sqrt{n}}}; G_{Lindahl_2} = \frac{a_2 - \lambda_2 c}{b_2 + \lambda_2 \frac{d}{\sqrt{n}}} \quad (21)$$

In **Berge equilibrium**, each individual's marginal benefit equals the marginal cost of providing the good,i.e. $MB_1(G) = MC(G); MB_2(G) = MC(G)$.Solving for G: $a_1 - b_1 G = c + \frac{d}{\sqrt{n}} G; G_{Berge_1} = \frac{a_1 - c}{b_1 + \frac{d}{\sqrt{n}}}$.Same applies for the second individual. In **Impure altruism**, individuals gain utility from the act of giving itself. So utility function is given as: $U_i = MB_i(G) - \alpha \cdot MC(G)$. The parameter α captures the relative importance or weight of this altruistic component. If α is high, the individual derives significant utility from others benefiting from the public good. If α is low, the individual's utility is more focused on their direct benefit from the public good. FOC is given as: $\frac{\partial U_i}{\partial G} = 0$.For individual i:$a_i - b_i G - \alpha \cdot \left(c + \frac{d}{\sqrt{n}} G\right) = 0$. Solving for $G_{impurealtruism_1}; G_{impurelatruism_2}$:

$$G_{impurealtruism_1} = \frac{a_1 - \alpha c}{b_1 + \alpha \frac{d}{\sqrt{n}}}; G_{impurealtruism_2} = \frac{a_2 - \alpha c}{b_2 + \alpha \frac{d}{\sqrt{n}}} \quad (22)$$

In **Nash equilibrium**, each individual's contribution is optimal given the contributions of others. Condition here is: $MB_1(G) = \frac{MC(G)}{2}$.For individual i:$a_i - b_i G = \frac{c + \frac{d}{\sqrt{n}} G}{2}$. Solving for G_{Nash}:

$$G_{Nash} = \frac{a_1 + a_2 - c}{b_1 + b_2 + \frac{d}{\sqrt{n}}} \quad (23)$$

In **Kantian equilibrium**, individuals contribute equally to the public good. Solving for two individuals $G_{Kantian}$:

$$G_{Kantian} = \frac{a_1 + a_2 - c}{b_1 + b_2} \quad (24)$$

The **Arrow-Lind principle** states that the marginal cost of providing a public good is divided among all individuals. Marginal cost are: $MC(G) = c + \frac{d}{\sqrt{n}} G$.FOC is given:$MB_i(G) = MC(G)$. For individual i:$a_i - b_i G = c + \frac{d}{\sqrt{n}} G$. Solving for two individuals $G_{ArrowLind_1; G_{ArrowLind_2}}$:

$$G_{ArrowLind_1} = \frac{a_1 - c}{b_1 + \frac{d}{\sqrt{n}}}; G_{ArrowLind_2} = \frac{a_2 - c}{b_2 + \frac{d}{\sqrt{n}}} \quad (25)$$

These derivations provide the mathematical conditions for each equilibrium concept in the context of public goods provision.

9. Conclusion

Kantian equilibrium in our model is almost same as Nash equilibrium so we can call him Kantian-Nash equilibrium. There is a literature or there exists a concept of generalized Kantian-Nash equilibrium see Grafton et al.(2017).This equilibria are about forming stable coalitions in static game of climate change mitigation. The results might have been different if we assumed that the population of Kantians in the society increases more than Nashians. But as the general population grows Arrow-Lind is far more efficient than Kantian and Nash equilibrium. And warm-glow model or impure altruism together with Berge equilibrium where agents cooperate instead of defect are much more efficient than Kantian and Nash equilibria. Linear cost equilibrium (modified Lindahl equilibrium)seems to be only Pareto efficient solution from those offered. In the second simulation of the model, impure altruism is again the most efficient equilibrium suggesting that private provision of public goods is the most efficient way of supply of public goods. The applicability of these equilibria was tested in the case of provision of public goods. Lindahl equilibrium, Kantian equilibrium and especially Impure altruism led to overprovision of public goods. This in turn leads to: Inefficient resource allocation, crowding out of private investment, increased tax Burden, government budget deficits, distorted Incentives: Overprovision of certain public goods might create distorted incentives for individuals and businesses. For example, if public goods like healthcare or education are overprovided, it may reduce the incentive for individuals to invest in their own health or education. Moral Hazard: Overprovision of public goods can create a moral hazard problem, where individuals or businesses take on more risk because they believe the government will always provide for their needs, leading to irresponsible behavior. Inequitable distribution of benefits: Public goods are typically non-excludable, meaning that everyone can benefit from them. However, overprovision may disproportionately benefit certain groups over others, leading to inequities. For example, if more resources are allocated to public parks in wealthier areas, those communities benefit more than others. Berge equilibrium is same as optimal provision of public goods equilibrium. Nash equilibrium is located where marginal cost (Arrow-Lind principle) line crosses sum of marginal benefits (Samuelson condition).

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DIGITAL TRANSFORMATION OF HUMAN RESOURCE MANAGEMENT IN INDUSTRY 4.0

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Abstract

This study examines the importance of digitalization in Industry 4.0 for the transformation of Human resource management (HRM) in modern organizations. Drawing upon HRM and Industry 4.0 theories we analyze meaning of digital solutions for development of Electronic HRM. Empirical studies show that orientation supported by several digital solutions. Among them, literature highlights the importance of training through advanced digital environments, virtual reality, gamification, and social media. E-training fosters flexibility and accessibility, while virtual reality simulations heighten realism and safety of training scenarios. In addition, gamification strategies increase motivation and engagement, and leading to demonstrably improved learning outcomes of participants. Social media platforms facilitate informal knowledge exchange and peer collaboration, offering a flexible training ecosystem. Indicated training and empowering solutions of employees supporting the process of transformation of HRM from traditional to digital one. The results of our study have theoretical implications related to the required capabilities for the work of HRM participants in modern organizations. Practical implications include the development of Electronic HRM for Industry 4.0 and further technological and industrial advancement.

Keywords: Digitalization, Industry 4.0, Human resource management, Digital transition

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1. Introduction

In today's rapidly evolving business environment, it is undoubtedly true to say that digital transformation is one of the most powerful forces that is radically changing all industries and activities. Amond them, also effect on human resource management, as people are a key resource of any successful organization. These drastic changes are driven by the integration of cutting-edge technologies which are according to Piccarozi et al. (2018) the Internet of Things, artificial intelligence, and cloud computing, the sum of which constitutes Industry 4.0. In this context, it is important to understand that the essence of the Fourth Industrial Revolution goes beyond technology, as it is sweeping into all aspects of the business world and fundamentally changing the way an organization operates. Digital transformation in the context of Industry 4.0 involves a fundamental change in business processes, models, and organizational culture, while at the same time enabling organizations to increase their efficiency, foster innovation, and deliver personalized experiences for customers. This metamorphosis is not a superficial adaptation but a deep-rooted change that, according to Mcgrath & Maiye (2010), redefines traditional business practices while requiring new upgraded competencies and skills of organizations and their employees.

In particular, human resource management (HRM) is changing significantly with the goal of increasing efficiency and strategic value creation for organizations. HRM' activities themselves are increasingly using digital tools to streamline processes, increase employee engagement, and foster a culture of continuous learning and development. Technologies such as Human Resource Information Systems (HRIS) and electronic HRM (e-HRM) are revolutionizing all HR activities, enabling more effective human capital management and driving organizations' performance (Strohmeier, 2007). Moreover, the digital transformation of HRM reveals the critical importance of digital skills and competencies for the employees.

Technological advances and the constant changes in Industry 4.0 leading to evolving workplaces and for new demands from employees' skills. That accelerate interest of organizations for investments and development of digital training and development programs, as this is the only way to make their employees truly competent and productive. In this context, the literature highlights the importance of E-learning, training through virtual reality, gamification, and social networks as effective methods to equip employees with the necessary advanced skills and knowledge (Chen, 2010).

The focus of our paper is the transformative impact of Industry 4.0 on Human Resource Management (HRM) practices through the integration of several digital technologies like HRIS and e-HRM. Additionally, the study investigates the evolution of employees' digital competencies through advanced training methodologies, including virtual reality, gamification, and social media, shaping the future landscape of HRM in the digital age.

2. Literature review

2.1. Development of Industry 4.0

Industry 4.0, or the Fourth Industrial Revolution, refers to the era of "cyber-physical systems (CPS) that combine computing, networking, and physical processes. This era includes various technologies such as mobile devices, the Internet of Things (IoT), artificial intelligence (AI), cybersecurity and 3D printing (Piccarozzi, Aquilani & Gatti, 2018), while TIBCO Software Inc. (2021) simplifies the definition of Industry 4.0 as the application of IoT, cloud computing, CPS and cognitive computing in manufacturing and service environments, enabling fully connected and scalable production and increased value in factories and across the supply chain. The term was coined at the Hannover Fair in Germany in 2021 to describe a revolution in the global value chains of organizations (Schwab, 2017). This revolution is enabling smart factories where virtual and physical production systems will be connected at a global level and will interact in a highly flexible way, allowing for the complete customization of products and the creation of a new operating model. The essence of Industry 4.0 is the transition from the digital to the physical world, which means using algorithms to translate digital decisions that affect the physical world. According to Schwab (2017), Industry 4.0 encompasses not only smart, connected machines and systems but also a wide range of breakthroughs- from genetics to nanotechnology to renewables and quantum computing. This fusion of technologies and their interactions across the physical, digital, and biological domains distinguishes the Fourth Industrial Revolution from previous ones (Schwab, 2017).

Abdelmajied (2022) claims that in the context of Industry 4.0 all systems are interconnected, forming ‘’cyber-physical production systems’’ that create smart factories. In these environments, production systems, components and people communicate via a network, enabling near autonomous production. The integration of these elements allows Industry 4.0 to bring significant advancements to manufacturing (for instance, machines can predict malfunctions and initiate their own maintenance, and logistics systems can self-organize in a response to unexpected production changes. Industry 4.0 also has the potential to transform work practices. It can incorporate individuals into smarter networks, enhancing efficiency. Digitalization of the manufacturing environment enables more flexible delivery of relevant information to the right person at the right time. With the increased use of digital devices both in factories and on the field, maintenance personnel can access equipment documentation and service history more rapidly and directly at the point of use, allowing them to focus on solving problems rather than searching for technical information.

In the context of our article, which focuses on the impact of Industry 4.0 on human resources, it is relevant to look at the impact of these technological advances on the workplace and skill development. It is no secret that technological advancements are aggressively transforming the workplace, redefining jobs and essential skills. According to Qin, Liu & Grosvenor (2016) the key change is the human-machine interaction, with new collaborative work

methods emerging. As robots and intelligent technologies become more prevalent, the merging of real and virtual environment signifies a significant transition in the workplace. The increased importance of human-machine interfaces enhances interactions between production elements and facilitate communication between smart machines, products and employees. Consequently, ergonomic considerations must be prioritized, and future systems should emphasize work relevance. Successful adoption of Industry 4.0 also hinges on skill development, necessitating demographic and societal shifts. Thus, work environments require new competencies, and in this matter high-quality training is essential. Mohammed & Wang (2018) explain that interdisciplinary thinking and strong technological skills are crucial and educations systemst must incorporate these new competencies, preparing workers for new responsibilities.

In summary, Industry 4.0 is undoubtly having a revolutionary impact on the way the world works, and the very concept of Industry 4.0, with its advanced technologies that enable businesses to move into the digital age, where processes are more automated, connected and data-drive, is a key part of the digital transformation of business world that we focus on below.

2.2. Digital business transformation

Schwertner (2017) emphasizes that digital business transformation is reshaping industries by breaking down the barriers between people, businesses, and things. This allows for the creation of new products and services, as well as more efficient business practices. These changes are happening across organizations of all kinds, but they all center around the ability to transform processes and business models, empower workforce efficiency and innovation, and personalize customer experiences. To accomplish this, companies need a Digital Business Platform that focuses on outcomes and utilizes technology effectively.

McGrath & Maiye (2010) define digital transformation as the integration of digital technology into all aspects and operations of the organization, resulting in significant infrastructural changes in how the organization operates and delivers value to its customers. This integration is not merely a superficial adjustment but a profound shift that impacts the core functions and strategies of the organization. Some researchers (Bouncken, Kraus & Roig-Tierno, 2021) argue that digital transformation extends even further, leading to fundamental changes in business operations, products, and processes. This transformation can be so extensive that it sometimes results in the creation of entirely new business models, reflecting a complete overhaul in how the organization competes and succeeds in the market.

In this context, Enterprise magazine points out that the concept of digital business transformation itself can be divided into four main parts-business process, business model, scope and organization (Yuleva-Chuchulayna, 2021):

- **Business processes** are often at the heart of digital transformation. This involves incorporating technologies to enhance key aspects of common procedures, such as utilizing artificial intelligence for inventory management, developing a mobile ordering app, or automating accounting tasks;

- **Transforming the business model** involves integration technologies to change or improve the entire industry by creating c completely new or different business model. This often entails digitizing resources or adopting advanced technologies that revolutionize the industry (for example such companies as Uber and Lyft);
- **Transforming the scope** is more complex and not feasible for all businesses. It allows a company to broaden its services and offerings to become a more comprehensive organization. Amazon exemplifies this approach, expanding from an online retailer to include cloud computing, the Internet of Things, and delivery services;
- **Organizational or cultural transformation** is another dimension of digital transformation. It involves developing systems that enhance company culture by creating innovative procedures, increasing productivity, and adopting flexible, collaborative methods.

Legner et al (2017) claim that digital transformation has a key impact on value creation in various aspects of business. One of the key benefits is the increase in operational efficiency, enabling organizations to run their processes more smoothly and effectively. It also contributes to improving organizational performance, because organizations that undergo effective digital transfromations are better at abling to measure and analyze their performance and make data-driven decisions and leads to better relationships with stakeholders as digital tools enable better communication and collaboration. Göz et al (2020) adds that one of the most important benefits is significant reduction in costs, the introduction of digital technologican can also automate many processes, reducing the need for manual work and thus increasing productivity. In addition, improved strategic differentiation allows organizations to more effectively differentiate themselves from their comeptitors with unique offercs and services (Götz et al., 2020).

It is important to acknowledge that the digital transformation process is a very complex and demanding activity, which can be slowed down or stopped by various obstacles that can affect it's successs. Therefore, identifying barriers, understand their nature and assessing the likelihood of their occurrence is an important element for the successful adoption of the digital transformation concept. Among the many potential barriers, various studies identified field of HRM, especially employees as the biggest challenge and a key success factor for digital transformation, highlighting employee competency traps, their IT knowledge, skills and capabilities. Accroding to this, we have decided to examine the impact of digitalization, or more specifically digital transformation, primarly from a human resource management perspective.

2.3. Digitalization of HRM

The digital transformation of HRM represents a significant shift in the way HRM activities are carried out, with a focus on the use of digital technologies, applications and tools. This shift is driven by the need for simplicity, fast and secure handling of employees which is made possible by a number of digital solutions, and at the same time a shift towards a new way of carrying out the

activities of HRM through technologies also brings challenges, such as the need to acquire new skills and competences (Bizjak Ferjanin, Bernik, 2024).

Liu & Su (2022) state that digital transformation improved the quality of HRM. Their main findings are related to the analysis of some of the activities of HRM and highlight the priorities which the HR function creates value in organization and contributes to performance. They add that through digital transformation, organizations need to focus not only on technology, but on capabilities, competencies, motivation and commitment to employee development and organizational behavior in relation to digital transformation. In the meantime, Hemantha (2021) claims that most of the CEOs have already implemented at least one digital technology by the year of 2019.

In organizations where digital technologies have already been implemented, HRM practices changed significantly. As a result of the development of technologies, the nature of work is changing more rapidly than the capabilities of employees, which results in a significant gap between employee capabilities and the demands of job. Nawaz & Gomes (2014) also note a shortage of qualified candidates for jobs on the labour maker are the related need to acquire new comptences and skills for existing employees. While School Education Gateaway (2016) claims that digital skills and competencies are a key part of normal functioning in modern society and in moderny economy.

Vieru et al. (2015) define digital competencies as the ability to adopt and use new or existing digital technology to analyse, select and critically evaluate digital information in order to research and solve work-related problems. According to Vuorikari et al. (2016) the following areas of digital competences are:

- Information literacy: finding, selecting, evaluating, managing data, information and digital content;
- Communication and collaboration: communicating, sharing and collaborating using digital technologies, online etiquette and digital identity management;
- Digital content production: development, placement and creationg of digital content;
- Security: protecting devices, personal data and privacy:
- Problem solving: technical and technological problem solving, use of digital technologies etc.

As noted, digital skills and competencies are essential for organizations but according to Cetubdanar et. el (2021) they also represent huge benefits for employees. Having the key digital skills and competences needed to help drive an organization forward is empowering and helps employees feel more confident, motivated and secured in their roles. In today's digital era, jobs traditionally carried out by people are increasingly being replaced by automation software, however research shows that having the right skills and competences reduce the risk of their role becoming automated by nearly 59%. Furthermore, demonstrating a veriety of digital skills often results in higher salary, with roles requiring digital skills paying on average 29% more than roles that do not. Therefore, developing digital skills for the workplace not only aids employability, job security and career progression, but often generates a financial boost too

3. Digital transformation of HRM

According to Amalia (2024) digital transformation revolutionized many aspects of our lives, including the way organizations manage their human resources. As new digital technologices continue to evolve, the field of HRM has been deeply impacted, resulting in the emergence of Human Resource Information Systems (HRIS), and Electronic Human Resource Management (E-HRM).

3.1. Human Resource Information Systems

Parkash, Krishna & Mores (2019) argue that the world has undergone far-reaching changes due to the increasing use of digital technologies, which characterize the current era as the digital age. Technological advancements have transformed human resource management (HRM) into a strategic partner in organizational decision-making. Organizations have realized the necessity of technology for effective HRM, which has stimulated investments in digital solutions to improve business performance and understand that collaboration between IT and HRM is critical for business sustainability (Das & Barman, 2019).

One of the systems commonly used by today's organizations is HRIS, which is used to manage human resources within an organization in the form of applied data and information about human resources in a more structured way (Hendrickson, 2003). Hendrickson (2003) described HRIS as a system that is developed using integrated technology to collect, store, and analyze information related to employees in an organization. The implementation of HRIS includes databases, computer applications, hardware and software that aim to store, manage, recod, deliver and manipulate various data for different human resource management functions. Literature explain HRIS as a phenomenon that serves as an aid for effective human resource management, and several different studies have shown that the implementation of HRIS has brought many benefits to the organization as it is believed to have a positive impact on time efficiency and data entry. The benefits of using HRIS undoubtedly include faster and more efficient processing of information withing organizations, improved planning, and improved communication with employees (Troshani, Jeram & Hill, 2011).

3.2. Electronic Human Resource Management

Digitalization also contributed to the rapid development of Internet, which resulted in the implementation and utilization of electronic human resource management (e-HRM). E-Hrm can be defined as the planning, implementation, and application of information technology to network and support human resource management activities (Strohmeier, 2007), while Parry & Tyson (2010) describe e-HRM as executing HR strategies, policies, and practices through online technological channels.

E-HRM can be divided into operational, relational, and transformational levels (Fındıkl & Bayarçelik, 2015; Strohmeier, et. Al, 2007). Operational e-HRM includes administrative tasks such as record keeping and payroll (Snell et al., 2001), Relational e-Hrm includes activities such as e-recruitment and e-learning and requires a direct relationship between HR professionals and internal or

external resources and lastly, transformational e-HRM, which includes strategic activities that follow the organization's mission and vision (Snell et. al., 2001).

Overall benefits of e-HRM according to Samaduzzaman & Zaman (2012) are improved communication with employees, computerization of business processes, optimization of supply chains, alignment of the human resource structure, acceleration of the organization's performance, increased efficiency, cost reduction, online training and attracting new employees.

As several studies indicate, the development of HRIS and E-HRM is not possible without increasing digital skills and competences of employees through advance training ad empowerment solutions (Salah, 2016; Das & Barman, 2019).

4. Developing digital capacity of employees

Today, organizations face increasing competition and constantly changing technological and business environments. In order to cope with these challenges, organizations thus need to focus on the developing skill and competences of employees (Salah, 2016). Among others, for example, Sengupta (2019) reports that technological advancements and digital tools demands new methods of employees' training and empowerment in organizations.

4.1. Digital transformation of training for employees

For more than a decade, organizations have regularly used technology to deliver training programmes precisely because of the many benefits, such as savings in travel costs and training time, flexibility and nature of training delivery, availability of a wide variety of content, usability of organizational resources, increase in employee productivity, increase in the number of trained employees, and maintaining competitiveness (Chen, 2010). Moore et al (2014) argue that the very concept of e-learning is still evolving due to the constant development of modern technologies that are growing day by day, especially due to its connection with the virtually changing world. E-training is thus defined as a distance training process using the Internet that provides individuals with the necessary knowledge on various content using computers, audio, video content, multimedia, e-books, email, chat rooms and discussion groups (Arkorful & Abaidoo, 2014). These authors also consider that it is an online training that facilitates collaboration between trainers and trainees due to easier access and, consequently, leads to an improvement in the quality of training. Undoubtedly, the COVID-19 pandemic has further contributed to this, forcing many organisations to move away from traditional training methods. In this context, distance training has undoubtedly been the most important.

E-training refers to a method of acquiring knowledge that has no limitation on the means, as any television programme, video or any information programme can be considered as distance training. An important role of this method is to facilitate and simplify the whole training process, since nowadays anyone can develop skills of various kinds without being present in a specific place. Thus, the network contains virtual organisations that work by providing employees with lectures and lessons in a desired field (Shahzad, 2022). Shahzad (2022) also cites the

possibility of continuous training as an advantage of modern training techniques, as it is information technology that has made the training process continuous. Thus, networks are home to numerous programms and virtual classrooms that can be open 24 hours a day, which means that employees can receive training anytime and anywhere. It is also extremely important that the programme is tailored to the employees' skills and builds on their strengths, while at the same time offering the possibility to provide topics for their weaknesses. Technology thus provides the possibility of training programmes for more than one level, as it adapts to the nature and abilities of the participants. By using a series of tests and artificial intelligence, the programme determines the employee's level of skills and provides additional topics that can be used to build and acquire new skills (Shahzad, 2022).

4.2. Training in virtual reality

Effective training of employees can present significant challenges as it requires access to the right physical equipment in the real world, and on-the-job training can lead to lost productivity, damage to materials or - worst of all - physical injury to employees. Some events can be extremely difficult or even impossible to create in the real world, such as fire, power failure, medical emergencies, etc., and these events require specific responses that employees rarely have the opportunity to master. Virtual or virtual reality thus provides solutions to many training challenges (Grajewski et. al, 2013).

Grajewski and co-authors (2013) describe virtual reality systems as information solutions that support a growing number of areas of the economy (from medicine to entertainment), and are often used in various manufacturing processes. Davila Delgado et al. (2020) define virtual reality as a set of technologies that allow users to have a sensory experience of things, in a similar way to the real world. In this case, such an experience is merely simulated. In other words, virtual reality is nothing more than an artificial reality that replaces the reality we experience in the real world.

Training employees in virtual reality is excellent for a number of reasons, as it creates realistic, contextual scenarios that mimic real-life situations and give employees the feeling of actually being physically present. It allows them to get up close and see things from a new perspective without, for example, risking injury. It is also a bonus point that employees are allowed to make as many mistakes as necessary and are given the opportunity to try again and again to learn new skills, as they do not destroy physical material and do not incur additional costs (SynergyXR, 2022).

One of the biggest challenges for effective employee training and development is how to engage or involve employees. Virtual reality also attempts to overcome this barrier by creating a learning environment with minimal distractions, incorporating a sentient and learning simulation of the actual work environment, and giving employees control over their experience. A study by Stanford University and the Technical University of Denmark found that virtual reality training increases performance by as much as 76% compared to traditional training (Wiseman, 2022).

4.3. Training through gamification

Gamification is a tool that uses game-related elements in different contexts and, when used correctly and innovatively, stimulates employee interest and training (Rodrigues et al., 2022). Larson (2019), on the other hand, describes the concept of gamification as harnessing the human psychological tendency to play games by using the motivational mechanisms that designers have used in the creation of video games as a potential means of making real-world activities significantly more engaging. In this context, of course, we are talking about serious games whose primary purpose is not simply entertainment. The use of games in training is supported by a number of studies which show that their use leads to improved employee learning. Gamification thus provides a methodology for organizations looking to improve their education and training programmes to increase employee engagement and competitiveness through engaging, game-like mechanisms and incentives (Baxter et al., 2017). Alfaqiri and co-authors (2020) propose a framework of requirements that gamification should contain as a successful training tools, namely:

- Clarity of purpose, where the objectives to be achieved in the training should be clear to all those involved and predetermined;
- Autonomy/creativity, which means that training is tailored to employees' abilities and also offers them autonomy to make their own decisions, without constant intervention;
- implementation, which means that benchmarks for the success of the training should be established;
- social interaction between the trainees and the trainer and a good rapport between them;
- thinking skills or the integration of critical thinking skills to solve problems and overcome challenges in the training process;
- feedback to help employees learn from their mistakes;
- entertainment to further engage trainees;
- cognitive skills.

4.4. Social media as a training tool

Social media or social networks are nowadays the main means of communication focused on the mass of participants. They represent a world of blogs, Wikipedia, Twitter and Facebook accounts, instant messaging and many other things that many companies are increasingly using for branding and customer interaction. Social media can therefore also be an extremely useful tool in terms of employee training, as it helps to maintain and acquire new knowledge (SHRM, 2022).

In contrast to training that focuses on the acquisition of specific skills, social media training is suitable for informal skills acquisition. Social media are collaborative tools that are asynchronous and mobile, and help employees to carry out their daily tasks. Informal learning takes place according to the abilities, tastes and needs of the people involved, and many experts believe that this is the best way to acquire knowledge, as it contains tools that can be accessed anytime and

anywhere. The extensive use of social media thus represents a flexible and employee-centred approach that is beneficial for both employees and the organisation (Ewing et al., 2019).

In this context, we are talking about internal or internal social media that are managed by the organization and access is restricted to employees only. Thus, employees can create a public profile within the system where they can share or receive information with other employees through websites such as Yammer, Jive, Facebook for Work, SocialChorus (Ewing et al., 2019).

Ouirdi and co-authors (2013) state that empirical findings have shown that the use of social media and technologies as a means of employee learning and training offers interactivity, peer collaboration and support, and instant feedback, so it is not entirely surprising that it is becoming an increasingly popular method of training in the age of digitalization due to its flexible access, time and cost-effectiveness.

5. Discussion

Our study highlights the important implications of digital transformation for HRM in the era of Industry 4.0. The integration of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and cloud computing is not just a superficial upgrade, but a fundamental shift that is reshaping the core functions of HRM. This transformation is thus crucial for organizations that want to remain competitive in a rapidly evolving business environment.

One of the main findings of our analysis is the role of digital competencies among employees, as the transition to electronic human resource management (e-HRM) requires employees who are proficient in digital tools and platforms. E-learning, virtual reality simulations, gamification, and the use of social media emerge as key methods in equipping employees with the necessary skills. These methods provide flexibility, greater inclusiveness, and realistic training environments while fostering a culture of continuous learning and adaptability. These findings are consistent with the theoretical implications of our study, which highlight the need for advanced digital capabilities among HRM participants.

In addition, the practical implications of our findings are also important. There is a clear need for organizations to invest in digital training methods to bridge the gap between the current capabilities of employees and the demands of modern job roles. For example, the use of virtual reality provides a safe and controlled environment in which employees can practice and hone their skills without the consequences of doing so in the real world. Gamification, on the other hand, exploits human psychology to increase motivation and engagement, which in turn leads to better learning outcomes. Social media platforms enable informal knowledge sharing and peer-to-peer collaboration, creating a dynamic and flexible training ecosystem.

The transformative potential of these digital innovations thus goes beyond Industry 4.0. As we look ahead to Industry 5.0 and beyond, the continuous development of digital training tools and methodologies will be an essential part of preparing the workforce for future technological and industrial evolutions. A

future-oriented perspective is thereby crucial for organizations that aim to maintain a competitive edge and foster continuous growth in the digital age.

6. Conclusion

The integration of digital technologies into HRM represents a fundamental shift in the way organizations manage their most valuable asset: people. In the era of Industry 4.0, the digital transformation of business is not just a trend, but a fundamental shift involving advanced technologies. This transformation is reshaping human resources management through the introduction of Human Resource Information Systems (HRIS) and Electronic Human Resource Management (e-HRM), which enable more efficient and effective HR processes.

The digital tools available today have revolutionized training and development in organizations, offering personalized training experiences that meet the individual needs and preferences of employees. These technologies increase engagement and foster a culture of continuous learning, which is essential to maintain a competitive edge in today's fast-paced business environment. However, the adoption of these technologies requires a strategic approach. Organizations need to invest in the right tools, ensure robust data security measures, and provide ongoing support and training for both HR and employees.

As organizations grapple with the complexities of digital transformation, it is crucial to foster a culture that embraces innovation and change. The role of HR will continue to evolve and become a central driver of digital strategy and organizational growth. Future research should focus on the long-term effects of digital training tools and HR technologies on employee performance and overall business success, ensuring that HRM practices keep pace with technological advances.

In short, the digital transformation of HRM promises to create a more agile, responsive, and empowered workforce. By embracing these changes, organizations can prepare themselves for the challenges of the modern business environment and ultimately drive sustainable growth and success.

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QUANTIFYING THE IMPACT OF BIG DATA ANALYTICS ON PREDICTIVE MARKETING STRATEGIES AND PERSONALIZED EXPERIENCES

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Abstract

Big data analytics plays a crucial role in modern marketing strategies by enabling the extraction of valuable insights from vast volumes of data, encompassing customer interactions, surveys, transactions, websites, and social media. This study delves into the significance of big data analytics in marketing, aiming to provide insights for professionals and organizations seeking to leverage big data for marketing purposes. The research quantitatively measures the impact of big data analytics on predictive marketing strategies and assesses the perceptions of marketing professionals, digital marketing specialists, data analysts and scientists, e-commerce professionals, and business owners and executives regarding this impact. The data collection process, conducted in April and May 2024, involved 130 participants selected based on specific criteria reflecting expertise and involvement in marketing and e-commerce sectors. A structured questionnaire, comprising three sections, was utilized to gather insights. The first section focused on demographic information; the second section explored current utilization of big data analytics in marketing strategies, including tools, techniques, challenges, and perceived effectiveness; while the final section delved into participants' perceptions and attitudes towards the impact of big data analytics on predictive marketing strategies. Overall, this research seeks to enhance understanding of the role of big data analytics in marketing, providing a foundation for optimizing marketing campaigns, improving customer targeting, and enhancing decision-making processes through actionable insights derived from complex datasets. The integration of advanced technologies such as machine learning, predictive analytics, and artificial intelligence further underscores the transformative potential of big data analytics in shaping the future of marketing practices.

Keywords: Big Data Analytics; Predictive Marketing Strategies; Quantitative Research; Customer Targeting; Machine Learning in Marketing

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1. Introduction

In the present digital age, data explosion has by far transformed how businesses formulate and implement their marketing strategies. Research (Barutçu, 2017) shows that big data and data analytics have become the cornerstone in the marketing realm by empowering businesses with the know-how to comprehend consumers' behavior as well as being able to forecast marketing trends, consumer needs, and preferences, thus delivering personalized consumer experiences. Besides, big data analytics in the realm of marketing delves into predictive marketing strategies with personalized experiences, which in turn sum up several significances in driving success for any business

2. Literature Review

2.1. Overview of Big Data Analytics in Marketing

Research by Pınarbaşı and Canbolat (2019) explains big data analytics as the process through which vast volumes of data are examined to try to uncover hidden patterns, insights, and correlations that can be useful in understanding the market swings and consumer trends as well. In this case, this involves collecting, processing, and analyzing vast datasets fetched from different sources such as customer interactions, surveys, transactions, websites, and social media. The process is tailored to the primary objective of optimizing marketing campaigns, improving customer targeting, and enhancing decision-making through big data analytics. In addition (Saidali et al., 2019), it is highlighted that the utilization of advanced technologies such as machine learning, predictive analytics, and artificial intelligence has been the key components of big data analytics in marketing, from which marketers can extract actionable insights from complex datasets, study the existing marketing trends, and accurately forecast the market's future behavior.

2.2. Predictive Marketing Strategies and Personalized Experiences

Predictive marketing strategy (Tanase, 2022) leverages the potential of big data analytics in anticipating future market trends and outcomes while keeping an eye on the trending customer behavior in the market. This implies that by analyzing the available historical data and the current market trends, retailers can develop useful predictive models that can be used in forecasting consumers' preferences and needs, purchasing patterns, as well as the change in market trends over time. Predictive marketing strategies leverage big data analytics to anticipate future outcomes and customer behavior. As a result, a marketer can make data-driven decisions while optimizing their marketing efforts for a better return on investment. In marketing, excelling in predictive analytics is tailored to various techniques such as demand forecasting, lead scoring, customer segmentation, and churn prediction. Research (Hultén, 2007) explains that from this technique, big data analytics enables marketers to segment customers based on their demographics, behavior, needs, and preferences. This implies that businesses are effectively able to tailor their marketing messages and offerings to resonate with specific target audiences by understanding the distinct customer segments. A study (Ahmad et al., 2019) highlights that through predictive analytics, marketers can identify customers who

have the likelihood of churning or discontinuing their services over time. This is achieved by analyzing factors such as usage patterns, customer feedback, and customer interactions, from which the business can then implement retention strategies to minimize the churning rate and boost customer loyalty to the business. Through big data analytics, marketers can prioritize leads that have the likelihood of converting into paying customers. Businesses can identify high-value leads by analyzing data points such as demographics, email engagements, and website interactions to allocate resources more efficiently to drive conversions (Wu et al., 2023). Research (Punia & Shankar, 2022) points out that predictive analytics assists businesses in accurately forecasting demands for their products and services in any market. In this case, this is achieved by analyzing the market trends, historical sales data, as well as external factors, where businesses can then formulate production plans and pricing strategies and optimize their inventory management. According to Eg et al. (2023), personalization has become a cornerstone of modern marketing, where in this case big data analytics has played a crucial role in delivering more personalized experiences to consumers of all diversities. Personalization involves tailoring customer interactions, product recommendations, and marketing messages to match individual customer needs and preferences. In this case, big data analytics promotes individual personalized customer experiences through components such as omnichannel personalization, recommendation engines, customer insights, and dynamic content optimization. It is explained (Shen, 2014) that by analyzing vast amounts of customer data, businesses can gain deeper insights into individual customer needs and preferences, purchasing history, and customer behavior patterns. As a result, this information assists marketers in formulating highly targeted and relevant marketing campaigns that resonate with specific individual customer needs, demands, and preferences in the market. By studying the nature of data obtained from customer feedback, big data analytics has been at the forefront in providing real-time optimized content on customer needs, preferences, and interactions. A study (Chu & Park, 2009) explains that businesses have been able to deliver personalized website experiences, advertisements, and email campaigns that match users' preferences in real time through leveraging dynamic content generation algorithms. How big data analytics has powered recommendation engines that provide personalized product recommendations to customers based on their browsing history, purchase histories, and preferences (Gorgoglione et al., 2019). Through recommendation engines, businesses can enhance cross-selling and upselling opportunities to improve overall customer satisfaction by leveraging suitable machine learning algorithms. Delivering consistent and personalized experiences across multiple touchpoints has been essential considering the proliferation of digital channels (Tyrväinen et al., 2020). In this case, big data analytics has helped businesses integrate various channels, such as social media and websites, for both online and offline interactions to create seamless omnichannel customer experiences. Generally, big data analytics has revolutionized marketing by providing valuable insights into consumer behavior, predicting future trends, and delivering personalized customer experiences. While predictive marketing strategies enable businesses to anticipate customer needs and preferences, drive business growth, and optimize marketing efforts, personalization on the other hand

has powered big data analytics by allowing businesses to create meaningful connections with customers which in return has increased engagement and fostered customer loyalty.

3. Methodology

The research adopts a quantitative approach to investigate the impact of big data analytics on marketing strategies, specifically focusing on predictive marketing strategies. The data collection process took place in April and May 2024. Participants for this study were selected based on specific criteria, including marketing professionals, digital marketing specialists, data analysts and scientists, e-commerce professionals, and business owners and executives. These individuals were chosen due to their expertise and involvement in marketing and e-commerce sectors, ensuring a comprehensive understanding of the subject matter. The target sample size was 130 participants. The data collection process involves the administration of a structured questionnaire designed to gather insights into the perceptions of professionals regarding the impact of big data analytics on predictive marketing strategies. The questionnaire consists of three sections, each focusing on different aspects related to big data analytics and marketing strategies. The first section was referring to the demographic information of the participants; the second section was devoted to their current utilization of big data analytics in marketing strategies, including the tools and techniques employed, challenges faced, and perceived effectiveness; and the last section explored participants' perceptions and attitudes towards the impact of big data analytics on predictive marketing strategies. It included multiple-choice questions and Likert scale items to assess various dimensions such as perceived benefits, challenges, and future trends.

4. Data analysis

The data analysis involved examining the responses from 130 participants to understand their current roles, years of experience, industry sectors, company sizes, levels of big data analytics adoption, involvement in decision-making processes, and frequency of data collection and analysis for marketing purposes.

Section 1:

Regarding the current roles of the respondents, the majority (36.92%) are marketing professionals. This is followed by data analysts/scientists at 27.69%, digital marketing specialists at 20.00%, business owners/executives at 10.77%, and e-commerce professionals at 4.62%.

When considering the respondents' years of experience in marketing or related areas, 35.38% have 6-7 years of experience, 28.46% have 3-5 years of experience, 22.31% have over 7 years of experience, and 13.85% have 1-2 years of experience.

In terms of industry sectors, 45 out of 130 respondents work in the retail industry, 39 are in e-commerce, 28 in technology, 11 in healthcare, and 7 in finance.

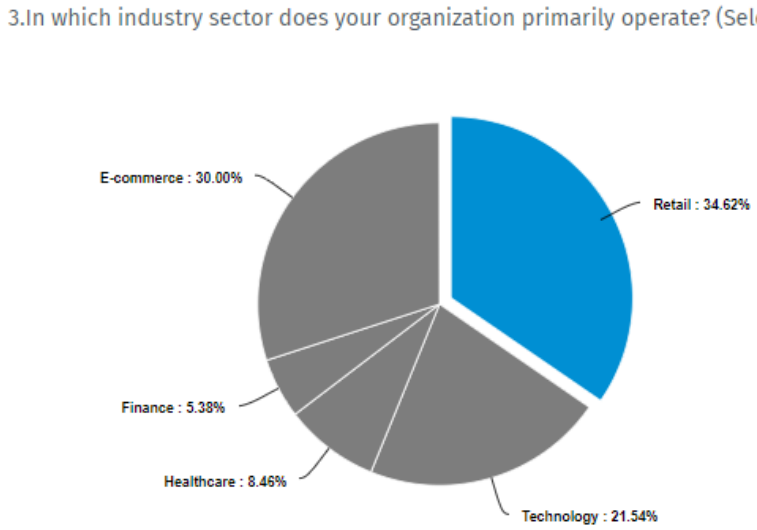


Figure 1. Source by author

The size of the respondents' companies varies, with 46.92% working for large companies with more than 501 employees, 33.08% in medium-sized companies with 51-500 employees, and 20% in small-sized companies with 1-50 employees. Regarding the level of adoption of big data analytics, 46.92% of respondents reported a moderate level of adoption in their organizations, 36.92% indicated a high level, 10.77% a low level, and 5.38% a very high level.

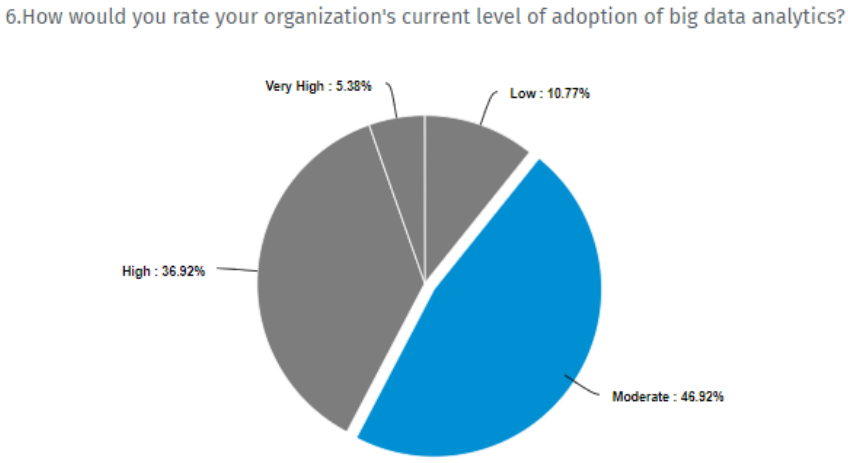


Figure 2 Source by author

Finally, the frequency of data collection and analysis for marketing purposes varies among the respondents' companies. 42.31% reported that their companies

collect and analyze data monthly, 24.62% weekly, 18.46% quarterly, 10% annually, and 4.62% daily.

Section 2:

Regarding the specific tools or platforms used for big data analytics in marketing, Google topped the list with 67.69% of respondents, followed by Salesforce Marketing Cloud at 54.62%, Adobe Analytics at 35.38%, IBM Watson Analytics at 22.31%, and Hadoop at 13.0%. In terms of the frequency of data collection and analysis for marketing purposes, 43.31% of respondents reported monthly collection and analysis, followed by 24.03% weekly, 17.83% quarterly, 10.08% annually, and 4.65% daily.

When asked about the primary objectives of their organization's big data analytics initiatives in marketing, 63.85% of respondents cited customer segmentation, 54.62% predictive analytics for customer behavior, 36.92% personalized marketing campaigns, 29.23% product recommendations, and 16.92% marketing ROI measurements.

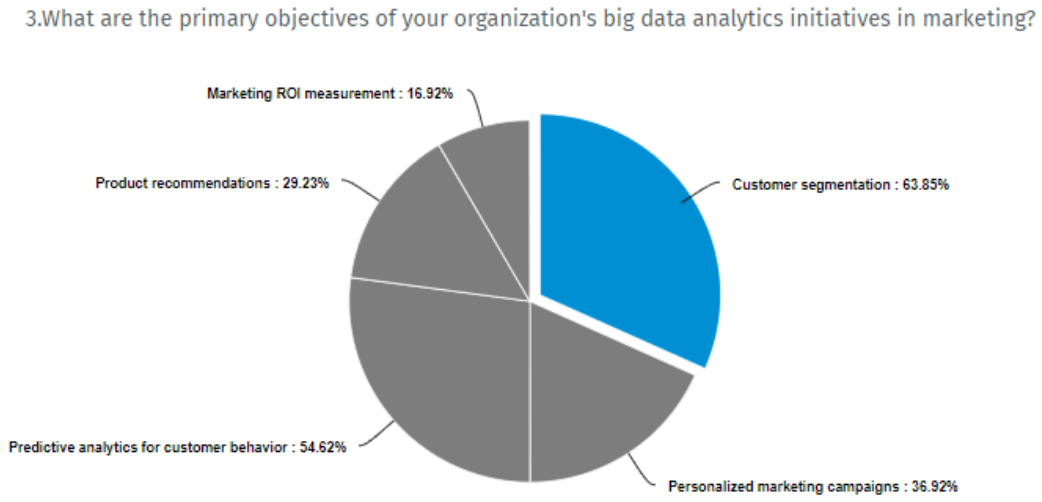


Figure 3,. Source by author

Regarding the main challenges faced in utilizing big data analytics for marketing purposes, 58.46% of respondents mentioned the lack of skilled personnel, 47.69% integration with existing systems, 37.69% data privacy and security concerns, 26.92% data quality issues, and 19.23% cost of implementation. In terms of effectiveness in improving an organization's marketing efforts, 66 out of 130 respondents believed big data analytics was very effective, 30 respondents found it moderately effective, 21 respondents somewhat effective, and 13 respondents extremely effective.

Regarding reliance on big data analytics for making marketing decisions, 44.62% of respondents reported heavy reliance, 27.69% moderate reliance, 15.38% occasional reliance, and 12.31% complete reliance.

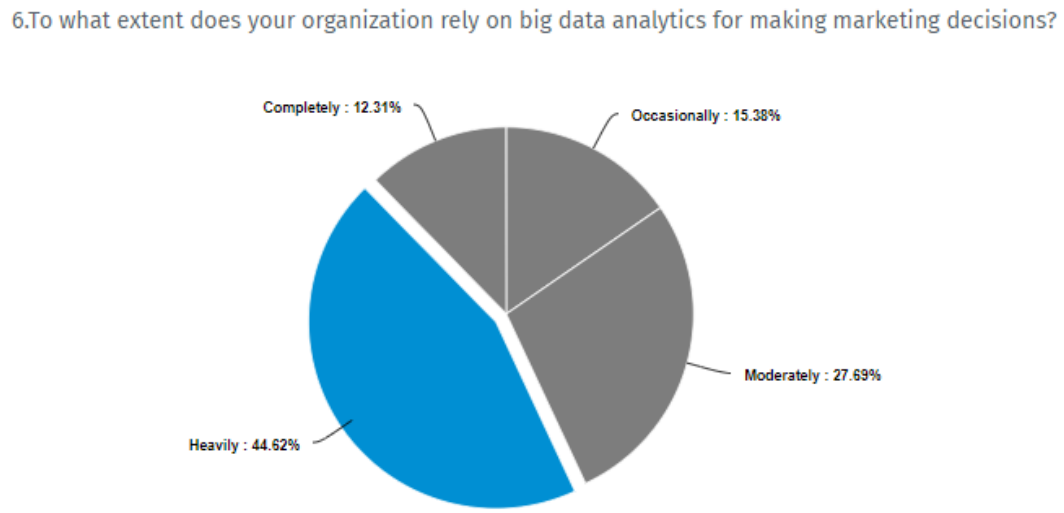


Figure 4. Source by author

When asked about satisfaction with current outcomes achieved through big data analytics in marketing, 53.08% of respondents were satisfied, 27.69% neutral, and 19.23% very satisfied. In terms of time spent on activities related to marketing analytics and data analysis, 48.46% of respondents spent 11-20 hours, 26.92% over 20 hours, 18.46% 5-10 hours, and 6.15% less than 5 hours per week. Regarding perceptions on the impact of big data analytics tools, 63.08% agreed that big data analytics has revolutionized the way we approach customer segmentation and targeting, 29.23% were neutral, and 7.69% disagreed.

When asked about the complexity of big data analytics tools hindering adoption, 67.69% agreed, 25.38% were neutral, and 6.15% disagreed.

Section 3:

The data analysis reveals insights from 130 respondents regarding their agreement with various statements related to big data analytics in marketing. Respondents were asked about their agreement with the statement, "Big data analytics has significantly improved our organization's ability to predict customer behavior." Results show that 43.85% agree, 28.46% strongly agree, 20.77% are neutral, 5.38% disagree, and 2.31% strongly disagree. Regarding the statement "Personalized marketing campaigns based on big data insights are more effective than generic marketing approaches," 54.62% strongly agree, 21.54% are neutral, 17.69% agree, 3.08% disagree, and 3.08% strongly disagree. When asked about the statement "Data privacy concerns outweigh the benefits of utilizing big data analytics in marketing," 43.85% disagree, 33.08% are neutral, and 23.08% strongly disagree. Regarding the integration of big data analytics into marketing strategies and its impact on overall marketing ROI, 47.69% are neutral, 27.69% agree, 16.15% strongly agree, 6.15% disagree, and 2.31% strongly disagree. Respondents' opinions on whether their organization has invested sufficient resources in training personnel to effectively utilize big data analytics for marketing purposes are as follows: 53.85% are neutral, 19.23% agree, 17.69% strongly agree, 6.15% disagree, and 3.08% strongly disagree. Regarding the statement "The complexity of big data

analytics tools hinders their adoption and utilization within our organization," 58.46% are neutral, 18.46% agree, 16.15% strongly agree, 4.62% disagree, and 2.31% strongly disagree.

When asked about their organization's ability to leverage emerging trends in big data analytics for future marketing initiatives, 41.54% agree, 32.31% are neutral, 20.00% strongly agree, 3.85% disagree, and 2.31% strongly disagree. Regarding the statement "Big data analytics has revolutionized the way we approach customer segmentation and targeting," 49.23% agree, 26.92% are neutral, 16.92% strongly agree, 3.85% disagree, and 3.08% strongly disagree.

Section 3: Perceptions and Attitudes towards Big Data Analytics Please indicate your level of agreement with the following statements using the scale from 1 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree".

Statement	1 - Strongly Disagree	2 - Disagree	3 - Neutral	4 - Agree	5 - Strongly Agree	Overall
Big data analytics has significantly improved our organization's ability to predict customer behavior.	3 2.29%	7 5.34%	27 20.61%	57 43.51%	37 28.24%	131 100%
Personalized marketing campaigns based on big data insights are more effective than generic marketing approaches.	4 3.08%	4 3.08%	28 21.54%	23 17.69%	71 54.62%	130 100%
Data privacy concerns outweigh the benefits of utilizing big data analytics in marketing.	30 23.08%	57 43.85%	43 33.08%	0 0%	0 0%	130 100%
The integration of big data analytics into marketing strategies has increased overall marketing ROI.	3 2.31%	8 6.15%	62 47.69%	36 27.69%	21 16.15%	130 100%
Our organization has invested sufficient resources in training personnel to effectively utilize big data analytics for marketing purposes.	4 3.08%	8 6.15%	70 53.85%	25 19.23%	23 17.69%	130 100%
The complexity of big data analytics tools hinders their adoption and utilization within our organization.	3 2.31%	6 4.62%	76 58.46%	24 18.46%	21 16.15%	130 100%
Our organization is well-positioned to leverage emerging trends in big data analytics for future marketing initiatives.	3 2.31%	5 3.85%	42 32.31%	54 41.54%	26 20%	130 100%
Big data analytics has revolutionized the way we approach customer segmentation and targeting.	4 3.08%	5 3.85%	35 26.92%	64 49.23%	22 16.92%	130 100%

Min Max

Figure 5 Source by author

5. Conclusion

The analysis of responses from 130 participants provides valuable insights into the perceptions and attitudes of marketing professionals towards big data analytics. The findings reveal a generally positive outlook on the impact of big data analytics on marketing strategies. A significant majority of respondents perceive big data analytics as significantly improving their organization's ability to predict customer behavior and enhancing the effectiveness of personalized marketing campaigns. These perceptions underscore the transformative potential of big data analytics in shaping modern marketing practices. However, the study also identifies notable challenges and concerns. A significant percentage of respondents's expressed neutrality or disagreement regarding the integration of big data analytics into marketing strategies and its impact on overall marketing ROI. Similarly, while a substantial proportion acknowledges the transformative effect of big data analytics on customer segmentation and targeting, a significant minority remains skeptical or neutral about this assertion. These findings suggest that while big data analytics offers promising opportunities, there is a need for organizations to address challenges related to data privacy, complexity of tools, and perceived ROI.

Organizations must invest in training and resources to optimize the use of big data analytics for marketing purposes.

In conclusion, this study contributes to a deeper understanding of the current perceptions and challenges surrounding big data analytics in marketing. It highlights the importance of strategic planning and resource allocation to fully realize the potential benefits of these technologies. Future research could delve deeper into specific strategies that can address these challenges and maximize the value of big data analytics in marketing contexts.

6. Future Recommendations

Future research should delve deeper into understanding the specific barriers that prevent some organizations from fully leveraging big data analytics. Longitudinal studies could track the evolution of perceptions and practices over time, providing insights into the long-term impact and adoption of these technologies in marketing.

Additionally, there is a need for further exploration into the strategies that can optimize the integration of big data analytics into marketing practices, with a focus on addressing privacy concerns and enhancing data quality.

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ASSESSING FINANCIAL PERFORMANCE FROM DIGITAL MARKETING STRATEGY IN SMEs

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Abstract

This paper seeks to delve into the financial implications of digital marketing strategies adoption within SMCs, with a specific focus on its impact on revenue dynamics, cost levels and profit. By comparison the outcomes associated with the utilization or non-utilization of digital marketing strategies, this research endeavors to shed light on the nuanced relationship between digital marketing initiatives and financial performance metrics. The study aims to analyze empirical evidence on revenue changes, cost fluctuations, and overall financial performance resulting from digital marketing adoption. By analyzing the gathered data and employing statistical methodologies, the research seeks to discern patterns, correlations, and causal relationships between digital marketing utilization and financial outcomes. By shedding light on the interplay between digital marketing adoption, revenue dynamics, and cost levels, this research aims to contribute to the evolving discourse on marketing strategies management practices within the SMEs. These analyses help assess the strength and significance of the relationship between digital marketing efforts and financial performance metrics.

Keywords: revenue, costs, financial metrics, digital marketing strategies

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1. Introduction

"Long ago, during the industrial age...marketing was about selling the factory's autput of products to all who would buy them... Over the past 60 years, marketing has moved from being product-centric to being consumer-centric. Toaday we see the stage when companies shift from consumer-centricity to human-centricity.Toady the marketer must segment the market and developed a superior product for a specific target market.Today's marketer try to touch the consumere's mind and heart. Unfortunately, the consumer – centric approach implicitly assumes the view that consumers are passive targets of marketing campaigns. Now... instead the treating simply as consumers, marketetrs approach them as whole human beings with minds, hearts, and spirits. The comany views its customers as it s strategic starting point and wants to address them in their needs and concerns (Kotler **et al.**, 2010)."

In today's interconnected world, where people spend a significant amount of time online, digital marketing has become essential for businesses to reach and engage with their targetIn the contemporary bisiness landscape, the adoption of digital marketing strategies has emerged as a pivotal driver of growth and competitiveness, particularly for Small and Media Companies (SMEs). As digital technologies continue to reshape consumer needs, behaviors and market dynamics, SMCs are increasingly compelled to explore and harness the potential of digital marketing channels to augment their revenue streams and optimize operational efficiencies (Andrew, 2015). Over the past 15 years, digital media platforms have revolutionized marketing, offering new ways to reach, inform, engage, sell to, learn aboutm, and provide service to customers (Lemberton and Andrew, 2016). Digital marketing is n not a one-size-fits-all discipline. The challenge and opportunity is to select the right channels and tactics to achieve business goals. Digital marketing encopasses a broad range of strategies and techniques aimed at promoting products, services, or brands through digital channels. However, the decision to embrace digital marketing entails multifaceted considerations, encompassing investment costs, anticipated revenue gains, and strategic alignment with organizational objectives. The insights derived from the modern society hold profound implications for SMEs navigating the complexities of digital transformation and marketing strategy formulation (Chaffey and Chadwier, 2019).

By elucidating the financial impacts of digital marketing adoption, this research aims to equip SMEs with actionable insights for informed decision-making and strategic planning in increasingly digital-centric business envronment. By investing in digital marketing innovation, SMEs can improve their marketing capabilities ant to developed better interaction and relationsheep with customers throuh varios digital marketing strategies. There are various digital marketing strategies by which, businesses can effectively reach and engage with their target audiences in today's digital landscape (Ananieva, 2022):

- ✓ **Email marketing** involves sending targeted messages to a list of subscribers to promote products, services, or offers. It's a cost-effective way to nurture leads, build relationships, and drive conversions.

✓ **Social media marketing (SMM)** involves leveraging social media platforms like Facebook, Instagram, Twitter, and LinkedIn to connect with audiences, build brand awareness, and drive engagement. It includes creating and sharing content, running ads, and engaging with followers. Display advertising involves placing banner ads, text ads, or multimedia ads on websites, apps, or social media platforms to increase brand visibility and drive traffic to a website or landing page.

✓ **Post sites video marketing** involves creating and sharing videos to engage and educate audiences. Platforms like YouTube, TikTok, and Instagram offer opportunities for businesses to showcase their products, share testimonials, or provide tutorials

✓ **Pay per click and influencer marketing** involves collaborating with influential individuals on social media or other platforms to promote products or services to their followers. This can help businesses reach new audiences and build credibility.

✓ **Search engine optimization (SEO)** involves optimizing a website to improve its visibility and ranking in search engine results pages (SERPs). This is achieved through techniques such as keyword research, content optimization, and link;

✓ **Search engine marketing (SEM)** involves paid advertising campaigns on search engines like Google or Bing. It typically includes pay-per-click (PPC) advertising, where advertisers bid on keywords to display their ads in search results;

✓ **Television and radio marketing** refers to the use of data-driven targeting, interactive TV / radio ads, connected TV / radio adverstising and using digital platforms to extend the reach and impact of television / radio campaigns;

✓ **Mobile marketing** focuses on reaching audiences on their mobile devices, such as smartphones and tablets. This can include mobile-friendly websites, mobile apps, SMS marketing, and location-based targeting.

2. Literature review

Many studies provide valuable insights into the relationship between marketing efforts and financial results and suggest that digital marketing positively influences customer satisfaction, which in turn leads to improved financial performance for firms. Kalbuana et al. at 2021 founded out that low volume of investment in current assets means the firm's inability to provide a suitable marketing strategy to meet its target, low inventory, and inability to provide the needs and desires of customers. Marketing mix strategies have been employed by respondents to a great extent and these have been found to have significantly influenced income per month, per day customer and employee turnover (Guzman, 2016). There is impact between advertising and marketing expenses and net profits caused by direct marketing's impact of improving companies reputation and arise of market value and competitiveness (Munter, 2015). Shubita in 2019 founded out a positive correlation between content marketing activities, customer engagement metrics and financial performance measures such revenue and profitability. Buzzel, Gale and Ralph at 1975 determinate that on the average a increase of 10% in market share is

accompanied by a difference of about 5% in pre-tax return in investment (ROI = 100 x Net Profit / Cost of Investment). Wang (2002) investigated the association between marketing strategy and firm value and concluded that an aggressive marketing strategy improves firm financial performance and increases firm value. Profitability reflects the ability and efficiency of the marketing management in exploiting its capabilities and financial resources in a way that contributes to achieving its objectives in obtaining profits (Cherian et al., 2019). All these studies highlight the importance of leveraging marketing channels effectively to enhance firm performance.

3. Methods

Empirical data collected from this research were processed with SPSS statistical program and elaborated by the basic descriptive statistical procedures**.** Analysing the data where the basic statistical parameters of 5 variables were given, we can state that the distribution of the results in most variables is mostly within the normal margins of distribution without declination and with a relatively high degree of homogeneity in relation to the average values in each variable. In the descriptive statistics for each of the variables, the basic measures of central tendency and dispersion were estimated, and the results were grouped in classes (frequency analysis). These analyses help assess the strength and significance of the relationship between digital marketing efforts and financial performance metrics.
The primary objective of this study is to examine the perception of the respondents - key decision-makers or marketing executives within the selected companies, of impact of digital marketing activities on the revenue and profitability of companies. In pursuit of this goal, two main hypotheses are formulated and tested using empirical data obtained through a disseminated questionnaire distributed to a representative sample of 100 SMEs. A structured questionnaire is designed to gather data on digital marketing techniques and strategies, financial performance metrics, and cost-revenue analysis. A representative sample of 100 SMEs companies from diverse industries and occupation is randomly selected to ensure the objectivity of the findings. Set of defined two basic hypothesis and analogy four sub hypothesis are:
Hypothesis 1 - Strong positive relationship between digital marketing and financial performance;

- *Null Hypothesis (H_0)* - There exists a strong positive relationship between digital marketing activities and the financial performance of companies, leading to increased revenue and profitability;
- *Alternative Hypothesis (H_1)* - There is no significant relationship between digital marketing efforts and financial performance metrics such as revenue and profitability;

Hypothesis 2 - Costs of digital marketing do not exceed revenue;

- *Null Hypothesis (H_0)* - The costs incurred in digital marketing activities are justified by the resulting revenue, demonstrating cost-effectiveness and positive ROI;

➢ *Hypothesis 1 (H_1)* - The costs associated with digital marketing activities are higher than the generated revenue, indicating inefficiency or lack of cost-effectiveness.

4. Results and Discussion

The results obtained from the *first and second Variable* (Fig. 1) reveals that all of respondents employ digital marketing strategies, with social media being the most dominant channel used by 95% of respondents. Additionally, mobile marketing (92%) and television and radio (80%) are also widely utilized alongside digital platforms. This highlights the importance of a multi-channel approach in marketing to reach diverse audiences effectively.

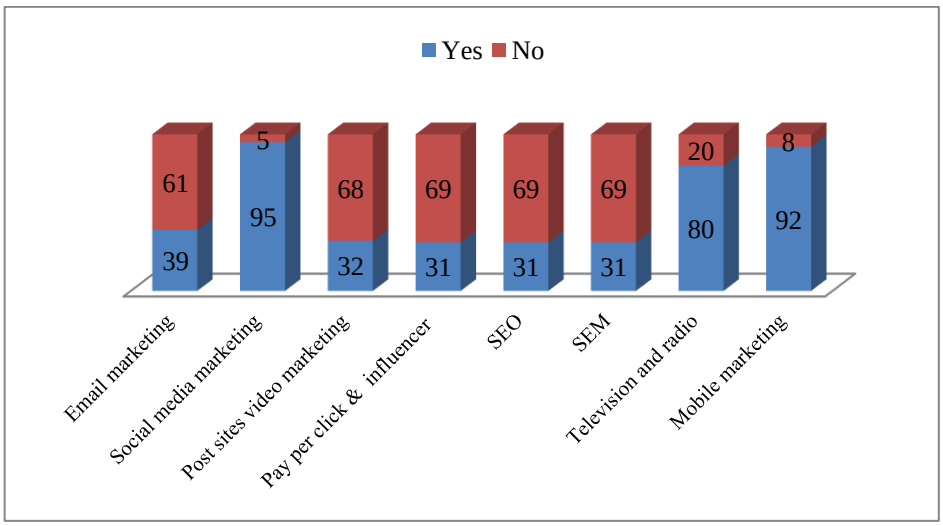


Figure 1. Adopted digital marketing strategies (in %)

Variable 3 and the results presented with Fig. 2 display the responses concerning the impact of adoption od digital marketing on sales revenue. The findings from the processing, analysis and grouping of data, indicate that 80% of respondents perceived a notable increase in sales revenue. Among these, 54% reported a high increase, while 16% reported a very high increase. Additionally, 16% of respondents noted a moderate increase, while 4% observed either no increase or a low increase in sales revenue.

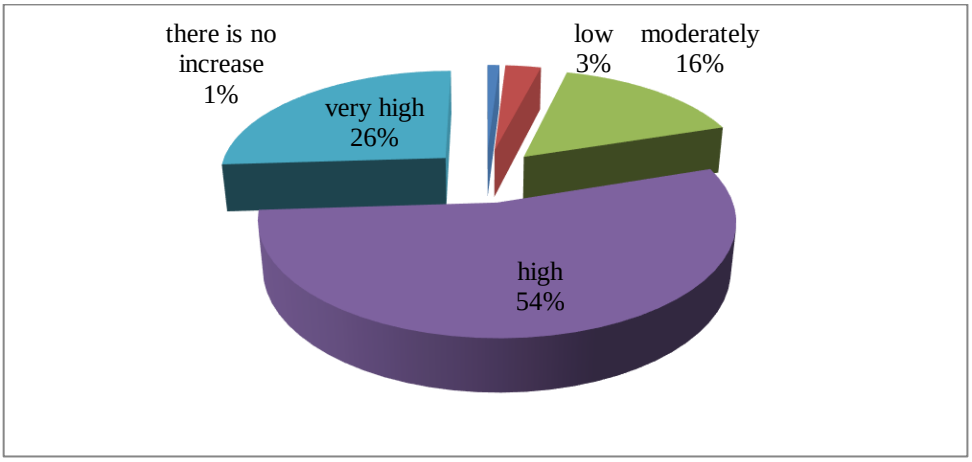


Figure 2. Degree of increase in sales revenue after the introduction of digital marketing

These results shown by the frequency analysis in Table 1, suggest a strong correlation between the adoption of digital marketing and increased sales revenue, particularly reflecting a substantial positive impact as perceived by the majority of respondents.

Table 1. Degree of increase in sales revenue after the introduction of digital marketing

		Frequency	Percent	Valid Percent	Cumulative Percent
VValid	There is no increa	1	1,0	1,0	1,0
	Low	3	3,0	3,0	4,0
	Moderately	16	16,0	16,0	20,0
	High	54	54,0	54,0	74,0
	Very high	26	26,0	26,0	100,0
	Total	100	100,0	100,0	

Objective of the *Variable 4* is to determine whether the costs incurred in digital marketing activities are justified by the resulting revenues. This involves analyzing the return on investment (ROI) of digital marketing campaigns and assessing whether the costs remain within acceptable margins relative to generated revenues. The data processing results reveal that 83% of respondents concluded that the benefits of using digital marketing strategies outweigh the associated costs. This finding suggests a strong consensus among the responders regarding the positive impact and value generated by leveraging digital marketing tactics. The high percentage underscores the perceived effectiveness and profitability of investing in digital marketing initiatives for businesses or organizations. This outcome highlights the growing importance and effectiveness of digital marketing in achieving strategic goals and maximizing returns on investment.

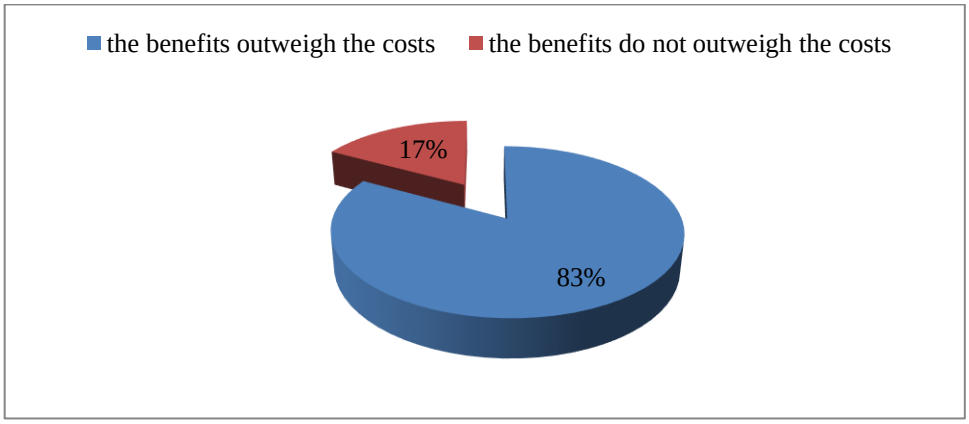


Figure 3. Cost- benefit analyze of implementation and use of digital marketing

The result obtained from *Variable 5*, as shown by the frequency analysis in Table 2 and presented in Figure 4, demonstrate that 80% of firms experienced increased profits following the adoption of a digital marketing strategy. Within this group, 6% reported a consistent upward trend in profits. This data highlights a strong relationship between implementing digital marketing strategies and achieving higher profitability among businesses surveyed.

Table 2. Profit level after adoption digital marketing strategy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Decreased	4	4,0	4,0	4,0
	Stagnaires	16	16,0	16,0	20,0
	Increased	74	74,0	74,0	94,0
	Constantly increasing	6	6,0	6,0	100,0
	Total	100	100,0	100,0	

The Figure 4 visually represents the significant impact of digital marketing on enhancing financial outcomes for the majority of firms involved in the study.

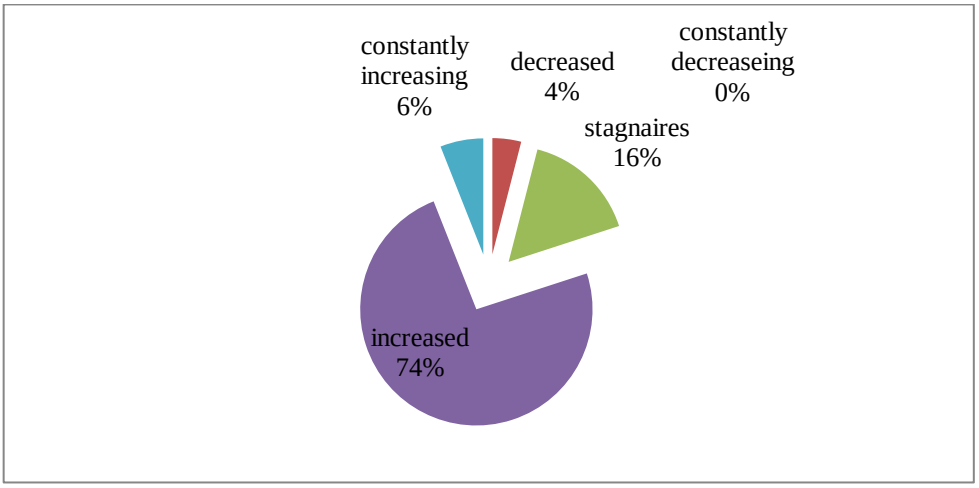


Figure 4. Profit level after adoption digital marketing strategy

Variable 5, which incorporates Variable 3 and Variable 4, shows that 80% of firms registered increased profits after adopting digital marketing strategies. The results obtained from variable 3, which show that 80% of SMEs experienced an increase in sales revenue after implementing digital marketing, correspond with Variable 5 and increase in profits. Also, the high percentage (83%) from Variable 4 indicating perceived benefits exceeding costs, corresponds effectively with the high percentage (80%) from Variable 5 and increase in profits reported folowing the implementation of digital marketing strategies.

This findings suggest collectively support the notion that Variables 3, 4 and 5 are complementary and note consistent view of the effectiveness of digital marketing. Specifically, if a significant percentage of firms see high increases in sales revenue, note that digital marketing benefits outweigh the costs, and observe increased or consistently rising profits, this suports the hypothesis that there is strong positive relationship between digital marketing and financial outcome of companies, as well as hypothesis that digital marketing strategy enhances profitability. This alignment suggests that the perceived value and benefits of digital marketing, as identified by respondents, translate directly into tangible financial outcomes for businesses.

5. Conclusion

Through empirical and statistical analysis, this study confirmed the significant relationship between digital marketing efforts and the financial performance of companies and provided insights into the effectiveness of digital marketing in driving revenue and profitability for companies. Processing and analyze of the results confirm set of *Hypothesis 1* and *Null Hypothesis (H_0)* that there is strong positive relationship between digital marketing and financial performance of companies, leading to increased revenue and profitability; as well as *Hypothesis 2* and *Null Hypothesis (H_0)* that costs of digital marketing do not exceed revenue demonstrating cost-effectiveness and positive ROI. By testing the formulated hypotheses, the study underlined the importance of digital marketing strategy as an

incentive for businesses in optimizing their marketing investments for improved financial outcomes. The data obtained from the conducted research underscores the importance of strategic digital marketing initiatives in driving business growth and financial success, affirming their interdependent and mutually reinforcing nature within organizational contexts. Digital marketing helps a busiiness to remain relevant to the cusomers and in it's domain and to increase product sales volume, which will impact increased levell of market share. By identifying the most cost-effective and impactful digital marketing strategies, businesses can enhance their financial performance and competitiveness in today's evolving marketplace.

The confirmation of a strong positive relationship between digital marketing and the financial performance of SMEs is a crucial insight for the evolving business landscape. This finding highlights the transformative power of digital marketing in levelling the playing field for small and medium-sized enterprises, allowing them to compete with larger corporations through strategic online engagement, targeted advertising and efficient resource allocation. From a practical perspective, SMEs can leverage digital marketing not just as tool for customer acquisition, but as a driver of sustainable growth. The ability to reach wider audiences at lower cost than traditional marketing methods enables these businesses to maximise their marketing ROI. This is particularly important in a fast-paced, digital-first world where adaptability and innovation are key option to survival.

Moreover, the finding that digital marketing costs do not exceed the revenue generated reassures SMEs that investing in digital marketing is not only viable but essential for long-term financial success. It suggest that even with limited budgets, SMEs can effectively harness digital platforms to generate substantial returns, provided that they implement data driven strategies and continuously optimize their campaigns. Future studies should delve deeper into specific financial metrics and ROI calculations associated with different marketing channels to provide actionable insights for SMEs owners and marketers.

Incorporating this knowledge into their business models, SMEs should prioritize developing their digital marketing capabilities and embrace an experimental mindset, where strategies are constantly tested and refined. The integration of analytics, customer insights and evolving digital trends into marketing efforts can further enhance their competitive edge.

Ultimately, the conclusions of this study underline that digital marketing is not just a cost but powerful investment in future profitability, providing a clear pathway for SMEs to scale and thrive in a digital economy.

**The views expressed in this paper do not necessarily reflect the views of the institutions in which authors are employed.*

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COOPERATIVE MODELS IN BULGARIA - PROBLEMS AND PROSPECTS

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Abstract

During the years of their development, the cooperatives in Bulgaria have had periods of significant growth, but also periods of stagnation. They develop over time specific models based on a different subject of activity – agrarian, consumer, credit, all-round, etc. A cooperative is a voluntary association of persons for mutual assistance and cooperation, assuming equal responsibilities and rights. The main purpose of the cooperative enterprise is to satisfy the needs of the members, not to make a profit. Proceeding from the multifacetedness of the researched topic, we limit the purpose of the scientific development to analyzing the development of cooperatives in the economic life of Bulgaria. We focus on their status in recent decades to identify current problems and characterize some perspectives in their development. As a result of the research, some main conclusions were drawn: In Bulgaria, the cooperative as a legal organizational form is widespread in almost all economic sectors of the national economy. Its role is dominant, however, in two sectors: A. "Agriculture, forestry and fisheries" and G. "Trade, repair of cars and motorcycles"; The activity of the Bulgarian cooperatives is low-profit; In regional terms, the largest number of functioning cooperatives is in the South Central region, with a dominant location in the Plovdiv and Haskovo areas for almost all economic sectors, followed by the Southeast region, where the Stara Zagora area has a leading position. In the conditions of modern challenges and heterogeneous problems, the study of cooperatives in Bulgaria must continue and be upgraded in order to find answers to many questions related to their past and future development. Finding an answer to the problematic aspects in their development is important not only to enrich the theory, but also above all to support the cooperative practice in our country.

Keywords: cooperative, model, development, status, assets, income, employed, sector

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1. Introduction

Globally, cooperatives have occupied and will continue to occupy an essential place in socio-economic life. According to the International Cooperative Alliance, 12% of the world's population is a member of more than 3 million cooperatives. They provide more than 10% of the jobs of the working population, and the most successfully developing 300 cooperatives and cooperative groups realize 2.1 trillion dollars in annual turnover.

The cooperative model arose as a result of specific historical and socio-economic needs. It is a specific model of economic activity in which the most democratic form of management is present, i.e. each cooperative member has the right to one vote in the supreme governing body - the general meeting, regardless of his participation in the capital of the cooperative.

Fundamental to the development of the cooperative model are its values and principles: voluntary and open membership, equality in management, economic participation of members, autonomy and independence, education, training and information, cooperation between cooperatives, care for the community. This creates a specific internal environment of transparency and awareness of cooperative members, conditions for empathy and commitment to the development of the cooperative.

The European Economic and Social Committee, on the occasion of the International Year of Cooperatives 2012, defines the role of the cooperative model/cooperative as follows: "manages changes in an economically efficient and socially responsible manner, contributes to social and territorial cohesion and creates innovative business models to increase its competitiveness. Cooperatives are part of the social economy."

The cooperative model of economic activity in Bulgaria arose at the end of the 19th century. During its more than a hundred years of development, numerous varieties of it appeared with a different subject of activity, which had periods of growth, but also of decline. This is a reason for interest in the cooperative model from both theory and business practice.

In recent years, cooperatives worldwide are facing new challenges and opportunities, this is equally true for Bulgarian cooperatives. In this regard, taking into account the importance and understanding the wide scope of the researched topic, we limit the purpose of the scientific development to analyzing the development of cooperative models and their applicability in the economic life of Bulgaria.

To achieve the set goal, the following tasks are solved:

- Clarifying the concepts of "business model" and "cooperative model";
- Study of the normative frameworks regulating the creation and development of cooperative models in Bulgaria;
- Study of the first models of cooperatives in Bulgaria;
- Research of individual characteristics of cooperative models in Bulgaria, with a focus before and after the democratic changes at the end of the 20th century and the beginning of the 21st century.

Through retrospective and historical analysis, moments from the process of the birth of the first Bulgarian cooperatives in the 19th century are revealed. Based on statistical groupings of a large array of official data on cooperatives in Bulgaria from their emergence to the present moment, selected indicators reflecting trends in their development are established. Microsoft Office and a licensed version of Statistics Grad Pack under Windows are used to process the information.

2. Definition of the concepts of "business model" and "cooperative model"

Of primary importance in the analysis of the available cooperative models in Bulgaria is the need to define two concepts - "business model" and "cooperative model", between which there is a certain relationship.

In the scientific literature, the concept of "business model" is used as a characteristic of the idea of implementing a specific economic activity, the idea being to clarify the subordination of its constituent elements and the way of creating a product/service for users Falencikowski (2013), Gorka-Chowaniec (2024).

There are many criteria for defining and differentiating business models, but we limit ourselves to one of them - the life cycle of the organization. Due to the specificity of the organizational life cycle criterion, it should be noted that there are different opinions in the literature about the number and nature of its phases/stages. According to Greiner (1972), Miller, Friesen (1984), Lester, Parnell, Carraher (2003), they are five. While according to Quinn, Cameron (1983), Kazanjian (1988), McMahon (1998), Gorka-Chowaniec (2024) they are four, and the opinion of Phelps, Adams, Bessant (2007) is three. Regarding the essence of the individual phases, there are no significant differences in the author's opinions. Some unite them, and others divide them into more in number. Summarizing the opinions of the listed authors, for our research we limit the stages of the organization's life cycle to four, which is the basis for differentiating all four business models:

•*The start-up model*, which is characteristic of the start-up phase of economic activity. It includes activities to overcome various barriers (administrative, legal, etc.), securing the necessary assets and requires targeted work of the owners to validate the model. The "start-up" period is strategically important for the future activity and development of the organization.

• *The development model* includes the growth and maturity phases of the organization's life cycle, reflecting the realized changes in its potential, mainly in the medium and long term aspects.

• *The reorganization model* expresses the need for transformation of the organization, as a result of internally or externally influencing factors. The purpose of the model is to rationalize the internal processes in the organization, to adapt to the external environment and to overcome management errors through changes in the organizational structure.

• *The closure pattern* is characteristic of the phase of difficulties and stagnation, which can lead to a temporary suspension of business operations or their complete liquidation.

From the perspective of the social orientation of the cooperative, another research group of authors Xu X., S. Pan, E. Ballot (2012) developed what they call a "*general cooperative model*" applicable to different forms of cooperation. The authors also define four stages through which the construction of the model passes: selection of opportunities for cooperation; building a specific cooperative mechanism, harmonizing interests, reaching a cooperation agreement on profit sharing.

From the analysis of the literature, the main conclusion is that both approaches for determining the business model and the cooperative model are applicable to the research object - the cooperative models in Bulgaria over the years from their creation to the present moment. Adding to Shaarz and Casselman's (1980) claim that a cooperative is an "economic system with a social content", i.e. it is a specific business model with a social focus.

2.1 Normative frameworks of the cooperative model in Bulgaria

Legal regulations are essential for the available varieties of cooperative models in Bulgaria. The first law on cooperatives from 1907 defines a cooperative as a company that is composed of an indefinite number of members for the purpose of developing their economic interests to promote credit, agriculture, industry and trade through joint activities. The law regulates seven types of cooperatives: associations for advances and credit; user associations; associations for the common use of agricultural and industrial machinery, for the delivery of livestock, etc.; associations for the joint sale of agricultural and industrial goods and for the creation of common warehouses; productive associations; housing associations; mutual insurance associations.

In the second law on cooperatives from 1948 (effective during the years of centralized-planned economy until 1991), a cooperative is defined as a public economic organization, in which members are an unlimited number of workers with equal rights and obligations, with unlimited share capital, through mutual aid they support the national economy and satisfy the economic and cultural needs of their members. The type of cooperatives is also regulated: comprehensive, labor-productive, consumer, credit, housing and cooperative unions. The peculiarity of them is that their activity is in line with public interests and participates in the formation of the national economic plan.

The current law on cooperatives of 1999 defines a cooperative as an association of natural persons with variable capital and number of members, which, through mutual aid and cooperation, carries out commercial activities to satisfy their economic, social and cultural interests. The law regulates the establishment of cooperative enterprises in the form of Ltd. or JSC, as well as the creation of territorial, sectoral or national cooperative unions of at least seven cooperatives that are members of them.

The main conclusion is that there are analogies in some provisions in the three cooperative laws, despite the different socio-economic systems of government.

2.2 Cooperative start-up model

The creation of the first cooperative model in Bulgaria in the form of an agricultural credit cooperative took place on June 11, 1890, by two school leaders T. Yonchev and T. Vlaikov in the village of Mirkovo, Pirdopsko. By analogy with it, a second one was built in 1897, and this is the Agricultural Loan Fund "Protection" in the village of Ljubenova Mahala, Novozagorsko. Years followed in which no one dared to take the path of cooperation. An explanatory campaign is needed among the population about the advantages of cooperation. The agronomist N. Kardzhiev and N. Bachvarov - director of a homestead near Ruse, are taking on this difficult task, assisted by the teacher from the village of Shtrklevo A. Gradev. As a result, in November 1987, a cooperative credit association was founded in Shtrklevo village, Ruse district. A few days later, another cooperative was established in the same neighborhood in the village of Chervena Voda to support farmers (table 1).

Table 1. First cooperatives in Bulgarian villages at the end of the 19th century

Year	Startup model	Founders	Basis
June 11 1890	Agricultural credit cooperative in the village of Mirkovo, Pirdopsko	T. Yonchev – inspector; T. Vlaikov - teacher	Type statute, translated from German, compiled by Fassbender - Raiffeisen's student; Created according to Commercial Law
1890	Agricultural Loan Fund "Protection" in the village of Lyubenova Mahala, Novozagorsk		Initially registered as an Economic Joint Stock Company Created according to Commercial Law
1897	Cooperative credit association in Shtrklevo village, Ruse District	N. Kardzhiev - agronomist; N. Bachvarov - director of a homestead near Ruse; A. Gradev - teacher	Honorary chairman is Gr. Nachovich - Minister of Trade and Agriculture. The members of the management board contribute 1/10 of the capital, according to Art. 163 of the Commercial Law
1897	Cooperative in the village of Red Water, Ruse district	N. Kardzhiev - agronomist; N. Bachvarov - director; A. Gradev - teacher	The members of the management board contribute 1/10 of the capital, according to Art. 163 of the Commercial Law

Source: Cooperative documents.

A few years after the appearance of the first cooperatives in the villages, they began to be built in several large cities in Bulgaria. The first urban cooperative is a consumer cooperative and its business is bread production. It was established in 1899 in the city of Plovdiv. After it, in May 1900, a second consumer cooperative "Saglasie" was established in the town of Samokov, and in January 1901 - a third "Brotherhood" in the town of Kazanlak. In November 1902, a consumer cooperative "Brotherhood" was registered in the city of Yambol (table 2).

In Sofia in 1903, P. Cholakov founded a consumer cooperative "Brotherly Work". In the same year, a teachers' savings and insurance cooperative was also registered. In November of the same year, under the leadership of A. Ivanov, the first Sofia popular bank in the country was established. Two years later, the first cooperative savings insurance company was registered in Bulgaria (table 2).

Table 2. First city cooperatives in Bulgaria at the end of the 19th century, the beginning of the 20th century

Year	City	Model	Activity	Basis
1899	Plovdiv	First Urban Consumer Cooperative	Bakery	Art. 239 -267 of Section II, Chapter V of the Commercial Law
1900, May	Samokov	Consent Consumer Cooperative	Trading	
1901, January	Kazanlak	Cooperative "Brotherhood"	Services	
1902, November	Yambol	Consumer cooperative "Brotherhood"	Trading	
1903	Sofia	Consumer Cooperative "Brotherly Labor"	Services	
1903	Sofia	Teachers' savings and insurance cooperative	Financial Services	
1903, November	Sofia	First Popular Bank of Sofia	Financial Services	
1905	Sofia	Cooperative Savings Insurance Association	Financial and insurance services	

Source: Cooperative documents.

The Bulgarian Agricultural Bank (BAB), in the person of A. Ivanov, head of the bank's credit department, played a significant role in building the first cooperatives in Bulgaria. It implements a policy of building cooperatives by forming so-called "cores" of bank employees to popularize cooperatives in the country.

For the period from 1899 - 1910, the BAB analyzed the process of cooperatives and published information that 238 cooperatives of various economic activities were established and functioning in Bulgaria (table 3).

Table 3. Number of the first cooperatives in Bulgaria and their membership

Year	Number of cooperatives	Change in the number of cooperatives compared to 1899.	Number of member-cooperators	Change in the number of member-cooperators compared to 1899
1899	4		236	
1900	2	- 2	234	- 2
1901	2	- 2	140	- 126
1902	17	+ 13	683	+ 447
1903	77	+ 73	739	+ 503
1904	24	+ 20	1447	+ 1211
1905	91	+ 87	5458	+ 5222
1906	147	+ 143	11224	+ 10988
1907	238	+ 234	19422	+ 19186

Source: The Bulgarian Agricultural Bank, 1900-1910.

At the beginning of the 20th century, the cooperative start-up model was difficult to establish in Bulgaria. On the one hand, the provisions of Art. 239-267 of section II, chapter V of the first Commercial Law in Bulgaria, and on the other hand the resistance of moneylenders. After the participation of A. Ivanov and H. Chakalov in the International Congress of Cooperatives in Budapest in 1904, the leaders of the established cooperatives decided that a special cooperative law should be created. Thus, in 1907, the first Law on cooperatives in Bulgaria was adopted (promulgated in State Gazette No. 45 of February 28, 1907, amended State Gazette No. 48 of January 1, 1911). It gives the "green light" for the launch and subsequent development of the cooperative model in the country.

In summary, several main conclusions can be drawn:

• The cooperative model in Bulgaria was first born in the villages at the end of the 19th century and the beginning of the 20th century to meet the needs of the local population. Later, cooperatives also appeared in cities. This process is the opposite of other European countries with a more developed market economy.;

• Even at the end of the 19th century, the Bulgarian intelligentsia was a supporter of cooperative ideas, but the population needed time and purposeful agitations to be convinced of them. The initiative to create the first Bulgarian cooperatives did not come from the population, but from progressive-minded Bulgarians (teachers, agronomists, bank employees, etc.). The Bulgarian intelligentsia sees the possibility that through the cooperative model it is possible to help and support the poor rural population and unite the urban population. BZB provides great support in this direction.;

• The agrarian orientation of the Bulgarian economy at the end of the 19th century is a prerequisite for the first cooperative models in Bulgaria to be the agricultural credit cooperatives in the villages. Years after them, at the beginning of the 20th century, the consumer cooperative model emerged, followed by the popular city banks, as well as some professional associations.;

• Although more than a century has passed since the creation of the first cooperatives in Bulgaria, the start-up model leaves a mark and influences the modern development of the cooperative model.

2.3 Cooperative development models before and after the democratic changes

With the modern models of cooperatives, two periods can be distinguished: *the first* from the end of the 40s to the end of the 80s of the 20th century, of the centralized-planned management of Bulgaria, and *the second* from the beginning of the 90s of the 20th century to the present moment - of a functioning market economy. In the two periods, both significant differences and the manifestation of the same models of development, reorganization and closure of cooperatives, but with different contents, are observed.

2.3.1 Cooperative development models in conditions of centralized-planned government

In the thirties and early forties of the 20th century, various cooperative models were created and successfully developed: cooperatives for service, production and exchange, labor-productive cooperatives, labor-cooperative agricultural holdings, credit cooperatives, consumer cooperatives, insurance cooperatives, etc. (table 4). However, their life cycle is relatively short. In September 1944, the socio-economic system in the country changed (socialism began to be built). A few years later, the first cooperative law of 1907 was also repealed. Gradually, the established cooperatives reduced their activities by either reorganizing or closing down.

Table 4. Cooperative development models in Bulgaria 1943-1947

A cooperative model of development	Year				
	1943	1944	1945	1946	1947
1. Service, production and exchange cooperatives	780	808	961	1179	1056
2. Labor-producing cooperatives	377	375	739	887	909
3. Labor-cooperative agricultural holdings		17	35	444	537
4. Credit cooperatives	2607	2606	3013	3152	3297
5. User cooperatives	147	146	181	213	133
6. Insurance cooperatives	101	94	90		
7. All-around cooperatives		2276	2682	2819	3006
8. Health cooperatives, cooperatives for culture	13	13	13	13	13
9. Savings construction and housing cooperatives	3	5	5	6	11
10. Cooperative Unions	71	72	81	85	64

Source: Statistical Yearbook 1943-1948.

In 1948, a new law on cooperatives was adopted. It subordinates the cooperative activity to the goals of the political power and the national economic plan. Forced cooperativeization of agricultural holdings in villages begins by seizing owned land and owned animals. A single model has been imposed - of labor-cooperative agriculture (TKZS) in the villages (table 5).

Table 5. Model Labor-cooperative agriculture (TKZS) in the villages 1948-1956

Model Labor-cooperative agriculture (TKZS)	Year								
	1948	1949	1950	1951	1952	1953	1954	1955	1956
Number	1100	1601	2 501	2739	2747	2744	2723	2735	3100
Private agricultural holdings included in the TKZS (thousands)	124	156	502	582	553	569	569	591	911
Agricultural land (thousand decares)	1761	4851	5738	23438	23184	23620	23374	23459	31298
Member-cooperators (thousands)					1287	1252	1251	1252	1862

Source: Statistical Yearbook 1948-1957.

All-round and consumer cooperatives in the trade, food industry, services, etc. sectors function in the cities, as well as regional and national cooperative unions. Only that over the years their rule has been usurped and they are forced to operate under the dictates of a one-party government. Gradually, the fundamental cooperative principles and values are destroyed, and this distances the member-cooperators from the management of the cooperatives. A policy of reorganizations and subsequent consolidation of TKZS is also wrongly imposed. After depriving the landowners of their right to receive rent, their connection with the land is completely severed. In the 1970s, the cooperative model in agriculture was transformed into an agro-industrial complex. Thus, during the years of centralized planned economy in Bulgaria (1944-1989), the cooperative model was compromised.

2.3.2 Cooperative development models in conditions of market economy

After the beginning of the democratic processes in the last decade of the 20th century in Bulgaria, many changes took place in all spheres of public life. In the conditions of a market economy, there is freedom to choose the form, size and type of economic activity. Such an opportunity was also revealed to the cooperative model.

As a result, cooperatives develop activity in 19 out of a total of 21 economic sectors of the national economy according to the Classification of Economic Activities (KID-2008). There are no cooperatives in only two economic sectors - O. "State Administration" and T. "Activities of households as employers". (Fig. 1 and Table 5).

The largest number of established and functioning cooperatives - 4534 (agricultural, production) in sector A. "Agriculture, forestry and fisheries" - 50.2% of the total number. The number is smaller - 1443 cooperatives (mainly consumer) in sector G. "Trade, repair of cars and motorcycles", which is 16% of all. And 771 are the cooperatives (consumer, labor-productive, etc.) in sector L. "Operations with real estate - 8.5% of all (fig. 1).

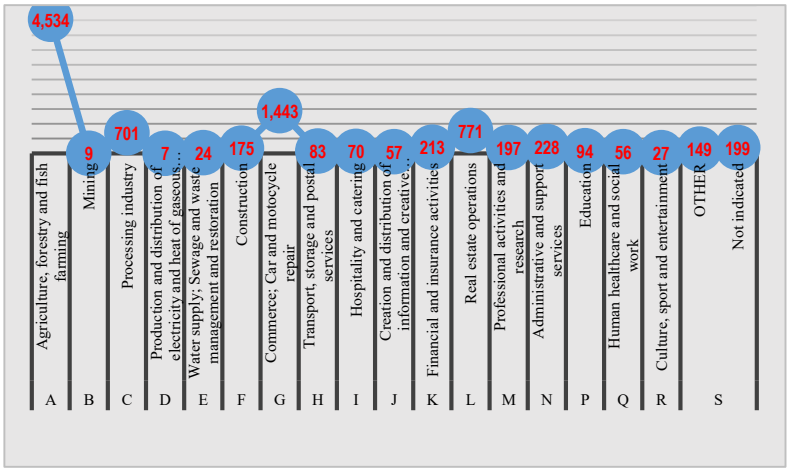


Fig. 1. Cooperatives by economic sectors (KID-2008) in the late 20th and early 21st centuries. (Source: Ciela Norma and own calculations)

There are 701 registered labor-producing cooperatives falling into sector C. "Manufacturing industry" or 7.8% of all. While credit and insurance cooperatives are less - 213 or 2.4% of all. They develop credit-savings and insurance activities and refer to sector K. "Financial and insurance activities" and to a large extent correspond to credit and insurance cooperatives from the beginning of the 20th century.

The number of labor-producing and consumer cooperatives that have economic activity, referring them to sector N. "Administrative and auxiliary activities" is 228 or 2.5% of all. Their main role is to support disadvantaged people as well as small producers and artisans.

A total of 197 are the cooperatives (2.2% of all), which are registered and develop activity corresponding to sector M. "Professional activities and scientific research". These include youth cooperatives, design cooperatives, cooperatives of war disabled people, etc. This sector also includes functioning regional and branch cooperative unions.

The cooperative model of development has also prevailed in such economic sectors as: F. "Construction" - 175 units, or 1.9% of all; R. "Education" - 94 items, 1% of all; Q. "Human health care and social work" - 56 items. or 0.6%; R. "Culture, sport and entertainment" - 27 items. or 0.3%. With the exception of construction in the other three economic sectors, cooperatives are mainly professional associations, built by intellectuals (doctors, teachers, musicians, athletes, etc.), which are very similar to those that existed in our country more than a century ago.

Table 6. Cooperative models in Bulgaria, grouped according to economic activity from the beginning of the 21st century until now

code	Economic sector	Total number	Relative share of the total number	Number of active	Relative share of the number of active
A	Agriculture, forestry and fish farming	4,534	*50.2*	1,074	*38.1*
B	Mining	9	*0.1*	2	*0.1*
C	Processing industry	701	*7.8*	201	*7.1*
D	Production and distribution of electricity, heat and gaseous fuels	7	*0.1*	2	*0.1*
E	Water supply; sewage and waste management and restoration	24	*0.3*	8	*0.3*
F	Construction	175	*1.9*	34	*1.2*
G	Commerce, car and motorcycle repair	1,443	*16.0*	473	*16.8*
H	Transport, storage and postal services	83	*0.9*	20	*0.7*
I	Hospitality and catering	70	*0.8*	17	*0.6*
J	Creation and distribution of information and creative products; telecommunications	57	*0.6*	17	*0.6*
K	Financial and insurance activities	213	*2.4*	79	*2.8*
L	Real estate operations	771	*8.5*	509	*18.1*
M	Professional activities and research	197	*2.2*	68	*2.4*
N	Administrative and support activities	228	*2.5*	45	*1.6*
P	Education	94	*1.0*	14	*0.5*
Q	Human healthcare and social work	56	*0.6*	16	*0.6*
R	Culture, sport and entertainment	27	*0.3*	6	*0.2*
S	Other activities	149	*1.6*	53	*1.9*
	Not indicated	199	*2.2*	180	*6.4*
	TOTAL	**9,037**	***100.0***	**2,818**	***100.0***

Source: Ciela Norma and own calculations.

A model for the development of consumer, production, and supply cooperatives has become established in the following sectors: N. "Transport, warehousing and post" - 83 units, or 0.9%; I. "Hotel and restaurant industry" - 70 items. or 0.8%; J. "Creation and dissemination of information and creative products; Telecommunications" - 57 pcs. or 0.6%; B. "Extractive industry - 9 or 0.1% and S. "Other activities" - 149 or 1.6%.

The most widespread in Bulgaria is the cooperative model with annual revenues from the activity up to BGN 300 thousand (150 thousand Euro). To a lesser extent, the cooperative model with annual revenues of BGN 301-600 thousand has also prevailed. At the same time, it is the least widespread the cooperative model with realized annual revenues from the activity over BGN 6 million (fig. 2). According to the established annual revenues of the cooperatives, it turns out that they develop a relatively small-sized activity.

The most widespread is the model of cooperatives with owned assets up to BGN 3.9 million (2 million Euro), with a tendency towards a slow and insignificant decrease in the value of assets from 100% to 91.7% for the period under study. The relative share of the cooperative models, which have from BGN 3.9 million to BGN 19.5 million (10 million Euro) in assets, is significantly smaller, with a

tendency of gradual increase up to 7.9% for the studied period. The relative share of less than 0.5% of all cooperative models, which have assets over BGN 19.5 million, is insignificant (fig. 3). The results for owned assets of the cooperative models in Bulgaria show that the size of their activity is equal to the size of micro- and small enterprises.

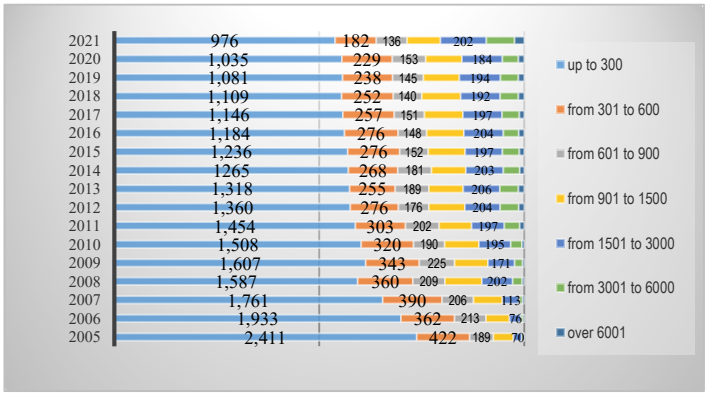


Fig. 2: Cooperative models in Bulgaria, grouped by annual revenue in thousands of BGN: 2005 - 2021 (Source: Siela Norma and own calculations)

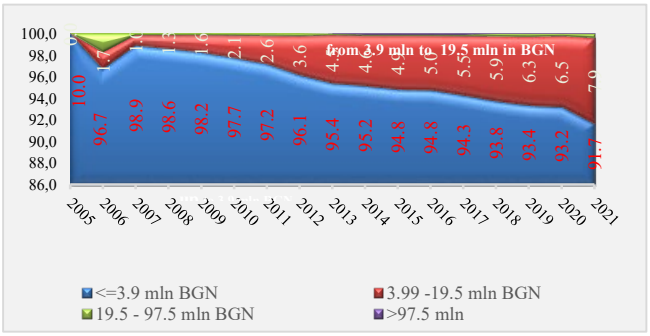


Fig. 3. Model of cooperatives according to value of owned assets in %: 2005 -2021 (Source: Ciela Norma and own calculations)

The main part of the cooperatives corresponds to the indicator "number of employees" of the micro- and small enterprises. The number of cooperative models with up to 10 employees is the largest. In second place are cooperative models with 10 to 50 employees. The third is the group (the smallest) with an average annual employment of 50 to 250 persons. These cooperative models correspond to an average enterprise in terms of the number of employees. In Bulgaria, there are no cooperative models that have an average annual employment of more than 250 people. Therefore, according to the number of employees/the size of the activity, they cannot be classified as a large enterprise (Fig. 4).

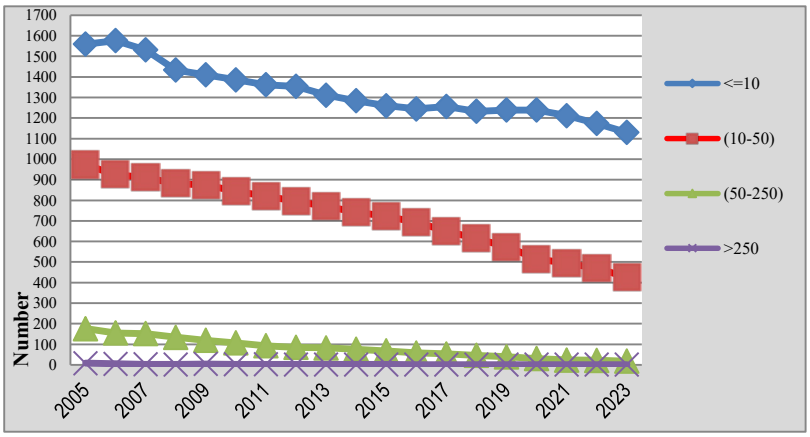


Fig. 4. Average annual number of employees in cooperatives: 2005-2023.
(Source: Ciela Norma and own calculations)

The analysis allows the following main conclusions to be drawn:

• The cooperative model, despite certain moments of difficulties in its development, is widely applicable in the Bulgarian national economy;

• In the conditions of centralized-planned management of Bulgaria, a unified model of labor-cooperative agriculture has been imposed. Comprehensive and consumer cooperatives are developing in the cities in the trade, food industry, services, etc. sectors, but gradually their independence is usurped and they operate under the strict dictates of one-party power;

• In conditions of a market economy, the cooperative model is spread in 19 sectors of the national economy. It dominates in two sectors: A. "Agriculture, forestry and fisheries" and G. "Trade, repair of cars and motorcycles". This is a result of existing cooperative traditions in both sectors;

• The activity of the current cooperatives is less profitable. Cooperatives with annual revenues of up to BGN 300,000 (150 thousand Euro) are the most, but there is a tendency towards a slight increase in the number of higher-income groups of cooperatives;

• The cooperative model with up to 10 employees is the largest, with a decreasing trend. The second is the one with 10 - 50 employees, and the third is the model with an average annual employment of 50 - 250 people.

3. Conclusion

In the conditions of contemporary challenges, the study of cooperative models in Bulgaria must continue and be upgraded in order to find answers to many questions related to their past and future development. As an organizational form of association, they have had and continue to have a major role in the production, processing, trade of many products, as well as in the service sector in the country. Finding an answer to the problematic aspects in their development is important not only for enriching the theory, but above all for supporting the cooperative practice.

The application in the study of aspects of the past and traditions in cooperative work, starting from the appearance of the first cooperative models to establishing their current state, is an expression of a complex scientific approach. In this way, the influence of main factors (social, economic, political, etc.) is revealed, through which the presence of some and the absence of other characteristics and problems of modern Bulgarian cooperatives are explained.

In line with the analysis above, we allow ourselves to end the presentation with the thought of Iliya Palazov - one of the researchers of the cooperative theory and the Bulgarian cooperative practice, expressed about eight decades earlier, but still relevant today: "The modern cooperative is the product of economic and social conditions of more recent times, so viewed, by connecting them with the history of the co-operative movement, we shall arrive at the most correct conclusion".

To what has been said, it can be added that our upcoming research will develop the theoretical underpinnings of the cooperative model of doing business and illuminate its conceptual distinction from other related concepts.

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TRENDS IN ONLAIN CONSUMER BEHAVIOUR IN THE EUROPEAN UNION

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Abstract

With the evolution of information and communication technologies and digital transformation, there has been a shift in purchasing philosophies and patterns, the basis of which is to engage digital customers more effectively in the electronic transaction. More and more consumers in the European Union, seeking practicality and flexibility, are ordering goods and services online. For them, this is the more convenient and attractive purchasing segment, as a consequence of providing a wider choice of products and finding them more easily due to the availability of heterogeneous information and the possibility to compare products and prices in parallel, as well as getting a better and more personalised shopping experience. The aim of this paper is to investigate trends in online consumer behaviour across the 27 Member States of the European Union for the period 2013-2022. Summarising the more important findings of the study implies highlighting certain patterns in online consumer behaviour. In this context, on the basis of the results obtained, the main conclusions and generalisations are drawn regarding the dependencies manifested in the evolution of the phenomenon under study.

Keywords: online consumer behaviour, online purchases, electronic transaction, European Union.

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1. Introduction

Consumer behaviour has evolved in recent years. More and more consumers in the European Union (hereinafter EU), seeking practicality and flexibility, are ordering or purchasing goods and services online. A growing number of retailers have therefore moved towards creating or improving their online store (website) to influence digital consumer behaviour by providing useful value and realising positive interaction, with no geographical or time constraints. In this context, direct and fast access to products is offered, unlimited choices are provided, special service is applied and personalized campaigns are implemented to meet the unique needs and preferences of individual online users. In practice, the discovery and knowledge of individual consumer specificities and their behaviour in the virtual space becomes the starting point for online transactions.

The main objective of this study is to interpret more significant trends in online consumer behaviour in the 27 Member States of the EU for the period 2013-2022. In order to achieve the main objective, this paper uses methods of analysis and development evaluation, as well as specification and analogy, to explain and characterise changes in the numerical magnitude of the phenomenon under study. The respondents of the study are individuals from the 27 Member States of the EU who have ordered or purchased goods or services online, and the period chosen allows the trends and structural changes occurring to be traced. The main source of data is the annual surveys conducted by Eurostat. Summarising the main findings of the survey suggests certain patterns in online consumer behaviour. In this context, based on the results obtained, the main conclusions and generalisations of theoretical and practical relevance are formulated.

2. A theoretical framework of online consumer behaviour

The revolutionary development of the internet and digital technologies has led to major changes and transformations in the way goods and services are sold and bought. The fact is that product exchanges and commercial transactions are increasingly taking place in the virtual space. In view of this, conventional trade is rapidly being displaced by electronic commerce (e-commerce), which is becoming an indispensable part of the global trade network for product exchange.

In this direction, enterprises that sell goods and services electronically adopt a consumer-oriented approach (Shah & Murthi, 2021) and thus demonstrate "intelligent" behaviour towards their customers (Hunter & Perreault Jr, 2006). They use a wide range of digital technologies, providing a continuous cycle of data processing and exchange, through which personalization in online sales and product portfolio promotion takes place. As a consequence, customer orientation is improved by applying new models to manage strategic and operational aspects of sales processes (Pascucci, Savelli, & Gistri, 2023).

At the same time, modern consumers prefer to buy goods and services for personal purposes online, as the electronic transaction can be realized at any time and in any place. They have global accessibility, a wide choice of products and the ability to compare multiple items and prices in parallel. This enables safer and

better purchase decisions by online consumers who are primarily driven by the information content (interface) and attractiveness of digital platforms as they seek to obtain the best bargains (Ranganathan & Ganapathy, 2002). Thus, the level of customer satisfaction and effective engagement increases at every touchpoint in the customer experience lifecycle (Gimpel & Röglinger, 2015).

Undoubtedly, e-commerce is the more convenient and attractive segment for consumers seeking practicality and flexibility (Yu & Wu, 2007). These are a new type of consumers that require a radical transformation of commerce models (Petrova, Marinov, Ivanova, & Akhmedyarov, 2023). In this regard, the evolution and change in consumer behavior is leading to a rethinking of the marketing approach and improvement of online sales technology, incorporating the commercial aspects of customer relationship management and digital product exchange applications (Hunter, 2011).

E-commerce, in its various models, is driving radical qualitative changes in trade based on increased digitisation and accelerated technological development. However, the main actors involved in e-transactions demonstrate specific behaviours. On the one hand, businesses that sell goods and services over the Internet are creating digitised sales opportunities by developing an online shop (website) or using platforms designed to provide information and transact with customers, replacing many routine sales activities. They seek to satisfy heterogeneous preferences and needs and increase added value for consumers by transforming and reengineering conventional sales processes and implementing innovative smart management functionalities that create the prospect of easing key procedures and tasks. The focus is on systematizing and analyzing market information, managing customer contacts (relationships), automating sales, preparing reports and developing sales forecasts, and reducing the time and cost of their execution.

On the other hand, online consumers want more flexibility, convenience and privacy when choosing and buying goods and services. They raise their demands and expectations in the process of their online experience. Very often, online consumers make purchase decisions after a comprehensive search for information, analysing the details in the information flow and evaluating the different alternatives available in the virtual space. This is due to the fact that they do not have real contact with the chosen item and also the opportunity to test it (try it out, experience it) before acquiring it. However, sometimes they act more impulsively compared to consumers who prefer to buy offline. In fact, when online consumers see an Internet advertisement or an online promotion, or are influenced by the aesthetics of the websites, their interest is stimulated and their motivation to purchase increases. Moreover, online consumers like variety and do not rely on only one retailer. They may transact online once and not commit to a future relationship.

3. Empirical dimensions of online consumer behaviour in the EU

E-commerce is the fastest growing sector and is of increasing importance to the EU economy. Moreover, it is the "*new commerce*" in the EU, creating opportunities to increase levels of consumer satisfaction and expand the reach and efficiency of buying and selling channels (Dawson, 2001). In 2022, the annual turnover of e-commerce in the EU Member States amounts to 573 billion euros, the ratio of E-GDP in total GDP-27 is 3,58%. The EU is the third largest online market after China and the United States, with ¾ of internet users buying goods and services online for personal purposes (European E-Commerce Report 2023, 2023).

The data studied shows that the behaviour of modern consumers in the EU is changing in the direction of increasing online ordering or purchasing of goods or services. In 2022, 67,95% of consumers in the EU made online purchases or ordered goods or services online for personal purposes, i.e. almost 7 out of 10 consumers made online purchases. Within the 27 Member States of the EU, Denmark ranks first with an enviable 88,30%, followed by Netherlands – 88,21% and Sweden – 85,96%, while the least active consumers are in Cyprus (50,06%), Italy (49,30%), Romania (45,73%) and Bulgaria (40,54%) (Eurostat, 2023). The data are illustrated in Fig. 1.

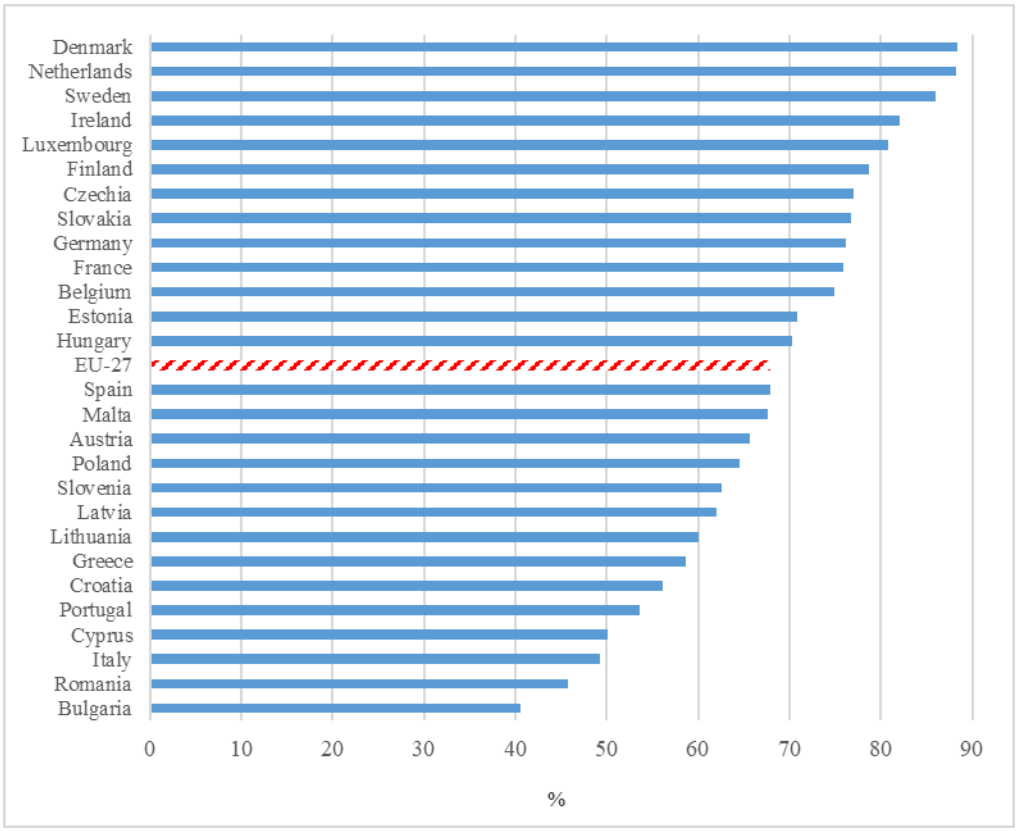


Figure 1. Proportion of people who bought goods and services online for personal purposes in the last 12 months in the EU Member States in 2022.
Source: Eurostat (Eurostat, Internet purchases by individuals, 2023)

It is undeniable that online purchases are strongly influenced by individual consumer characteristics. In particular, factors such as: gender, age, level of education, place of residence and employment status should be taken into account as among the main influencing factors on the evolution of online purchases (see Fig. 2).

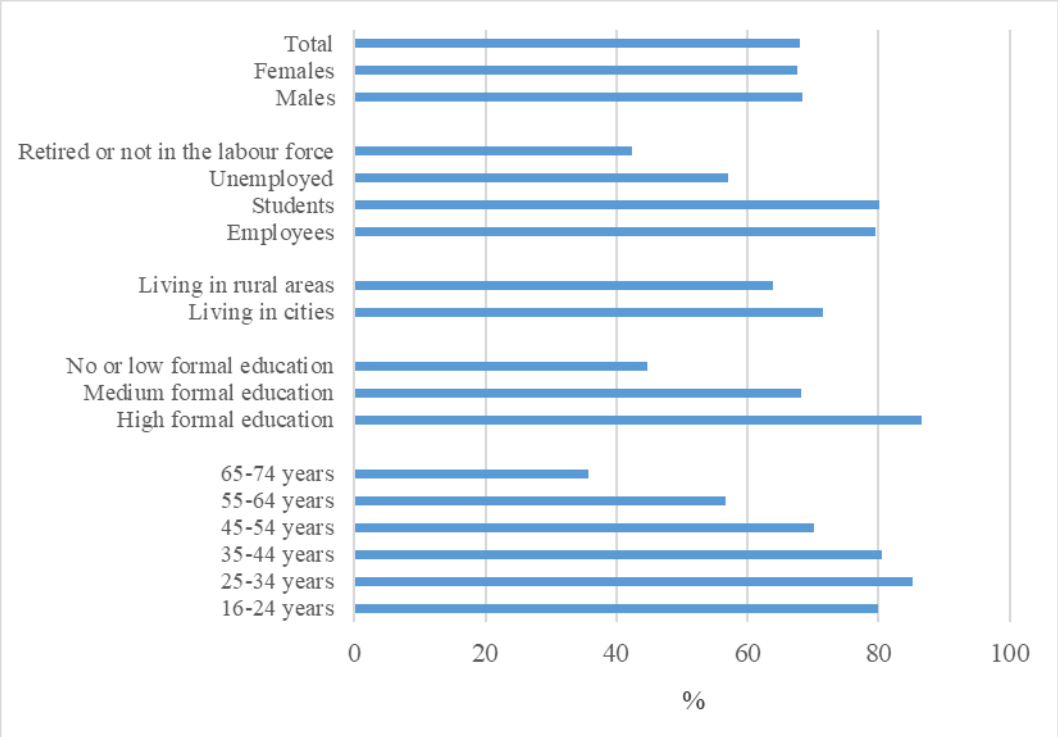


Figure 2. Individuals who bought or ordered goods or services for private use in the previous 12 months, EU-27, 2022 (% of individuals who used internet in the previous 12 mounts)
Source: Eurostat (Eurostat, Internet purchases by individuals, 2023)

The purchase reporting shows that online consumers prioritize ordering or purchasing clothes (including sport clothing), shoes or accessories – 68,09%. The next commodity groups reporting a high relative share of online purchases are: deliveries from restaurants, fast-food chains, catering services – 30,35%, cosmetics, beauty or wellness products – 26,62%, furniture, home accessories or garden products – 26,24%, music as a streaming service or downloads – 24,98% (Eurostat, 2023). In specifics, apart from the priority group, consumers aged 16-24 registered a high activity in the category – music as a streaming service or downloads. The group of online consumers aged 25-34 years, as well as aged 35-44 years prefer deliveries from restaurants, fast-food chains, catering services. At the same time, consumers aged 45-54 and 55-74 mainly make online purchases of furniture, home accessories or garden products, as well as medicines or dietary supplements such as vitamins (see Fig. 3).

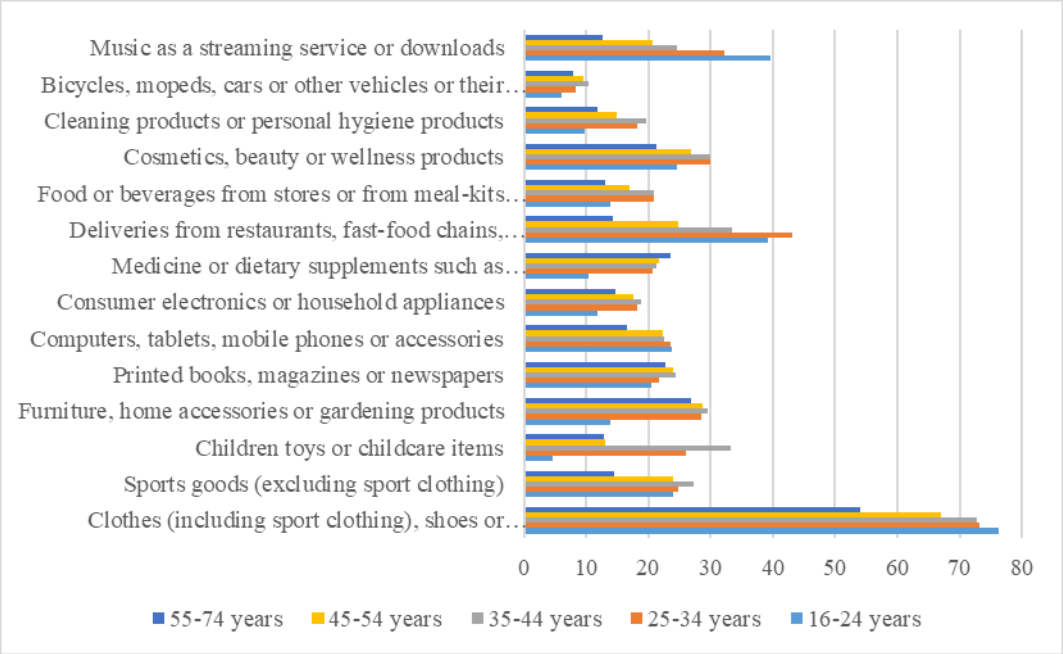


Figure 3. Online purchases of goods, EU-27, 2022 (% of people who have shopped online in the last 12 months)
Source: Eurostat (Eurostat, Individuals using the internet for buying goods or services, 2023)

It should be pointed out that over the period analysed (2013-2022), the share of people who have bought goods and services online for personal purposes in the last 12 months in the EU has been changing steadily without significant deviations from the trend (see Fig. 4). The variations tend to increase continuously and range from an average absolute growth rate of 2,76%, a growth rate of 1,58% and an average growth rate of 5,18%, indicating a steady change in consumer behaviour.

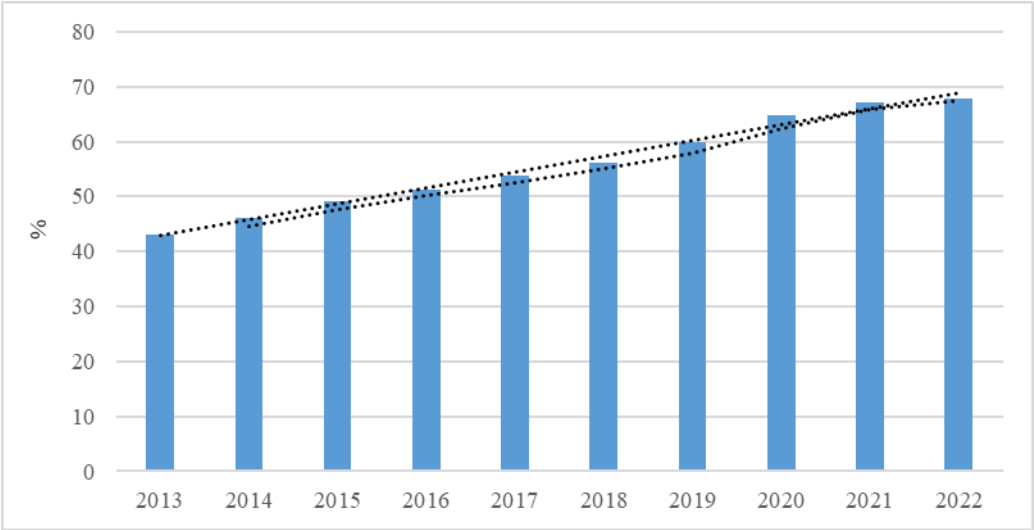


Figure 4. Trends in the share of people who bought goods and services online for personal purposes in the last 12 months in the EU 2013-2022.
Source: Eurostat (Eurostat, Internet purchases by individuals, 2023)

Substantial differences in the intensity of people making online purchases are found across EU Member States (see Table 1). The most noticeable changes are in Estonia (47,63%), Hungary (41,47%), Czechia (40,61%) and Romania (37,41%). Particularly favourable for Romania, Bulgaria, Estonia, Italy and Hungary is the ratio between average annual absolute growth rates and the growth rate relative to the EU average. The positive values of the average absolute growth rate range from 0,85% to 5,29% and of the average growth rate from 1,18% to 20,85%, which is evidence of large imbalances.

Table 1. Change in the share of people who bought goods and services online for personal purposes in the last 12 months in the EU Member States for the period 2013-2022 (%)

EU Member States / Indicators	Absolute rate 2022/2013	Absolute growth rate	Growth Rate 2022/2013	Average Annual Growth Rate
EU-27	24,83	2,76	1,58	5,18
Austria	11,66	1,30	1,22	2,20
Belgium	27,22	3,02	1,57	5,15
Bulgaria	28,39	3,15	3,34	14,33
Germany	7,65	0,85	1,11	1,18
Greece	34,12	3,79	2,39	10,16
Denmark	10,88	1,21	1,14	1,47
Estonia	47,63	5,29	3,05	13,20
Ireland	36,28	4,03	1,79	6,71
Spain	36,11	4,01	2,14	8,80
Italy	29,64	3,29	2,51	10,75
Cyprus	25,4	2,82	2,03	8,18
Latvia	30,29	3,37	1,96	7,74
Lithuania	34,53	3,84	2,35	9,97
Luxembourg	10,84	1,20	1,15	1,61
Malta	21,39	2,38	1,46	4,31
Netherlands	19,35	2,15	1,28	2,79
Poland	32,94	3,66	2,04	8,25
Portugal	29,02	3,22	2,18	9,07
Romania	37,41	4,16	5,50	20,85
Slovakia	32,24	3,58	1,72	6,24
Slovenia	26,65	2,96	1,74	6,36
Hungary	41,47	4,61	2,44	10,41
Finland	13,45	1,49	1,21	2,11
France	17,2	1,91	1,29	2,90
Croatia	29,75	3,31	2,13	8,75
Czechia	40,61	4,51	2,12	8,68
Sweden	13,41	1,49	1,18	1,90

Source: Author's calculations based on Eurostat data.

Without a doubt, with the dynamic changes in the digital markets, consumers who buy online are constantly evolving. They are much more adept at using global networks and mobile apps, and are also becoming more demanding and with higher expectations. Logically, this implies the demonstration of specific consumer behaviours, influenced by different determinants that transform the way in which the decision to make one online purchase or another is made. These determinants can be systematized along the following lines:

- ☑ a functioning and organized online store (website);
- ☑ privacy protection;
- ☑ good service;
- ☑ secure delivery;
- ☑ free advice and instruction;
- ☑ long-term (extended) guarantees;
- ☑ preferential insurance;
- ☑ different payment methods;
- ☑ various price incentives (discounts);
- ☑ receipt of additional accessories;
- ☑ free return of items, etc.

It is necessary to take into account the fact that online users have different behaviour with regard to the alternatives provided. To a large extent, *consumers who are innovators* and make their own decisions depending on their own attitudes are ready to follow the new offers that are offered to them, which would significantly improve their lives. On the other hand, *conservative consumers* who are conventionally thinking and acting move towards those options for which they have good information and certainty, relying on the experience and feedback of other actors in the process. At the same time, *socially responsible consumers*, distinguished by their high social status and good ability to pay, are focused on safety, convenience and peace of mind when shopping, therefore they have high demands on the quality of service and attach importance to ensuring confidentiality and protection of information in its implementation. In parallel, for *consumers who tend to experiment*, as they often change their decisions and many times act impulsively, their shopping experience is subordinated to their desire for variety as well as fun and pleasure.

Regardless of the diversification aspects, all online consumers pay serious attention to the negative effects of online shopping where they feel cheated and wronged. They react to possible changes and problematic situations that create the preconditions for dissatisfaction, and even directly to abandoning the order, as well as to the more extreme measure of stopping following and using the enterprise's website and terminating the relationship with it.

The following main conclusions can be formulated from the above analysis and evaluation:

- ✓ the behaviour of modern European consumers is changing in the direction of increasing online orders or purchases of goods or services, overall online purchases by consumers increased by 24,83% over the ten years analysed;
- ✓ online consumer behaviour is strongly influenced by individual characteristics: age, level of education, place of residence, employment status, gender, with individuals aged 25 to 34 being more active online shoppers, almost 9 out of 10 consumers having a high level of education, over 7 out of 10 living in cities, these are mostly employees and students and with almost equal parity in gender structure;
- ✓ individuals in the 27 Member States of the EU appreciate the advantages, convenience and practicality of online shopping and access to a wide range of goods or services, with clothes (including sport clothing), shoes or

accessories, being the most preferred product group and bicycles, mopeds, cars or other vehicles or their spare parts having the lowest share;

- ✓ found significant differences in the intensity of people making online purchases across the EU Member States, in fact the average absolute growth rates range from 0,85% to 5,29% and the average growth rates range from 1,18% to 20,85%, which is evidence of large imbalances;
- ✓ different types of consumers demonstrate specific behaviours, influenced by certain determinants, but setting the direction of change in the way retail companies do business, with a focus on improving their online experience;
- ✓ at the heart of digital shopping and changing consumer behaviour from the EU are opportunities to create consumer value.

4. Conclusion

In the new realities, the online consumer is a major key player in the digital transaction, setting the direction of change in the consumption pattern. The analysis confirms the significant change in online consumer behaviour in the EU, through the intensive shift from the classical (conventional) model to online shopping. The significant upward trend is found over the last ten years. However, there are still large imbalances between 27 Member States. We believe that efforts should be in this direction, which requires the digitisation of commercial processes to continue at an even higher pace so as to provide useful value and realise positive customer relationships by offering the best shopping experience.

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THEMATIC ANALYSIS OF ONBOARDING GOALS: RESEARCH CONDUCTED IN TWO SMALL IT COMPANIES

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Abstract

Onboarding refers to the process that helps new employees learn the knowledge, skills, and behaviors they need to succeed in their new companies. Onboarding procedures are very important because they affect the faster adaptation to work and life in the company of new employees. This further affects the better efficiency and productivity of the company, which in turn affects the company's profit. The new employee should familiarize himself with the organization and organizational culture of the company. The starting point is that Human resources' services assess the psychological profile of the new employee and that he will fit into the company. Good Onboarding will solve the problem of hiring new people because the new employee will be a worker who will be productive and familiar with the company's work. The paper presents a study based on semi-structured interviews with experts from two small IT companies. Qualitative analysis was conducted where certain themes were identified through coding and analysis of identified codes. The results highlight the importance of onboarding goals, as they have a profound impact on employee performance and, consequently, company productivity.

Keywords: thematic analysis, onboarding goals, small IT companies, IT experts

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1. Introduction

Onboarding is the process of supporting new employees regarding their social and performance adjustment to their new job (Britto et al., 2018; Bauer& Erdogan, 2011). Effective onboarding helps new employees learn attitudes, knowledge, skills, and behaviors required to work effectively (Britto et al., 2018; Bauer & Erdogan, 2011; Cable et al., 2013; Klein et al., 2015). Software companies face challenges in recruiting and onboarding new team members (Britto et al., 2018). Companies face various challenges to survive in an increasingly competitive market. The source of competitive advantage has always been associated with competent resources due to the knowledge-intensive nature of work. Recruitment and acceptance of new employees is one of the key areas of the company's success (Britto et al., 2018). Many reasons can lead to the inclusion of new developers such as (Britto et al., 2018): replacing retiring developers; replacing developers who left the company; incorporating new people who can bring new ideas and thus help the company to innovate; taking over work from original developers so that experienced developers are freed up to start something new.

The involvement process can be formal or informal. In informal onboarding, new employees learn about their new job without an explicit organizational plan, while formal onboarding helps new organizations through a written set of coordinated policies, procedures, and actions. Levels of formality and understanding of onboarding programs vary between companies. The existing literature suggests that successful companies consider hiring new employees formally rather than ad-hoc (Britto et al., 2018; Bauer & Erdogan, 2011).

The aim of this paper is to present the onboarding goals in small businesses through the analysis of semi-structured interviews conducted in two small IT companies. Small companies are those that have from 10 to 49 employees (OECD, 2024). Semi-structured interviews involve data collection in qualitative research and the quality of the interview guide fundamentally affects the results of the study (Kallio et al., 2016). One of the main advantages is that the semi-structured interview method has been shown to be successful in enabling reciprocity between interviewer and participant (Galletta, 2012), where the researcher could improvise additional questions based on participant responses (Hardon et al., 2004; Rubin, 2005) and where they allowed space for individual verbal expressions of participants (Kallio et al., 2016; RWJF, 2008). This study used thematic analysis as a qualitative research method to explore the onboarding goals.

2. Related Works

The primary goal of onboarding is to facilitate the rapid adaptation and integration of new employees into the work environment (Cable & Judge, 1996). Quality onboarding can increase employee retention by providing them with clear guidance and a sense of belonging (Saks & Gruman, 2014). An effective onboarding process enables new employees to reach full productivity faster,

reducing the time required for learning and adaptation (Bauer et al., 2007). Providing ample support and resources to new hires contributes to their workplace satisfaction (Bauer et al., 2008), while also enhancing the company's reputation as an employer of choice (Cable & Turban, 2003).

Some objectives of onboarding are (Buchan et al., 2019; Ju et al., 2021; Gregory et al., 2020):

- Understand and fit in with company culture;
- Understand and fit in with the team norms;
- Understand and meet others' expectations of one's own role's responsibilities;
- Understand the responsibilities, expertise and authority of other team members;
- Understand what work to do and when;
- Understand and meet the team's standards of work quality;
- Understand the short, medium and long term work structures, aims and implications;
- Understand the product/project domain knowledge and terminology…

The authors of the study (Ju et al., 2021) present work on the tasks and strategies for involving software developers. By interviewing developers and managers, the authors show how tasks affect three representative themes of onboarding: learning, confidence, and social interactions. The findings lead to some recommendations for practitioners to improve onboarding processes.

3. Method and Result of Research

This paper aims to present the onboarding objectives resulting from a thematic analysis of interviews with two IT professionals employed in different companies, focusing on their experiences and perceptions of the onboarding process. The participants in this study were selected based on their expertise and experience with the onboarding process in the IT industry. Two senior level developers, each with extensive experience, one with 12 years of experience and the other with 20 years of experience, were selected to provide valuable insight into onboarding goals. These participants were actively involved in implementing the onboarding process in their companies, ensuring that their perspectives were based on practical knowledge. Through inductive thematic analysis, we represent the identified onboarding goals. The analysis involved transcribing the interviews and uncovering themes using thematic analysis techniques as outlined by Braun and Clarke (2022). The resulting themes are illustrated.

3.1 Data Collection

The data collection process involved conducting in-depth semi-structured interviews with two IT experts from small companies. Participants were informed about the purpose of the study and provided with informed consent forms to ensure voluntary participation and confidentiality of their responses. The interviews were conducted in a conducive environment, either in person or via video trough Internet, based on participant preference and logistical feasibility.

The interview questions were designed to explore participants' experiences and perceptions of the onboarding process, with a focus on identifying specific goals. Subsequently, we conducted a comprehensive analysis of the interview transcripts using QDA Miner software.

3.2 Thematic Data Analysis

When applying thematic analysis, we identified themes about the observed phenomenon. We opted for thematic analysis due to our past experience in investigating issues within agile meetings (Gaborov et al., 2023). Inductive thematic analysis (Braun & Clarke, 2022) was used as a data analysis method. The authors used interviews to collect a qualitative data. All qualitative data were prepared in Microsoft Word documents and imported into the QDA Miner software tool for qualitative data analysis (John Hopkins University, 2024).

The data were coded and reviewed and then relabeled. After that, the codes were combined, which resulted in the translation into themes. The authors performed a thematic analysis of the selected semi-structured interviews to identify the onboarding goals in small IT companies. Qualitative data were analyzed inductively to generate themes using a well established six-stage approach, the steps of which can be summarized as: familiarization with data; generation of initial codes; searching for themes; reviewing themes; defining themes; final analysis (Proudfoot, 2023).

The mentioned interviews were transcribed and saved as a Microsoft Word documents. Word documents were loaded into QDA Miner software. Coding involves the work of studying, reflecting and organizing the collected observations and connecting them with theoretically relevant abstract features, possible relationships and research questions (Locke et al., 2022). The codes are identified by reading the documents in the mentioned software. Codes are marked in the figure 1 in the form of a light blue ellipses. The focus of the analysis shifted to searching for themes that would allow for the organization of the various codes into potential themes. Themes are displayed as white rectangles in the Figure 1. Thematic analysis involves the application of codes, and ultimately the production of themes (Lester et al., 2020). The codes are connected by gray lines to the corresponding themes. Each theme should be supported by relevant pieces of data marked with appropriate codes. Authors identified the most important themes based on the codes in the interviews. We emphasize that it is necessary to pay more attention to themes that are linked to several similar/same codes. Themes are: Adaptation in the company; Achieving productivity and competitiveness; Communication with colleagues and clients; Adaptation to the internal organization and organizational culture of the company; Fitting into the work environment; Getting to know the work team; Getting to know the project and the tools for the project's needs.

Identified themes include key onboarding goals in small IT companies. The derivation of themes facilitated the interpretation of findings and provided a structured basis for presenting the results.

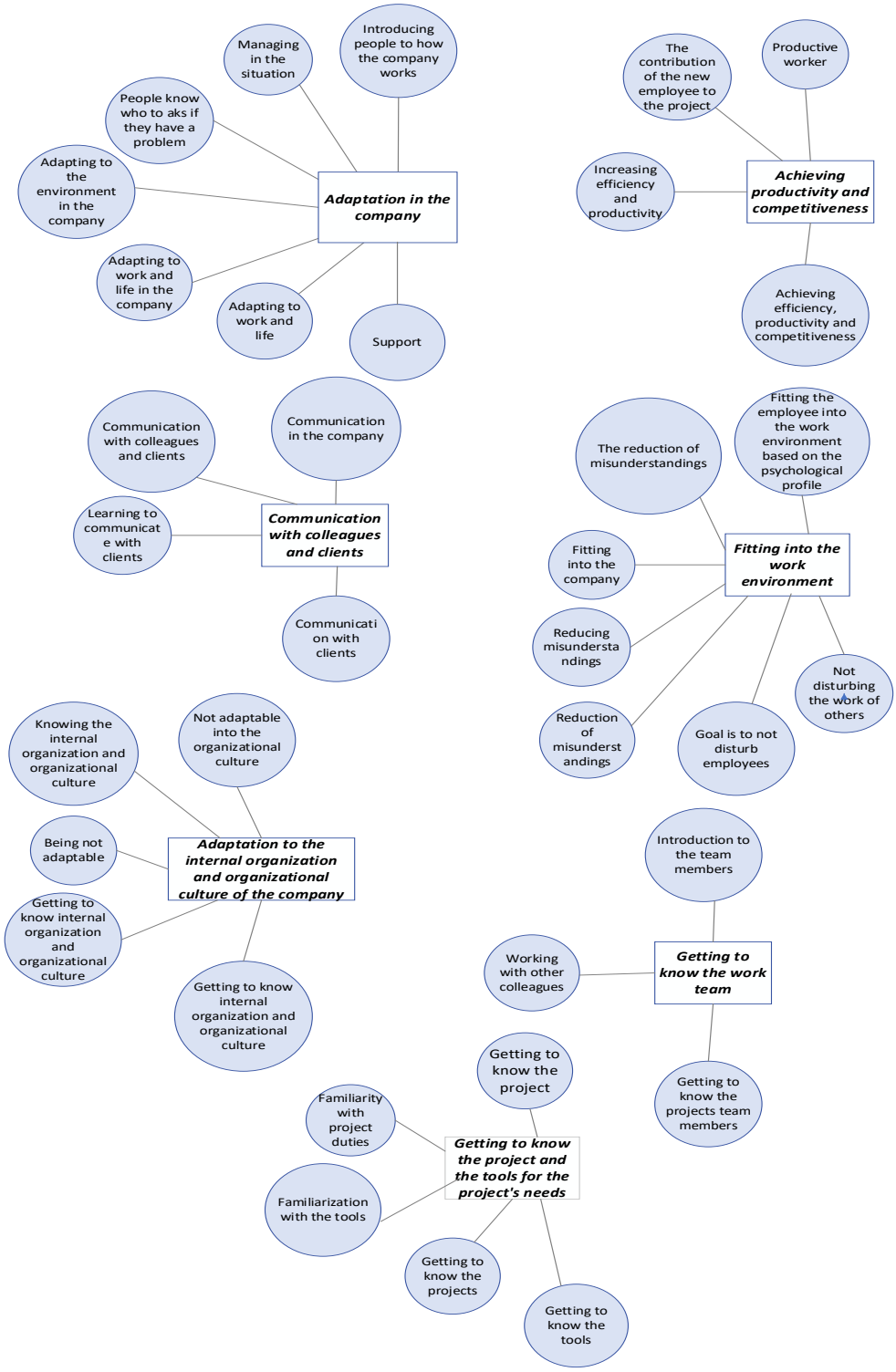


Figure 1. Display of themes determination from codes

Customizing onboarding fosters a supportive environment, promoting new employee success and long-term engagement and retention. This encompasses aspects such as socialization, cultural adaptation, role clarity, and social

integration. Achieving productivity and competitiveness in the onboarding process requires a strategic approach that focuses on preparing new hires to contribute effectively to the organization's goals while also differentiating the company from its competitors. Effective communication with colleagues and clients is a critical goal of the onboarding process because it facilitates relationship-building, knowledge sharing, collaboration, and cultural integration within the organization. By emphasizing communication skills during onboarding, companies can set new hires up for success in their roles and contribute to overall organizational effectiveness. Adaptation to the internal organization and organizational culture of the company is a critical goal of the onboarding process. By facilitating this adaptation, companies can enhance employee integration, performance, engagement, and retention, ultimately contributing to organizational success. The onboarding process aims to ensure employees seamlessly integrate into the work environment, fostering cultural alignment, social integration, role clarity, and performance expectations, ultimately enhancing engagement and retention. This entails embracing the company culture, integrating into team dynamics, and establishing rapport with coworkers. Employees who fit in are better positioned to meet expectations, understand their impact on team and organizational success, and are more engaged and committed to their roles. Fostering a sense of belonging in the workplace contributes to higher retention and job satisfaction. Getting to know the work team helps new hires build relationships, establish rapport, and foster a sense of camaraderie within the team. Understanding the work team helps new hires integrate more smoothly and collaborate effectively. Onboarding provides opportunities for new employees to collaborate with their teammates on projects, tasks, and initiatives, fostering a sense of teamwork and collective effort.

4. Discussion of Identified Themes

It is necessary to familiarize the new employee with the work of the company (in general with the working atmosphere) and that the employee knows who to turn to if he needs help. It is necessary for the employee to familiarize himself with the internal organization and organizational culture and fit in with the working environment. Participant number 2 stated: *"We mean introducing people to how the company works, introducing them to general processes. In general, people should know how to manage when they come to a situation, for example, how to take vacation and sick leave. Who should they contact if they have any problems, from the most common ones to problems on the project. It means they should know who to turn to for a problem and how things work".* This all leads to the fact that the company needs a productive employee who will contribute to the company, for example through work on projects. It is known that every company must be as competitive as possible in the market, so productive employees are needed. We should not forget that good communication is very important, both with clients and colleagues from the company. It is necessary that there are no bad relations between colleagues in the company and that good communication is

maintained. It is useful to know well the team with which one is collaborating on one of the projects. The worker will not be adaptable if he meets all the conditions and is not communicative. Participant number 1 stated the following: "*This means that he is technically well-versed, handles technologies and tools well, thinks well and solves problems, but has, for example, a problem in communication, then in accepting that meetings are at a certain time. Just someone who is not adaptable".* Also, it is necessary to be kind and communicative with clients in order to establish a good relationship for further work with them. Participant number 1 stated: *"And during the meeting, where we try to have free and unstructured communication, a new employee came to the meeting with clients and started communication in the style of "bye, where are you, what's up, ...". And if he had read the document he would have found how to communicate with clients when the meeting is already in progress. Communication with clients should be direct, not intimate, and use appropriate vocabulary".* In addition, it is necessary for the new employee to be familiar with the tools for working on the project in which he is involved. Participant number 2 stated the following*: "When the employee gets to know the internal organization, organizational culture, colleagues and develops good communication, he needs to be able to handle the tools for working on the project where he was assigned. The employee also must be well acquainted with the project".* These are all implications for the fact that a new employee needs to be familiar with the work of the company, employees, clients, to develop good communication with both employees and clients. And in addition to being familiar with the necessary tools for the project on which he is engaged, which implies that he is also well acquainted with the project. If only one of these items is not present, the new employee will not be adaptable to the company. Therefore, onboarding is important for the company.

5. Research implications

Implications of the research for industry practitioners and academic researchers are discussed in the following subsections.

5.1 *Industry practitioners*

This thematic analysis is valuable for industry practitioners to take note of. Although this theoretic framework contains only the specific goals of onboarding, it can help practitioners understand the importance of being familiar with the goals of onboarding. It is critical for industry practitioners to adhere to onboarding goals, as they significantly impact a company's bottom line performance and profitability.

5.2 Academic researchers

Researchers can learn from this paper what are the steps in conducting inductive thematic analysis. Also, researchers can view some of the onboarding

goals and embark on the development of theoretical frameworks that clarify the dynamics of onboarding goals.

6. Trustworthiness

Trustworthiness refers to the credibility, reliability, and dependability of the research findings and interpretations. It is about establishing confidence in the accuracy, integrity, and transparency of the research process and outcomes. Trustworthiness is particularly emphasized in qualitative research, where the subjective nature of data collection and interpretation requires attention to ensure the research is credible and trustworthy (Braun & Clarke, 2022).

To establish credibility, we used a variety of strategies aimed at accurately representing the perspectives and experiences of IT professionals. First, we conducted semi-structured interviews with open-ended questions, allowing participants to freely express their thoughts and experiences. In addition, we established rapport with the participants before and during the interviews, fostering an environment of trust and open communication. All authors of this paper participated in the discussion and development of the findings and finally agreed on the defined themes. This highlights that multiple authors were involved in the analysis process, thereby reinforcing the confidentiality of the study's findings.

We believe that the insights gained from our study could be applicable to other small IT companies as well. To ensure the dependability of our study, we adhered to a systematic approach to data collection and analysis. During the thematic analysis, we followed the guidelines for conducting thematic analysis (Braun & Clarke, 2022) and clearly described the whole process. Interviews were transcribed verbatim, and multiple researchers independently analyzed the data to identify themes. Any discrepancies in coding were resolved through discussion among the authors.

7. Conclusion and Future Work

The goals of the onboarding were identified using the method of inductive thematic analysis. The main contribution of the presented research is that employees can perceive the essential goals of onboarding. A detailed description of the analysis process is another important contribution of this research. The research results indicate a great need to pay close attention to onboarding goals. In the upcoming period, the study will be broadened to offer a more comprehensive presentation of onboarding goals.

The following themes are very useful for further research: Adaptation in the enterprise; Achieving productivity and competitiveness; Communication with colleagues and clients; Adaptation to the internal organization and organizational culture of the company; Fitting into the work environment; Getting to know the work team; Getting to know the project and the tools for the project's needs. These themes are very important items for further analysis because they affect the quality of work, and therefore the productivity of the company.

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THE ROLE OF ACCOUNTING IN MEASURING THE EFFECTS OF DIGITAL MARKETING IN SOCIAL ENTERPRISES

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Abstract

Entrepreneurship, as the driver of the economic and social development, can be focused on achieving the economic mission (generating profit), but also on correcting social inequality with the aim of contributing to the improvement of general well-being. In this regard, as an addition to the classical concept of entrepreneurship, the phenomenon of social entrepreneurship is also developing, as well as issues around measuring and reporting on social performance. Social entrepreneurship is implemented in the form of the establishment of social enterprises that represent private organizations whose main goal is to serve the welfare of the social community. The basic idea of social entrepreneurship is the realization of a social mission, not the increase of the personal wealth of interest groups.

Accordingly, the subject of this paper is the review of one of the most important aspects of social enterprise operations, which represent its measuring effects of digital marketing activities. The marketing activities of a social enterprise are primarily aimed at recognizing a certain social problem, for which an adequate solution should be offered. Thus, the focus of market research is placed on the identification of social problems, and decisions related to the marketing mix are made respecting the efforts to eliminate these social problems.

The aim of this paper is to look at the role and highlight the importance of digital marketing as one of the decisions made within the marketing mix strategy of a social enterprise, and investigate the effects of digital marketing through the prism of social accounting.

The methods that will be used in this work are analysis, synthesis and generalization. The research results will provide basic knowledge about the state

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and perspectives of digital marketing in social enterprises and their social accounting with an emphasis on social return on investment (SROI).

Keywords: social accounting, digital marketing, social entrepreneurship, social return on investment (SROI).

1. Introduction

Globalization and constant technological development create intense and dramatic changes in the whole human environment. In such conditions, entrepreneurship, as the driving force of economic and social progress, is expected to offer innovative solutions to challenges and problems, both in the business and non-business sector. In the last few decades, the attention of the academic and wider social community has been particularly attracted to innovations that, through the symbiosis of business -methods and philanthropic motives, create sustainable and influential social value (Dees, 2007). In the relevant literature, such innovations are attributed to the phenomenon of social entrepreneurship, and their holders are designated as social entrepreneurs, that is, social enterprises.

Taking into account the accumulated environmental, social and economic problems (e.g. environmental pollution, social inequality, unemployment and poverty) and the need to solve them, social enterprises can improve the degree of achievement of positive social change and ensure their long-term financial sustainability. Since the intensive development of information and communication technology requires digital transformation and the implementation of digital solutions, the subject of the paper is an overview of one of the most important aspects of the business of social enterprises, which represent its marketing activities. The marketing activities of a social enterprise are primarily aimed at recognizing a certain social problem, for which an adequate solution should be offered. Thus, the focus of market research is placed on the identification of social problems, and decisions related to the marketing mix are made respecting the efforts to eliminate these social problems.

The aim of this paper is to look at the role and highlight the importance of online promotion as one of the decisions made within the marketing mix strategy of a social enterprise, and to investigate the effects of digital marketing through the prism of social accounting.

The paper is structured as follows. First, based on a review of the relevant literature, a conceptual determination of social entrepreneurship and social enterprise was made. After that, the importance of digital marketing for the business of social enterprises and adequate marketing tools are presented, taking into account the scarcity of resources at their disposal. In order to determine the effects of digital marketing activities, the possibilities of accounting measurement of their contribution to the financial sustainability and degree of social impact of a social enterprise are discussed below. The theoretical and pragmatic contribution of the work, as well as recommendations for future research, are listed in the concluding remarks.

2. The concept of social entrepreneurship

The importance of entrepreneurship for the dynamic development of every national economy has been argued in numerous theoretical and empirical studies. Traditionally, the entrepreneurial mode of thinking and acting was considered to have a dominant profit orientation with a focus on launching new business initiatives in order to achieve above-average income as a reward for taking risks and operating in conditions of uncertainty (Lazonick & Mazzucato, 2013). Thanks to the definition of entrepreneurship offered by Shane and Venkataraman (2000, p. 218), according to which entrepreneurship represents the process of discovering, evaluating and exploiting business opportunities with the aim of creating future goods and services, the paradigm of entrepreneurial opportunities becomes the central concept of contemporary entrepreneurship research (Ferreira, Reis & Miranda, 2015).

By introducing the paradigm of entrepreneurial opportunities, sufficiently flexible boundaries of the scientific domain of entrepreneurship have been determined, which enable the incorporation of various aspects of its manifestation, while at the same time ensuring distinctiveness in relation to other areas. Accordingly, the entrepreneurial process may or may not lead to the creation of a new company (the idea can be sold), it can be implemented through various institutional arrangements (small businesses, corporations, public companies, etc.) and the outcomes do not necessarily have to be in the form of economic wealth, but also other types of effects of entrepreneurial initiatives (Busenitz et al., 2014). Thus, in addition to employee satisfaction, customer satisfaction, self-actualization of entrepreneurs, learning, etc., solving social problems and creating positive social change through a specific type of entrepreneurial behavior designated as social entrepreneurship stands out among the non-financial motives of entrepreneurial ventures.

If we focus on productive entrepreneurship, i.e. exclude the occurrence of unproductive and destructive entrepreneurship (Baumol, 1990), the final effects of entrepreneurial thinking and action contribute to increasing economic and social well-being (creating added value, reducing unemployment and poverty, and sustainable economic growth and development) (Chandra , Paul & Chavan, 2020) regardless of the type of initial engagement motive. However, the characteristics of the process of identifying, evaluating and exploiting business opportunities, as well as the context in which it takes place, can vary significantly. As stated by Kruse, Wach, Costa and Moriano (2019, p. 58), entrepreneurial initiatives can be focused on market opportunities for profit, which is a feature of commercial (traditional) entrepreneurship, or on a social problem as a means of creating a market opportunity or positive social changes, which represents the specificity of social entrepreneurship.

Social entrepreneurship is a complex concept that implies the manifestation of entrepreneurial behavior based on moral principles in order to achieve a social mission, consistent alignment of goals and actions when facing moral challenges, the ability to recognize opportunities for creating social value, as well as

innovation, proactivity and a tendency to risk when making decisions (Mort, Weerawardena & Carnegie, 2002, as cited in Ahuja, Akhtar & Wali, 2019). The initiator and driver of the social entrepreneurship process is a social entrepreneur who, as a catalyst for social change, possesses a transformative and innovative idea, creativity, broad influence, expressed entrepreneurial skills and ethical commitment (Drayton, 2002, as cited in Lancastre, Lages & Santos, 2024). According to Dees (1998), a social entrepreneur is characterized by a focus on creating social value (not only on financial profits), using creative and new approaches to solving social problems, as well as balancing social impact with financial sustainability needed for business continuity.

In addition to being able to act as an individual, a social entrepreneur most often realizes his activities through companies that are terminologically designated as social enterprises or social organizations. Their conceptualization is the subject of numerous research debates, because one group of authors considers them as subjects of the non-profit sector that use alternative financing or management strategies to create social value, while for others they are commercial enterprises that implement the practice of socially responsible business (Mair & Marti, 2006, p . 37). Weber, Leibniz and Demirtas (2015) define social enterprises as organizations that have identified a certain social problem and alleviated it with innovative, market-oriented approaches. For this reason, they can have numerous legal forms of organization and are represented both in the non-profit, as well as in the for-profit and public sectors.

According to Kannampuzha and Hockerts (2019), social enterprises should be viewed from the perspective of realizing the process of social entrepreneurship, which consists of three basic dimensions: the intention to achieve social change, the realization of commercial activities and the mechanism of cooperative (inclusive) management. This company demonstrates its intention to achieve social change with its social mission, which can refer to the employment of categories of persons who are more difficult to find employment, the provision of assistance in achieving health care and financial assistance during treatment, the education of marginalized groups, solving environmental problems, the performance of work and the financing of legal projects persons who achieve social goals, etc. When striving to achieve their social mission, social enterprises do not rely exclusively on government support and donations, but independently achieve long-term financial sustainability by selling products and/or services. Commercial activities may refer to the sale of products produced by marginalized groups, provision of consulting services, realization of trainings, recycling and environmental protection services (collection of recyclable materials, production of environmentally friendly products), education and training of marginalized groups, etc. In order to achieve a balance between the requirements for achieving social change and the need for financial sustainability, social enterprises should implement the principles of cooperative rather than corporative management. This implies the inclusion in the decision-making process of numerous stakeholders, especially the local community and target users of social enterprise services/products (employees, customers, shareholders, foundations, donors, state authorities, etc.) (Kannampuzha & Hockerts, 2019).

Considering that there is a wide and varied spectrum of individuals, groups and organizations interested in the business of social enterprises, it is necessary to establish an adequate communication system that will enable a reliable, fast and useful exchange of information. As in all other spheres of life, digital transformation has made it imperative to use digital communication channels. Online promotion, as an element of digital marketing, represents one of the forms of communication between the social enterprise and the social community, which with its enormous potential contributes to a large extent to the achievement of the goals of the social enterprise.

3. The importance of digital marketing for the business of social enterprises

Modern times and today's business challenges impose the need to use online, that is, digital technologies. In this regard, "smart factories" are increasingly present, which, in fact, represent companies within which all systems are integrated with the help of digital technologies and, increasingly, with the assistance of artificial intelligence (Breckova & Karas, 2020). One of the company's systems, which is strongly influenced by the development of technology, among others, is the marketing system. The rapid development of technology, supported by the development of the Internet, creates the basis for the creation of new marketing concepts that have the task of satisfying the needs of consumers, while creating value and achieving the simplest possible communication between companies and consumers (Shemi & Procter, 2013). Using the possibilities of online marketing, based on the Internet platform, companies can realize the benefits of greater growth, development and profitability (Wilson & Makau, 2018), but also other (non-profit) goals.

In contrast to the tools used by traditional marketing with a majority focus on the implementation of a push strategy of marketing communications, online marketing offers an advantage through its interactivity, individualization and integration, with the implementation of both push and pull strategies of marketing communications (Kumar, Kumar & Mishra, 2015). Online marketing not only enables the transmission of a message to a potential consumer as traditional marketing tools (daily press, television, radio, etc.) allow, but also creates a platform for two-way communication of perceptions and ideas in a very short time interval (Drury, 2008). Marketing tools on the Internet enable promotion characterized by adequate targeting at very low costs (Marinescu & Toma, 2012).

Promotion, as one of the elements of the marketing mix, in its online form, most often uses platforms such as websites, content marketing, e-mail, ads at the top of search results, social networks, mobile marketing and banners (Eida & El-Gohary, 2013).

The website represents one of the basic platforms through which communication and sales of the enterprise's products and services are carried out. What is very important for the enterprise is the task of creating a website that represents the vision and mission, that is, the purpose of the enterprise's existence,

which should be attractive to the extent that it interests the visitor enough, but also stimulates him to visit it again (Hauser, Urban, Liberali & Braun, 2009).

According to the definition of the Content Marketing Institute (2018), content marketing is "a strategic marketing approach focused on creating and distributing valuable, relevant, and consistent content to attract and retain a clearly defined audience - and, ultimately, to drive profitable customer action". The role of content marketing is primarily to provide information for potential consumers, but also to educate and entertain them, and encourage the exchange of ideas and sharing of values (Harad, 2013).

By sending electronic mail, that is, by using e-mail marketing, enterprises try to inform target groups about their offer of products/services and activities, and encourage them to buy, use or participate in them. Modern software solutions enable the creation of mailing lists and personalized messages, thus developing stronger connections between enterprises and target groups (Bala & Verma, 2018).

Ads at the top of search results are a component of paid internet search results, and are based on the fact that when a target user types a word into a search engine (e.g. Google), next to or above the search results, an advertisement of a specific enterprise is displayed, and that in relation to how much that enterprise paid or depending on the algorithm that the search engine uses (Steel, 2009). If it is about unpaid advertisements, it is very important for companies to develop a search engine optimization (SEO) strategy, which achieves the effect of increasing the probability that a certain advertisement will appear closer to the top of the search results when a target person uses a search engine to find a certain term, product or service (Lukito, Lukito & Arifin, 2015).

Social networks such as Facebook or Instagram can be used as a tool that primarily enables communication between businesses and target groups, but also the promotion of products/services and activities (Hajarian, Camilleri, Díaz & Aedo, 2021). One of the main benefits of using social networks for the purpose of promotion is increasing the loyalty of existing target users (Smith, Hernández-García, Agudo Peregrina & Hair, 2016).

Observing the modern market, it can be concluded that marketing itself is becoming mobile marketing because target groups, using mobile devices and tablets, strive to ensure the convenience of shopping with the greatest possible personalization of the offer (Ittaqullah, Madjid & Suleman, 2020). The importance of mobile marketing is all the greater if you look at how much time target persons spend using a mobile phone on average, how much time they search the Internet with the help of a mobile phone, and to what extent they make purchases or another feedback via a mobile phone (Berman, 2016).

Advertisements on websites (banners) represent one of the tools of online promotion that has been used since the very beginning of the mass use of the Internet, and is a combination of graphic and textual content, which appears on the user's screen, with the aim of directing him to the enterprise's website (Peker, Menekse Dalveren & İnal, 2021). In the era of globalization, when the Internet becomes an inseparable part of the lives of all inhabitants of the world, banners

are one of the most powerful and effective tools of online promotion (Pandowo & Pangellu, 2014).

When we look at promotional activities, unlike conventional companies that primarily focus on branding, advertising and sales promotion (Bandyopadhyay & Ray, 2020), social enterprises are oriented towards a dual promotion strategy that represents a strategy that is, on the one hand, activity-oriented which are related to the improvement of sales, and on the other hand, oriented towards activities highlighting the importance of solving certain social problems (Davies, Haugh & Chambers, 2019). As the issues that social enterprises seek to solve most often concern society itself, governmental institutions also play an important role as catalysts in the promotion of social enterprises (Choi & Park, 2021).

4. Measuring the effects of digital marketing in social enterprises

Creating and maintaining a competitive advantage is one of the many important goals of every enterprise, and the prerequisite for their achievement is the production of a quality offer with the lowest possible costs (Ishaq Bhatti, Awan & Razaq, 2014). In order to be able to monitor the realization of the enterprise's goals, management develops performance measures called Key Performance Indicators (KPIs), which are seen as a set of measures for monitoring organizational performance that are of crucial importance, both for the current and future successful operation of the enterprise (Parmenter, 2015).

The role of KPIs, on the basis of which the management of the organization wants to implement its goals into reality, connecting them with its business strategy, is also to provide information on the basis of which the growth of the organization will be stimulated, to control the implementation of the organization's strategy, and to improve the productivity, efficiency and profitability of the business (Domínguez, Pérez, Rubio & Zapata, 2019).

Setiawan and Purba (2020), based on the analysis of the literature in which the authors deal with the implementation of KPIs, state their five functions: 1) connecting the basic values of the company's vision and mission with current activities and goals; 2) measuring the performance of the entire company or its individual parts with the purpose of establishing whether they achieve growth or decline in activity; 3) comparison of current and past performance of the company, and comparison with competitors in order to create the best basis for creating a SWOT analysis; 4) creating a basis for creating individual goals of the company's subdivisions or individual employees and 5) using KPIs as a basis for creating a reward model and employee motivation.

Investigating the impact of KPIs on overall organizational performance, Ishaq Bhatti et al. (2014) list eleven business dimensions for which KPIs can be developed: 1) quality, 2) flexibility, 3) time, 4) safety, 5) financial performance, 6) costs, 7) employee satisfaction, 8) learning and growth, 9) performance of socially responsible activities, 10) customer satisfaction and 11) delivery reliability.

Since, in addition to financial results, social enterprises also aim to increase social well-being, in addition to financial KPIs, among others, an indicator called

social return on investment (SROI) has been developed. In the simplest terms, SROI is an indicator of the impact of social enterprise activities on people's lives (Nicholls et al., 2012). According to Maldonado and Corbey (2016), SROI is a technique that measures the impact of a company on socio-economic reality and the natural environment by combining elements of cost benefit analysis, stakeholder metrics, financial indicators, and metrics that monitor projects.

Wright, Nelson, Cooper and Murphy (2009) state that SROI is tasked with proving and improving the impact of social enterprise on stakeholders. When looking at the relationship between classical cost-benefit analysis and SROI, Arvidson, Lyon, McKay and Moro (2013) state that the mentioned techniques differ in terms of stakeholder issues, perception of SROI as a management tool, comparability and proxy information.

Monitoring the company's activities with the need for SROI can have certain advantages, but also problems. Yates and Marra (2017) state that SROI has certain advantages because:

1. includes information on the amount of resources used in a project activity, includes information on the value of project outcomes for society,
2. enables comparison of different projects (even in cases where results are expressed in different units of measure),
3. shows the possible net gain of social resources,
4. can summarize the value of the project for the entire society (and not only for certain groups of stakeholders),
5. can motivate stakeholders to be involved in projects from its very beginning (taking into account that the stake is high).

When talking about the problems of using SROI, Fujiwara (2015) lists the following seven problems:

1. lack of a normative approach to SROI,
2. lack of measures for interpersonal comparisons,
3. too narrow a view of stakeholders,
4. risk of biased calculations,
5. the problem of adequate use of statistical methods,
6. outdated theory and methodology related to SROI,
7. unclear meaning of SROI ratio.

5. Conclusion

Social enterprises conduct digital marketing activities to inform stakeholders about their social mission, involve target users in the decision-making process, and promote their products/services and activities. Digital marketing channels such as websites, content marketing, e-mail, ads at the top of search results, social networks, mobile marketing and banners can be very effective when trying to reach socially conscious users and consumers. In doing so, social enterprises have at their disposal a multitude of potential strategies, of which they are particularly useful: Storytelling, SEO (Search Engine Optimization) and SEM (Search Engine Marketing), Social Media Marketing, E-Commerce and Online Sales.

For the implementation of the selected digital marketing strategy, it is necessary to engage the funds of the social enterprise, which requires an assessment and comparison of costs and benefits in order to determine the achieved effects on the business of the social enterprise. Accounting measurement of the effects of digital marketing is crucial for determining the financial viability of social enterprises, as well as for assessing their social impact. At the same time, social enterprises, in addition to focusing on financial performance (income, profit margin, cash flow, etc.), must integrate the measurement of social impact with financial data. Social Return on Investment (SROI) is most often used to measure social performance, which quantifies, monetizes and then compares the costs and benefits of organizational activities in order to assess the profitability of an investment or project. Unlike the traditional cost-benefit analysis, SROI has a focus on the involvement of various stakeholders because, in addition to the economic ones, it also includes the social and environmental results of the business. In accounting reporting, digital marketing analytics (e.g., social media engagement, website traffic, conversion rates) can be used to measure marketing ROI, the commitment of users to the company and the effectiveness of drip marketing in achieving both commercial activities and social impact.

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ANALYSIS OF THE PAYMENT SPHERE IN THE MACEDONIAN BANKING SECTOR

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Abstract

The rapid technological transformation, which, in addition to advantages, also has challenges, as in the banking sectors of other countries, has its influence in the payment sphere of the Macedonian banking sector. In the past year, the most significant activity in this domain is actually the application of the new Law on Payment Services and its regulations, which were adopted by the National Bank. They made a significant contribution in the direction of harmonizing our legislation with European standards and regulations. Also, as a result of the change in habits and the payment culture of individuals and legal entities, payment functions that were less used until now are increasingly being use.
For that, in this paper is made an analysis of non-cash payment transactions and payment transactions with credit transfers initiated by individuals and legal entities in our country. Also, is given a review of the use of payment cards in everyday transactions. A comparative analysis of their application by individual years was also made. The goal is to perceive the dynamics of their movement in the analyzed period, as a result of rapid technological changes.

Keywords: payment sphere, transactions, payment cards.

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1. Introduction

The analysis of this paper has been made by using data from the annual reports of the National bank, of the e-commerce Association of R. Macedonia, and the information on the payments in our country. Its aim is to view the state of the payment sphere in the Macedonian banking sector, with an accent on cashless payment transactions (by number and value) in each year of the analyzed period, and the use of payment cards in realization of these transactions.

The analysis gives a review of the realized positive movements in the payment infrastructure, considers the progress on annual level according to the available data compared to the previous years, which is a challenge for further acting by the banks for even higher improvement.

2. Cashless payment transactions

Digital payment channels that are offered by the payment service providers to individuals and legal entities especially enabled the cashless payments growth in the previous 2023. Good payment infrastructure for using contactless technology has provided growth for both the number and the value of transactions realized by contactless technology.

According to the data contained in the Reports issued by the National bank, the use of digital ways for realizing payments in the country, especially by the natural persons, has been significantly increased. This trend is not noticed only in the use of the payment cards, but also in the use of mobile apps for realizing electronic credit transfers.

In the previous 2023, there was significant annual growth of 16,8% in the use of payment cards for paying products and services in the country, and also higher growth of 17,4% in the payments made in the physical points of sale, and growth of 11,1% in the payments on internet points of sale.

When it comes to the number and value of payment transactions made by use of payment cards, the data shows a decrease in cash withdrawals from ATMs, against the growth in the use of payment cards in commerce.

Cashless payment transactions among individuals and legal persons in 2022/2023 show an annual growth of 12.4% in the number of transactions against the annual growth of 6.6% in the number of transactions in 2021/2022. Positive annual growth rates in credit transfers of 4.1% in 2022/2023 are also noticeable, against the negative annual changes of -2.6% in 2021/2022. Regarding payment cards as payment instruments, the annual changes in the number of transactions amounted to 17.3% in 2022/2023, compared to 13.1% in 2021/2022, which is a noticeable improvement over the past year.

These changes in the number of non-cash payment transactions can be seen in the following table 1 (Authors' calculations using the data from the annual information on payments from NBRM and reports from the Association of e-commerce of Macedonia):

Table 1. Non-cash payment transactions (number of transactions)

Payment tools	(number of transactions) (in millions)				
	2021	2022	2023	Annual growth 2021/2022	Annual growth 2022/2023
Total payment transactions in the country	182	194	218	6,6%	12,4%
Credit transfers	75	73	76	-2,6%	4,1%
Payment cards	107	121	142	13,1%	17,3%

As for the value of transactions, there is an annual growth of 20% in the value of transactions with a realized number of 218 million non-cash payment transactions and 6,691 billion MKD value of transactions in 2022/2023 against the negative annual changes of -7.0% in 2021/2022 year. Positive annual changes in the value of transactions with credit transfers in 2022/2023 of 20.1% are also noticeable, against the negative annual changes in their value of -7.4% in 2021/2022. For the annual changes in the value of payment card transactions, the data shows annual growth of 16.7% in 2022/2023 compared to annual growth of 11.9% in 2021/2022. These changes in the value of non-cash payment transactions can be seen in the following table 2 (Authors' calculations using the data from the annual information on payments from NBRM and reports from the Association of e-commerce of Macedonia):

Table 2. Non-cash payment transactions (value of transactions)

Payment tools	(value of transactions) (in billions denars)				
	2021	2022	2023	Annual growth 2021/2022	Annual growth 2022/2023
Total payment transactions in the country	5.995	5.574	6.691	-7,0%	20,0%
Credit transfers	5.893	5.454	6.551	-7,4%	20,1%
Payment cards	101	120	140	11,9%	16,7%

With that, the share of the value of payment transactions by payment cards in the country's trade increases every year, and in the previous 2023 it reached 43,8%. That confirms the change in the habits of the individuals and legal entities, for higher use of the payment cards for making payment transactions in the trade.

This can be seen in the following figure 1 (Annual reports, NBRM):

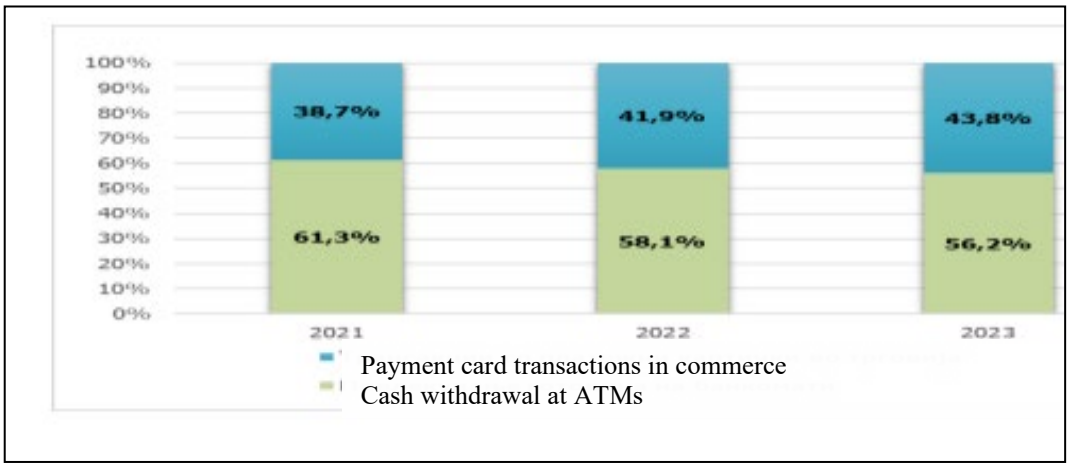


Figure 1. Value of payment transactions with payment cards in the country (%)

3. Payment infrastructure with payment cards

At the end of 2020, the total number of payment cards was 2.1 million cards. The biggest influence on the annual increase in the number of payment cards in 2020 is the issuance of the domestic payment card, as one of the measures of the Government of the Republic of North Macedonia to support economic activity in conditions of covid-19. Of the total number of payment cards, 83% belong to payment cards with a debit function and 17% are cards with a credit function. The biggest participation is the cards with debit function with 83%, from the "Visa" brand with a participation of 55% and the "Mastercard" brand with a participation of 42%. The other brands are less represented, i.e. with 3%.

At the end of 2020, the share of contact-contactless cards in the total number of cards with a payment function of 2.1 million payment cards was 62%. Also, in the same year, three banks offered the virtual wallet integrating the contactless card with the mobile application. With this technological innovation, the domestic market of payment services has been enriched with a modern and reliable way of making payments. For the application of contactless technology, in parallel with the growth in the number of contact-contactless cards, the number of installed devices at points of sale with contact and contactless technology also increased, and their participation reached 72.6% in the total number of devices for electronic payments on physical points of sale at the end of 2020, i.e. 24,466 installed contact- contactlesses devices of a total of 33,699 devices for electronic transfer of funds at physical points of sale. All this led to a change in the payment habits of individuals and legal entities, i.e. using the benefits of contactless technology, so that the number of payments with contactless cards increased in 2020.

Those changes had continuity in the following years in the analyzed period.

At the end of 2023, the total number of payment cards amounted to 1.9 million cards, and the largest share is the cards with debit function with 83.9%, from the "Visa" brand with a share of 55.9% and the "Mastercard" brand with a share of 41.7%.

Of the total payment cards 75.9% are based on contactless technology and they are used on 94.5% of the total number of devices for electronic payments at physical points of sale with an annual growth of these devices of 7.3%. A high annual growth of 38.3%, i.e. 325 ATMs, is observed in the number of ATMs with an additional function for depositing cash, and there is also an annual growth of 4.7% for ATMs with the function of initiating a credit transfer, i.e. 312 ATMs.
These changes can be seen in the following table 3 (data available from Annual information on payments, NBRM):

Table 3. Payment infrastructure for paying with payment cards

Payment infrastructure	2020	2021	2022	2023
Total cards with payment function	2.114.133	2.125.888	2.112.004	1.947.189
0f which according to the function of the card				
debit	1.756.294	1.754.171	1.753.654	1.634.288
credit	357.839	371.717	358.350	312.901
of which according to the brand of the card				
Master card	899.085	922.100	927.370	817.428
Visa	1.173.563	1.161.512	1.145.211	1.094.377
Other brands	63.914	59.784	52.819	46.732
of which according to payment technology				
Contact/non-contact	1.317.290	1.450.704	1.468.428	1.472.794
contactless		2.144	2.498	5.119
internet	10.872	11.410	11.983	10.880
ATMs	1.001	981	1.013	1.023
with a cash deposit function	193	202	235	325
credit transfer function	359	297	298	312
Devices at physical points of sale	33.699	29.807	29.916	32.113
Contact/non-contact	24.466	25.008	25.771	3.348
Devices at points of sale for e-commerce	1.459	1.652	1.891	2.123

4. The impact of the new Law on Payment Services and Payment Systems

The new Law on Payment Services and Payment Systems, which entered into force in January 2023, represents a challenge for the payment services market whose impact will be felt in the coming years. This law is expected to increase the competitiveness of the market as a result of the offer of new providers of payment services, which have to meet certain criteria in order to receive a permit from the National Bank. As with banks, individuals and legal entities will be able to open payment accounts with new payment service providers, use payment cards and other forms of electronic banking to make payments. All that will certainly have reflection on the payment infrastructure and payment transactions in our country.
If we take into account the experience of the countries where such new payment service providers are present, it is expected that they will offer innovative ways to

make payments easier and faster. As an additional benefit for individuals and legal entities is considered the possibility to make their payments using electronic money that will be issued by payment service providers. During market competition, existing payment service providers are expected to offer new and innovative payment services for individuals and legal entities for easier and faster execution of payments.

One of the more significant benefits of the new regulatory framework is the application of the concept of the so-called "open banking" which will include the fintech sector in the offer of new payment solutions for individuals and legal entities. Then, the National Bank will play a key role in the payments market as a regulator of this market, in the direction of encouraging competition and contributing to the increase of digital solutions for payment services, as well as encouraging the process of financial inclusion of individuals and legal entities.

5. Conclusion

It can be unanimously concluded that several years after Covid-19, the digital transformation has become imperative for all on the global level, and in our country as well. Fast digital changes have come as a blessing for development of the banks' payment infrastructure, especially in the emerging markets, because it has put forward the digitalization in their economies in a few years. The digital payment channels offered by the banks played very important role in the society, providing safe access to their clients. That was an important boost for adaptation of the banks in order to keep the existing clients and attract new ones. Result of that is the significant growth and development of the payment infrastructure in all analyzed years. Despite the growth in the past years, of course there is potential that should be utilized for even higher progress. In this direction, it is necessary to work on enhancing and advancing the digital skills, education on the market, the awareness raising, trust building, advancement of payment solutions etc. The challenge is not only to keep, but also to increase the growth realized in all previous years and to take advantages offered by the digital payment channels.

Also, there is the challenge that will bring the new Law on Payment Services and Payment Systems in the coming years, its impact on market competitiveness with new payment service providers and their offer of innovative ways to make payments.

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FROM THEORY TO PRACTICE: IMPLEMENTING THE CONTEMPORARY BALANCED SCORECARD IN NORTH MACEDONIAN PUBLIC SECTOR ORGANIZATIONS

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Abstract

The aim of this scientific paper is to present and analyze the implementation of the contemporary Balanced Scorecard (BSc) model in public sector organizations of North Macedonia, and bridging the gap between the theoretical framework and practical application.
The Balanced Scorecard, as a traditional performance measurement model in the private sector, has been increasingly adapted in the public sector in order to enhance performance measurement, as well. Besides the four perspectives of the model – citizens' perspective, financial perspective, internal processes and learning and growth, special attention will be paid on the fifth perspective of the contemporary BSc model, the sustainability perspective.
Through a comprehensive literature review, key theoretical foundations and adaptations of the contemporary BSc model for the public sector, will be identified. On the other side, through a case study approach, a specific organization from the public sector in North Macedonia, will be analyzed. Emphasis is placed on the sustainability perspective, demonstrating how public institutions in North Macedonia should integrate long-term environmental, social and economic goals into their performance measurement systems.
Accordingly, that will be the main focus of this paper, where concrete recommendations will be given in a way to improve the public service delivery and to optimize the use of this model in the public sector of North Macedonia.

Keywords: performance measurement, Balanced Scorecard, contemporary model, sustainability perspective, public sector.

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1. Introduction

The Balanced Scorecard (BSc) model has long been recognized as a powerful model for performance measurement in the private sector. It offers organizations a structured approach to evaluate and improve their organizational efficiency and effectiveness. Originally developed by Harvard professors Robert Kaplan and David Norton in the early 1990s, the fundamental BSc model focuses on four key perspectives: financial perspective, customer perspective, internal processes, and learning and growth. This multifaceted approach enables organizations to achieve a balanced view of their organizational performance, integrating both short-term and long-term objectives. However, as public sector organizations face increasing pressures to improve accountability, transparency, and service delivery, the relevance and adaptability of the BSc model to this sector have become a subject of growing interest.

In recent years, the public sector in North Macedonia has undergone significant reforms aimed at enhancing the efficiency and effectiveness of its organizations. These reforms are part of a broader effort to align public sector management practices with international standards, ensuring that public services meet the needs of citizens while maintaining financial accountability. One of the critical challenges in this context is the development of performance measurement systems that can provide actionable insights for public sector managers. The BSc model, with its focus on financial and operational metrics, offers a solid foundation for such systems. However, adapting the model to the unique demands of the public sector requires careful consideration of additional factors, particularly in areas like sustainability and social impact.

This paper explores the implementation of the contemporary Balanced Scorecard model in public sector organizations in North Macedonia, with a special focus on the sustainability perspective. While the fundamental BSc model has proven effective in the private sector, its application in the public sector requires modifications to address the sector's specific characteristics. Public sector organizations are not driven by profit, but rather by the need to deliver public value, which includes environmental management, social equity, and economic sustainability. As such, the contemporary BSc model incorporates a fifth perspective—sustainability—that reflects these broader societal goals.

Furthermore, the paper examines the theoretical foundations of the contemporary BSc model and analyzes its practical application in a specific public sector organization in North Macedonia, offering concrete recommendations for optimizing the use of this model to improve public service delivery and achieve sustainable outcomes.

2. Literature review

According to Kaplan and Norton (2007) the Balanced Scorecard model "…addresses a serious deficiency in traditional management systems: their inability to link a company's long–term strategy with its short–term activities.

Most companies' operational management control systems are built around financial measures and targets, which bear little relation to the company's progress in achieving long–term strategic objectives. Thus, the emphasis most companies place on short–term financial measures leaves a gap between the development of a strategy and its implementation." (Kaplan & Norton, 2007).

The model has emerged as a significant performance management measurement model in public sector organizations, evolving from its origins in the private sector to address the unique challenges faced by public sector organizations. Unlike private sector organizations, where the financial perspective is the primary measure of success, public sector organizations focus on service delivery and community impact – the citizens' perspective.

Over the years, the BSc model has evolved significantly since its inception. Initially designed as a performance measurement framework, it aimed to provide a more comprehensive view of organizational performance beyond traditional financial metrics. Its application has expanded, and it has become a critical tool in performance measurement.

The early development and adoption stage from 1992 – 2002, is the stage where the BSc was first introduced in Kaplan and Norton's article, which emphasized the need for organizations to balance financial and non–financial performance indicators (Kaplan& Norton, 1992). This approach has been revolutionary, as it encouraged managers to consider customer satisfaction, internal processes, and innovation alongside financial outcomes. By the late 1990s, the model had gained traction as organizations recognized its potential to align business activities with strategic objectives, leading to its widespread adoption across various sectors.

In the 2000s, the BSc has evolved from a performance measurement tool to a strategic management system. At this stage, Kaplan and Norton in their books like "The Strategy–Focused Organization" (Kaplan& Norton, 2000) and "The Execution Premium" (Kaplan& Norton, 2008) have outlined how the BSc could facilitate strategy execution by linking performance metrics to strategic goals. Also, this period has seen the emergence of the "strategy map", which is a visual tool that illustrates the causal relationship between strategic objectives (Kaplan & Norton). "Specifically they defined relationships between lagging measures (financial measures) and performance–driving measures (such as internal process and growth and learning)". (**Rangarajan, & Mishra, 2014).**

The last decade (2010 – present) has witnessed a significant shift towards integrating sustainability and social responsibility into the BSc model. Recent literature highlights the emergence of the "Sustainability Balanced Scorecard", which incorporates environmental and social metrics alongside traditional performance indicators. This adaptation reflects a growing recognition of sustainability as a critical component of performance management in today's businesses.

Furthermore, advancements in data analytics and technology have transformed how organizations implement the BSc. The integration of big data analytics enables more precise tracking of performance metrics and enhances decision–making capabilities. Researchers suggest that future developments may focus on

refining the BSc model to accommodate these technological advancements, ensuring its relevance in an increasingly complex and dynamic business environment (Kumar, Lim, Sureka, Chiappetta Jabbour, & Bamel, 2023)

As organizations continue to face new challenges, the BSc model will likely evolve further, maintaining its status as a crucial model for performance measurement.

3. Implementing the contemporary BSc in public sector organizations in North Macedonia

This paper analyzes the implementation of the contemporary BSc in the National Extension Agency for Agriculture (NEA), which is a public sector institution in North Macedonia. NEA is a government institution established to provide professional assistance to farmers and herdsmen, to enhance the quality and quantity of agricultural production and promote its broader utilization.

"The focus of NEA as a public provider of advisory services are the agricultural producers, i.e. their agricultural holdings, which also represent the main users of the services and are therefore a priority stakeholder." (National Extension Agency, 2022)

To effectively implement the BSc methodology, it is essential to begin with the institution's mission, vision, and strategic goals. A strategic map, which is a fundamental component of the BSc methodology, should then be developed. After establishing the mission, vision, and strategic goals within the strategic map, the five perspectives of the contemporary BSc methodology are analyzed, with distinct strategic goals and activities defined for each perspective.

The integration of the sustainability perspective into the BSc methodology is particularly relevant for public institutions in North Macedonia, which are increasingly required to balance short-term operational objectives with long-term environmental, social, and economic goals. By focusing on sustainability, public sector organizations such as NEA, can ensure that their performance measurement systems support not only immediate service delivery objectives but also the broader goals of sustainable development.

Figure 1 shows a schematic view of NEA's strategy map which outlines the implementation of the BSc methodology, centered around the mission, vision, and strategic goals. The map includes the five perspectives of the model: citizens, sustainability, learning and growth, internal processes, and financial. Each of these perspectives plays a crucial role in achieving NEAs strategic goals of competitiveness, sustainability, providing effective advisory services, and also optimizing its overall organizational performance.

The mission of NEA emphasizes its commitment to developing competitive and advanced agricultural holdings. This is accomplished through providing information, counseling, education, and technical assistance, all while upholding the principles of good agricultural practices and preserving rural areas. The vision further builds on this foundation, positioning the organization as a respected institution dedicated to offering professional advisory services aimed at achieving efficient agricultural production and fostering sustainable rural development.

In the center of the strategy map are NEAs three key strategic goals: competitiveness, sustainability, and advisory services. These goals serve as guiding principles for the objectives outlined in each of the five perspectives.

If analyzed separately, the Citizens' perspective focuses on enhancing the relationship between NEA and the farmers it serves. For example, by improving the accessibility of advisory services, NEA ensures that the farmers as its end users, will receive timely and relevant guidance and information. By increasing the adoption rate of modern agricultural practices, NEA aims to elevate productivity and sustainability within the farming community.

Moving to the second perspective – Sustainability, NEA has a strong emphasis on promoting sustainable agricultural practices. This involves not only encouraging environmentally friendly farming methods but also fostering resilience to the impacts of climate change. Also, it recognizes that climate change poses a significant threat to agricultural productivity and is therefore committed to helping farmers adapt to these challenges. Moreover, the agency seeks to enhance the use of renewable energy in agricultural practices, aligning its operations with broader environmental goals.

In the third perspective, Learning and Growth fostering a culture of continuous learning and development is a key objective. Also, improving knowledge sharing and collaboration across departments is another important objective because it facilitates the flow of information and fosters innovation. Increasing the number of new employees is essential for the continuous and timely performance of work tasks and activities.

One of the main objectives in the Internal Processes perspective is optimizing internal operations to support the main strategic goals. Enhancing data collection and analysis is critical for informed decision-making and strategic planning. Furthermore, the implementation of an integrated software solution for the archive department is aimed at streamlining internal processes and improving overall efficiency.

Finally, the Financial perspective addresses the financial sustainability of NEA. As a public sector institution, established by the government, NEAs main budget funding is from the state budget. So, its main objective in this perspective is increasing government funding, to provide the necessary resources to support NEAs everyday operations and activities. But also, another objective here is to improve the budget utilization, so that will ensure that finances are allocated effectively to maximize impact. Besides, the government funding, NEA should expand the opportunities to generate additional income, for example from participating in new projects and activities.

By addressing the objectives within each of the five perspectives—Citizens, Sustainability, Learning and Growth, Internal Processes, and Financial, NEA is well-positioned to achieve its main strategic goals of competitiveness, sustainability, and effective advisory services.

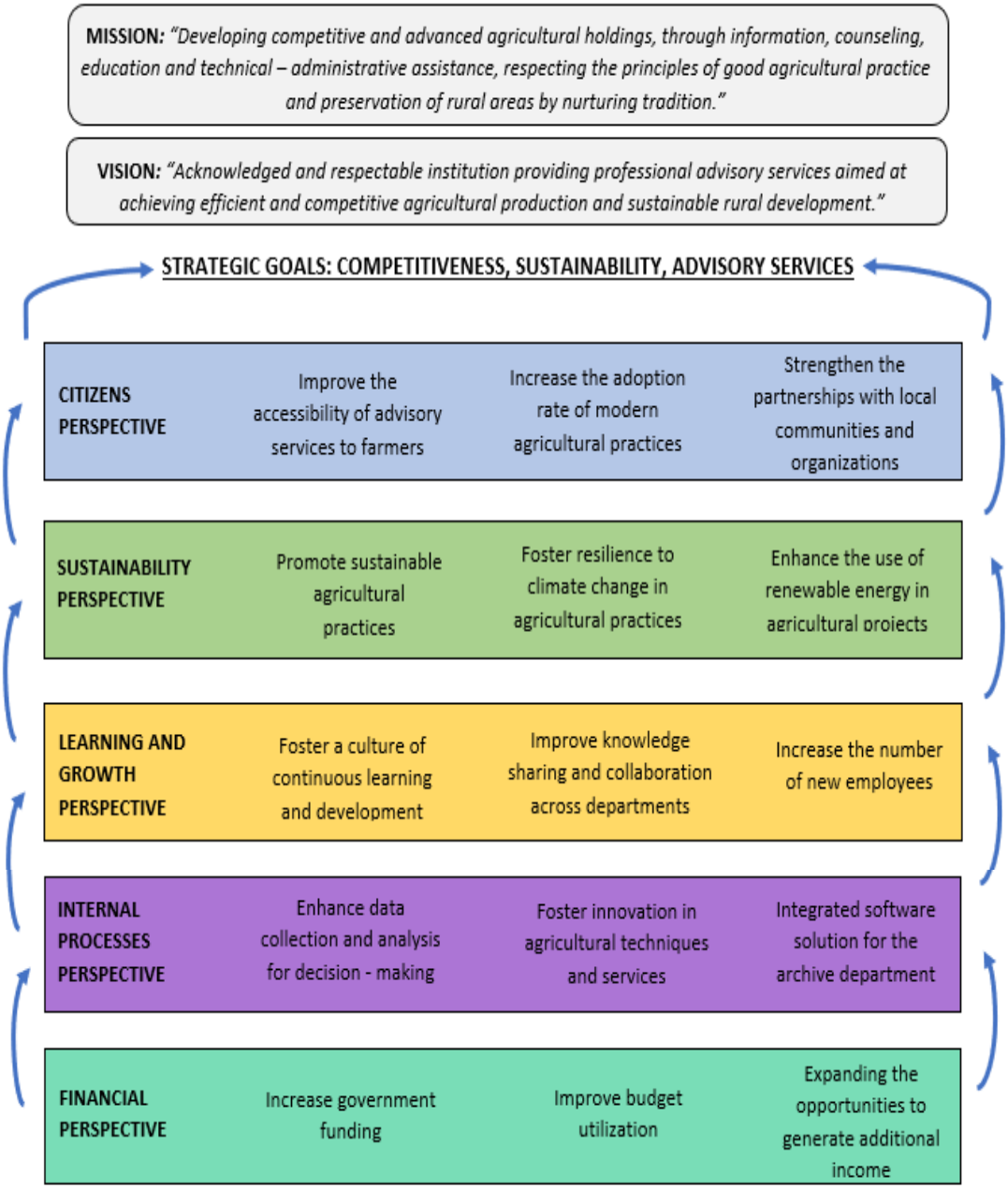


Figure 1: Strategic map of the National Extension Agency
Source: Original author's research data

The next step in implementing the BSc methodology is identifying Key Performance Indicators (KPIs). "Well-defined indicators increase the performance of civil services in accordance with the government's efforts to improve the overall public advisory service in agriculture. The KPIs of NEA are focused on measuring the effectiveness and efficiency of work processes to deliver quality

services to its end users – citizens/farmers, through the appropriate use of available resources (finances, human resources, IT equipment, database, etc.)" (Jusufi, 2023).

Figure 2 shows the KPIs of NEA, based on the defined strategic goals for each perspective of the BSc, with the corresponding performance measurement method.

Each perspective has specific objectives aimed at improving the overall organizational performance of NEA. The KPIs associated with these objectives provide measurable benchmarks that allow NEA to track progress, measure performance, assess effectiveness, and make informed decisions to enhance its operations. The measurement methods, including service reports, financial records, and sustainability assessments, ensure that the KPIs are accurately monitored and reported.

In the center of Figure 2 is optimizing NEAs organizational performance. This central objective is influenced by the targets set within each of the five perspectives. NEAs ability to meet its strategic goals - competitiveness, sustainability, and effective advisory services - depends on how well it monitors and achieves the KPIs outlined in this framework.

For example, to successfully achieve the objectives in the citizens' perspective, as it is improving the accessibility of advisory services to farmers, KPI for measuring performance is the number of farmers served, measurement method would be the records from delivered services and farmer outreach logs. For the objective: of strengthening partnerships with local communities and organizations, KPI would be the number of established partnerships, and a measurement method would be the signed agreements and collaboration reports.

The objectives under the sustainability perspective include fostering resilience to climate change, encouraging the adoption of renewable energy in agricultural practices, and promoting sustainable farming methods. The KPIs associated with these goals include the number of sustainable practices adopted by farmers, climate impact metrics, and the percentage of energy projects using renewable energy. Measurement methods such as sustainability reports, climate impact evaluations, and energy usage reports are used to monitor these KPIs. This perspective underscores the agency's role in addressing global environmental challenges through local agricultural initiatives.

The Learning and Growth Perspective focuses on the internal development of NEAs workforce. For example, for the objective to foster a culture of continuous learning and development, KPI would be employee engagement in learning programs, and a measurement method – participation records and reports.

By investing in the professional development of its employees, NEA ensures that its workforce remains skilled, motivated, and capable of meeting the demands of the sector.

For the objective – integrated software solution for the archive department, which is in the Internal Processes perspective, defined KPI is the extent of the software's usefulness to the employees, and the measurement method would be the number of entered data into the software. This perspective is vital for

maintaining the efficiency and effectiveness of the agency's internal processes, which in turn supports its external goals and overall organizational performance.

Lastly, the objectives in the Financial perspective focus on increasing government funding, improving budget utilization, and expanding opportunities to generate additional income. The defined KPIs include the amount of government funding received, the percentage of budget execution, and the income generated from additional sources. These financial metrics are measured through annual financial reports, budget execution reports, and income generation records.

By clearly defining objectives and KPIs across the five perspectives of the BSc model, NEA can systematically track its progress and measure its performance in order to make informed decisions to enhance its operations. Each perspective, whether focused on citizens, sustainability, internal processes, learning and growth, or financial management, contributes to the overall organizational performance. This comprehensive approach ensures that the agency remains aligned with its strategic goals of competitiveness, sustainability, and advisory excellence, ultimately benefiting the agricultural sector and the broader public sector.

CITIZENS PERSPECTIVE		
Objective	**KPI**	**Measurement method**
Improve the accessibility of advisory services to farmers	Number of farmers served	Service delivery records and farmer outreach logs
Increase the adoption rate of modern agricultural practices	Percentage of farmers adopting new practices	Post-training evaluation and follow-up studies
Strengthen partnerships with local communities and organizations	Number of partnerships established	Partnership agreements and collaboration reports

SUSTAINABILITY PERSPECTIVE		
Objective	**KPI**	**Measurement method**
Promote sustainable agricultural practices	Number of farmers adopting sustainable practices	Sustainability audits and farmer activities
Foster resilience to climate change in agricultural practices	Number of climate-resilient practices adopted	Climate impact studies and farmer adoption reports
Enhance the use of renewable energy in agricultural projects	Percentage of projects utilizing renewable energy	Energy usage reports and project evaluations

NEAs overall **ORGANIZATIONAL PERFORMANCE**

LEARNING AND GROWTH PERSPECTIVE		
Objective	**KPI**	**Measurement method**
Foster a culture of continuous learning and development	Employee engagement in learning programs	Learning program participation records
Improve knowledge sharing and collaboration across departments	Frequency of cross-departmental meetings and collaborations	Meeting logs and collaboration records
Increase the number of new hires	Number of new hires per year	HR recruitment records and workforce planning reports

INTERNAL PROCESSES PERSPECTIVE		
Objective	**KPI**	**Measurement method**
Enhance data collection and analysis for decision-making	Data accuracy and timeliness	Data audit and quality check
Foster innovation in agricultural techniques and services	Number of innovative solutions implemented	Innovation reports and pilot project evaluations
Integrated software solution for the archive department	The extent of the software's usefulness to employees	Number of entered data into the software

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FINANCIAL PERSPECTIVE		
Objective	**KPI**	**Measurement method**
Increase government funding	Percentage increase in funding	Annual financial reports
Improve budget utilization	Percentage of budget spent	Budget execution reports
Expanding the opportunities to generate additional income (e.g. from project activities)	Number of projects the institution is involved in	Keeping records of all the projects in which the institution participates

Figure 2: Key Performance Indicators of the National Extension Agency as part of the strategy map
Source: original author's research data

4. Conclusion

The implementation of the contemporary BSc in the public sector of North Macedonia demonstrates the model's adaptability and effectiveness beyond its traditional private sector roots. By incorporating a fifth perspective – sustainability – the model has evolved to address the unique needs of public sector organizatons, which focus more on delivering public value rather than profit.

The case study of the National Extension Agency exemplifies the successful adaptation of the model in a public sector context. NEAs strategis map and KPIs reflect the institution's commitment to enhancing agricultural productivity while promoting sustainable practices.

To further strengthen the implementation of the model in public sector organizations, some recommendations can be made. Firstly, organizations should prioritize the integration of sustainability into their performance measurement systems, ensuring that the metrics align with their strategic goals.

Secondly, there is a need for continuous traning and development of public sector employees. Public sector organizations should invest in building a culture of learning and growth. This can be achieved through training programs, workshops, seminars, etc. That will enhance their ability to adapt to new challenges and improve service delivery.

Thirdly, the optimization of internal processes remains crucial. These organizations should leverage technology and data analytics to optimize operations and improve the decision – making process. For example, implementing integrated software solutions in the archive department of NEA, can lead ot significant efficiency and effectiveness. Additionally, enhancing data collection and analysis capabilities will enable organizations to monitor performance more effectively, identify areas for improvement, and make informed decision that align with strategic objectives.

Lastly, public sector organizations should seek to diversigy their funding sources and improve budget utilization. While government funding remains a primary source of financial support, exploring additional income for eg. from project activities, can provide the necessary resources to sustain operations and drive innovation.

By focusing on sustainability, workforce development, process optimization, and financial diversification, public sector organizations can enhance hteir implementation of the contemporary BSc model. The insights form NEAs case study provide valuable guidance for other public sector organizations aiming to achieve sustainable outcomes through improved performance measurement systems.

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THE CONNECTION OF ORGANIZATIONAL AND INDIVIDUAL LEARNING WITH ORGANIZATIONAL CONFLICTS

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Abstract

In the modern business environment, organizations are constantly faced with challenges that require adaptability, innovation and continuous learning. To build and maintain their competitive advantage, organizations increasingly rely on effective learning processes. This paper presents a theoretical research whose goal is to determine the existence of a connection between organizational, individual learning and organizational conflicts, presenting the relevant results of various researches and drawing universal conclusions. The paper emphasizes the importance of learning in the organizational context, as well as the performance of the learning process in the domain of organizational conflicts. Also, the paper presents the key aspects of the connection between the two levels of learning and conflicts. A theoretical framework for the connection of these aspects is provided in the form of a model, which further explains the key elements and emphasizes the importance of each of them. This paper confirms that learning, both organizational and individual, is an important element that affects the dynamics and management of organizational conflicts and enables organizations to draw knowledge from these experiences that is crucial for their adaptation and long-term sustainability. Finally, the paper provides guidelines and recommendations for further research and organizations that want to improve the processes of learning and solving organizational conflicts.

Keywords: Organizational Learning, Individual Learning, Organizational Conflicts.

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1. Introduction

An organization's ability to learn and develop becomes a key factor in its success and sustainability. In addition, individual learning of employees plays a significant role in improving their skills, knowledge and competencies, which directly affects efficiency and productivity in the workplace. However, learning processes, whether at the individual or organizational level, are often accompanied by different types of conflicts. These conflicts can arise from different views, learning methods, changes that learning brings, or from resistance to change. Therefore, understanding the connection between organizational and individual learning and organizational conflicts becomes essential for managing and harmonizing these dynamic processes.

This paper aims to investigate and analyze the connection between organizational and individual learning with the emergence and development of conflicts in the organization. Through the theoretical framework, the foundations of organizational and individual learning will be discussed, as well as their interdependence with organizational culture, structure and performance. The paper will deal with the definition of organizational conflicts, with consideration of their causes, consequences, as well as strategies for their resolution and management. The paper will consider how learning processes can contribute to the understanding, prevention and resolution of conflicts within organizations, and how conflicts, on the other hand, can affect the effectiveness and outcomes of the learning process.

Paper represents a theoretical research that will include an overview of relevant literature, research studies and theoretical approaches dealing with this topic, as well as the methodology that will be used in the work. The aim of this paper is not only to identify the links between organizational and individual learning and organizational conflicts, but also to offer practical recommendations for organizations in order to optimize the learning process and manage conflicts more effectively. Through analysis and discussion, this paper aims to contribute to a better understanding of the complex relationships that shape the work environment and to highlight the importance of an integrative approach in the development of organizational learning and conflict management strategies.

2. Theoretical background

Organizational learning does not require a comprehensive cultural and structural change, but an incremental approach that becomes more complex as employee capacities expand. However, if the organization finds itself facing a change in crisis character, the crisis becomes a catalyst for long-term changes. When organizations receive feedback on their performance and make appropriate changes to their policies and procedures, organizational learning occurs (Donnelly, 2022).

When high uncertainty and a dynamic environment become the norm in business, companies should adopt a strategic orientation to improve the

effectiveness of organizational learning and achieve sustainable development. Organizational learning plays an intermediary role between good business strategies and sustainable development (Subramanian, 2022). Organizational cognition is constantly repeated and updated, therefore it is necessary to explore new business opportunities through learning and strive to create advanced knowledge (Zhuge, 2023).

Organizational learning is important for achieving positive organizational outcomes and can enhance performance such as innovation, adaptation, gaining and renewing competitive advantage (Tu, 2021; Argote, 2021). Organizational learning involves three levels: individual, group and organizational, and for the concept of a learning organization and the achievement of business efficiency and effectiveness, it is important to study each level.

One of the most important contexts for individual learning is collaboration with others, as evidenced by the fact that critical team-level variables are related to members' individual learning (Parboteeah, 2015). However, individual learning of organizational members, especially when it comes to organizational teams, should support prerequisites for learning, such as interest. Interest refers to a positive interactive relationship between a person and an aspect of their environment, such as an object, event, topic, or idea. It has cognitive and affective components, including positive feelings, as well as personal relevance and a strong willingness to engage with the content (Vieluf, 2019).

Contemporary learning theories assume that learning involves iterative processes of structuring and restructuring mental models. These processes are combined with other learning-related processes such as sense-making, debugging, evaluation, reflection, and the like. All these processes are necessary for meaningful learning, whether they are used in the context of shared, organizational or individual learning. Collaborative environments in organizations are only effective if each employee performs their task independently. This shows the importance of personal tasks and responsibilities even within collaboration, especially since conflicts between individual solutions are often used to drive effective collaborative learning. Therefore, the importance of individual learning in organizations is reflected in the ability of employees to analyze, solve, eliminate errors, think and repeat the process as much as necessary. These individual learning abilities or habits play a key role in any collaborative learning or work environment that employees will encounter (Reychav, 2015).

Conflicts are an integral part of business operations and cannot be avoided. In a globalized and dynamic environment, there is a need to manage conflicts in a productive and effective way. Conflict resolution styles depend on various factors, including the national culture of employees, who will have certain preferences in conflict resolution in accordance with their culture (Husaković, 2020). Conflicts are natural elements of all human interactions that operate at all levels of society, such as interpersonal, intrapsychic, intergroup, intragroup and international (Pang, 2023). However, the occurrence of conflicts can also indicate giving way to changes and innovations, which is considered beneficial for the organization (Hashish, 2023).

When it comes to the causes of organizational conflicts, internal and external factors are taken into account. Internal conflicts include unhealthy communication, avoiding issues when they can be managed, problematic organizational structure, lack of diversity in the workplace, individual differences in personality and perception, flexible offices, and failure to meet expectations or needs, while external conflicts include issues that employees "introduce" to the workplace, such as personal problems and stress (Diin-Fitri, 2018).

Organizational efficiency depends on the way conflicts are resolved, and it is in the interest of every organization to apply a timely and constructive approach. The management of organizational conflicts, first of all, depends on the skills of managers in their resolution, which includes relational attitudes and effective communication. In addition, the nature of the conflict plays a significant role in the conflict management strategy. Therefore, it is imperative to manage conflicts at the appropriate time, in order to establish a favorable workplace environment (Nordbhy, 2018).

3. Methodology

3.1 Subject and problem of research

The subject of theoretical research in this paper includes two key aspects of the modern business environment: organizational and individual learning, as well as organizational conflicts. The work focuses on the analysis and understanding of dynamic relationships between learning processes within organizations and their impact on the emergence, development and resolution of organizational conflicts. In a broader sense, the subject of the research includes the examination of theoretical frameworks, models and practices related to learning and conflicts in organizations, with special reference to the mechanisms through which learning at different levels (individual and organizational) can contribute to better conflict management, as well as ways which conflicts affect learning and development processes.

The problem of theoretical research relates to the lack of deep understanding of the specific ways in which organizational and individual learning affect organizational conflicts, and vice versa. Although learning and conflict are recognized to have a significant impact on organizational dynamics, performance, and culture, the detailed mechanisms of interaction between them remain underexplored. The specific problem includes identifying factors that facilitate or hinder learning processes due to the presence of conflicts, understanding how conflicts can serve as drivers or barriers to learning and innovation, and determining strategies that organizations can implement to harmonize learning goals and conflicts. Additionally, the research seeks to identify how learning at the individual and organizational levels contribute to the perception, interpretation and resolution of conflicts in an organizational context. This problem is particularly relevant in the context of globalization and technological progress, which bring new challenges and opportunities for organizational learning and conflict management.

3.2 Research goal

The theoretical research in the paper aims to fill existing gaps in the literature by providing a comprehensive overview and analysis of the links between organizational, individual learning and conflict. Through a systematic review of relevant theories, case studies and empirical research, the paper will attempt to answer key questions and thereby contribute to the development of more effective learning and conflict management practices in the organizational context.

3.3 Research questions

Based on the above-mentioned subject and theoretical research problem, two key research questions that can be formulated are:

1. Is there a significant connection between individual, organizational learning and organizational conflicts?
2. How does the connection between individual, organizational learning and organizational conflicts affect the perception, prevention and resolution of organizational conflicts?

3.4 Research method

This paper represents a form of theoretical research in which the conclusions are derived based on previously conducted research. The research considers different methods of other authors and analyzes the results in order to draw universal conclusions.

4. Results and discussion

When it comes to the connection between organizational learning and conflicts in the organization, individual and organizational conflicts among employees can be prevented by fostering organizational learning and improving employees' communication skills. Interpersonal skills are essential for good communication, but in certain industries, interpersonal skills are insufficient. Research results (Chitpin, 2021) show that employees who are persistent and proactive in thinking about their behavior and learning from those around them succeed in solving organizational conflicts. Moreover, they seek feedback from their colleagues, put their assumptions to the test, work to balance advocacy and research, and learn about the pattern of their daily practice.

Using the theory of organizational learning, one can investigate the mechanism by which task conflict in an organization affects the performance of companies. Knowledge integration and coordination of specific organizational projects can be identified as mediators between task conflict and organizational performance. Task conflict promotes knowledge integration but worsens project performance, while knowledge integration functions as a mediator between task conflict and project performance (Jia, 2021). Today's organizations are obliged to manage the conflicts and tensions that arise from finding an appropriate balance between research, organizational learning and knowledge exploitation that can lead to a synergistic effect (Khattak, 2021), and organizational learning provides significant benefits when the values, beliefs and interests of members aligned with those in the company.

Organizational learning is an indispensable part of knowledge management practice, and the implementation of this concept mitigates the ill effects of role conflict and improves organizational performance (Lin, 2021). Team learning plays an important role in solving organizational tasks, and individual learning activities contribute to the exchange of knowledge in teams and, as a result, increase team effectiveness (Anselmann, 2023). Also, developing an environment that fosters creativity is important for organizations, and developing strategies for managing conflict in relationships related to supervisory support and positive affective tone will help to transfer creative ideas to multiple organizational levels even when dysfunctional conflicts exist (Ahmad, 2022).

When it comes to the connection between individual learning and conflicts in the organization, orientation towards the goal of learning affects how individuals react to challenges and obstacles, that is, positive and negative stressors in the domains of work and family. Learning goal orientation strengthens the positive links between work-family stressors, challenges, and conflict, and individual differences influence the effects of workforce stressors, challenges, and barriers. It is important to support employees with a high orientation towards learning goals in order to avoid potential disadvantages of challenges and opportunities in the workplace (Morganson, 2022). In the individual learning behavior of an employee, job demand and job control positively influence self-efficacy, which positively influences learning goal orientation, and learning goal orientation positively influences learning behavior.

When it comes to monitoring organizational conflicts, individual employee differences in processing feedback and learning are very significant. Individuals with higher reasoning traits and higher impulsivity traits are more likely to rely on feedback processing during reinforcement learning. Individuals with higher trait anxiety intensify their monitoring of conflict during a task in order to learn successfully. Therefore, individual differences and social context modulate the intensity of information processing in the task of learning employees, even when it comes to organizational conflicts (Leue, 2020).

The connection of organizational and individual learning with organizational conflicts can be considered through several key aspects. The findings of the aforementioned research indicate that the development of communication and information skills can be crucial for reducing the occurrence of conflicts through better understanding and coordination between team members.

On the other hand, the aforementioned researches show that the individual characteristics of employees, such as proactivity and the ability to reflect on their own behavior, play a significant role in conflict management. This points to the importance of developing personal skills and capacity for self-assessment as part of broader organizational learning strategies. In the context of permanent professional development, it is particularly interesting to consider how older employees approach learning, not only to achieve career goals, but also to improve work efficiency, which further emphasizes the need for organizational support for continuous learning of all employees, regardless of age group.

It is important to consider how conflicts can act as a stimulus for knowledge integration and coordination within the organization, but also how they can

negatively affect project performance. Interestingly, although conflicts can have a potentially destructive impact, they can also foster organizational learning when directed toward productive problem solving. This paradox of conflict suggests that it is not the occurrence of conflict itself that is problematic, but the way in which the organization deals with it. In addition, the importance of multiple membership in teams is highlighted and how it can contribute to individual and team learning, showing that dynamic team structures can be useful for developing organizational capacity. In this sense, empowering employees through training and developing interactive activities that promote team dynamics can have far-reaching positive effects on organizational climate and performance.

5. Model of the connection of organizational and individual learning with organizational conflicts

Based on the theoretical analysis of various research and the presented discussion, a model was developed that would illustrate the connection between individual and organizational learning and organizational conflicts. This model, shown in Figure 1, includes several key components and their interrelationships.

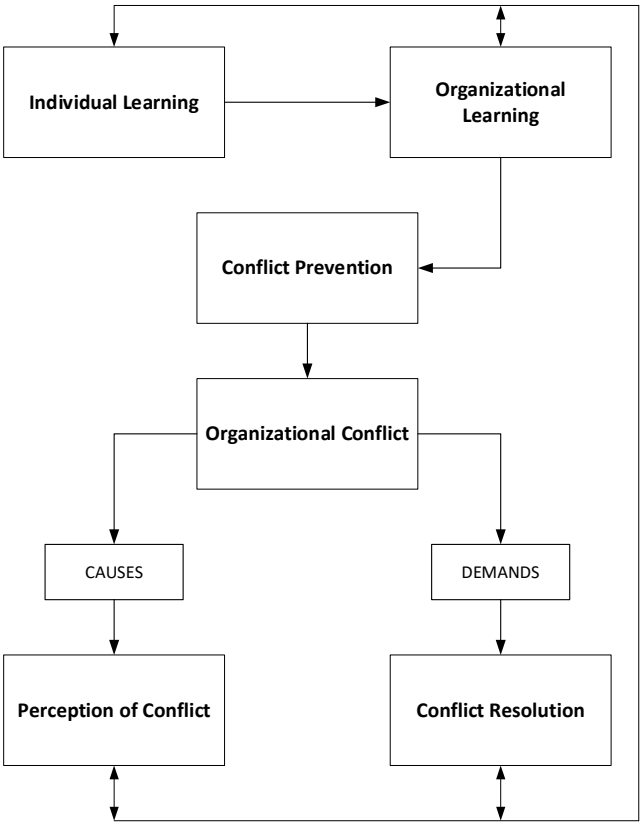


Figure 1. Model of the connection of organizational and individual learning with organizational conflicts

Individual learning component in the model includes all processes through which individuals acquire, develop and apply knowledge and skills. It is focused

on personal development, self-reflection and behavioral adjustment for the purpose of better conflict resolution.

The organizational learning component includes the processes through which the organization as a whole acquires, disseminates, and uses knowledge to improve its operations and strategies. It includes formal and informal learning processes, organizational culture development, policy and practice.

The component of organizational conflicts includes types of them, including task, interpersonal and structural conflicts, as well as their consequences on the organization.

The perception of conflicts answers the question of how individual and organizational learning affects the way employees perceive and interpret conflicts within the organization, while conflict prevention includes strategies and practices that an organization develops through learning to minimize the occurrence of conflicts.

Conflict resolution is based on methods and approaches that are applied to effectively resolve existing conflicts, supported by acquired knowledge through individual and organizational learning.

Feedback is a key element of the model that shows how conflict resolution leads to new learning, both at the individual and organizational level, thus closing the circle and enabling continuous development and adaptation.

6. Guidelines and recommendations

Based on the analysis of the connection between organizational and individual learning and organizational conflicts, the following guidelines and recommendations can be formulated for organizations that strive to improve their performance and a harmonious work environment:

- Improving communication skills: Organizations should continuously invest in the development of communication skills of their employees. Effective communication reduces opportunities for organizational conflicts, facilitates decision-making processes and problem solving within teams. Employee training programs should include active listening techniques, assertive communication and negotiation skills.
- Development of proactivity and reflexivity: Employees should be encouraged and supported in developing the ability for self-reflection and proactive problem-solving behavior. Workshops and training that focus on these skills can help employees better understand their own behavior and impact on others, as well as improve their learning and adaptation strategies.
- Support continuous learning for all generations of employees: Organizations should implement policies that encourage learning and development for different generations of employees. Lifelong learning and mentoring programs are especially useful for older employees, who can contribute to the transfer of knowledge to younger colleagues, while improving their skills and maintaining work efficiency.

- Effective conflict management: Organizations should develop and implement clear procedures for early recognition and resolution of conflicts. This includes training managers in conflict recognition skills and mediation techniques. Also, creating an open environment in which employees can freely express their opinion can contribute to the prevention of various conflict situations.
- Using conflicts as a source of learning: Rather than seeing conflicts solely as obstacles, organizations should explore how conflicts can serve as opportunities for learning and development. Analysis of conflict situations and feedback after conflict resolution can provide significant insights that will improve organizational processes and interpersonal relationships.
- Promotion of team learning: It is necessary to create a work environment that encourages teamwork and knowledge sharing among employees. The development of team projects in which employees from different sectors collaborate can contribute to a better understanding and greater respect for different perspectives, which can reduce the potential for conflicts.

By implementing these recommendations, organizations can reduce the frequency and intensity of conflicts and build an effective system of organizational and individual learning, which will contribute to their overall development and competitiveness in the market.

7. Conclusion

The conclusion of this paper is a synthesis of the answers to the research questions, highlighting the connection between individual and organizational learning and organizational conflicts, as well as the impact of this connection on conflict management within organizations. Based on the analysis of previous research and presented model, it can be concluded that there is a significant connection between organizational, individual learning and organizational conflicts. Learning at both individual and organizational levels plays a key role in shaping how organizations perceive and resolve internal conflicts. Learning enables employees and organizations to develop and apply the skills and strategies necessary for effective conflict management, including communication skills and proactive behavior (RQ:1).

The connection between individual, organizational learning and organizational conflicts significantly affects the perception, prevention and resolution of conflicts in several ways. Through learning processes, employees acquire the necessary skills to recognize and adequately address conflicts before they escalate. In addition, organizational learning encourages the development of a culture of openness and mutual respect, which reduces the frequency of conflicts and improves the general working atmosphere. Also, learning enables organizations to extract messages from conflicts that contribute to their further development and improvement of business practices (RQ:2).

Organizations that actively promote a culture of learning at all levels and implement effective conflict management strategies create the foundation for success and innovation in an ever-changing business environment.

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THE IMPACT OF EMOTIONAL INTELLIGENCE ON BUSINESS DECISION PROCESS

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Abstract

Human mind as a complex mystery has been a subject of research from different points of view for decades. To the extent that the mind manifests itself as an observable phenomenon, it is often considered a peculiar human property or even thought of as a material property of human. The complexity of the mind includes cognitive abilities such as perception, recall, thinking, evaluation, decision making, critical thinking, logic, which are the product of Intellectual ability. Emotional Quotation controls such things as sensations, perceptions, emotions, memory, desires, different types of reasoning, empathy, etc. Understanding how this machine works is a challenge for us, as researchers, to come to some conclusions. The main subject of this research paper will be how Emotional Intelligence affects business decision-making among managers. Also in this research paper we will review the difference between IQ versus EQ and their characteristics. As the IQ is the more static and more permanent, we will also analyze separately Emotional Intelligence and how it can be quantified, i.e. which measurement methods are used. Also, how and in what way it can be increased to improve decision-making among managers. Methodologically, we will use the comparative analysis to make a comparison between these two terms. Also, we will use an interview as a method to find out if the managers are familiar with Emotional Intelligence and their awareness of how important it is for their business decision making.

Keywords: Intellectual Quotient, Emotional Quotient, Decision making, Managers

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1. Introduction

The complexity of the human mind is fascinating to all researchers from different perspectives. Biological research is very clear and researchers have achieved the most results in that part. However, when we look at the cognitive nature of the human mind, -then it is a mystery how logical thinking, opinion, idea works. Service. R, (2011), debates on this issue that intelligence is well known and is commonly thought of as "mental capacity". However, intelligence is a difficult concept. Most psychologists now agree that intelligence is a highly complex amalgam of a wide range of different sets of knowledge, skills, and abilities which are at best extremely hard to measure and define. The mystery of this paper is to discover one small segment and contribute with this paper, that is, to divide the mind into hardware and software, or, IQ and EQ. As the author Singh. D, (2006) will say that the lack of emotional intelligence explains why people who, despite having a high IQ, have been failures in their personal and professional lives. The authors will explain what emotional intelligence is, compare it with IQ and explain how emotional intelligence affects the decision-making process in the business world. According to Ikart, E. (2023) Emotional intelligence (EQ) is recognized as a key leadership skill critical in achieving organizational goals and succeeding in a volatile and ambiguous global business environment. EQ accounts for 90% of what sets effective leaders apart from their peers with technical skills. The most effective leaders are alike in one crucial way: they all have a high degree of EQ. Hence, EQ is the sine qua non for superior leadership performance. As Ramaraju, A. (2015) will emphasize that we are at the beginning of a new century, and intelligence and success are not viewed the same way they were before. New theories of intelligence have been introduced and are gradually replacing the traditional theory. Unlike IQ, which changes little after our teen years, emotional intelligence seems to be largely learned, and it continues to develop through life and learn from our experiences.

2. Emotional intelligence

Since emotional intelligence is the starting point of many authors to show how important the emotional intelligence is, there are a number of definitions in the literature regarding this issue. Salovey & Mayer, (1990) coined the term 'emotional intelligence' and described it as 'a form of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action'. All definitions of emotional intelligence explain some aspect from which the researcher started and all fit into what emotional intelligence means. According to Annette Prins et al, (2018) the word 'emotion' comes from the Latin word 'emovere', this means 'to move'.

For this purpose the authors will mention some of them:

1."Emotional intelligence is your ability to recognize and understand emotions in yourself and others, and your ability to use this awareness to manage your behavior and relationships" (Bradberry & Greaves, 2009).

2. “Emotional Intelligence refers to the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships” (Goleman, 1998).
3. “Being able to monitor and regulate one’s own and others’ feelings, and to use feelings to guide thought and action” (Salovey & Mayer, 1990).

The first impulse in a situation arises in the heart, not in the head. As a Singh,(2006) would explain that the *emotional mind* is the source of basic emotions: anger, sadness, fear, lust, surprise, disgust, and so on. Earlier species, including humans, operated exclusively from the emotional mind— the old sub-cortical limbic system lying beneath the grey matter. The *rational mind* is centered in the neo-cortex, the outer part of the brain, and allows humans to plan, learn and remember. Historically, the subtler part of the brain, or the neo-cortex, developed about a million years ago. If we look at it from a philosophical point of view, the eternal question is: which provides more relevant information, the rational mind or the experience. Do we make decisions a priori or a posteriori? Does absolute truth come from the mind or from the emotions? The answer is not at all easy and is always subject to new doubts.

Some Misconceptions about emotional intelligence according to Daniel Goleman

First, emotional intelligence does not mean merely “being nice

Second, emotional intelligence does not mean giving free rein to feelings.

Lastly, levels of emotional intelligence are not fixed genetically, nor does it develop in early childhood.

Our emotional intelligence determines our potential for learning the practical skills that are based on its five elements: self-awareness, motivation, self-regulation, empathy, and adeptness in relationships.

Table 1. Four elements of EI

Emotional Awareness: Recognizing One’s Emotions and Their Feelings People with this competence:	• Know which emotions they are feeling and why • Realize the links between their feelings and what they think, do and say • Recognize how their feelings affect their performance • Have a guiding awareness of their values and goals
Accurate Self-Assessment People with the ability to self-assess are:	• Aware of their strengths and weaknesses • Reflective, learning from experience • Open to candid feedback, new perspectives, continuous learning, and self-development • Able to show a sense of humor and perspective about themselves

Self-Confidence People with this competence:	• Present themselves with self-assurance; have "presence" • Can voice views that are unpopular and go out on a limb for what is right • Are decisive, able to make sound decisions despite uncertainties and Pressures
Self-Regulation Self-regulation means managing impulse as well as distressing feelings. It depends on the working of the emotional centers in tandem with the brain's executive centers in the prefrontal areas. These two primal skills – handling impulse and dealing with upsets – are at the core of five emotional competencies:	1. Self-control: Managing disruptive emotions and impulses effectively 2. Trustworthiness: Displaying honesty and integrity 3. Conscientiousness: Dependability and responsibility in fulfilling obligations 4. Adaptability: Flexibility in handling change and challenges 5. Innovation: Being open to novel ideas, approaches, and new information

Source: Daniel Goleman Working With Emotional Intelligence

Emotional intelligence becomes a very important segment of the entire human existence and is the basis for getting to know oneself, as well as behavior with other people. When we talk about behavior with others, we mean first life, friends, but also most importantly at the workplace. As Singh, (2006) will state, unlike IQ, emotional intelligence can be improved throughout life. In the normal course of a lifetime, emotional intelligence tends to increase as you learn to be more aware of your moods, to effectively handle distressing emotions, and to listen and empathize. In short, as you become more mature, you can acquire certain emotional competencies that lead to outstanding performance at work. Gardenswartz, et al, (2008) are explaining that the more of these feelings you can engineer in your work environment, the more engaged and productive your workforce will be: stimulating, energizing, compelling, fun, enticing, engaging, inspiring, meaningful, productive, emotionally safe, encouraging, rejuvenating, purposeful, trusting.

3. IQ versus EQ

The definition of intelligence itself has been a major source of debate, and, as Sternberg (1985) argues, there seems to be almost as many definitions of intelligence as there are experts asked to define it (see also Gregory, 1998). Nevertheless, Carroll, (1993) defines intelligence as a type of mental ability that concerns the handling of (and reasoning about) information of various sorts. Often, these abilities are described as falling along a hierarchy from simple perceptual processes and information processing to higher and more general forms of problem solving. Golman, D,(2006) emphasizes the limits of IQ and how much emphasis schools and admissions tests put on it, IQ alone explains surprisingly little of achievement at work or in life. When IQ test scores are correlated with how well people perform in their careers, the highest estimate of how much difference IQ accounts for is about 25 percent. This means that IQ

alone at best leaves 75 percent of job success unexplained. Rebecca Joy Stanborough, (2021) in her article explains what's the difference between IQ and EQ? Your IQ usually refers to your intellectual ability. Some of the most common elements of your IQ include your ability to: use logic to solve problems, plan and strategize, understand abstract ideas, learn and adapt to change, grasp and use language. Your emotional quotient (EQ) generally refers to your ability to sense emotion in yourself and in other people. It also refers to how you use that awareness to guide your behavior. In general, if you have a high EQ, you may find it easier to: identify emotions in yourself and others, empathize with other people, adapt your feelings and behavior to different situations, control your impulses, withstand temptations and delay gratification, resolve conflicts with others, communicate effectively. There are a number of scales that measure IQ and EQ. Table 2 will present out a few scales in order to explain what those scales actually measure and which abilities. To make a distinction between Intellectual Intelligence and Emotional Intelligence.

Table 2 Measuring scales

The Stanford-Binet Intelligence Scale Alfred Binet and Théodore Stanford created the first formal intelligence test for the United States. The original version was an individual intelligence assessment that calculated the ratio between a person's mental and chronological age. The current edition tests individuals on:	• Fluid reasoning • Knowledge • Quantitative reasoning • Visuospatial processing • Working memory The test includes a mixture of verbal and non-verbal tasks, with scores based on comparisons to the performance of one's peers.
The Wechsler Adult Intelligence Scale Daniel Wechsler originally developed the Wechsler Adult Intelligence Scale (WAIS) to measure mental health and psychiatric afflictions. Now, the test measures human intelligence, assessing the following skills:	• Vocabulary • Comprehension • Arithmetic • Reasoning skills • Verbal comprehension • Perceptual reasoning • Working memory • Processing speed.
The Woodcock-Johnson Test for Cognitive Abilities	The Woodcock-Johnson Test for Cognitive Abilities is a comprehensive set of assessments used to test gifted individuals. Over twenty subtests combine to measure an individual's cognitive abilities and achievements by assessing subjects like mathematics, auditory processing, and short-term memory.

Mayer-Salovey-Caruso Emotional Intelligence Test	The MSCEIT measures emotional intelligence based on one's ability to perceive, comprehend, act on, and manage emotional stimuli. The test provides useful insights into how you approach or avoid emotional situations, and these insights might help you improve your interpersonal relationships and communication style.
Situational Tests for Emotional Management (STEMs) Different social situations and contexts often tease out different reactions. Coworker conflicts might require a unique approach from client conflicts.	STEMs measure how your reactions change depending on the context, like how you approach family versus friends, address calm versus heated situations, and shift focus to and from emotion-inducing stimuli. Taking one of these tests might offer you the insights needed to self-regulate when more triggering scenarios occur.

Source: EQ versus IQ: Which should you leverage when? By Allaya Cooks-Campbell August 9, 2023

Your IQ may help you in understanding and dealing with the world at one level, but you need emotions to understand and deal with yourself and, in turn, with others. It is not possible to get along well with others, and get ahead in the world regardless of how 'academically smart' you are, if you are unaware of your emotions and not able to recognize and value them, and act honestly with them.

4. Emotional intelligence and business decision making

Decision making is a very important process in everyday life in general. However, when it comes to making business decisions and when those decisions are very important for the company and for all stakeholders, then the decision-making process is even more difficult. The ability to determine potential emotional results and reactions to decisions can allow decision-makers to forecast the feeling of the stakeholders, thus, ensuring a more positive outcome. Ramaraju, A. (2015) identifies that success requires more than IQ (Intelligence Quotient), which has tended to be the traditional measure of intelligence, ignoring essential behavioral and character elements. Despite possessing a high IQ rating, success does not automatically follow.

Decision making consists of: Problem Solving includes the ability to understand how emotions impact decision making. Reality Testing is the capacity to remain objective by seeing things as they really are. This capacity involves recognizing that emotions or personal bias can cause one to be less objective. Impulse Control is the ability to resist or delay an impulse, drive, or temptation to act and involves avoiding rash behaviors and decision making. According to Esther, O. (2020) More than ever, organizations are increasingly concerned about making better decisions with a positive influence on especially the people, condition of work and the workplace environment – since organizational success seem to be

exclusively hinged on the quality of these decisions. The expressed concerns in the corporate system have eventually brought to limelight the significance of the concept of emotional intelligence in the corporate ecosystem, thus, creating a paradigm shift. We mention Self-Awareness, Self-Management, Social Awareness but Mersino, (2007) also explains how important is Organizational awareness and Relationship Management. Organizational awareness is the ability to interpret the context for emotions in an organization. It includes the spoken and unspoken rules and values that guide each organization. Relationship management means using the awareness of our own emotions and those of others to build strong relationships. The domain of relationship management includes the competencies of stakeholder relationships, developing others, and truth telling. Stakeholder relationship includes the systematic identification, analysis, and management of the relationships with our project stakeholders. Madhavi & Felix, (2015) emphasizes that Emotional intelligence plays a significant role in many aspects of leaders. It is important to make effective decisions in day to day life in an organization. Strong emotions help leaders to make effective decisions. All workplaces require decision making and all decisions have both cognitive and emotional components. Emotional intelligence plays an important role in this process because managers need to know their emotions and know themselves, but also the emotions of other people and how they would react to their decisions.

Aloqaily, (2020) will clarify that people can make their emotions work in their favor by using them to rationalize their behavior and thinking in ways that increase their chances o-f success. Therefore, the study of the relationship between emotional intelligence and the decision-making process is one of the necessary things to prove its importance.

Hess & Bacigalupo, (2011) have great point it comes to emotional intelligence and decision making process, so, according to them, consideration of the effect of decisions on others should be an important element of the decision-making process. While determining “who” will be affected by decisions may be a more pragmatic function requiring rationality and logic, determining “how” the decision will be interpreted and its subsequent effect on others requires the skills associated with emotional intelligence.

5. Research

For this paper, data obtained from research conducted electronically (via e-mail) with companies in the Republic of North Macedonia was used. The survey questionnaire for the research purposes was structured into three parts: basic data of the respondents, emotional intelligence and its impact on decision-making, and the application of emotional intelligence elements in business operations. Answers were collected from 62 respodents from different companies in the Republic of North Macedonia.

The first part of the questions refers to the demographic characteristics of the respondents and all those parameters can be viewed in the following Figures.

Figure 1 one shows the activity of the companies in which the respondents work. It can be noted that there is an equal coverage of respondents from the areas of

production and trade, i.e., 40% from each area, while the number of respondents in the area of services is 20%.

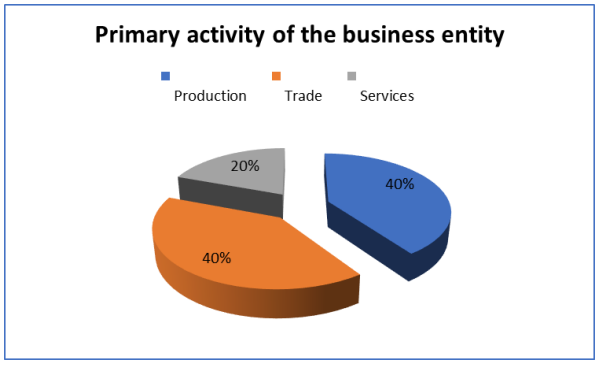


Figure 1. Primary activity of business entity

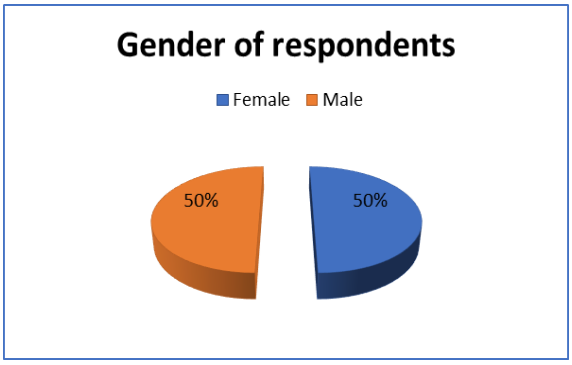


Figure 2. Gender of respondents

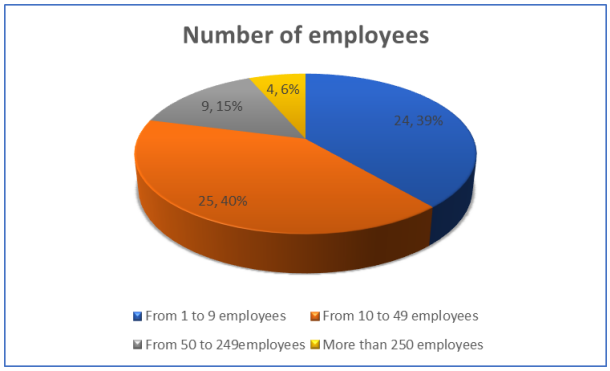


Figure 3. Number of employees in business entity



Figure 4. Job position of respondents

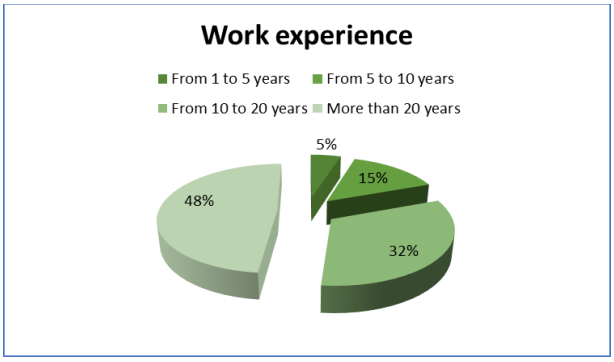


Figure 5. Work experience of respondents

Figure 2 shows the representation of the respondents by gender, from where it can be seen that males and females are equally represented, i.e. 50% of each, while Figure 3 shows the structure of the companies according to the number of employees. According to Figure 3, most of the respondents work in companies with 10-49 employees or 40%, while the smallest part of respondents work in large companies with over 250 employees or only 6%. When it comes to the job position of the respondents, it is shown in Figure 4 and according to the results obtained for the job position of the respondents, most of the respondents have a managerial position, i.e. 74%, while according to work experience, most of the respondents have work experience of more than 20 years or 48% of respondents.

The survey contains a large number of questions related to this problem, but due to the limited size of the paper, only those questions that are of exceptional importance for this research will be presented. In the following papers, the other aspects of this research will be presented, where an appropriate quantitative analysis will be made. For these reasons, in this paper we will only focus on a qualitative analysis of the questions that are significant for the research.

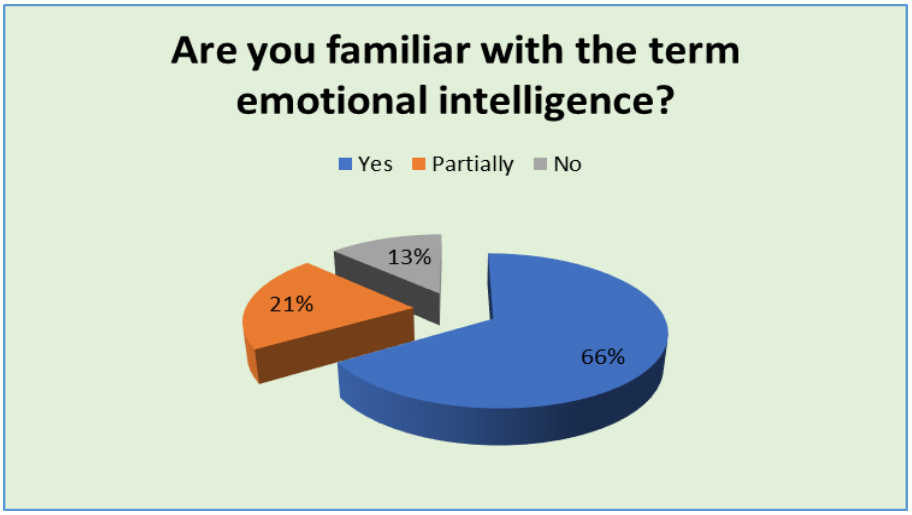


Figure 6. Familiarity of respondents with emotional intelligence

One of the most important aspects from which this research starts refers to the respondents' familiarity with the concept of emotional intelligence. According to the results obtained from the research shown in Figure 6, most of the respondents are familiar with the term of emotional intelligence or 66%. A certain part of the respondents is partially familiar with this term, i.e., 21%, while only a small part of them or 13% are not at all familiar with this concept. Taking into account that most of the respondents are in a managerial position, it can be concluded that most of the managers are familiar with this concept, which can also be seen from the following cross-tabulation.

	What job position do you have in the company?	
Are you familiar with the term emotional intelligence?	Managerial position	Non-managerial position
Yes	51.61%	14.52%
Partially	12.90%	8.06%
No	9.68%	3.23%

Table 1. Cross-tabulation Job position vs. Familiarity with emotional intelligence

A few more cross-tabulations that refer to the familiarity of emotional intelligence with some parameters that were covered by the research are interesting. For example, from Table 2, it can be seen that the highest familiarity with emotional intelligence exists in the Production sector, or 25.81%, while the lowest is in the Trade sector, or 16.13%. Also, from Table 3 it can be seen that

respondents in companies with 10-49 employees or 27.42% are most familiar with emotional intelligence.

	Primary activity of the business entity?		
Are you familiar with the term emotional intelligence?	Production	Trade	Services
	25.81%	16.13%	24.19%
Partially	6.45%	1.61%	12.90%
No	8.06%	1.61%	3.23%

Table 2. Cross-tabulation Primary activity vs. Familiarity with emotional intelligence

	Number of employees in your business entity?			
Are you familiar with the term emotional intelligence?	1-9	10-49	50-249	Over 250
Yes	24.19%	27.42%	11.29%	3.23%
Partially	4.84%	11.29%	3.23%	1.61%
No	9.68%	1.61%	0.00%	1.61%

Table 3. Cross-tabulation Primary activity vs. Familiarity with emotional intelligence

One more cross-tabulation is presented in this paper due to its limited size. Thus, from Table 4, it can be observed that the most familiar with the concept of emotional intelligence are employees who have over 20 years of work experience, or 30.65% of them, while the least familiar with emotional intelligence are those respondents who have work experience of 1-5 years.

	How many years of work experience do you have?			
Are you familiar with the term emotional intelligence?	1-5 years	5-10 years	10-20 years	Over20 years
Yes	3.23%	20.97%	11.29%	30.65%
Partially	0.00%	8.06%	3.23%	9.68%
	1.61%	3.23%	0.00%	8.06%

A large number of relevant conclusions can be drawn from the analyzes that will be presented as the conclusion of this paper.

The next few survey questions were created using a Likert scale where the respondents expressed their views. When it comes to identifying emotions, strengths and weaknesses, most respondents agree with this statement, or about 80% of them. These research results are shown in Figure 7.

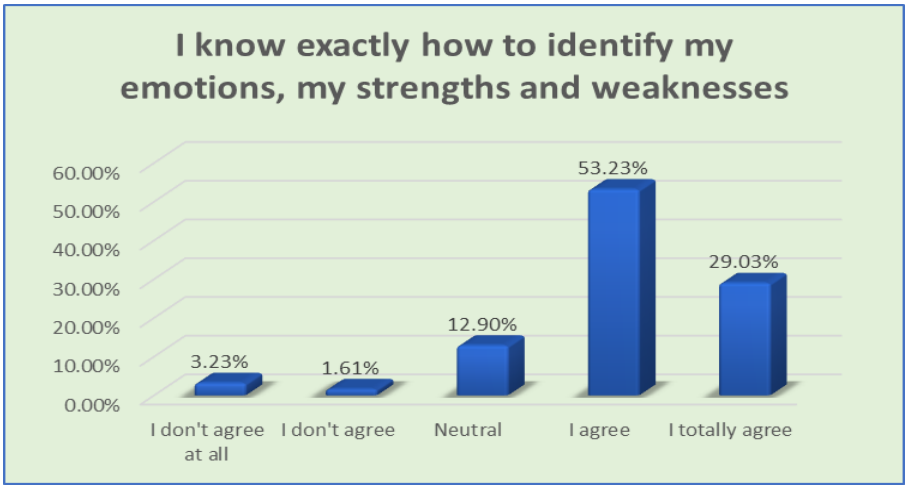


Figure 7. Respondents know exactly how to identify emotions, strengths and weaknesses

Figure 8 shows the results of the research regarding the influence of the respondents' emotions on the making of business decisions. The most of the respondents agree with this statement or 35.48%, there is also a significant number who believe that emotions do not affect decision-making or 25.81%

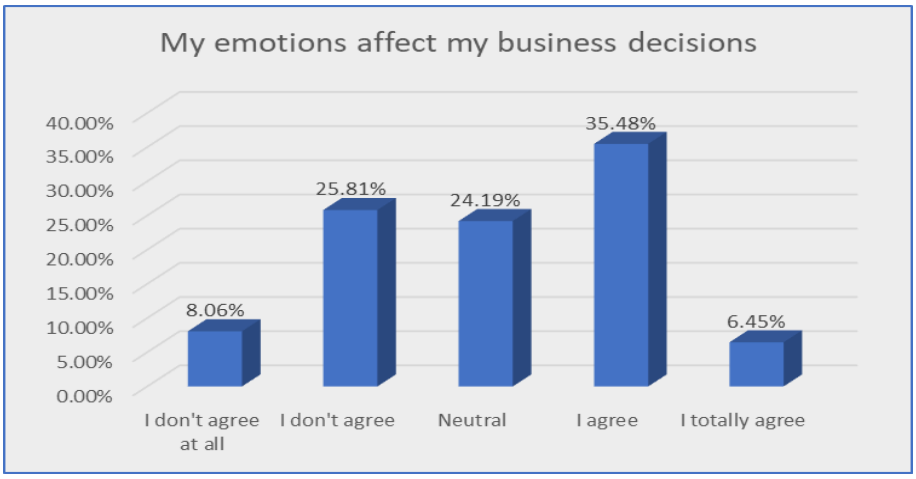


Figure 8. Respondents know exactly how to identify emotions, strengths and weaknesses

On the other hand, according to the results obtained from the research, a significant number of respondents agree that the emotions of employees/colleagues influence their decision-making, or 30.65%. These results are shown in Figure 9.

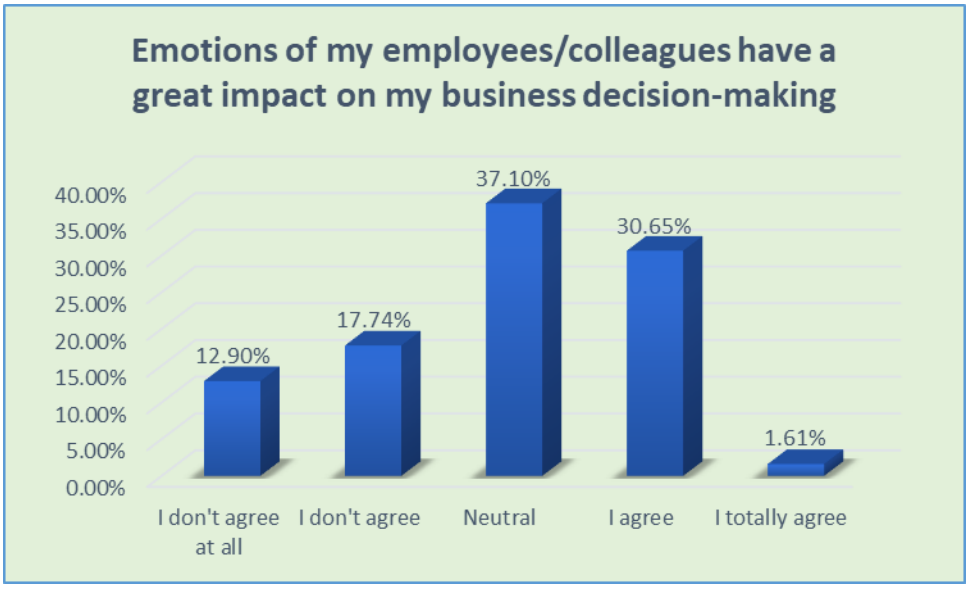


Figure 9. Emotions of employees/colleagues have great impact on respondents' business decision-making

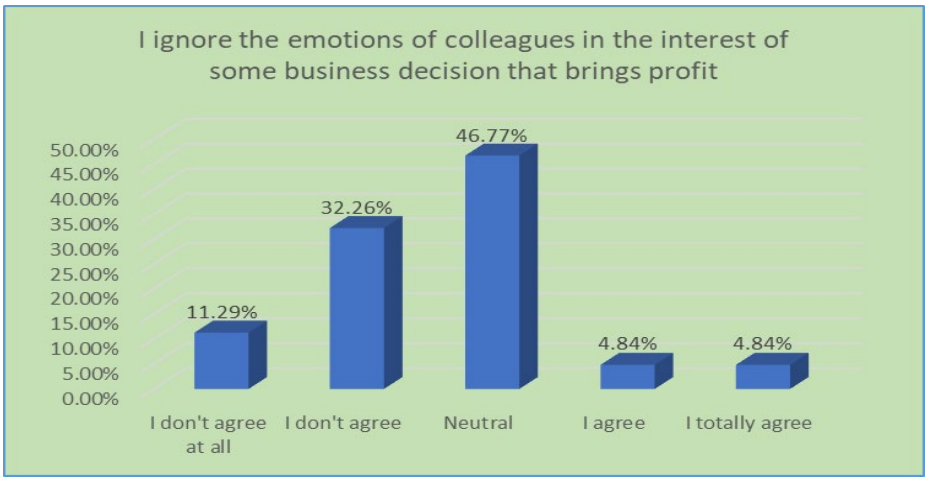


Figure 10. Respondents ignore the emotions of colleagues

6. Conclusions

Emotional intelligence plays a crucial role in shaping decision-making processes. Managers are constantly faced with choices that can significantly impact their businesses. Understanding how EI influences these decisions is crucial for success. By understanding and managing their own emotions, as well as recognizing and empathizing with the emotions of others, managers can make more effective and well-rounded decisions. From the research that the authors have done, many important conclusions can be drawn. In this paper will be mentioning some of them:

- Self-awareness, a fundamental aspect of EI, involves recognizing our emotions, strengths, and weaknesses. When making decisions, managers can assess their preferences and emotional state.

- Self-regulation, or controling the emotions is crucial for making strong decisions by managers. Successful managers maintain self-control during difficulties and uncertainties. They regulate their emotions, avoiding impulsive decisions driven by fear or frustration.
- Empathy, another EI element, enables us to recognize others' feelings and perceptions. In decision making, empathetic managers consider the impact on stakeholders—employees, customers, investors, and the community. Empathy implicates noticing and understanding others' emotions.
- Motivation, a component of EI, drives persistence and resilience. Managers with high motivation take calculated risks, learn from failures, and adapt.
- Creativity and Innovation, managers who embrace diverse perspectives and brainstorm collaboratively find creative solutions. EI energies creativity by allowing managers to hit into their emotional reservoirs. It encourages thinking outside the box and embracing ambiguity.
- Effective Communication, emotional intelligence is closely tight to effective communication. Being emotionally intelligent means not only being aware of your emotions but also articulating them and listening to others.

Emotional intelligence can have a significant impact on decision-making process. By developing our emotional intelligence skills, managers can make better decisions that take into account both their own needs and the needs of others. This can lead to improved outcomes in all spaces of our lives.

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DIGITAL PAYMENT ADOPTION DECISIONS FOR SMALL ENTERPRISES IN BULGARIA

Dancho Petrov[1]

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Abstract

Digitalization has become part of the daily life of modern society. In the business world the invasion of digital services over the last decade is an undeniable fact. In this regard, online payment services are no exception. The paper studied the factors influencing the adoption of digital payments in the small business sector in Bulgaria. Based on a survey conducted among managers of small businesses, the degree of penetration of digital forms of payments is studied, as well as the main difficulties in their implementation. The specifics of digital payment instruments are clarified from the point of view of their convenience and cost of use, the level of digital integration of the enterprise and the level of digital literacy of managers. The challenges faced by small businesses in the context of competitive pressure from large enterprises in offering digital services are synthesized. Managers' perceptions of the benefits of using digital payment technologies and risks related to digital financial literacy of customers, suppliers and counterparties were investigated. Tax related issues, security, bureaucracy and a lack of trust in the regulatory environment were also discussed. Based on the broad-spectrum analysis, conclusions and recommendations have been formulated for more effective implementation of digital payments in small businesses.

Keywords: digital payments, small enterprises, digital literacy, digital payment adoption.

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1. Introduction

The rapid development of technological innovations in the financial sector finds a favorable ground for application in the sphere of payments. Digital forms of payments have developed dynamically in recent decades and are increasingly entering the daily lives of modern people. The invasion of digital payments is a consequence of the accelerated development of high technologies, the mass use of the Internet and mobile services, the emergence of cryptocurrencies, and the role of a catalyst for these processes was played by the covid-19 crisis. The automation of key business processes and the increasingly frequent use of artificial intelligence contributed to the further acceleration of digitization in payments.

The functional essence of payment systems consists of a legal framework and institutions operating according to certain rules and mechanisms for carrying out monetary transfers between entities (Grace, 2022). Constituent components of any payment system are the used payment instruments, clearing and/or settlement mechanisms and payment process administrators. Payment administration is usually done by banking and non-banking institutions.

2. Genesis and evolution of innovations in digital payments

The first attempts to make cashless payments were made by Western Union at the end of the 19th century. The evolution of payment systems took place in the 1950s with the appearance of the companies Diners Club and American Express and the prototypes of modern debit and credit cards. From then until today, digital forms of payment have undergone a colossal development, which can be traced in chronological order from Table 1.

Table 1. Genesis and evolution in digital payments

Period	Company/Country	Innovation
1950	Diners Club, American Express	An early form of debit card
1958	Bank of America	The first modern credit card was issued
1968	USA, Dallas	The first ATM was installed
1969	IBM	Magnetic plastic card readable electronically
1994	Japan	QR code
1997	Bank for International Settlements - Basel	Real time gross settlement (RTGS)
2008	Unknown	Bitcoin – the first cryptocurrency
2011	Google	Google Wallet
2013	China	WeChat Pay
2014	Apple Pay	Apple Pay
2015 -	Worldwide	Application programming interface using Artificial intelligence, Internet of

		Things, Big Data and quantum computing, cloud computing, and distributed ledger technologies (blockchains)

Source: author's interpretation based on data from Paypal, 2020; Statista 2024; UN Secretary, 2020; World Bank and Committee on Payments and Market Infrastructures, 2020.

Modern communication technologies make payment processes faster, more flexible and accessible. Cloud computing technology, for example, creates conditions for easier, faster, more efficient and, most importantly, cheaper money transfers due to the huge capacity of data volumes connected to powerful real-time servers. This technology also facilitates financial intermediaries by giving them opportunities to exercise effective control over digital identity authentication and compliance with regulatory standards (Zetzsche et al., 2020). Blockchain and Distributed Ledger Technologies are also successfully adapting to the so-called peer-to-peer payments that are faster and cheaper due to the elimination of the need for a financial intermediary in transactions (Petrov, 2020).

The global COVID-19 pandemic has accelerated digitization processes due to the restrictions imposed on consumer movement and physical trade at sales sites. The boom in the development of mobile technologies and the Internet contributed to the emergence of innovative products and services for digital payments. New electronic platforms such as PayPal and Amazon Pay have made it possible to transfer electronic money from user accounts to electronic wallets of merchants participating in the same platforms (PayPal Inc., 2020).

3. Advantages and disadvantages of digital payments

In short, the benefits of digital forms of payments consist of speed, efficiency, flexibility, saving money, time and effort.The speed and convenience of making transactions is an undoubted "plus" for both merchants and their customers. This leads to an increase in customer satisfaction and is an important prerequisite for increasing customer loyalty. Non-cash payments prevent entrepreneurs from the inconvenience of maintaining high cash balances. At the same time, digital payment systems should be as simple as possible to use and maintain and not require expensive technical equipment (Brunnermeier et al., 2019). It is a known fact that customers who use credit cards tend to make larger purchases. In addition, there are foregone benefits in not offering digital payments while competitors are offering them, although it is difficult to measure their value. Sometimes offering innovative digital payments is not so much a matter of business expansion as of business survival.

An important condition for accepting innovative forms of payment is the level of their integration with the used business systems for financial reporting of transactions. Their compatibility with various promotional conditions such as cashback, various bonuses, customer cards and others is also essential.

Last but not least is risk assessment. Not only among entrepreneurs, but also among their customers, there are concerns about the security of digital transactions (Abe et al., 2021; Ganne and Lundquist, 2019). Digital payments are

often associated as more risky, as there is a risk of system breaches, hacker attacks, phishing, etc. Not only the speed, but also the safety and traceability of transactions are of paramount importance (Widayani et al. 2022). One of the essential requirements for digital payment systems is to provide all the necessary information - in addition to the value of individual transactions, date and time and statistics for processed transactions, turnover report, etc.

Compared to cash payments, the advantages of debit and credit cards as payment instruments consist in avoiding the need to store cash, their transportation and deposit. Card payments ensure the traceability of transactions and eliminate the risk of errors, falsifications of banknotes, theft of money, etc. At the same time, the costs associated with the need for a stable and permanent Internet connection, the bank fees for each payment can be mentioned as disadvantages of card transactions. The same applies to the slow clearing causing delayed sales renenues or the risk of customers canceling the transaction.

Cash payments have their own risks and disadvantages. Among them are frauds, the dangers of theft, robbery from commercial stores or during the transport of money. In addition, physically depositing money in banks can take a lot of time to prepare the shipment, transport it safely, fill out payment documents, and the time it takes to accept and process transactions.

4. Results of a survey of the opinions of managers of small enterprises in Bulgaria

A survey of opinions of managers of small businesses in Bulgaria regarding digital payments was conducted in June 2024 using the in-depth interview method. The interviewees are managers of small businesses that operate in tourism and catering, wholesale and retail trade, education, health care, culture and in the field of transport services.

Competitive pressure and customer demand are generally considered to be the main drivers for the adoption of digital forms of payment by small businesses. Higher costs for installing technical equipment and processing transactions are not an obstacle to the use of digital payment services when there is strong customer demand. Whether to adopt a new form of payment depends on an analysis of the costs of offering the service and the benefits of increased customer consumption.

Regarding the used forms and methods of payment, all entrepreneurs who took part in the study accept cash payments. Regardless of the growing trends of digital payments in recent years, cash payments remain the most widely used. Although cash requires costs for its storage and transportation, cash payments are traditionally the most popular due to the lack of service fees and the preference of a large part of the clientele. Driven by the idea of reducing their own costs, commercial banks are encouraging the use of online channels for carrying out transactions and charging ever higher fees for processing cash payments. Rising bank fees appear to be no barrier to using cash payments for most small-volume retail entrepreneurs.

More than half of entrepreneurs offer payment by debit and credit cards at their sites. Paying by credit card is becoming more and more popular among

customers. Transactions are quick, easy and enable foreign customers to make purchases seamlessly. This is a particular advantage for merchants who have an international business. According to the entrepreneurs' personal observations, customers who use card payments tend to make more purchases and spend larger amounts. Banks charge high fees for credit card transactions, which is the main reason for some merchants not to offer such an option. Others who offer credit card payments say they are being forced out by competition and customer demand.

Online banking is also gaining popularity among the interviewees – every second uses the banks' electronic platforms to make transactions. Businessmen find bank transfers easy and secure, especially for international transactions. At the same time, some of them share a negative experience of cases where the transaction can be canceled by the customer after the delivery has been made and recommend that the terms of bank payments be carefully negotiated and carried out only with trusted and reliable customers.

None of the research participants are yet using cryptocurrency payments, mobile-to-mobile payments or digital platforms like Revolut. Some of them say that they would accept innovative forms of payments only if they found increased demand from customers. Others expressed the opinion that they would take such a step to demonstrate that they are up to date with new technologies and thus enhance their image and reputation among customers. At the same time, some of them fear that it will cost time and effort to train the staff and the entrepreneurs themselves to work with digital forms of payments. Part of the entrepreneurs who do not yet offer digital forms of payment are afraid of the low level of their own digital literacy, which would create difficulties for them in the assimilation of innovative forms of payment. Others comment that their core clientele is not prepared for the new digital payments and strongly prefers to pay in cash.

Offering different forms of payments depends on the nature of the entrepreneurs' business. For example, hoteliers and restaurateurs are motivated to offer more forms of payment, while smaller commercial shops with regular clientele use fewer forms of payment. Most entrepreneurs share that they themselves would not take the initiative to offer innovative digital forms of payments that have little demand. They would rethink this vision if there is an increased demand and this leads to the loss of customers wanting such payments and in case competitors already offer this type of payment services. Entrepreneurs who have shops with retail sales share that under the influence of the covid-19 pandemic and the change in customer preferences, they have undertaken the introduction of digital forms of payment.

Enterpreneurs prefer to have their payment systems serviced by a local provider who can quickly resolve technical and other payment issues that arise.

Regarding external problems, entrepreneurs express the opinion that there is a lack of sufficient incentives of an administrative nature for a more widespread use of digital payments. State and local tax administrations have not created the necessary infrastructure and are not sufficiently interested in streamlining procedures and integrated reporting of digital transactions.

On the issue of possible obstacles to the implementation of digital payments, problems of the following nature are shared:

1) Costs: high costs in the form of service fees; the cost-benefit analysis compared to other forms of payment is often not in favor of digital services; digital payments do not lead to improvements and simplifications in financial reporting.

2) Technical problems: misunderstanding and learning difficulties to work with them; the service of the payment system suffers from difficulties and is not reliable; the internet connection is not reliable enough.

3) Risk: the security and safety when performing transactions is not at the required level; there are opportunities for system breaches, hacking attacks and other types of fraud; possible access by outsiders to confidential financial information.

4) The main clientele prefers to pay in cash or most customers are not digitally literate.

5. Conclusion

It can be summarized that, in general, entrepreneurs are satisfied with the forms of payments they currently use. The most important factors for the adoption of a digital payment instrument are increased customer demand, cost level, speed, security, ease of use, compatibility with accounting and other reporting systems in companies. The main obstacles are weak demand, excessively high investment costs for new technologies, time and effort to familiarize with innovative methods.

It takes some time for new digital payment services to become popular among more consumers and merchants, as only a small number of people use these services in the beginning. To convince entrepreneurs to offer innovative digital payments, these services should not have high initial costs.

State and local administrations should put more effort into popularizing digital forms of payments by creating the necessary infrastructure for integrated reporting and by conducting information and explanatory campaigns emphasizing the benefits and advantages of digital payments.

Acknowledgment

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THE IMPORTANCE OF JUDICIAL EFFECTIVENESS AND GOVERNMENT INTEGRITY IN THE EXPORT OF COMMERCIAL SERVICES: THE CASE OF SOUTHEAST EUROPE

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Abstract

The paper aims to examine the influence of the judicial effectiveness system, government integrity, fiscal health, investment freedom, and trade freedom on the commercial services export for the six Southeast European nations. The reason for doing this research is based upon a variety of discussions in national, regional, and international forums on the importance of creating conditions for businesses, particularly for those businesses focused on export. The study relies on annual secondary data from the World Bank and the Heritage Foundation, stretching from 2017 to 2023. The applied empirical approach is the dynamic one through Arellano-Bond since we are dealing with panel data. The findings of this study indicate that there is a negative significant interaction between the judicial effectiveness system and government integrity with commercial services export. Conversely, investment freedom has a positive significant influence on commercial services exports. Whereas, fiscal health and trade freedom have no significant influence on commercial services exports. The study's academic contribution and novelty derive from its contribution to the creation of empirical evidence, on these economies with these specific features. Consequently, the findings obtained from this study will stimulate productive discussion that will influence the policy-making contexts to the strengthening or redesign of the regulatory structure at the state level.

Keywords: Commercial services export, judicial effectiveness, government integrity.

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1. Introduction

Nowadays services are considered as the driving force of the economic development for all countries around the globe. They create the majority of new jobs, particularly for young and female workers, employ the greatest number of people, and generate almost two-thirds of the world's GDP, making up the largest portion of the global economy. Meanwhile, trade in services has emerged as a critical component of growth strategies, accounting for the majority of recent global trade activity and generating higher value-added jobs.

Commercial services trade has become essential for developed and developing countries to increase productivity in both agricultural and manufacturing sectors. Additionally, it is critical for building infrastructure and enhancing access to quality health, education, and other important services. Commercial services are grouped into four major categories: transport, travel, goods-related services, and other commercial services (ESCAP, 2017).

Market globalization, rapid technological improvements, government support, and recent changes to the global economy, such as market and trade liberalization initiatives, have all played a positive role in increasing the internationalization of small and medium enterprises (SMEs) through exporting their products or services (Andersson et al., 2004; Fillis, 2007; Krammer et al., 2018).

The world economy has in recent decades undergone structural shifts brought on by rapid technological developments that have made services one of the most dynamic sectors. The services sector has been the main source of economic growth since the 1990s and services today dominate the production and employment landscape of economies at all levels of development (Nayyar and Davies, 2023).

The contribution of services in economies worldwide has increased markedly over time. The services sector’s share of global GDP increased from 53 percent to 67 percent between 1970 and 2021. The increasing contribution of services to GDP has occurred in economies at different levels of development and has been accompanied by a marked decline in the relative share of agriculture (WTO & WBG, 2024).

Based on the importance of the performance of services export for each economy, the main objective of this research is to analyze the influence of Judicial effectiveness (JE), Government Integrity (GI), Fiscal Health (FH), Investment Freedom (IF) and Trade Freedom (TF) on Commercial services export (CSE).

The study relies on annual secondary data from the World Bank and the Heritage Foundation, stretching from 2017 to 2023. As we based our research on panel data, we used the Arellano Bond estimator to analyze the influence of independent variables on our dependent variable.

By highlighting the impact of the factors mentioned above, the research aims to fill in the gaps in the scientific literature currently covering the export of commercial services in the Southeastern European region (Albania, Bosnia & Herzegovina, Kosova, North Macedonia, Montenegro, and Serbia). In light of this, it is anticipated that the study's findings would provide policy-makers in this area with insightful information that will help them strengthen or redesign the regulatory structure at the state level.

2. Theoretical Background

Services are playing a bigger role in international trade and already are responsible for 70% of jobs and 50% of global GDP (UNESCAP, 2017). According to UNESCAP (2017) services exports - which make up about one-fourth of all exports have emerged as a major force in the global economy, mainly due to large part to technological advancements. Exporting services creates new opportunities for the country's development and expansion (Uygun & Gujrati, 2020). Due to the services sector's growing significance in international commerce and investment, in recent decades most countries - especially emerging ones - have recognized it as the new engine of growth (Mattoo & Stern, 2007).

Previously, it was thought that only manufactured products could be traded and exported. The World Trade Organization (WTO), (2014) reported that the sector of trade in services is becoming more and more integrated with the manufacturing of produced goods. Services were created with national use in mind (Uygun & Gujrati, 2020). Many services that were before thought to be non-tradable are now actively traded, having changed since the mid-1980s (McGuire, 2002). Services Export can be saved and used at a later time, either directly or indirectly (Mishra, Lundstrom, & Anand, 2011).

Copeland and Mattoo (2008) noted that trade in services is different from trade in goods in two ways:

(1) Trade in services is typically highly regulated, with many types of services being produced or provided by regulated monopolies;

(2) Trade in goods involves shipping goods from one country to another, but in the case of trade in services, cross-border trade is not the most important way of conducting international transactions.

Uygun & Gujrati (2020) found that the global export of services is expanding. Many nations accept it, due to export services, the majority of people have switched from exporting products to exporting services, and they are now providing their services globally (Uygun & Gujrati, 2020). In their paper, Ahmad, Kaliappan, & Ismail, (2017) found that America and Europe were the two largest contributors among the developed economies in 2013, with respective shares of 45.0% and 39.7%. A nation's economy by adopting the export of services will flourish and improve every day (Uygun & Gujrati, 2020).

The factors influencing the patterns of comparative advantage in the service trade (insurance, various forms of transportation, and freight transportation) were the main subject of Sapir and Lutz's (1981) study. The authors emphasized the relationship between capital intensity, scale, trade mix, distance from trading partners, and the competitive advantage in freight services. In addition according to Sapir & Lutz (1981), economies of scale and the availability of human capital appear to be significant factors influencing trade in insurance services. Furthermore, certain exchanged services are crucial to the development process because they act as a channel for the transfer of technology, including consulting and engineering services, licensing, and technical support (Sapir & Lutz, 1981). Choi (2010) employed panel data covering 151 nations from 1990 to 2006 to conduct an empirical examination of the Internet's role in the global trade of

services, using a panel Generalized-Method of Moments (GMM). His results indicated that a rise in service trade from 0.23% to 0.42% was correlated with a 10% increase in the number of Internet users per hundred persons (Choi, 2010).

Ahmad, Kaliappan, & Ismail (2017), investigated the factors that influence service export in a few growing Asian nations through empirical research (China, Hong Kong, South Korea, India, Iran, Indonesia, Malaysia, Philippines, Singapore, Thailand, Kuwait, Saudi Arabia, and Turkey). A static linear panel data analysis was performed on annual data from 1985 to 2012 in this study. Their findings suggest that the currency rate, foreign income, FDI, the value contributed by services, and communication infrastructure are likely to have an impact on the export of services in the developing Asian nations that have been chosen (Ahmad, Kaliappan, & Ismail, 2017).

In this paper, we have chosen to examine the influence of the judicial effectiveness system, government integrity, fiscal health, investment freedom, and trade freedom on the commercial services export for the six Southeast European nations and thus contribute to the existing theory.

3. Research Methodology

To meet its stated objectives, the research employed a methodology to utilize secondary data extracted from two credible databases (the World Bank and The Heritage Foundation), followed by applying the dynamic approach known as Arellano-Bond Estimation. The study relies on annual secondary data from the World Bank and the Heritage Foundation, dating from 2017 to 2023. The reason for using this data is the existence of credibility and the general application of this data. Immediately extracted from the databases involved, the data was designed in structure and processed based on the research paradigm as designed. On adjustment, the econometric method to be used was selected primarily since most of the data was dynamic, like panel data. It is worth emphasizing that many authors have reached a common conclusion regarding panel data, where the most appropriate models that estimate fixed effects of individual states can be utilized random effects, fixed effects, 2SLS, GMM, and other approaches (Ullah et al. 2024; Durguti et al. 2023; Arifi, 2023). Additionally, it is emphasized that this is the most appropriate approach as it can capture effects like potential endogeneity problems, autocorrelation problems, and the estimates of individual effects by analyzing the econometric evidence in detail, following the research of (e.g., Batrancea, 2022; Tran et al., 2022; and Kesar et al., 2021) who applied the GMM method, specifically Arellano-Bond. Consequently, given the limited number of observations and taking into account this issue, the Arellano-Bond Estimation is said to be the most suitable approach. The original development of this method was by Arellano and Bover (1995), with further specifications made later by Blundell and Bond (1998), addressing problems associated with first differencing in regressors and instrument adaptation. The general formula for GMM is as follows:

$$\Delta Y_{it} = \Delta \sum_{j=1}^{r} \varphi_j Y_i, t - j + X_{i,t}\beta_1 + w_{it}\beta_2 + \pi_i + \varepsilon_{i,t} \quad (1)$$

From this general formula, by substituting in our specific example, the formula is constructed as follows:

$$\Delta CSE_{i,t} = \varphi + \Delta\mu(CSE_{i,t})_{-1} + \beta_1(JE_{i,t}) + \beta_2(GI_{i,t}) + \beta_3(FH_{i,t}) + \beta_4(IF_{i,t}) + \beta_5(TF_{i,t}) + \pi_i + \varepsilon_{it} \quad (2)$$

Where: CSE,- in our explicit instance, denotes the dependent variable, β_1 to β_5- denotes the explanatory variables contained within the investigation, i- means the specific effects within the investigation, *t* - denotes the period covered (2017-2023), π_i - denotes unnoticed properties within the assessment, and ε_{it}- denotes the potential error in the simulated method.

3.1 Econometric findings

The authors provide a comprehensive overview of the parameters included in the analysis, offering detailed information starting with the number of observations, mean, standard deviation, minimum, and maximum values for the six Southeastern European countries.

Table 1. Descriptive statistics

Variables	Obs	Mean	S.D.	Min	Max
CSE	42	21.653	0.604	20.457	23.172
JE	42	45.238	10.313	22.800	61.400
GI	42	40.939	5.323	28.400	52.000
FH	42	75.076	22.436	11.900	97.300
IF	42	67.500	4.845	60.000	75.000
TF	42	80.797	5.924	68.000	88.400

Source: Author's calculations

Based on the reported findings, we can observe that CSE has a mean value of 21.65 with a standard deviation of 0.6%. In the same context, it is noted that the minimum value does not show a significant variation from the maximum, with values of 20.45 and 23.17, respectively. Meanwhile, the two parameters associated with good governance, JE and GI, have mean values of 45.23 and 40.93, respectively. The standard deviation for these two parameters shows a significant variation of 5% between them. The maximum value for JE during the exploration period is reported at 61.40, while the minimum is 22.80. For GI, the maximum reported value is 52.0, while the minimum is 28.40. The next parameter, categorized as an indicator of economic freedom, fiscal health (FH), has a mean value of 75.07 with a standard deviation of 22.4%. This result provides sufficient evidence that the treated countries maintain FH at an adequate level, based on the evaluated methodology which ranges from 0 to 100 points. On the other hand, two other parameters, IF and TF, have mean values of 67.50 and 80.97, respectively. These values indicate that these economies have an above-average rating, although there

is still room for continuous improvement when compared to European Union countries.

Beyond the descriptive analysis, our study steered a correlation breakdown to identify two key topics: the degree and nature of the associations between parameters, and whether the applied data exhibit any multicollinearity concerns.

Table 2. Correlation analysis

Variables	CSE	JE	GI	FH	IF	TF
CSE	1.000					
JE	-0.219	1.000				
GI	-0.395	0.475	1.000			
FH	0.134	-0.083	-0.276	1.000		
IF	0.221	0.142	-0.027	-0.653	1.000	
TF	-0.020	-0.105	-0.035	-0.287	0.029	1.000

Source: Author's calculations

The results reported in Table 2 show that CSE has moderate positive associations with FH and IF, while moderate negative associations are reported with JE, GI, and TF. Furthermore, these reported results provide additional indications that none of the correlation coefficients in the analysis reach or exceed $r \geq 0.8$, which demonstrates that the data applied for the six Southeastern European countries do not present multicollinearity concerns. This argument is supported by the idea that if any of the association coefficients were $r \geq 0.8$, multicollinearity could be considered a problem; however, in our case, the highest reported coefficient is -0.653, consistent with the conclusions drawn by (Wang et al. 2022).

Given the nature and structure of the panel data, the most appropriate analysis to evaluate whether the data may have potential multicollinearity concerns is the widely recommended Variance Inflation Factor (VIF) analysis.

Table 3. Vector inflation factor analysis

Variables	VIF	1/VIF
FH	2.45	0.407854
IF	2.03	0.492579
GI	1.35	0.738335
JE	1.24	0.803215
TF	1.18	0.844454
Mean VIF	**1.65**	

Source: Author's calculations

Accordingly, as reported in Table 3, it is observed that none of the coefficients exceed a value greater than 0.5 ($\alpha \geq 0.5$), with the highest value in our specific case being FH at 2.45. This provides further evidence that the data do not exhibit concerns related to this issue. More specifically, as stressed by Wooldridge (2012), if any of the individual coefficients exceed the value of 0.5, it could be considered that the selection of data with the applied model might yield unstable results. An

additional important reason is that the VIF mean should not be greater than 10, and in our case, the mean value is 1.65, ensuring that the data are appropriately fitted within the applied model.

Following the logic and flow of econometric analyses, before discussing the model's results, our study considers the discussion of several additional diagnostic tests. One of these is the test for heteroskedasticity, which resulted in a coefficient of 8.55 with $\rho = 0.0734$, indicating that the level of significance is greater than $\alpha \geq 0.5$, providing reliable evidence that the data do not have heteroskedasticity issues. The ex-post verification was performed using the Sargan J test, where the level of significance is evaluated at 5% ($\alpha = 37.56$ and $\rho = 0.0172$), to test the appropriateness of the fit of the instrument in the econometric model. If the calculated test value is above the specified threshold, this means that the instruments are well placed within the model. The Wald chi2 reported is 279.487, with a level of significance of 1 percent, or $\rho = 0.000$, which is an indicator that the model is properly specified, and the results presented are valid.

Table 4. Regression estimation

	Arellano-Bond estimation	
	β	ρ ≥ [z]
CSE L1.	0.2882	0.203
JE	-0.0092	0.034
GI	-0.0370	0.010
FH	-0.0077	0.074
IF	0.2878	0.000
TF	-0.0178	0.154
Observation	42	
Heteroskedasticity	8.550	0.0734
Wald chi2	279.4870	0.0000
Sargan test	37.56	0.0172

Source: Author's calculations

Results revealed that the judicial effectiveness system and government integrity impacts negatively to CSE. On the opposite, investment freedom has a statistically significant positive effect.

Our research results (p=0.034) revealed that the JE influences significantly CSE. Our findings are in line with the findings of (Wang, Wang, and Li, 2014) according which judicial quality affects firms' exports through its efficiency in settling business contract disputes (transaction costs), moreover when the efficiency of judicial institutions is high and/or the judicial corruption is low, non-exporting firms can now enter into the exporting markets due to legal cost-saving mechanisms. Also, according to Kapri's (2021) findings court fairness increases the export share as well as the likelihood that a firm becomes an exporter.

Our econometric model results (p=0.010) revealed that GI influences significantly CSE. Our findings are in line with the findings of Sabry (2021) which state that governance indicators such as regulatory quality and government effectiveness directly affect exporting activities. Moreover, this is in line with the

findings of Bah, Ondoa, and Kpognon (2021) which found that total exports and exports of services are positively affected by governance quality.

According to the level of confidence of 95%, the findings for FH using the coefficient $\beta = -0.0077$ with $\rho = 0.074$ were statistically insignificant. Our findings are not in line with the findings of Wang and Fang (2015), according to which fiscal reforms are important for alleviating regional enterprises' financial constraints and stimulating export competitiveness.

The results of the regression indicate that the Investment Freedom (IF) at a coefficient $\beta = 0.2878$ with $\rho = 0.000$ has statistically proven a significant positive effect on Commercial Services Export (CSE). Our findings are in line with the findings of Berulava, Gugushvili & Javakhishvili (2012) according to which the size of the firm and foreign investment do matter as well. These factors significantly and positively affect not only the decision to export but also the export intensity of manufacturers. They state that firms that have more resources for investment attain a competitive advantage globally.

Furthermore, based on the level of confidence of 95%, the findings for TF using the coefficient $\beta = -0.0178$ with $\rho = 0.154$ were statistically insignificant. Our findings are not in line with the findings of Gnangnon, S.K. (2021), according to which greater services export diversification results in higher services export revenue stability in countries that further open up to international trade, and the greater the degree of trade openness, the higher is the magnitude of the positive effect of services export diversification on the stability of services export revenue.

4. Conclusion

Most of the Southeast European Countries have a negative trade balance. The main contributor to the suficit of the trade balance are exports which means that the variables analyzed are of immense importance. Further, as above mentioned, nowadays services are considered the driving force of economic development for all countries around the globe. With market globalization, and rapid technological improvements the services exports are growing which has a positive contribution to the trade balance of each country.

This paper aimed to examine the influence of JE, GI, FH, IF, and TF in CSE. The research is based on secondary data obtained from the World Bank and the Heritage Foundation, stretching from 2017 to 2023. It uses the Arellano Bond estimator, including many diagnostic tests to analyze the influence of the independent variables on our dependent variable which was Commercial Services Export.

Results revealed that JE and GI impact negatively to CSE, whereas IF has a statistically significant positive effect. Fiscal health (FH) and Trade freedom (TF) present an insignificant influence on CSE, which is against what was expected. The research makes an important contribution from an empirical point of view to a rather unexplored area.

Based on the results revealed that policymakers from South-eastern countries must adopt policies that contribute to the export of commercial services. The liberalization of service sectors needs to be a top concern in nations' trade policies

as the importance of trade in services keeps growing. Increased liberalization would help make domestic service providers more competitive and make it possible for services to be imported/exported at a lower cost.

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THE APPLICATION AND EFFECTIVENESS OF E-MARKETING IN MACEDONIAN COMPANIES

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Abstract

The impact of digital technology and e-marketing on the business world is one of the most pertinent topics for marketing research. E-marketing is imperative in contemporary times, and companies should integrate it into their operations to fulfill consumer needs and enhance their market positioning. In this era of digital transformation, every company must make distinct decisions and adapt to change uniquely to ensure success.

The aim of this research paper is to highlight the implementation and effectiveness of e-marketing strategies within Macedonian companies while also identifying the challenges and opportunities for its further development. Through the application of the survey method and data analysis, the most effective ways of using e-marketing to improve the presence of companies on the Internet and to increase their performance in the digital market will be identified.

The results of the research have a significant contribution to the understanding of the state of application of e-marketing in Macedonian companies and will represent a basis for making decisions for the creation of future effective marketing strategies.

Keywords: e-marketing, digital technology, strategies, companies, market.

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1. Introduction

In the digital-oriented business environment, e-marketing is a vital aspect of the successful functioning of companies, including those in the Republic of North Macedonia. Globalization and the increasing use of the Internet are two main reasons for the transition from traditional to digital marketing (Sharif & Butt, 2017). Digital transformation represents an evolutionary process, changing the results of life and the ways digital technologies work, primarily through the implementation of new technological solutions based on Internet services and information about information technologies (Helm et al., 2013). With the great progress of technology and increased access to the Internet, electronic marketing is constantly used as a means of communication and promotion for companies in Macedonia. The interactive and dynamic platform allows companies to engage their consumers with constantly updated content, personalized messages and innovative approaches (Cerchia & Popa, 2019). The introduction of e-marketing in Macedonian companies represents a significant step towards adapting to current marketing trends and gaining acceptance in the global market. At the same time, it opens doors for creativity, innovation, and faster growth, enabling Macedonian companies to expand and provide robust online information. Sharing, planning, implementing, and managing digital marketing are defined as digital marketing capabilities. These refer to an operator's ability to use information technologies to streamline internal interactions with consumers. Through these actions, consumers gain access to resources and information, allowing them to learn more about their needs and preferences. Digital marketing capability includes the processes, structures, and skills a company must have to succeed in the digital age (Chaffey & Chadwick, 2016).

The advantages obtained by using e-marketing in companies are of essential importance because the application of e-marketing allows companies to operate globally (Terziu, 2020). By using various digital strategies such as content marketing, social networks, influencer marketing, email marketing, mobile marketing, affiliate marketing, video marketing, individual advertising, SEO optimization, and Search Engine Marketing, companies have the opportunity to reach potential consumers worldwide. The application of graphic design includes the use of various options such as artificial intelligence and CRM systems for analytics and internal design, optimizing marketing strategies. Companies can reduce their marketing costs and increase their revenue through the efficient use of digital channels (Ram et al., 2024). Through the use of consumer data and personalized marketing campaigns, companies can engage their consumers on a deeper level (Ranjan et al., 2023). By creating quality content and engaging with consumers, companies can generate impactful connections with their audiences. These innovations help attract new consumers and retain existing ones.

2. Litterature review

The Internet is profoundly shaping modern society, moving from a communication tool to a ubiquitous technology that supports all economic activities. Today, geographical barriers have disappeared, allowing access to the Internet everywhere, which increases the availability and visibility of companies to consumers regardless of their location. The digital revolution has drastically changed people's daily lives, reducing costs and increasing opportunities to access and use Internet services (Felipa, 2017).

Online presence is crucial for companies, allowing them better visibility and accessibility to consumers (Lim, 2023). Electronic marketing enables communication with consumers through various channels, such as email, social networks, and Internet search engines, which increases the effectiveness of marketing strategies and sales results (Brătucu & Tălpău, 2014). The COVID-19 pandemic has further increased the importance of electronic marketing, as many companies have been forced to shift their activities to the virtual environment (Benartzi & Lehrer, 2015).

Electronic marketing has transformed traditional methods of advertising and sales, turning them into highly digitized activities that enable better communication with consumers and business expansion (Mirzaei et al., 2012). Electronic marketing tools play a key role not only in creating an online presence but also in successfully cultivating relationships with consumers and increasing sales (Alharthey, 2023). These tools also allow companies to measure the results of their marketing activities, which is of great importance for adjusting marketing strategies and increasing the chances of success (Grzywaczewski et al., 2010).

By using analytics tools like Google Analytics, companies can track consumers' interactions with their content and ads, allowing for the assessment of campaign effectiveness and making informed decisions about marketing investments (Andersson & Wikström, 2017). By analyzing data about consumers, such as their interests, wants, needs and habits, companies can create customized marketing messages and offers, which makes the messages more effective and increases the chance of a successful sale (Rashid et al., 2018).

Companies should be aware of the challenges and potential risks associated with implementing electronic marketing strategies, such as issues of data privacy, information security, and market competition. Therefore, they should apply best practices to protect privacy and data security, continuously update themselves with new knowledge, and adapt to the changing conditions of the digital market.

Marketing capabilities are critical to business performance and depend on the ability to understand consumer needs, which creates long-term relationships (Nath et al., 2010). Digital marketing capability is a multidimensional construct that includes IT resources, human resources and business resources (Trainor et al., 2010). IT resources refer to the technology infrastructure that supports e-marketing initiatives, human resources represent managerial support and organizational culture, and business resources capture the degree of integration of technology throughout the organization. This capability creates value by

synchronizing activities and information throughout the organization, which improves sales productivity and organizational efficiency (Kim et al., 2007).

3. Methodology

To investigate the application of e-marketing in companies in the Republic of North Macedonia, a representative sample method was used, employing a combination of different types of questions. In the Republic of North Macedonia, there is no official list of all companies by activity and size, nor official data on how many companies have a continuously updated website and how many only have a home page. According to the latest report from the State Statistics Office, the number of active companies in the Republic of North Macedonia in 2021 was 70,424[4]. Of these companies, only 52.5% have a website or home page[5]. Whereas, according to a survey by Telecom, 60.8% of companies have a profile on the social network Facebook, and 31.7% of companies have an Instagram profile [6]. For those reasons, the survey created with Google Forms was sent via email and social networks to Macedonian companies that are registered on the online web platform biznismreza.mk [7]. The platform provides insight into the work of more than 80,000 active Macedonian legal entities and contains all the latest information on all registered legal entities in Macedonia. Responses from 540 companies provide an adequate, representative sample (based on the previous reasons), enabling relevant conclusions. To achieve the goal of the research, a questionnaire was designed, which includes closed-type questions with multiple choices and a Likert scale. The questionnaire had four parts: (1) five questions on general company characteristics (e.g., activity, size, e-marketing budget), (2) questions assessing the ability and readiness to implement e-marketing, (3) questions on the current use of e-marketing, and (4) questions on its impact on company performance. The survey was anonymous, and responses were analyzed using Google Forms and Microsoft Excel.

4. Analysis of research results

4.1. General characteristics of the investigated companies

The general characteristics of the researched companies represent the various industries covered in the research. Most of the companies belong to the manufacturing industry with 21.23%, wholesale and retail trade with 17.32%, health and social care services with 15.64%, financial services and insurance services with 10.06%, construction with 9.5% and education services with 8.94%. Next, the distribution of companies according to the number of employees is shown. According to the data, most of the companies are small, with 10-49 employees, which make up 34.27% of the total number. Medium-sized companies with 50-249 employees follow, representing 23.60%.

[4] https://www.stat.gov.mk/PrikaziSoopstenie.aspx?rbrtxt=79
[5] https://www.stat.gov.mk/PrikaziSoopstenie.aspx?id=76&rbr=14462
[6] https://www.telekom.mk/content/Digitalen%20index_Istrazuvanje_2022-new.pdf
[7] https://biznismreza.mk/Marketing/Default

On the other hand, companies with less than nine employees and companies with over 250 employees participate with approximately 21%. Also shown is the distribution of companies according to the time of their existence in business. Most of the companies, 58.66%, have more than 20 years of experience in business. Companies with 11-20 years of experience follow, representing 25.14% of the total number. Companies with 6-10 years of experience make up 11.17%, while the smallest part of companies, 5.03%, have less than five years of existence in business. Then, the distribution of the companies according to the percentage of the total budget that they set aside for e-marketing activities is shown. Regarding e-marketing budgets, 63.48% set aside less than 10%, 26.97% dedicate 10-20%, 5.06% assign 20-30%, and 4.49% devote more than 30% of their total budget for e-marketing activities. The final general question addresses the distribution of companies by market type. About 48% sell in the domestic market, another 47% in both domestic and international markets, and approximately 5% sell only internationally.

4.2. Ability and readiness of companies to apply e-marketing

The following questions were covered in this section:

1. There is support from the top management for the application of e-marketing
2. We have developed a strategy for e-marketing
3. We have enough financial resources to apply e-marketing
4. Our company has a good technical-technological basis for the application of e-marketing
5. Our company follows trends in e-marketing technology
6. We have enough qualified staff for e-marketing in our company.
7. The employees of our company regularly attend trainings on the use of e-marketing tools
8. The employees of our company are well aware of the benefits of using e-marketing
9. In our company, there is resistance of the employees to the new trends for the application of e-marketing
10. We have a website that is continuously updated
11. Our website allows online orders
12. Our website enables electronic payments
13. Our website has a built-in data protection system

The answers to these questions are on a Likert scale. They are shown in the following diagram:

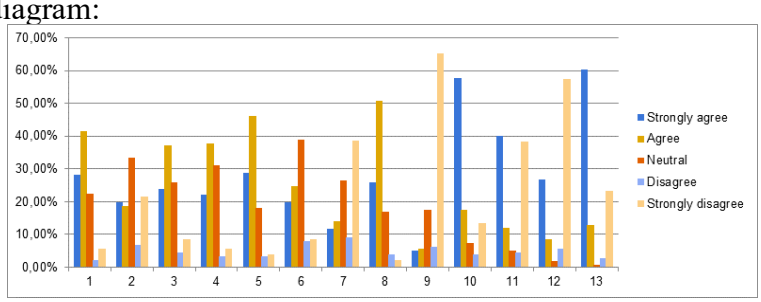


Figure 1 Answers related to the ability and readiness of companies to apply e-marketing

Figure 1 shows that a significant percentage of company employees recognize the benefits of e-marketing. Many companies have websites that are regularly updated, incorporate data protection systems, follow e-marketing trends, receive employee support for e-marketing initiatives, have sufficient financial resources, and possess a strong technical-technological foundation for e-marketing. Over 50% of the surveyed companies have websites that enable online orders. However, the data also indicate a need for additional education and training to improve skills and knowledge in this area. The lack of awareness of e-marketing tools and strategies among some companies is unsurprising, given the relatively low level of digital literacy in Macedonia. This is reflected in the unsatisfactory percentage of companies (about 35%) that offer electronic payment through their websites, and the fact that only around 38% have developed an e-marketing strategy. Despite these challenges, it is encouraging to see that many companies are taking steps to enhance their online presence and engage with customers through social media. Overall, the chart underscores the importance of developing an e-marketing strategy and providing training and support to help Macedonian companies improve their e-marketing capabilities and remain competitive in the digital landscape.

4.3. Application of e-marketing in companies

The following questions were covered in this section:

1. What e-marketing strategies are you applying? The answers to this question are given in the following diagram:

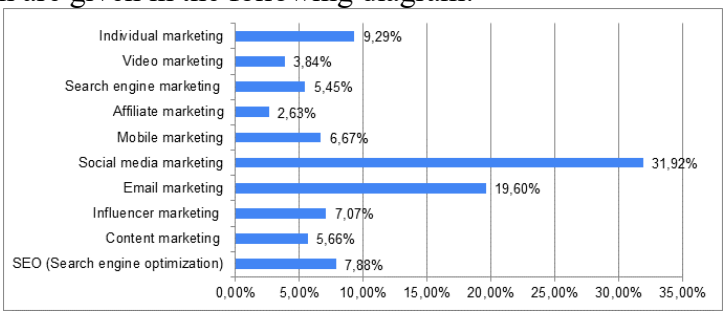


Figure 2 E-marketing strategies applied by companies

According to the data from Figure 2, Macedonian companies primarily rely on social media marketing strategies, with 31.92% using this approach. Email marketing follows, utilized by 19.60% of companies. Individual marketing and search engine optimization (SEO) are employed by 9.29% and 7.88% of companies, respectively, while influencer marketing and content marketing are used by 7.07% and 6.67%. Other strategies, such as affiliate marketing, advertisements, banners, and video marketing, are applied by a small percentage of Macedonian companies. These data confirm that the percentage of companies using any of the listed e-marketing strategies is low, with none exceeding 50%.

2. Which e-marketing tools do you use? The answers to this question are given in the following diagram:

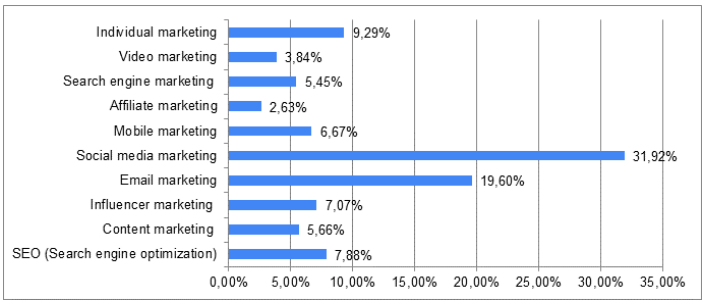


Figure 3 Which e-marketing tools are companies applying?

Figure 3 shows the e-marketing tools used by Macedonian companies. The majority, 46.69%, use customer relationship management (CRM) software, followed by 29.57% using analytics tools. Graphic design tools are employed by 17.12% of companies, while artificial intelligence is used by just 6.61%. These data suggest that the application of e-marketing tools is insufficient, as none are used by more than 50% of companies.

3. Which of the e-marketing tools do you plan to introduce in the next three years? The answers to this question are given in the following diagram:

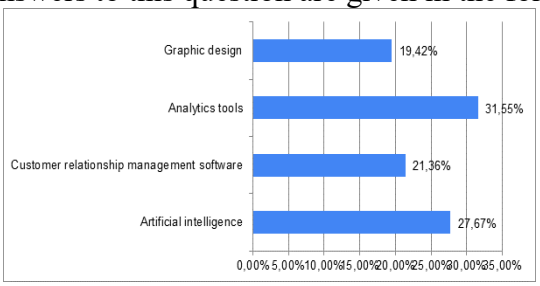


Figure 4 Which e-marketing tools companies plan to introduce in the next three years?

Figure 4 indicates which e-marketing tools companies plan to introduce in the next three years. According to the research data, most of the companies in RSM plan to introduce analytics tools 31.55%, followed by artificial intelligence, which is the very current at 27.67%, software for managing customer relations 21.36% and graphic design with the lowest percentage 19.42%.

4. The application of e-marketing is also perceived from a list of questions, such as:

1. We use the tools of e-marketing as a complement to traditional marketing activities
2. We apply the tools of e-marketing to communicate with our customers
3. We apply the tools of e-marketing to advertise the products/services
4. We apply the tools of e-marketing to sell the products/services
5. We apply the tools of e-marketing to build a database for our customers
6. The application of e-marketing is important for the company's brand
7. The application of e-marketing is important for attracting new customers
8. The application of e-marketing is important to attract and retain existing customers
9. The e-marketing strategy is integrated into the company's corporate strategy
10. We apply e-metrics for consumer behavior

11. We apply e-metrics for sales promotion
12. We use e-metrics for consumer behavior on the website

The answers to these questions are on a Likert scale. They are shown in the following diagram:

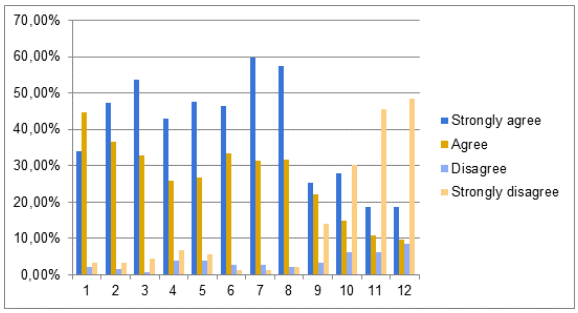


Figure 5 Application of e-marketing in companies

According to Figure 5, the application of e-marketing in Macedonian companies is the most important for attracting new customers, as well as retaining permanent ones. The data also indicate that a large percentage of companies that apply it – marketing to advertise products and services, communicate with customers, as well as create a base for their wants and needs, for the company's brand and supplement traditional marketing activities. Concerning the application of e-marketing, the percentage is the lowest for the application of e-metrics for sales promotion and consumer behavior on the website. Also, less than 50% of companies stated that the e-marketing strategy is not incorporated into the corporate strategy and that they do not apply metrics on consumer behavior.

4.4. Impact of E-Marketing on Company Performance

The following questions were covered in this section:

1. The application of e-marketing affects the improvement of the quality of services
2. The application of e-marketing affects the improvement of the quality of business processes
3. The application of e-marketing affects the increase in consumer satisfaction
4. The application of e-marketing affects the improvement of the relationship with consumers
5. The application of e-marketing contributes to the conquest of new markets
6. The application of e-marketing affects the increase in sales
7. The application of e-marketing affects the reduction of costs.

The answers to these questions are on a Likert scale. They are shown in the following diagram:

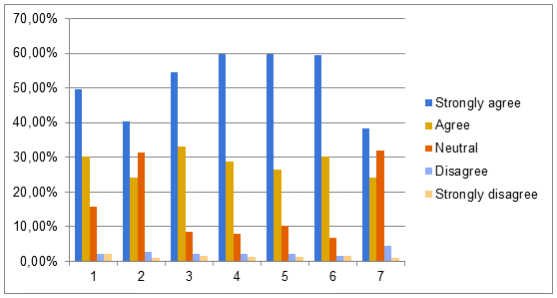


Figure 6 Impact of e-marketing on companies' performance

According to the data obtained in Figure 6, most of the companies think that the application of e-marketing has an impact on the improvement of the relationship with consumers, contributes to the conquest of new markets and affects the increase in sales. It also affects customer satisfaction and improves the quality of services. The smallest percentage belongs to the companies that believe that the application of e-marketing affects the quality of business processes and reduces costs. This is because they are not fully aware of how e-marketing affects these benefits.

The data obtained from the survey offer the possibility of a large number of cross-analyses. In the following, we will do several cross-analyses on separate questions. They are made using pivot tables in Excel.

In fact, the following tables will show the data for the first three questions that refer to the ability and readiness of companies to apply e-marketing (1. There is support from top management for the application of e-marketing, 2. We have developed a strategy for e-marketing -marketing and 3. We have sufficient financial resources for the application of e-marketing), in terms of the activity, the time of existence in the business, the annual budget for marketing activities and the type of market in which the companies sell their products/services.

	We have top management support for e-marketing implementation
Sectors of activity	Strongly agree and agree
Manufacturing	36,84%
Professional, scientific and technical activities	18,18%
Agriculture, forestry and fishing	25,00%
Human health and social work activities	32,14%
Wholesale and retail trade; repair of motor vehicles and motorcycles	41,94%
Information and communication	42,86%
Financial and insurance activities	50,00%
Construction	23,53%
Accommodation and food service activities	50,00%
Education	93,75%

Table 1. Cross-tabulation, We have top management support for e-marketing implementation - Sectors of activity

	We have top management support for e-marketing implementation
Years of existence in business	Strongly agree and agree
< 5	44,44%
6 - 10	60,00%
11 - 20	68,89%
> 20	73,33%

Table 2. Cross-tabulation, We have top management support for e-marketing implementation – Years of existing in business

	We have top management support for e-marketing implementation
Annual budget for e-marketing activities	Strongly agree and agree
< 10%	56,64%
10%-20%	93,75%
20%-30%	88,89%
>30%	87,50%

Table 3. Cross-tabulation, We have top management support for e-marketing implementation - Annual budget for e-marketing activities

	We have top management support for e-marketing implementation
Type of market in which the company sells the products/services	Strongly agree and agree
Domestic market	65,88%
International market	77,78%
Domestic and international market	72,62%

Table 4. Cross-tabulation, We have top management support for e-marketing implementation – Type of market in which the company sells the products/services

From the four cross tables, it can be concluded that the financial and insurance sector, the information and communications sector, wholesale and retail trade and the manufacturing industry have the greatest support from the top management (the accommodation and food sector is not emphasized, because, although the percentage is 50 %, the same with a small percentage is included in the research companies). The support of the top management for the application of e-marketing depends directly on the years of existence of the companies in the business. Namely, the companies with the most significant number of years of existence in business have the greatest support from the top management for the application of e-marketing. Businesses that allocate 10%-20% of their annual budget to e-marketing activities have the greatest support from top management, and the percentage of companies that have support from top management for the application of e-marketing, which allocates 20%-30%, is also high, even more than 30%. In terms of the type of market to which companies sell their products/services, there is no major difference in top management support for e-marketing implementation. Regardless of where they sell their products/services, whether on the domestic or international market, companies have a medium-high percentage in terms of top management support.

	We have developed an e-marketing strategy
Sectors of activity	Strongly agree and agree
Manufacturing	36,84%
Professional, scientific and technical activities	18,18%
Agriculture, forestry and fishing	25,00%
Human health and social work activities	28,57%
Wholesale and retail trade; repair of motor vehicles and motorcycles	32,26%
Information and communication	35,71%
Financial and insurance activities	50,00%
Construction	23,53%
Accommodation and food service activities	50,00%
Education	62,50%

Table 5. Cross-tabulation, We have developed an e-marketing strategy- Sectors of activity

	We have developed an e-marketing strategy
Years of existence in business	Strongly agree and agree
< 5	22,22%
6 - 10	45,00%
11 - 20	35,56%
> 20	39,05%

Table 6. Cross-tabulation, We have developed an e-marketing strategy- Years of existence in business

	We have developed an e-marketing strategy
Annual budget for e-marketing activities	Strongly agree and agree
< 10%	27,43%
10%-20%	66,67%
20%-30%	88,89%
>30%	87,50%

Table 7. Cross-tabulation, We have developed an e-marketing strategy- Annual budget for e-marketing activities

	We have developed an e-marketing strategy
Type of market in which the company sells the products/services	Strongly agree and agree
Domestic market	40,00%
International market	44,44%
Domestic and international market	35,71%

Table 8. Cross-tabulation, We have developed an e-marketing strategy- Annual budget for e-marketing activities

Regarding the development of an e-marketing strategy, it can be stated that only the sector for financial and insurance services differs from all other activities. Specifically, 50% of this sector has developed an e-marketing strategy, while this percentage is low for the rest of the activities. Businesses that have been in existence for 6-10 years (45.00%) declared the highest percentage that they have developed an e-marketing strategy, and young businesses (businesses that have existed for less than five years) have the lowest percentage, amounting to 22.22%. However, businesses that have been in existence for 11 to 20 years and even more than 20 years have a slightly lower percentage of statements regarding the development of an e-marketing strategy. In terms of the connection between the

allocation of funds for e-marketing activities and the construction of an e-marketing strategy, it can be concluded that there is a proportional dependence. Regarding the type of market in which companies sell their products/services, there is no major difference in the existence of a marketing strategy. Regardless of where they sell their products/services, whether on the domestic or international market, companies have a medium-low percentage of the existence of a marketing strategy.

	We have enough financial resources to apply e-marketing
Sectors of activity	Strongly agree and agree
Manufacturing	52,63%
Professional, scientific and technical activities	36,36%
Agriculture, forestry and fishing	50,00%
Human health and social work activities	39,29%
Wholesale and retail trade; repair of motor vehicles and motorcycles	67,74%
Information and communication	85,71%
Financial and insurance activities	66,67%
Construction	41,18%
Accommodation and food service activities	50,00%
Education	87,50%

Table 9. Cross-tabulation, We have enough financial resources to apply e-marketing-Sector activity

	We have enough financial resources to apply e-marketing
Years of existence in business	Strongly agree and agree
< 5	33,33%
6 - 10	55,00%
11 - 20	55,56%
> 20	65,71%

Table 10. Cross-tabulation, We have enough financial resources to apply e-marketing-Years of existence in businesses

	We have enough financial resources to apply e-marketing
Annual budget for e-marketing activities	Strongly agree and agree
< 10%	42,48%
10%-20%	93,75%
20%-30%	88,89%
>30%	87,50%

Table 11. Cross-tabulation, We have enough financial resources to apply e-marketing-Annual budget for e-marketing activities

	We have enough financial resources to apply e-marketing
Type of market in which the company sells the products/services	Strongly agree and agree
Domestic market	60,00%
International market	55,56%
Domestic and international market	61,90%

Table 12. Cross-tabulation, We have enough financial resources to apply e-marketing-Type of market in which the company sells the products/services

Regarding the availability of sufficient financial resources for e-marketing, the education and information and communication sectors show the highest percentages, ranging from 86% to 88%, significantly higher than other sectors. The wholesale and retail trade sectors and the financial and insurance sectors have moderately high percentages, between 67% and 68%. The availability of financial resources for e-marketing is directly related to the company's years in business, with older companies generally having more funds for e-marketing. The largest financial resources are found in businesses that allocate 10%-20% of their annual budget to e-marketing activities. A high percentage of companies, especially those that allocate 20%-30% or more, also report strong support from top management for e-marketing efforts. In terms of the market type, there is no significant difference in the availability of financial resources for e-marketing. Whether operating in domestic or international markets, 56% to 62% of companies reported having sufficient financial means to apply e-marketing.

4.5. Hypothesis testing

By applying the χ^2 test, as a result of the input information, as well as the corresponding empirical and calculated (theoretical) values of the answers from the respondents from the companies on separate questions, and by the subject and purpose of the research, the following general hypothesis was tested:

H_0 – The application of e-marketing does not depend on the size of the companies.

To test this hypothesis, the first five questions (related to the application of e-marketing tools) and the last three questions (related to the application of e-marketing metrics) are from the list of questions in Fig. 5.

Special hypotheses, which derive from the first general hypothesis, are:

H_{01} – The application of e-marketing tools does not depend on the size of the companies.

The empirical values of the responses of the respondents about the questions are:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Sum
< 9	201	255	75	0	36	567
10 - 49	375	294	153	33	42	897
50-249	288	222	78	15	27	630
>250	327	120	66	15	18	546
Sum	1191	891	372	63	123	2640

The theoretical values are:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Sum
<9	255,7943182	191,3625	79,89545455	13,53068182	26,41704545	567
10 - 49	404,6693182	302,7375	126,3954545	21,40568182	41,79204545	897
50-249	284,2159091	212,625	88,77272727	15,03409091	29,35227273	630
>250	246,3204545	184,275	76,93636364	13,02954545	25,43863636	546
Sum	1191	891	372	63	123	2640

Results:

Critical chi-square: 21.026

Computed chi-square: 119.3477

Degrees of freedom 12

p=8,337E-20

$\alpha = 0.05$

Conclusion:

Since the calculated χ^2 test value is greater than the critical (table) value, it can be concluded that the first special hypothesis is rejected, indicating that the application of e-marketing tools depends on the size of the companies.

H_{02} – The application of e-marketing metrics does not depend on the size of companies.

The empirical values of the responses of the respondents about the questions are:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Sum
< 9	51	48	57	21	150	327
10 - 49	93	24	90	3	339	549
50-249	126	96	51	72	24	369
>250	72	18	90	15	138	333
Sum	342	186	288	111	651	1578

The theoretical values are:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Sum
< 9	70,87072243	38,54372624	59,68060837	23,00190114	134,9030418	327
10 - 49	118,9847909	64,71102662	100,1977186	38,61787072	226,4885932	549
50-249	79,97338403	43,49429658	67,3460076	25,95627376	152,230038	369
>250	72,17110266	39,25095057	60,7756654	23,42395437	137,378327	333
Sum	342	186	288	111	651	1578

Results:

Critical chi-square:	21.026
Computed chi-square:	388.78389
Degrees of freedom	12

p=8,9561E-76

$\alpha = 0.05$

Conclusion:

Since the calculated test is greater than the critical (table) value, it can be concluded that the second special hypothesis is rejected, which means that the *application of e-marketing metrics depends on the size of the companies.*

From the tested special hypotheses, it can be concluded that the general hypothesis is rejected, which means that the application of e-marketing depends on the size of the company.

Such hypotheses can be tested for the rest of the issues, in relation not only to the size of the companies but also concerning the sector, the years of existence in the business, the annual budget for e-marketing activities and the market in which the companies sell their products/services, but due to the limitation of the scope of work, we only did the preliminary tests.

4. Conclusion

The following conclusions and recommendations can be drawn from the conducted research, data processing, and analysis:

In terms of the ability and readiness of Macedonian companies to apply e-marketing, it can be concluded that in several aspects, the respondents (more than 50%) expressed themselves positively. From all those aspects, over 70% of the respondents follow the trends and well recognize the benefits of the application of e-marketing, they have a website that is continuously updated and the website has a built-in data protection system. What is a weakness in terms of the ability and readiness of Macedonian companies to apply e-marketing is the absence of an e-marketing strategy and sufficiently qualified staff for e-marketing, non-attendance of training related to the use of e-marketing tools as well as the inability to make electronic payments on the website.

Concerning the application of e-marketing, it can be concluded that the application of both e-marketing strategies and e-marketing tools by Macedonian companies is unsatisfactory (less than 50%). The application of e-marketing in Macedonian companies is the most important for attracting new customers as well as retaining permanent ones. The data also indicate that the largest percentage of companies apply e-marketing to advertise products and services, communicate with customers, create a base for their wants and needs for the company's brand, and supplement traditional marketing activities. A small proportion of companies (less than 30%) that apply e-marketing stated that they apply e-metrics for sales promotion and consumer behavior on the website.

Regarding the benefits of e-marketing, it can be concluded that companies are not fully aware of all the advantages of e-marketing.

What is interesting is that many aspects related to the readiness of companies to apply e-marketing do not depend either on the activity (except for one or two activities), nor on the fact whether the products/services are sold domestically, internationally, or in both types of markets, and it depends on the years of existence of the company in the business.

The study showed that the application of e-marketing (e-marketing tools and e-marketing metrics) in Macedonian companies is significantly dependent on the size of the companies.

This research can serve as a basis for further research and for stimulating companies in the direction of greater implementation of e-marketing in their operations.

To increase uptake in sectors with a lower level of support, it is recommended that:

- Education and awareness: organizing workshops, seminars and training for top management and marketers on all aspects and benefits of e-marketing.
- Strategic plan: develop clear and measurable e-marketing strategies that will demonstrate a return on investment and be part of the corporate strategy
- Implementation of e-marketing tools: investing in tools that are specific to the industry and will contribute to increasing the competitiveness and profitability of the company.

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THE QUALITY OF INFORMATION IN HIGHER EDUCATION INSTITUTION – A CASE STUDY

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Abstract

Information quality problems affect the information system of organizations. Poor quality and inaccurate information can damage every aspect of organizations. In order to ensure the quality of information in information systems, it is important to understand the basic factors that affect the quality of information. In this paper, the focus will be on a specific category of organizations – higher education institutions. In order to investigate the quality of information in this type of institutions, a survey will be conducted in order to determine how the factors affect the quality of the information, and then the data obtained will be subject to statistical processing, which will include descriptive statistical analysis and factor analysis. This paper will provide a solid basis to research the factors affecting the quality of information. The study will have theoretical and practical contributions in the field of information quality evaluation, as a component of information management.

Keywords: quality of information, factor analysis, case study, higher education institutions, Faculty of Economics - Prilep.

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1. Introduction

During the industrial age, organizations are called upon to collect, store, update and manage information for their survival and in order to remain competent. Information has a vital importance and certain advantages in the work of organizations. Therefore, the quality of information must be first, because only quality information is significant for the performance of business activities, and even more in decision-making processes.

Despite the critical importance of information quality, there is a need to study the factors that influence quality. These factors and their levels should be identified in the context of information management in organizations to enable the necessary strategies or guidelines for information quality management to be established. However, due to the lack of associated strategy or directions, the majority of organizations fail to manage information quality as their key strategy.

This study focuses on determining the key factors that influence the quality of information among employees in a higher education institution, Faculty of Economics in Prilep. The focus is put on the connection of each of the factors in relation to the quality of the information that is implemented in the daily operation of this organization. Research findings can be used to determine what factors influence and how to effectively implement an information quality management system.

2. Research methodology

The quality of information has a significant impact on the organization of information systems. Therefore, understanding the quality of information is essential. In this paper, the quality of information in a higher education institution will be investigated, that is, the most significant factors that affect the quality of information will be identified. In this paper, a framework for the factors for the quality of information will be presented, that is, a case study will be prepared in a higher education institution - Faculty of Economics - Prilep. The findings of the study will present the most significant factors influencing the quality of information that should be widely understood, as well as providing recommendations that may be useful in the future. For the purposes of this paper, qualitative research has been carried out, that is, a case study will be prepared through descriptive statistical analysis, and factor analysis in the statistical package SPSS. The reason why this research will be conducted using factor analysis is to study a contemporary phenomenon in the context of real life. Since little research has been conducted on the issues surrounding the factors of information quality especially in the field of higher education institutions, there is a need to examine what are the most significant factors affecting information quality. Therefore, this type of research through a case study using a quantitative method is appropriate for this study.

This research is based on the analysis of primary data, collected through a survey method that was sent via web to the e-mail addresses of all employees of the Faculty of Economics, i.e. to members of the academic and administrative

staff, in the period from 01/05/2024 until 01/08/2024. The purpose of the case study is to investigate what actually happens in the real world in terms of information quality.

3. Theoretical concept

3.1 Quality of information

The literature makes several contributions regarding information quality: part of the literature defines information quality as a characteristic or as a driver of the information quality of systems (DeLone & McLean, 1992; Nelson et al., 2005), while other contributions in the literature refer to the assessment of information quality by proposing certain research frameworks or methodologies (Bovee et al., 2003; Lee et al., 2002; Stvilia et al., 2005). (Lee et al., 2002), for example, identify business areas that need to improve the quality of information through analysis of the companies. (DeLone & McLean, 1992; Nelson et al., 2005), have addressed studies that include information quality as an item affecting information system quality. (Nelson et al., 2005) have conducted a study on a user data storage, developing a model based on nine determinants of IT environment quality, four of which are related to information quality.

In the field of management, information systems, the quality of information and the quality of information systems are still the most discussed topics. The literature provides different interpretations of information quality, recognizing that information quality can be internal, contextual, representative and available, i.e. related to accessibility (Lee et al., 2002; Zmud, 1978; Ballou & Pazer, 1985; DeLone & McLean, 1992;).

3.2 Factors affecting the quality of information

Information should be considered and treated equally as tangible or intangible products. It is in this context of the philosophy and principles of quality management, which are appropriate to take as a basis for identifying the factors affecting the quality of information. This study derives 15 factors affecting information quality from previous elaborate studies on information quality. These factors include: accuracy of information, precision, reliability, completeness, objectivity, traceability, i.e. the information itself can be traced to the extent that the source of the information can be found, volume appropriate to the tasks set, effectiveness, relevance, value, interpretability, consistency, comprehensibility and accessibility. All these factors affect the quality of information among employees in higher education institutions.

4. Factor analysis of the quality of information in higher education institutions (case study Faculty of Economics - Prilep)

For the purposes of this research paper and explaining the factors affecting the quality of information in higher education institutions, a survey questionnaire was prepared and distributed to all employees (academic/administrative staff) of the Faculty of Economics in Prilep. The questionnaire was consisted of 10 questions.

The survey questionnaire was sent to 45 respondents, where all answers were positive, from which it can be concluded that there is a representational of the sample. The first five questions of the questionnaire referred to the age, gender, school preparation of the respondents, belonging to the type of staff (academic/administrative), while the fifth question referred only specifically to the academic staff. From the results of the first question, most of the employees, i.e. 33.3% (15 respondents) are between the ages of 46 and 55, then 31.1% (14 respondents) are between the ages of 36 and 45, 26.7% (12 respondents) are over 55 years old, 6.7% (3 respondents) are between 26 and 35 years old and 2.2% (1 respondent) are under 25 years old. In terms of gender, 51.1% (23 respondents) are women, while 48.9% (22 respondents) are men. Most of the respondents, i.e. 80%, are doctors of science, 6.7% are masters of science, 8.9% have higher education, while 2.2% have completed higher education and 2.2% have completed secondary education. preparation. 77.8% of respondents belong to academic staff, while 22.2% belong to administrative staff. Regarding the academic staff, 18.4% belong to the Department of Economics, 21.1% belong to the Department of Finance, 18.4% belong to the Department of Management, 15.8% belong to the Department of Business, 10.5% belong to the Department of Marketing and 15.8% belong to the department of informatics.

Regarding the format in which the employees or the respondents receive the information, the results are the following: 16 of the respondents declared that they often receive the information verbally, 12 very often, 10 neither rarely nor often, 5 rarely and 2 very rarely. 23 respondents declared that they very often receive information in printed form, 14 respondents often, 5 neither rarely nor often, 2 rarely and 1 very rarely. Regarding PDF format, 15 respondents declared that they very often receive information in PDF format, 11 often, 10 neither rarely nor often, 4 rarely and 5 very rarely. Regarding the Word format, 19 respondents declared that they often receive information in this form, and 18 very often, then 4 neither rarely nor often, 3 rarely and 1 very rarely. Regarding the Excel format, 21 respondents stated that they very often receive the information in this format, followed by 11 often, then 6 neither rarely nor often, 6 rarely and 1 very rarely. 29 respondents declared that they very rarely receive information in video format, then 12 rarely, 6 neither rarely nor often and 1 respondent answered often. About the audio format, 32 respondents declared that they very rarely receive information in this format, then 8 rarely, 2 not rarely, not often and 3 often.

Regarding the quality of the information for the oral format, the majority of the respondents (17 respondents) stated that they mostly received high-quality information, while only 4 respondents declared that it was of very poor quality. Regarding the printed form, most of the respondents (27 respondents) declared that they receive the information mostly of high quality, while only 2 respondents declared neither high quality nor poor quality. For the PDF format, most of the respondents (22 respondents) stated that the information is of very high quality, and 2 respondents said that the information is of very poor quality in their institution. Regarding the information they receive in Word format, respondents (24 respondents) think that it is mostly of good quality, and only 1 respondent stated that the information received in Word format is mostly of poor quality. As

an Excel format, 22 respondents declared themselves with the attitude of mostly quality, and 2 respondents mostly of poor quality. Most of the respondents think that the video format (12 respondents) and the audio format (13 respondents) that the information is of very poor quality.

Regarding the source from which they get the information, the employees of the Faculty of Economics - Prilep had a choice of 6 answers, namely:
- Dean - most of the respondents (16) answered "often", and 1 respondent "rarely";
- NNS/Secretary - 14 respondents answered "often" and 1 respondent answered "rarely";
- Head of department - 12 respondents each answered "neither rarely, nor often" and "very rarely", and only 3 respondents answered "rarely";
- Student service - 17 respondents declared that they receive information often, while 6 respondents each declared "very often", "rarely" and "very rarely";
- Administrative staff - most of the respondents (19 respondents) declared that they often receive information, while only 4 respondents "rarely";
- Academic staff - the respondents often receive the information from the academic staff, that is (12 respondents), and 5 declared "rarely".

5. Factor analysis of information quality factors

5.1 Creating basic components and criteria of factor analysis

Factor analysis is a statistical method used to describe the variability between observed interacting variables in terms of creating a potentially smaller number of unobserved variables, called factors.

The quality of information is influenced by a number of factors: accuracy of information that corresponds to its true value, precision to the extent that different measurements of the information are close to each other, reliability with the source, i.e. the information is without prejudice and unbiased, completeness and connection with the availability of the necessary data attributes, objectivity to the extent that the information itself is unbiased and without prejudice, ease of tracing to the extent that the source of the information can be found, appropriateness of the scope of the information is appropriate to the task to be performed, effectiveness to meet the needs of the task at hand, relevance to the extent that the information is applicable or useful to the task at hand, value i.e. timeliness for the task at hand, interpretability, consistency, comprehensibility, accessibility and appropriateness limitation by authorized authorities and availability as needed. The factor analysis performed in this paper investigates the most significant influencing factors on the quality of information in higher education institutions.

In this research, by applying factor analysis from 15 source variables, 2 extracted factors are obtained. The data in the survey research were collected based on a survey questionnaire, which was answered by 45 respondents, which is 100% of the total population. One of the basic assumptions for the application of factor analysis is that the data are measured on an interval scale, that is, an ordinal measurement scale. Namely, the employees gave their opinion on a scale from 1 to 5, where 1 means "disagree" and 5 means "agree". The factor analysis of the quality of the information was realized on 15 source variables.

For descriptive statistics of the answers of the employees in the Faculty of Economics - Prilep, it can be concluded that the employees mostly agree that: the information is interpretable, that is, the information is in an appropriate language, symbol and unit, and the definitions are clear for both people and equipment as a user (4.29), then the information is accessible and appropriately limited by authorized authorities (4.18), the information is easy to understand (4.11), and mostly they do not agree that: the information is confidential to the source, that is, it is without prejudice and impartial (3.27). The greatest variability in the answers of the employees refers to the fact that the information is confidential to the source, that is, that it is without prejudice and impartial (1,543), then the information has an adequate amount, that is, the volume of the information is adequate to the task to be performed (1,482) and information is objective to the extent that the information itself is unfounded and without prejudice (1.433). The least variability in the answers, or the employees mostly agree with regard to the statement that the information is accessible and appropriately limited by authorized authorities.

The correlation matrix containing the coefficients of the simple correlation of each pair of variables is the basis for the realization of the factor analysis. So one of the conditions for the application of the factor analysis is the connection between the source variables. Namely, from the correlation matrix, the connection between some variables can be determined and it can be determined that there is a suitability of the data for using the factor analysis procedure. To check whether the collected data are suitable for factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value should be equal to or greater than 0.6, and the Bartlett's Test of Sphericity value should be significant (i.e the value should be Sig. 0.05 or lower). In this analysis, the KMO indicator is 0.874, and Bartlett's indicator is also significant (p=0.000), which means that the factor analysis is justified.

Table 1. Specific values, individual and cumulative percentages of factor variables

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.415	56.097	56.097	8.415	56.097	56.097
2	1.420	9.464	65.561	1.420	9.464	65.561
3	1.227	8.183	73.744	1.227	8.183	73.744
4	.826	5.505	79.249			
5	.641	4.273	83.522			
6	.506	3.377	86.898			
7	.359	2.393	89.291			
8	.341	2.274	91.564			
9	.295	1.967	93.532			
10	.266	1.773	95.305			
11	.231	1.539	96.843			
12	.154	1.028	97.872			
13	.139	.928	98.799			
14	.104	.696	99.496			
15	.076	.504	100.000			

Source: Own analysis

The initial results based on which the factors are drawn out, are shown. From the results shown in the table, it can be seen that 3 factors have been drawn out,

because their characteristic value is 1 or greater than 1. In this table, only the first three components have a characteristic value greater than 1 (8.415, 1.420, 1.227). Those three components explain a total of 73,744% of the variance. But after the factor weight was calculated, this solution is not optimal, so it is concluded that only two components fulfill the condition.

The next is to present the unrotated factor weight items (variables) for the three components (factors). But only in the first two components there is a decent size of factor weight that is over 0.4.

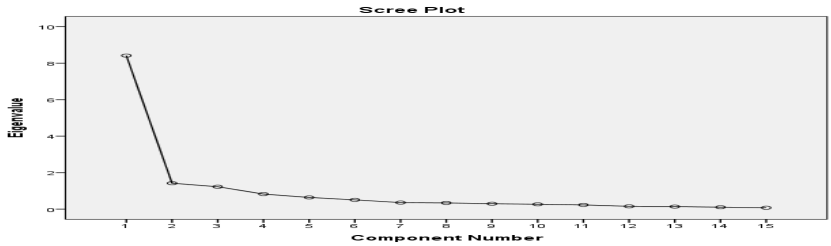


Figure 1. Kateliev diagram of the employees
Source: Own analysis

From the graphic display in Figure 1, which presents the Kateli diagram (scree plot) for 15 variables, it can be seen that 3 factors stand out. In the diagram, it is necessary to find the transition point, since only the components above that point should be considered. In this research, the breach of the connection between the second and third components is quite visible. Components 1 and 2 explain a much larger proportion of variance than the remaining components. It is also necessary to determine the factor structure matrix of the extracted factors. Analyzing the data in the Component Matrix table, it can be seen that separate variables correlate with several factors, and the factor analysis shows that the first factor is defined by a high factor loading with a larger number of variables.

For the strength of correlation between the factors where the correlation is quite small, -0.523. Based on this data, it should be concluded whether the procedure is justified, that those three components are not mutually dependent (which is an assumption for correctness of Varimax rotation). If the components have a higher correlation, it should be above 0.3, it will be noticed that the results differ. The Pattern Matrix table shows the factor weights of all variables. In this table, component 1 has the main factor weights, and there are 8 of them, because they all have factor weights greater than 0.3, component 2 has five, while component 3 has none, all of them have negative values. It is precisely for this reason that it is necessary to take only two factors, because ideally each component has three or more factor weights higher than 0.3. In this table, the main factor weights of component 1 are objectivity, availability, consistency and up-to-date, which means it is clear which are the main factors.

6. Conclusion

The topic of this research paper raised many questions that were answered, gave directions, but also raised dilemmas. The purpose of this paper is to investigate the quality of information in higher education institutions with a

special reference to the Faculty of Economics in Prilep, using a sophisticated statistical method, analysis and models. The choice of methods used in this paper arose from the specificity of the problem. In the first part of the paper, the quality of information and the factors that directly affect the quality of information were theoretically elaborated. In the second part, the results of the survey questionnaire are presented, while in the third part, a factor analysis of the factors that affect the quality of the information is performed. From the processing of the factor analysis, it was found that there are only two factors that have the greatest influence on the quality of information in higher education institutions according to their factor weight, namely:

- the information is interpretable, that is, the information is in an appropriate language, symbol and unit, and the definitions are clear for both the people and the equipment as users; and
- the information is easy to understand

Also, from the results where the factor analysis of 15 defined factors was processed, two were singled out that have little or no effect on the quality of information, namely:

- the information is confidential to the source, that is, it is without prejudices and impartial; and
- information is objective to the extent that the information itself is unfounded and without prejudice.

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IMPROVING BUSINESS ENGLISH PROFICIENCY FOR EFFECTIVE BUSINESS COMMUNICATION

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Abstract

Effective communication in the business world is essential for success, and business English plays a vital role in developing this skill. The ability to communicate effectively is necessary for students majoring in Business and Economics, as they will need to use their language skills in various professional settings. This study aims to improve the curricula regarding the Business English course at Macedonian universities by proposing practical solutions and strategies. A student-centred curriculum that considers the communication needs of the learners is crucial for success. Effective curriculum designs incorporate real-world business requirements and offer content directly applicable to the learners' needs and wants. Thus, this research surveyed company representatives, university professors, and students to propose and discuss several practical strategies for improving business English teaching and learning processes in the country. The survey results show that a student-centred curriculum that considers learners' diverse needs and perceptions of business English is critical in designing an effective curriculum. In conclusion, this study highlights the importance of a student-centred curriculum that aligns with the practical needs of the business arena and considers learners' diverse language needs and perceptions of business English. The proposed solutions and strategies in this paper, designed with practicality in mind, offer a guide for instructors and curriculum designers on how to incorporate Business English in the curricula in order to enhance the communication skills of business and economics students.

Keywords: Business English, Business Communication, Curriculum Design, Student-centred curriculum.

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1. Introduction

This research aims to develop and implement suitable course content, methodologies, and curricula at Macedonian universities in order to enhance students' business skills. The study seeks to determine the right pathway to enhance and attain language and writing skills for effective real-world use. The paper discusses research findings on improving the teaching and learning process of business English at Macedonian universities to improve the business communication skills of business and economics students. The proposed solutions and strategies are based on the need to understand business English as a core skill of the students and to include it appropriately in the curriculum for business and economics students. To create a student-centred curriculum, we must consider both the students' wants and needs and the requirements of the business community in terms of business English proficiency.

Research has shown that effective curriculum designs for English for Specific Purposes (ESP) programmes, such as business English programmes, are the ones that are best aligned with the specific professional field for which the English course is designed. The best programs for business English recognise the requirements of the business arena. In a study, Chan (2014) identified the need for a curriculum design to bridge the gap between communicative needs and the content of Business English courses. Chan gathered data from 215 working adults through a questionnaire survey and examined the most spoken and written needs of professionals, the challenges they face in achieving what is required of them, the most challenging spoken and written communication means, and professionals' perceptions of what factors can make such courses effective and valuable to them in the workplace. The findings showed that effective curriculum designs incorporate what is needed in the actual business field.

A strong and effective curriculum will have relevant content relative to the learners' needs and wants. Regarding business and economics students, their business communication skills are crucial for effective business transactions; thus, business English plays a key role here. Dimeski (2021) suggests that adopting business English as the common language in all companies would significantly improve the business environment and positively impact the country's economy. The field of business English is different from the general field of the English language since it is characterised by specific phrases essential to business operations. Examples of phrases in business English include employee turnover rates, gross domestic product, financial statements (balance sheets, income statements, and cash flow statements), investment decisions, portfolios, and others. The specialised literature presents an intriguing approach to business English, with most sources providing a specific and precise definition. The explanation for this situation relies on the concept being often self-explicit, and it could be difficult for researchers to create a stern and rigid definition to integrate the multitude of applications and importance of business English.

On the other hand, an effective curriculum design can be problematic when learners' needs and backgrounds are not considered. According to Friginal (2013), learners' diverse cultural and educational backgrounds make it difficult to rely on

guidelines. Lecturers and tutors can face challenges in meeting the academic expectations of the learners and vice versa. On the other hand, the content of English language courses must acknowledge the varied language requirements of learners (Daloglu, 2004; Nathan, 2013). Furthermore, Gardner (2012) emphasised that the literature demonstrates the extensive and diverse needs of foreign language learners, which can lead to substantial challenges if not addressed in the curriculum. In general, the curriculum for English learning courses must accept that learners have diverse language needs that must be met.

Considering the studies above, the researcher conducted a survey of company representatives, university professors teaching Business English and university students. The results were used to propose and discuss several strategies for improving the teaching and learning process of Business English at Macedonian universities.

2. Methodology

The research methodology involved conducting question-based interviews and surveys targeting company professionals, students, and teachers. This inclusive approach was implemented to ensure that all relevant stakeholders had the opportunity to contribute to the development of business English teaching practices. In addition, observations in various business English classes were made to provide a diagnostic assessment. The educators' feedback was obtained through a survey that spanned multiple days until all questionnaires were collected. Similarly, the responses of the students and company professionals were acquired using the same method. Subsequently, in-depth discussions and interviews were undertaken to gain valuable insight into the teaching and learning experiences, mainly focusing on the business communication skills essential for the business community. This analysis provided a comprehensive understanding vital for identifying areas requiring change and enhancement within the curriculum and teaching methods. The ultimate goal is to establish teaching procedures and foster outstanding learning outcomes.

The application of a qualitative research design in this study is not only suitable but essential, as it seeks to comprehensively assess and gauge the effectiveness of existing teaching methods, syllabi, curricula, and learning outcomes in the context of business English. The focus of this research pertains to enhancing the business communication competencies of graduates in the fields of business and economics. The objective is to comprehensively analyse and improve the pedagogical approaches utilised in the instruction of business English at Macedonian universities. With a qualitative design, surveys and other forms of questionnaires can be utilised to achieve the purpose of this research. They would allow the researcher to tap into the complex human behaviour and understand its sensitive nature (Creswell, 2009). This finding is particularly true when obtaining accurate, precise, and appropriate information and assessing it.

The aforementioned emphasises the validity of employing this research approach in the study. The primary objective of the research is to present potential remedies for designing a curriculum that aligns with the requirements of

university students majoring in Economics and Business. Utilising the qualitative research technique of surveys is intended to yield primary data regarding the necessity of enhancing business English proficiency to bolster students' business communication skills.

3. Research Findings and Analysis

As Catherine Nickelson and Brigitte Planken (2015) assert, intertextuality and interdiscursivity are integral to the transactional processes of today's business world. Business English is a ubiquitous language in both local and international settings. A questionnaire survey of company professionals revealed that a staggering 83.3% prefer business and economics graduates with higher English proficiency, as depicted in Fig. 1. Moreover, representatives from various companies underscore the high importance of English proficiency in the workplace, as expressed below:

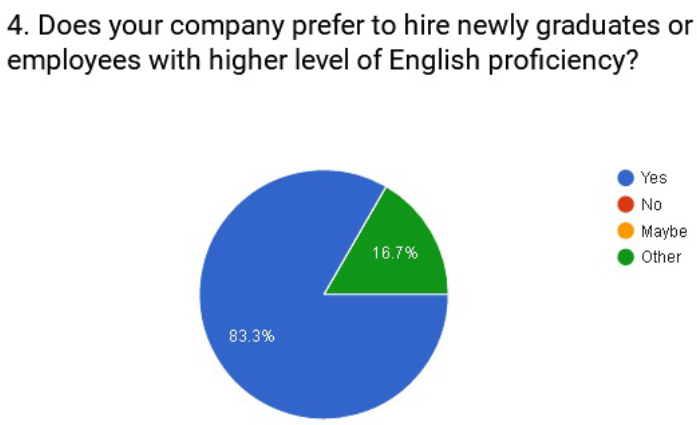


Figure1. Percentage of Companies' Preference to Hire Newly Graduates with Higher Levels of English Proficiency

According to Fig. 2, business representatives in Macedonia highly value business English proficiency. About 91.7% consider English proficiency very important in the workplace, rating it 10 or 9 on a scale from 1 to 10. The remaining 8.3% rate it with 8. This rating indicates the significance of English language skills for the business community in Macedonia. Therefore, it is evident that business representatives believe that Business English should be a compulsory and core course in the curriculum, just like the rest of the business and economics courses.

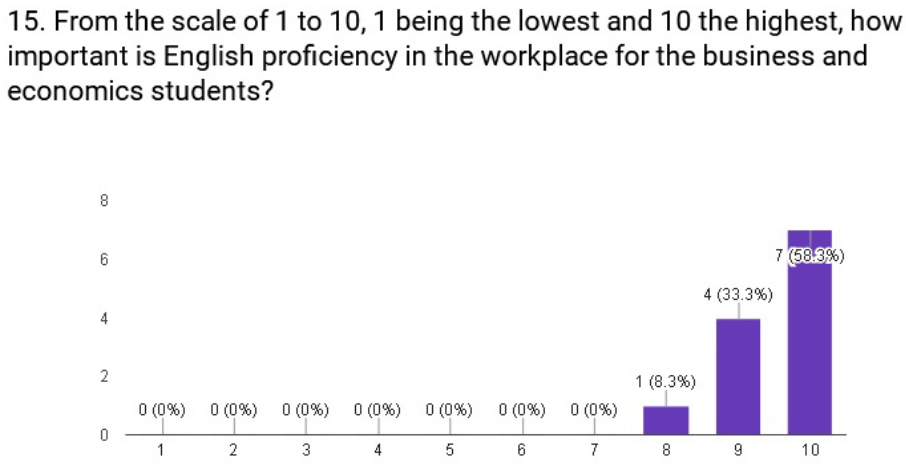


Figure 2. The Importance of English Proficiency in the Workplace - Company Representatives' View

Furthermore, company professionals who were interviewed emphasised the importance of fluency in English for business and economics graduates and potential employees. This expectation was derived from their feedback regarding their experiences in recruiting new personnel:

"…both who have not studied English and that have studied English. The interviews with the latter have [sic]often been disappointing due to 'relatively poor' English proficiency given that they have been studying English language."

"Yes I have executed interviews with newly graduates, and about 70% of them were fluent in English. As all newly graduates in MKD, most of them were with no working experience, but this company is a company that wants to develop young talents and invests in their knowledge."

"…In a potential interview, we would require the candidates to be fluent in English."

In addition, business and economics students are well aware of the significance of mastering business English in their professions. Therefore, revising the current curriculum and making the Business English course mandatory for all students is crucial. Survey responses have emphasised this need, as illustrated in Fig. 3.

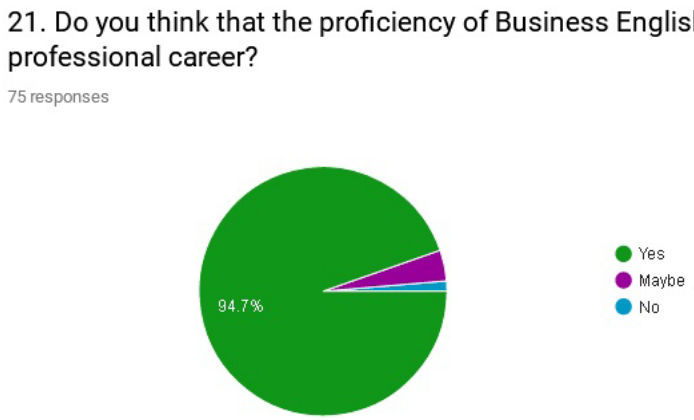


Figure 3. Percentage of Students' Response to the Need for Business English in Their Future Professional Careers

The student participants emphasised the significance of integrating Business English into additional semesters as they sought to enhance their communication skills. Recommendations regarding the duration of study for Business English within the curriculum included:

"Every semester, because the importance of knowing Business English is big and has a crucial part in growing your business."

"Every semester. That way, the classes will elaborate the topics on a more comprehensive level."

"Each semester, or at least one semester per academic year."

"According to me, in the last two years of the studies, 5th, 6th, 7th and 8th semester."

The collected responses from the students unmistakably indicate their robust understanding of the importance of business English in their prospective careers. Furthermore, they have duly recognised the intricate nature of the subject, underscoring the necessity for an increased number of semesters allocated to the Business English course within the curriculum to enhance the learning experience.

Likewise, the participating professors restated the importance of English as a compulsory curriculum component for all students. In addition, they provided valuable insights for enhancing specific elements of the curriculum in line with their feedback:

"It would be good if it could become compulsory instead of elective if the number of classes increased, and if group size decreased - thus, students would get a chance to practice their Business English, interaction would be enabled, the assessment would include an oral part, etc."
"A certain period of English language use in real-life situations, such as speaking with international experts in their field, should be part of their curriculum."

"A needs analysis will define specific aspects of students' needs, and the curriculum can be designed in negotiation with the students."

As per the recommendations of both students and professors, it has been proposed that the most effective approach to enhancing the proficiency of university students in business English is to extend the duration of the course and mandate its inclusion for all business and economics students due to its substantial impact on post-graduation outcomes. The research findings reveal that 66.6% of the student participants indicated that Business English is currently an elective. In comparison, only 20% reported its status as a compulsory course within their university, as illustrated in Figure 4.

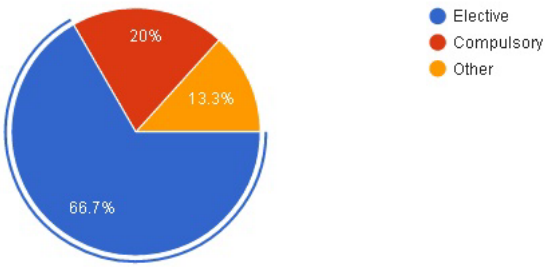


Figure 4. Percentage of Students Participants' Response on Whether Business English is a Compulsory or an Elective Subject

According to the findings of the study, a majority of participating students believe that extending the duration of the course would enhance their proficiency in English, contributing to their advancement as English users throughout their university tenure and post-graduation. Additionally, the students indicated a strong preference for the incorporation of additional Business English classes within their course curricula.

"More Business English classes."

"More classes being taught in English or having a choice to follow classes and pass exams in English."

"Business English should be studied in all four academic years."

The professionals engaged in the discussion highlighted the necessity for reforms within Macedonian universities aimed at establishing an educational framework for teaching business English. They recommended expanding the scope of activities and semesters dedicated to learning business English to ensure that graduates possess proficient business communication skills encompassing speaking, listening, comprehension, and writing. The following excerpt presents the viewpoint of certain participants:

"They must find a way to have more time past in communication (reading, writing, speaking."

"I think Macedonian students should be encouraged to visit international companies and learn how does it look [sic] like to communicate with foreign partners. Additional classes with company managers and directors are also a good idea."

"Learning Business English in every semester of the student is a must, and forcing them to practice it in real-time communication."

Fig. 5 shows that the median hour of teaching Business English in the current curricula is four hours a week.

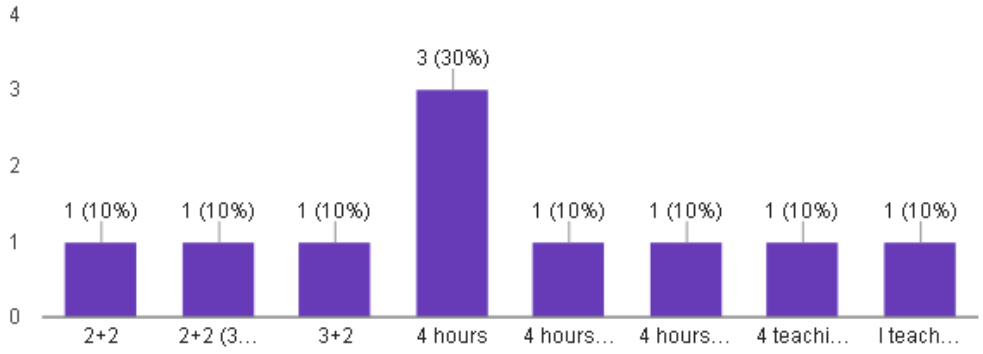


Figure 5. Number of Business English Instruction Hours Weekly

After conducting an analysis of the appointed weekly instructional hours for business English throughout the semester and considering the feedback from participating professors, it is evident that the curriculum needs to be revised. A review of the existing programs offered at universities in the country indicates that Business English is predominantly offered as an elective course across two semesters for more than 90% of students, as indicated in Figure 6.

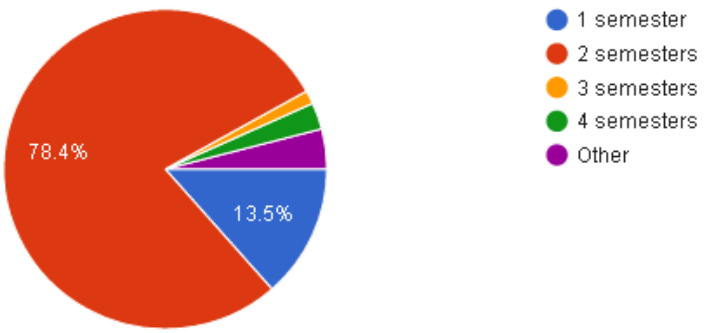


Figure 6. Semesters Business English Course Included in the Current Curricula

During the interview, a professor emphasised the necessity of allocating additional time to the course in order to enhance the efficacy of teaching and learning."Not enough time allocated for the course, more hours and more semesters are needed. Most of the students do not have any previous knowledge or practical skills of Business or Economics in combination with their insufficient level and skills of General English is a major and serious obstacle in achieving the course objectives in only 4 hours per week and in two semesters."

After gathering professors' responses to the question, "What is your recommendation for the number of semesters required to teach Business English for optimal results?" it emerged that the majority advocate for an extended course duration to attain superior outcomes. For instance, one of the professors articulated:

"I have so much material from a variety of areas in the business world I'd like to cover, but have so few classes."

While another professor delves even deeper into the topic by adding:

"It would be good if it could become compulsory instead of elective, if the number of classes increased, and if group size decreased – thus, students would get a change to practice their Business English, interaction would be enabled, assessment would include an oral part…"

Professors are considering increasing the time allocated for the Business English course in the curriculum to achieve better results. They also discuss revising the status of Business English courses from elective to mandatory for all students majoring in business and economics. Additionally, they propose increasing the number of semesters for these courses, aligning them with the students' proficiency in general English. This adjustment is prompted by the substantial difficulties encountered by instructors when teaching Business English to heterogeneous groups of university students, as indicated by research findings. One professor even articulated:

"2 semesters is enough, provided their level of English is suitable enough to follow the lectures."

Furthermore, it is important to note the responses provided by the other professors:

"At least 4, in this way students will be exposed to a number of different segments, and they will also have the chance to revise whatever needs to be revised or explained again."

"Business English should be taught at least three semesters and should be compulsory, not elective."

"Since it's an elective subject, in my opinion four semesters would be enough."

Professors have expressed their belief that the current curriculum needs updating, specifically regarding the allocated number of hours per week and the course duration. On the other hand, business and economics students require a more comprehensive and structured curriculum. This is necessary to meet the needs of students seeking in-depth knowledge and skills, as well as those of employers who seek to recruit graduates proficient in using English for business transactions.

4. Conclusion

The research objectives aim to revamp the curricula of business and economics study programmes, as well as the Business English syllabi, in order to provide more students with the opportunity to apply their knowledge and increase their chances of achieving a successful and fulfilling career. The quality of education depends on the ability to apply the acquired knowledge in practice, which is why communication is crucial in exhibiting one's expertise. Corporations value candidates fluent in business English and can use relevant terminology to communicate and collaborate with colleagues.

As a result, the study proposes promoting business English as a core competency, not just a part of an updated business and economics curriculum. Students need a structured language curriculum to develop and apply business communication skills to their future careers. The current situation in the country shows that only 20% of students are required to take Business English courses, while 80% still need to have it as a core subject in their business and economics programmes. Therefore, making Business English a compulsory course for all business and economics students in higher education institutions is the first step in upgrading the current curricula and creating a student-centred approach.

In addition, students should study Business English for at least four semesters to develop their communication skills and expand their competency in the business setting. Understanding how the business sphere operates can motivate students to learn and apply the language in practice. Finally, an effective

curriculum and syllabus are crucial in producing highly employable business and economics graduates from Macedonian universities.

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MANAGEMENT AND CONTROL OF THE BUDGET IN REPUBLIC OF KOSOVO

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Abstract

The management and control of the budget in the Republic of Kosova represents a critical aspect of the country's governance, impacting its economic stability and public service efficacy. This paper examines the frameworks and mechanisms that Kosova employs to manage and oversee its national budget. It highlights the role of the Ministry of Finance, Labor, and Transfers in formulating fiscal policies and administering budgetary allocations. The study delves into the legislative tools that guide budget planning, execution, and reporting, emphasizing the importance of transparency and accountability in public financial management. Furthermore, it explores the challenges faced by Kosova, such as limited fiscal space and dependency on international financial institutions, and evaluates the effectiveness of the audit processes conducted by the National Audit Office. Through an analysis of qualitative data and policy reviews, this paper assesses the strategic directions Kosova has adopted to enhance fiscal responsibility and governance. The findings suggest that while substantial progress has been made, continued efforts are necessary to strengthen institutional capacities and public trust in budgetary processes.Two of the specific issues raised on this paper are stated:A specific issue that Kosovo faces in its budget management is the alignment and compliance with European Union (EU) financial management standards. This includes the establishment of robust mechanisms for budget transparency, fiscal discipline, and public procurement processes. An interesting issue is the impact of political instability on the management and control of Kosovo's budget. Political instability can lead to frequent changes in government, which disrupts the continuity of fiscal policies and budgetary reforms, it can also affect investor confidence and international aid flows, which are significant for Kosova's budget.

Keywords: Institutional roles, fiscal policies, EU financial regulations, frameworks and mechanisms, political instability.

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1. Introduction

The management and control of public finances are foundational to a country's ability to sustain economic growth and deliver essential public services. In Kosova, the process of managing the national budget involves various institutions, legislative tools, and mechanisms designed to ensure fiscal responsibility, transparency, and accountability. Effective budget management is crucial for maintaining economic stability, particularly in a developing country like Kosova, where economic vulnerabilities and limited fiscal space pose significant challenges (Ministry of Finance, 2023)

The efficient allocation and oversight of public resources, alongside the country's reliance on international financial institutions such as the International Monetary Fund (IMF) and the World Bank, are critical to ensuring that Kosova can continue to finance its public services and development projects (World Bank, 2022).

A key institution in Kosova's budget management framework is the Ministry of Finance, Labor, and Transfers, which is responsible for formulating and implementing fiscal policies, preparing the national budget, and overseeing its execution. The ministry's role is not only to manage public funds but also to ensure that fiscal policies align with the country's broader economic and development objectives.

Moreover, the ministry plays a critical role in ensuring that Kosova's public finance system complies with European Union (EU) financial management standards, particularly in areas such as budget transparency, public procurement, and fiscal discipline (European Commission, 2022).

Kosova's efforts to align its public finance management (PFM) system with EU standards are part of a broader strategy to integrate with European institutions. The adoption of EU-compliant financial regulations is viewed as essential for improving governance and fostering public trust in budgetary processes (National Audit Office of Kosovo , 2023)

However, the country faces significant challenges in implementing these reforms, especially in the context of limited fiscal capacity and political instability. Frequent changes in government, often resulting from political instability, can disrupt the continuity of fiscal policies and delay critical budgetary reforms.

One of the primary legislative frameworks that guide budget management in Kosova is the Law on Public Financial Management and Accountability, which outlines the responsibilities of various institutions in overseeing public funds. This law also sets out the procedures for drafting, approving, and executing the

national budget, as well as the mechanisms for ensuring transparency and accountability (Assembly of the Republic of Kosovo, 2016)

In addition to the legislative framework, Kosova's budget process is subject to annual audits conducted by the National Audit Office, which evaluates whether public resources have been used effectively and in accordance with national priorities.

Despite these measures, Kosova's budget management system continues to face challenges, particularly in terms of institutional capacity and the need for greater public accountability (Kosovo Democratic Institute, 2022).

Political instability in Kosova also poses a significant risk to effective budget management. Frequent government changes disrupt fiscal planning and execution, leading to delays in policy implementation and the discontinuity of budgetary reforms.This instability not only affects internal budgetary processes but also has a negative impact on investor confidence and international aid flows, both of which are critical for financing Kosova's development projects.

The country's dependence on external financing makes it vulnerable to shifts in international financial markets and the priorities of donor countries, further complicating its budget management challenges.

This paper aims to examine the frameworks and mechanisms Kosova employs to manage and control its national budget. It will analyze the role of key institutions, particularly the Ministry of Finance, Labor, and Transfers, in overseeing the budgetary process, as well as the legislative tools that guide fiscal policy. Additionally, this paper will assess the challenges facing Kosova's public finance management system, with a specific focus on the issues of transparency, accountability, and political instability.

Through this analysis, the paper seeks to provide insights into the effectiveness of Kosova's budget management system and the steps needed to enhance fiscal responsibility and governance in the country.

2. Budget Management Framework in Kosova

Kosova's public finance management (PFM) system is regulated by a combination of national laws and international guidelines, with a significant focus on aligning with the European Union (EU) standards. The central legislative framework guiding public finance management is the Law on Public Financial Management and Accountability (Assembly of the Republic of Kosovo, 2016).

This law outlines the principles governing the drafting, approval, execution, and reporting of the national budget. It ensures that public funds are allocated efficiently, and fiscal operations are conducted with transparency and

accountability. Additionally, the law emphasizes the importance of adhering to fiscal discipline, particularly in times of economic uncertainty.

At the heart of Kosova's budget management process is the Ministry of Finance, Labor, and Transfers, which plays a crucial role in coordinating all aspects of budget preparation and implementation. The ministry formulates the national budget based on the government's strategic priorities and allocates resources accordingly. Once the budget is prepared, it is submitted for parliamentary approval, marking a critical step in ensuring democratic oversight over fiscal operations (Ministry of Finance, Labor, and Transfers, 2023).

The ministry also oversees the execution of the budget, ensuring that all government agencies comply with the approved allocations and that public resources are used efficiently.

An integral aspect of Kosova's public finance management is the country's alignment with EU regulations. The EU's Public Financial Management (PFM) guidelines serve as a benchmark for fiscal governance, providing a framework for budget transparency, fiscal discipline, and public procurement processes (European Commission, 2022).

Kosova's efforts to align its PFM system with these standards are critical for its European integration process, as compliance with EU regulations is a prerequisite for further political and economic cooperation. This alignment also strengthens the country's governance framework by promoting accountability and reducing the risk of corruption in public financial operations. (National Audit Office of Kosovo, 2023).

Kosovo's budget cycle follows a structured process that includes multiple stages: drafting, parliamentary approval, execution, and oversight. During the drafting stage, the Ministry of Finance consults with various stakeholders, including government agencies, to determine the country's fiscal priorities. Once the budget is finalized, it is submitted to the Assembly of Kosovo for approval, where it undergoes further scrutiny and adjustments. Upon parliamentary approval, the Ministry of Finance oversees the budget's execution, ensuring that expenditures align with the approved allocations and fiscal objectives.

To ensure accountability, the National Audit Office of Kosovo conducts regular audits of public expenditures, evaluating whether funds have been used effectively and in accordance with legal and regulatory requirements (National Audit Office of Kosovo, 2023).

This oversight mechanism is crucial for ensuring that the government is held accountable for its use of public resources and that any irregularities are promptly addressed. Furthermore, the audit reports are made publicly available, enhancing transparency and fostering public trust in the government's financial management practices.

One of the key priorities in Kosova's PFM system is its alignment with EU standards, which includes mechanisms for public procurement, fiscal discipline, and transparent financial reporting. The establishment of a robust public procurement system, in particular, is essential for ensuring that public funds are spent efficiently and that contracts are awarded in a fair and transparent manner. Fiscal discipline is also enforced through the establishment of expenditure ceilings and mechanisms for monitoring compliance with budgetary allocations. These mechanisms are not only critical for maintaining macroeconomic stability but also for building public trust in the government's fiscal operations.

The alignment with EU standards has been a central element in Kosova's fiscal reforms. The European Commission has consistently highlighted the importance of improving transparency and accountability in public financial management as part of Kosova's path to EU membership (European Commission, 2022). While significant progress has been made in aligning Kosova's PFM system with EU standards, challenges remain, particularly in terms of institutional capacity and the need for ongoing reforms in key areas such as public procurement and the oversight of public expenditures.

3. The Role of the Ministry of Finance, Labor, and Transfers

The Ministry of Finance, Labor, and Transfers serves as the central body responsible for managing the Republic of Kosova's national budget. Its role encompasses not only the formulation of fiscal policy but also the coordination of the budget's execution and ensuring compliance with the legal frameworks set by both national and international authorities. As part of its responsibilities, the ministry must also ensure that Kosovo's fiscal practices align with European Union (EU) standards, which is a key component of the country's integration into the EU (European Commission, 2022). This alignment includes maintaining transparency in public finance management, a requirement for establishing trust in public institutions and ensuring fiscal sustainability.

Budget planning and execution in Kosova are guided by several laws and regulations, including the *Law on Public Financial Management and Accountability*, which ensures the effective allocation of resources to priority areas. The ministry monitors the implementation of the budget to ensure that resources are used in accordance with the approved plans and that discrepancies are addressed promptly. EU Public Financial Management (PFM) standards provide additional guidelines, which are integral to Kosova's efforts to modernize its fiscal infrastructure and prepare for EU accession (Assembly of the Republic of Kosovo, 2016).

Through regular audits, the National Audit Office provides oversight, identifying areas for improvement and ensuring corrective actions are implemented when necessary. This process is fundamental to maintaining accountability and ensuring that public funds are managed in a manner that promotes long-term fiscal responsibility (National Audit Office of Kosovo, 2023).

4. Legislative Tools for Budget Planning and Execution

Kosova's budget management process is governed by several key legislative tools that regulate the drafting, approval, and execution of the budget. The primary law is the Law on Public Financial Management and Accountability, which sets out the responsibilities of various government entities in managing public funds. This law is supported by a range of regulations that ensure fiscal discipline and transparency. One of the critical mechanisms in place is the annual budget review, which allows for adjustments based on changing economic conditions. The Ministry of Finance, Labor, and Transfers plays a pivotal role in these reviews, ensuring that the country's budgetary resources are aligned with national priorities and that any gaps are addressed efficiently.

5. Transparency, Accountability, and Challenges in Public Financial Management

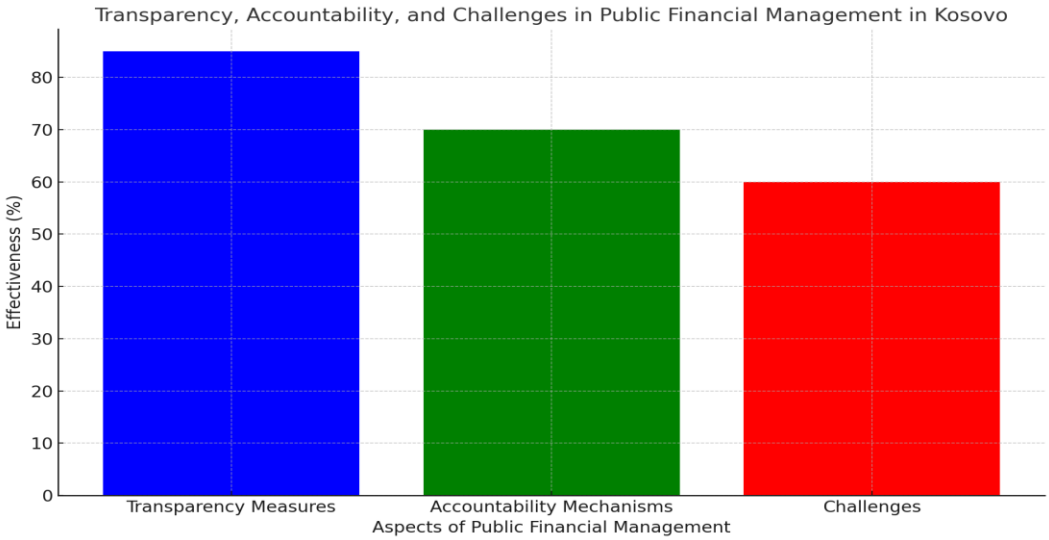
Transparency and accountability are essential principles of good governance, particularly in public financial management. In Kosova, these principles are reinforced through a series of mechanisms that ensure the responsible use of public funds. The country has implemented legal frameworks that promote transparency in fiscal operations, including regular public reporting on budget execution and audits conducted by independent bodies such as the National Audit Office (Ministry of Finance, Labor, and Transfers, 2023). These measures are essential for building public trust in the government's financial management and ensuring that public funds are used efficiently.

One of the main challenges faced by the country is its limited fiscal space, which is further constrained by its dependence on international financial institutions. Kosova's reliance on external financial assistance, particularly from institutions such as the International Monetary Fund (IMF) and the World Bank, restricts its ability to implement independent long-term fiscal strategies (World Bank, 2022). This dependence also means that many of the country's financial policies are influenced by external actors, making it difficult for Kosova to pursue strategies tailored to its specific needs.

The National Audit Office plays a critical role in overseeing the proper use of public resources, ensuring that government expenditures are aligned with national

priorities and legal requirements. The office conducts audit on an annual basis, assessing the effectiveness of public spending and identifying areas for improvement (National Audit Office of Kosovo, 2023).

Despite these efforts, political instability remains a significant challenge to effective public financial management in Kosova. Frequent changes in government disrupt the continuity of fiscal reforms, delaying the implementation of key budgetary initiatives and undermining long-term economic planning (Kosovo Democratic Institute, 2022).



Bar Chart 1. Financial Management in Kosovo

The bar chart provides a visual representation of three key aspects of public financial management in Kosovo:

1. Transparency Measures (85%): This high score indicates that Kosovo has put significant effort into promoting transparency in its fiscal operations. Legal frameworks and regular reporting on budget execution, along with audits by the National Audit Office, contribute to making financial operations more open and accessible to the public.
2. Accountability Mechanisms (70%): Accountability is also well-established, though not as strongly as transparency. Mechanisms such as independent audits ensure that public funds are used responsibly. However, there is still room for improvement in aligning government spending with national priorities and enforcing accountability consistently.
3. Challenges (60%): The lower score here highlights the ongoing challenges in Kosovo's public financial management, particularly the country's limited fiscal space and dependence on international financial institutions like the IMF and the World Bank. Additionally, political instability and

frequent changes in government disrupt fiscal reforms and long-term financial strategies.

In summary, while Kosovo has made substantial progress in transparency and accountability, challenges remain, particularly in achieving fiscal independence and maintaining stability in governance. The chart reflects these dynamics by showing the relative effectiveness of each element.

6. Political Instability and Its Impact on Budget Control

Political instability in Kosovo poses a substantial challenge to effective budget management. Each time the government changes, fiscal policies and budgetary reforms are disrupted. This discontinuity creates uncertainties that make it difficult to implement a consistent and long-term financial strategy. For instance, budget reforms initiated by one administration may be postponed or altered by a successive government, delaying critical economic initiatives (National Audit Office of Kosovo, 2023).

Moreover, political instability has a ripple effect on other aspects of the economy. It dampens investor confidence, which is essential for both private sector growth and public-private partnerships that drive infrastructure development (Ministry of Finance, Labor, and Transfers, 2022). Investors are less likely to commit resources to long-term projects in a politically unstable environment, leading to reduced capital inflows and slower economic growth. Additionally, Kosovo's heavy reliance on international aid means that political turbulence may affect the flow of external financial assistance, jeopardizing key public services and infrastructure projects funded by foreign donors. (World Bank, 2022). Ensuring a stable political climate is therefore vital for budgetary control and economic resilience.

7. Conclusion

In conclusion, it is imperative to underscore that budget control is a fundamental pillar of Kosovo's economic stability and the effective delivery of public services. Over the past decade, Kosovo has made significant strides in aligning its public financial management systems with European Union standards. This alignment has involved substantial improvements in several key areas.

Firstly, the legal frameworks that underpin transparency and accountability have been considerably strengthened. These frameworks are essential for ensuring that public financial operations are conducted openly and responsibly. Secondly, comprehensive mechanisms for independent audits have been established. These mechanisms are crucial for verifying that public resources are utilized efficiently

and appropriately, thereby fostering a culture of accountability within public institutions.

Despite these advancements, Kosovo continues to face several challenges. Political instability remains a significant obstacle, frequently disrupting the implementation of long-term fiscal reforms. Additionally, Kosovo's reliance on international financial institutions such as the International Monetary Fund (IMF) and the World Bank constrains its ability to pursue independent fiscal policies. This dependence can limit the country's flexibility in addressing its unique economic challenges and opportunities.

To advance further, Kosovo must prioritize the stabilization of its institutions. Enhancing the robustness of its budgetary processes is also critical. This includes adopting more sophisticated budgeting techniques and ensuring that budgetary decisions are based on accurate and comprehensive data. Furthermore, building public trust is essential. This can be achieved by promoting greater transparency and accountability in all aspects of public financial management.

Strengthening these areas is not just a matter of improving current practices; it is essential for fostering sustainable development. By ensuring that public resources are managed effectively and transparently, Kosovo can secure its long-term economic future. This will not only enhance the quality of public services but also contribute to the overall economic prosperity of the country.

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ON THE MACHINE LEARNING AND MACROECONOMIC FORECASTING: AN OVERVIEW OF LITERTURE

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Abstract

The expanding digitization of the economy gives rise to a rapid growth in the size and complexity of economic data, which, in turn, imposes a series of challenges for analysts who intend to provide insight into economic phenomena. Standard econometric approaches are not capable of dealing with excessively complex and too large volume of data; instead, small samples and strong assumptions about data distributions are the main driving forces in traditional statistics. More specifically, using an appropriate economic theory, the conventional econometric models help in quantifying and understanding the causal relationships between various features of the economy. However, if the interest is focused on where the things are moving in the future (or prediction is the main objective), then machine learning approaches provide more accurate results. Forecasting the macroeconomic indicators can be quite a difficult task. Traditionally, forecasters try to balance between complexity (include appropriate economic data) and focus (omit irrelevant data) by employing either statistical modeling techniques (particularly for time-series data) or consensus forecasting (model averaging). In both approaches, however, researchers use their economic intuition and judgment to assess the model. Machine learning, on the other hand, is a data-driven modelling technique that is not liable to discretion of the forecaster and, by capturing severe non-linearities, it is particularly beneficial for macroeconomic forecasting. This article intends to showcase the usefulness of machine learning in predicting macroeconomic indicators and provide an overview of the current forecasting literature thereof. Additionally, the paper will disclose the different cultures and disadvantages in the application of traditional econometrics and machine learning and will provide a brief outline of the emerging literature that combines machine learning and causal inference.

Keywords: machine learning, macroeconomics, prediction, econometrics

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1. Introduction: Machine Learning applications to Macro(Economics)

Machine Learning (ML) has developed against the backdrop of challenges brought about by digitization and the recent trend of constant increase in granular data. With the rise of big data, ubiquitous computing and the Internet of Things, machine learning, as a subfield of artificial intelligence, has actually become essential in adding value to a number of areas, including economic research and policy analysis (Kostoska & Kocarev, 2019; Angeleski & Kostoska, 2022; Angeleski & Kostoska, 2023; Kostoska et al., 2024). In point of fact, these new techniques could provide solutions to various problems encountered by traditional statistical and econometric techniques and could also change the way economists examine complex economic phenomena, forecast the trends, and optimize policy decisions. For example, Varian (2014) argues that the sheer complexity of big data may call for the use of more powerful manipulation tools that machine learning could provide. Basically, these methods are practical in coping with such data because they can detect more flexible relationships than what non-linear models can do. Moreover, if scholars have more possible predictors than are appropriate, machine learning can significantly contribute to variable selection. The success of ML techniques can also be seen in their capacity to identify complex structures in data that were not determined beforehand (Mullainathan & Spiess, 2017). In short, the major advantages of applying ML models in economics refer to their ability to (Desai, 2023): 1) process non-traditional data, 2) uncover nonlinear relationships and patterns that were not detected earlier, and 3) process traditional data in a way that will allow obtaining more accurate predictions.

First, machine learning has the capacity to transform non-traditional data into quantitative form, which allows researchers not only to have better insight into the data itself, but also to produce new indicators, overcoming the limitations of the traditional way of collecting and interpreting data (Mullainathan & Spiess, 2017). For instance, satellite image processing has made a significant upgrade to economic measurements, enabling the estimation of GDP growth at the sub-national and supranational regions (Henderson et al., 2012), as well as the assessment of land use, pollution, crop yields, resource exploitation, and areas of increased or reduced economic activity (Donaldson & Storeygard, 2016). Web scraping, on the other hand, made possible the recovery of millions of retail prices from different sources worldwide, which were subsequently transformed into price indices. Cavallo and Rigobon (2016) "experiment with these new sources of information to improve the computation of traditional economic indicators, starting with the Consumer Price Index". The authors also use their price data to examine price stickiness, and to study the 'law of one price' in international economics. Hansen et al. (2018) use computational linguistics algorithms to empirically examine the effects of transparency on deliberations of monetary policy-makers. Similarly, Alexopoulos et al. (2024) apply machine learning to obtain soft information contained in congressional testimonies and examine its effects on financial markets. On the basis of Italian tweets, Angelico et al. (2022) use textual data and ML techniques to construct new real-time measures of consumers' inflation expectations. Likewise, Naik et al. (2016) use a computer vision algorithm that measures the correlation

between perceived safety of streetscapes and the population density and household income. The exceptional intensity of big data we encounter today requires the scope of data analytics to go far beyond the application of linear models alone. In point of fact, the linear relationships that are most commonly examined in traditional econometric techniques are rarely found in machine learning. In view of this, Maliar et al. (2021) put forward "a unified deep learning method that solves dynamic economic models by casting them into nonlinear regression equations". The authors use deep neural network to conduct a model reduction and cope with multicollinearity.

Finally, and perhaps most importantly, economic decision-making can benefit from machine learning especially when prediction accuracy is the main focus of interest. Against this backdrop, one specific development worth mentioning, is the impressive number of studies that apply ML methods and refer to macroeconomic forecasting. For instance, Bolhuis and Rayner (2020) "develop a framework to nowcast (and forecast) economic variables with machine learning techniques". The authors describe how ML methods can deal with the usual flaws of conventional OLS-based models and employ several ML models to predict real output growth with lower forecast errors relative to traditional models. Similarly, Chu and Qureshi (2022) "run a 'horse race' among popular forecasting methods, including machine learning (ML) and deep learning (DL) methods, that are employed to forecast U.S. GDP growth". Considering that GDP growth data exhibit an unstable nature, the authors apply a recursive forecasting strategy to compute out-of-sample performance metrics of forecasts for multiple sub-periods. Moreover, Hall (2018) implements ML techniques to determine an optimal forecasting model for the unemployment rate. "His results suggest that when supplied with diverse and complex data, a machine learning model can outperform simpler time-series models as well as a consensus of professional forecasters, with better performance at shorter horizons". Finally, Coulombe et al. (2022) move beyond the question of whether machine learning is useful for macroeconomic forecasting by addressing the question of how. The authors examine the benefits of the underlying features driving ML gains over conventional macroeconometric methods, whereby they "distinguish four so-called features (nonlinearities, regularization, cross-validation, and alternative loss function) and study their behavior in both the data-rich and data-poor environments".

The rest of the paper is organized as follows. Section 2 is about defining machine learning. Section 3 refers to main branches or the types of learning algorithms. Section 4 deals with differences in objectives between machine learning and econometrics, and also the various forecasting methods are explained. Conclusions are provided in the last section.

2. Back to basics: What is the Machine Learning?

Machine learning is a subset of artificial intelligence that allows machines or systems to automatically learn from data and past experiences. Instead of explicit programming, ML actually uses algorithms that enable computers to operate autonomously (learn directly from data) and then make informed decisions or

predictions with minimum human intervention. Machine learning obtains perceptive information from large amounts of data through the concept of pattern recognition and learning in an iterative process. In essence, the primary goal of ML is to provide machines with the ability to adapt and improve incrementally, similar to how humans learn from examples and adapt their behavior accordingly. Formally, various definitions exist to define the concept of machine learning. One of the pioneers of machine learning, Arthur Samuel, defined the concept as a "field of study that gives computers the ability to learn without being explicitly programmed" (Samuel, 1959), a definition that is still relevant today. Less than four decades later, Tom Mitchell described the process of machine learning as "...any computer program that improves its performance at some task through experience", or more formally explaining the processes as "A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance at tasks in T, as measured by P, improves with experience E" (Mitchell, 1997). According to Awad and Khanna (2015) "Machine learning (ML) is a branch of artificial intelligence that systematically applies algorithms to synthesize the underlying relationships among data and information". With all definitions in mind, there is no doubt that the basic role of machine learning is to "learn" from data, draw conclusions based on certain rules, relationships between data and defined algorithms, and using what is learned to create a model for predictions of some new unseen data, interpret results or improve system performance over time. The better the quality and the greater the quantity of data that the computer system learns from, the more accurate the predictions or performance will be. There are basically four main types of machine learning: Supervised Machine Learning; Unsupervised Machine Learning; Semi-Supervised Machine Learning and Reinforcement Learning.

In supervised machine learning, a model is built that learns the pattern or connection between the independent variables (features) and the dependent variable (target variable) of the data in the dataset. Namely, in the dataset from which the model "learns", the values of the independent variables are known, as well as the corresponding outputs or target variable(s) for each record in the form of input-output pairs (Liu & Wu, 2012). This type of machine learning is used to solve classification problems (when it comes to categorical output variables) or regression problems (when it comes to continuous variables as output variables). The goal is that for each new independent variable the model can make a prediction about the class or value of the target variable or the output (Sarker, 2021b).

Unsupervised machine learning is used when there are only independent variables in the dataset, that is, data which, unlike supervised ML, are considered unlabeled or they are not related to certain output results or dependent variables. The goal is to model the structure or distribution of such data and, using different algorithms, to learn as much as possible about their interconnections, as well as to detect existing natural dependencies and patterns (Sebastian et al., 2024). So, "the goal of a typical unsupervised learning problem is primarily to discover similarity in a group of examples, where it is called clustering, or to determine the data distribution, where it is known as density estimation, or to make a dimensional reduction..." (Tyagi et al., 2022).

In practice, we usually encounter unlabeled data that are often difficult or expensive to label, and, on the other hand, there is a lack of labeled data (Kostopoulos et al., 2018). Semi-supervised learning exists when the dataset used to train the model contains a small amount of labeled data along with larger sets of unlabeled data. Semi-supervised learning can be divided into three types: Semi-Supervised classification, Semi-Supervised regression and Semi-Supervised Clustering (Kostopoulos et al., 2018; Reddy et al., 2018).

Reinforcement learning is a technique used to train the software to make decisions that will achieve the most optimal results. Namely, this technique mimics the trial-and-error learning process that people use to achieve their goals. The training and data processing process uses a reward and punishment paradigm learning from the feedback of each action in order to achieve the best final results (Aws.amazon.com, 2024).

Due to its learning capabilities from the given data, one of perhaps the most used branches of machine learning today is deep learning, which is based on the concept of artificial neural networks (Sarker, 2021a). There are a number of deep learning methods and architectures that are used to solve macroeconomic problems, and some of them will be discussed in the following sections.

3. Machine learning algorithms

In practice, different techniques or algorithms are used for different types of machine learning, and perhaps one of the biggest challenges is to find the most suitable algorithm for solving the problem. When determining the "most suitable algorithm", different performance evaluation metrics are taken into account for solving classification problems (e.g. precision, recall, f1-score, accuracy, confusion matrix, ROC-AUC score (Vakili et al., 2020)), while mean squared error (MSE), root mean squared error (RMSE), mean absolute error (MAE), R-squared, adjusted R-squared (Kassambara, 2018) are included when trying to solve regression problems. Most importantly, when solving economic problems and especially when making economic decisions, it is important to predict key variables, such as gross domestic product (GDP), inflation, interest rates, exchange rates, unemployment rate etc. (Nabil et al., 2020), “whereas ML algorithms aim to improve forecasting capabilities, especially when the actual model is unknown and complex and past experiences in the form of data are available” (Khan et al., 2022). In addition, issues from macroeconomics and monetary economics should be examined by observing and exploring long-term data, and thus, various deep learning models are utilized to predict phenomena such as currency crisis event, forecast exchange rate or estimate economy condition (Zheng et al., 2023).

In the following subsections, some of the most commonly used algorithms or methods for supervised and unsupervised machine learning will be elaborated.

3.1. Supervised machine learning algorithms

Most of the research published so far related to machine learning applications in economics are focused on supervised learning methods commonly used for prediction problems such as regression and classifcation (Desai, 2023). What follows is a brief taxonomy of more important algorithms in this area:

- Logistic Regression. Logistic regression is one of the simplest algorithms of machine learning and it is very often used in practice. The logistic or sigmoid curve in this case that takes values from 0 to 1 allows for making a decision about which class to apply to a test instance. Thus, for a given x, if the probability P(y=1|x) is more than 0.5 (this value is decision boundary), the value will belong to one class, and for values smaller than the decision boundary, the value will belong to another class (Daniel & Martin, 2023).
- Decision tree. Decision Trees decisions are made similar to the human way of thinking when making a certain decision. It is often used to solve classification problems, but it can also be applied to solve problems of a regression nature. This algorithm is based on a hierarchical structure consisting of: a root node, internal nodes, branches, and leaf nodes (also known as terminal or decision nodes). Internal nodes represent the features of a dataset, branches represent the decision rules and each leaf node represents the outcome (the most appropriate target value) or the probability vector (Rokach & Maimon, 2006).
- Random forest. Random forests combine the output of multiple decision trees to reach a single result "such that each tree depends on the values of a random vector sampled independently and with the same distribution for all trees in the forest" (Breiman, 2001). Despite the fact that the basis of random forest lies in the decision tree algorithm, it allows for much greater accuracy and overcoming the potential overfitting of the model. This algorithm can also be used to solve both classification and regression problems.
- Support Vector Machine (SVM). The goal of SVM is to find an optimal hyperplane in an n-dimensional space that will separate the data into different classes so that the margin between the different classes is maximal (Gupta et al., 2021). Hyperplane is a decision boundary with different possible dimensions. Hence, it has (n-1) dimension for an n-dimensional space, or it represents a line for two classes, a plane for three classes, etc. (Ktena et al., 2023). The training instances that lie closest to the decision boundary e.g. hyperplane are called support vectors (Tong & Koller, 2001) and they are very important in determining its position and orientation and affect the classification accuracy. SVM is predominantly used for classification problems, but it can also be used for regression problems through SVM generalization to SVR (Support vector regression) "in which the model returns a continuous-valued output" (Awad & Khanna, 2015).
- Naive Bayes classifier. Naive Bayes classifier algorithm, as the name suggests, is based on Bayes theorem and is used to solve classification problems involving high-dimensional training dataset based on a certain probability "with

the 'naive' assumption of conditional independence between every pair of features given the value of the class variable" (scikit-learn.org, 2024). What stands out about this algorithm is that it has a simple structure and high efficiency, and the evaluation of the parameters is based on a relatively small number of data in the training set (Chen et al., 2021). There are several different variations of Naive Bayes classifier algorithms, but the most commonly used are: Gaussian Naive Bayes Classifier, Multinomial Naive Bayes Classifier and Bernoulli Naive Bayes Classifier (Singh et al., 2019).

- k-Nearest Neighbors (KNN). This algorithm is used predominantly for classification problems, but it can also be used for regression tasks. The idea is to calculate the distance between some new data and existing data in the dataset. The algorithm includes a variable parameter k that determines the number of 'nearest neighbors' (Uddin et al., 2022). Usually, the most commonly used distance metric is Euclidean distance (QCBS R Workshop Series, 2023), but in practice other metrics can be used to measure the distance between instances such as: City block, Chebychev, Mahalanobis, Minkowski, and Standardize Euclidean techniques (Chomboon et al., 2015). In addition to the classic KNN algorithm, there are a large number of different variations such as: Adaptive KNN, Locally adaptive KNN with Discrimination class, K-means clustering-based KNN, Fuzzy KNN, Mutual KNN, Ensemble approach KNN, Hassanat distance KNN, Generalized mean distance KNN Weight adjusted KNN (Uddin et al., 2022).
- Linear Regression. Linear regression is one of the simplest and most commonly used algorithms in machine learning. Linear regression evaluates the linear relationship between the target variable and one or more independent features. Judging by the number of features, regression may either be a simple linear regression (case model with a single independent variable or one feature) or multiple or polynomial regression (more than one feature - independent or explanatory variables) (Maulud & Abdulazeez, 2020). The goal of this algorithm is "to minimize the residual sum of squares between the observed targets in the dataset, and the targets predicted by the linear approximation." (Scikit-learn.org, 2024).
- Regularization. In order to avoid overfitting, modified versions or techniques of the basic Linear regression algorithm are often used in practice through the so-called regularization or penalized regression: Ridge Regression, which penalizes sum of squared coefficients (L2 regularization) and Lasso Regression, which penalizes the sum of absolute values of the coefficients (L1 regularization) (Demir-Kavuk et al., 2011) and Elastic Net, as the minimizer of the empirical risk with combination of Ridge (L2) and Lasso (L1) (De Mol et al., 2009).

3.2. Unsupervised machine learning algorithms

Clustering and factor analysis are examples of unsupervised learning tasks that are already rather common in empirical economics (Hansen, 2018). Unsupervised ML commonly use videos, images, and text as a source of information (Tenorio & Wilder, 2023), but other types of unlabeled data related to certain economic phenomena can also be used.

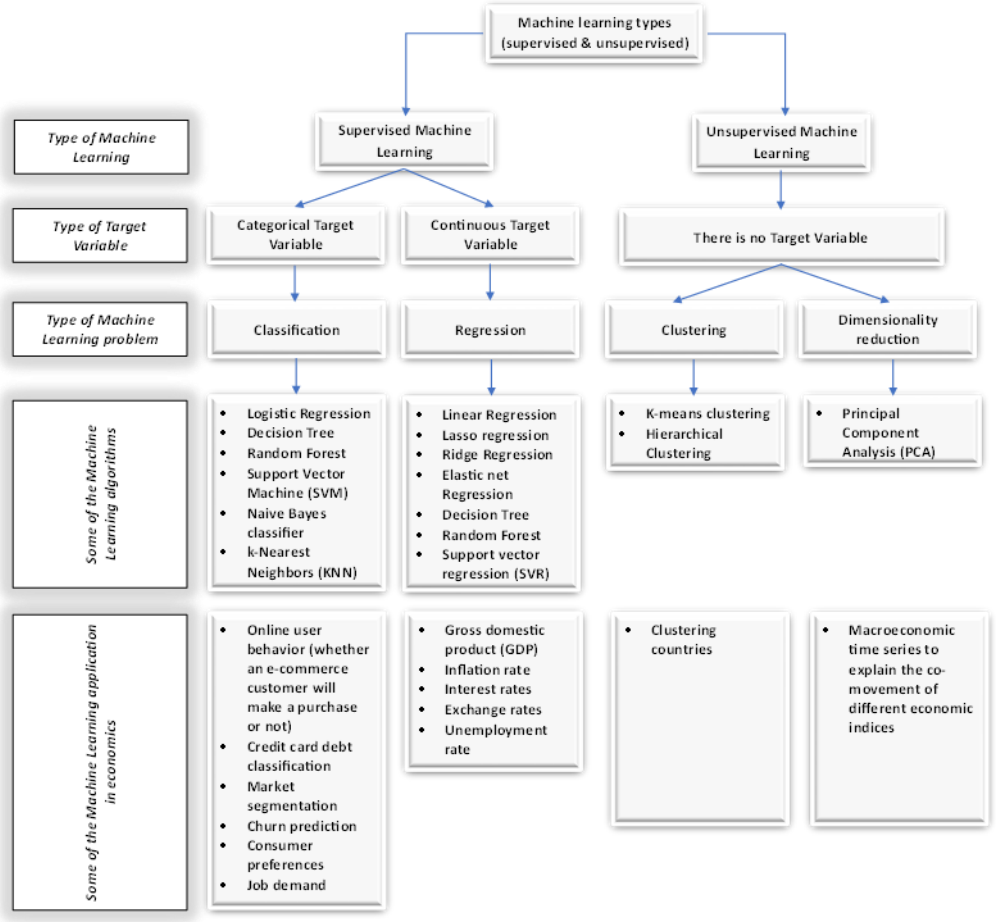


Figure 1. Some applications of supervised and unsupervised ML algorithms in economics (Source: Author's representation based on references listed in this article)

- K-Means. K-Means tries to discover similarities in a dataset of unlabeled data by aggregating them into subgroups (clusters) (Zubair et al., 2020), so that there are similarities of objects in one cluster. "K" in the algorithm indicates the number of clusters, and different criteria exist for determining its optimal value, such as: Elbow Curve Method and Average silhouette method (Nanjundan et al., 2019). K-means is a centroid-based clustering algorithm, which means that the belonging of an object to a cluster is done by calculating the distances of each data point from a centroid of a cluster (Zubair et al., 2020).

- Hierarchical Clustering. "Hierarchical clustering algorithms are a type of clustering algorithm where data items will be divided into sections in a hierarchical form" (Pitafi et al., 2023). Hierarchical Clustering, unlike K-Means, does not require to pre-specify the number of clusters. There are two main types of Hierarchical Clustering: Agglomerative clustering and Divisive hierarchical clustering (Makara et al., 2013). Agglomerative is a bottom-up approach, while Divisive algorithm represents a top-down approach (Madhulatha, 2012).
- Principal Component Analysis (PCA). PCA is a statistical method that transforms attributes from a set into a new set of uncorrelated attributes, the so-called principal components (PCs) in order to reduce the dimensionality, but keeping the greatest variability of the dataset (Howley et al., 2007). PCA is a powerful tool for synthesizing information especially when there is a large amount of quantitative data to process and interpret (Chahboun & Maaroufi, 2021), which means that this method contributes to increasing interpretability but at the same time minimizing information loss (Jollife & Cadima, 2016). The goal of reducing high dimensionality "...is to find another representation of a smaller dimension m such that as much information as possible is retained from the original set of observations x" (Sorzano et al., 2014) which leads to overcoming various problems such as computational complexity, visualization problem or redundancy.

Some of the important algorithms for supervised and unsupervised ML, as well as some of their applications in economics based on the references cited in this article, are organized in Figure 1.

3.3. Deep learning methods and architectures

Deep learning is based on deep neural networks. A deep neural network (DNN), originally inspired by neurobiology, is an artificial neural network (ANN) with multiple layers (hidden layers) between the input and output layers and it is one of the fundamental models of deep learning neural network (Zheng et al., 2023). In economic research, especially for forecasting or classifying the financial market, forecast stock price, evaluate and analyze supply chain financial credit level, currency crisis event, forecast exchange rate or estimate economy condition, a number of different deep learning models are applied including DNN, Long short - term memory (LSTM), Restricted Boltzmann Machine (RBM), DBN, Convolutional neural network (CNN), Recurrent neural networks (RNN), Autoencoder (AE), Transformer and Deep Reinforcement Learning (DRL) (Zheng et al., 2023).

Each of the previously listed models has a different architecture and can be used for some of the previously mentioned purposes. For example, "Convolutional Neural Network (CNN) is a well-known deep learning architecture inspired by the natural visual perception mechanism of the living creatures" (Gu et al., 2018). The CNN algorithm is composed of three types of layers: convolution layer, pooling layer and fully connected layer (Zheng et al., 2023). Convolutional layers

significantly reduce the complexity of the model through the optimization of its output through three hyperparameters: the depth, the stride and setting zero-padding; Pooling layers gradually reduce the dimensionality of the representation; and fully connected layer ensures each neuron to be connected to every neuron in the previous layer (O'Shea & Nash, 2015). There are two stages for the training process in CNN: the feed-forward stage, and the back-propagation stage (Mosavi et al., 2020); A recurrent neural network (RNN) is a specialized neural network with feedback connection (Das et al., 2023), specially designed to detect patterns in sequential or time-series data (Schmidt, 2019); An autoencoder is a type of neural networks that consists of two parts "The Encoder that transforms the high dimensional inputs into a smaller set of dimensions while keeping the most important features, and the Decoder that uses the reduced set of features to reconstruct the initial input data" (Tavakoli et al., 2020); The long short-term memory (LSTM) network architecture is one of the most advanced deep learning architectures particularly well-suited to deal with long-term dependencies from financial and economic time-series data (Hopp, 2022; Park & Yang, 2022).

4. Machine Learning algorithms versus Traditional Econometric models

Macroeconomics has always had a rich history of empirical estimation and validation due to the interest in evaluating the results of a particular policy or the causal relationship in a particular theory. While traditional econometric methods have particularly contributed here, machine learning-based applications have made headway in the area of macroeconomic analysis thanks to a better predictive fit. In view of this, the biggest difference is that in standard statistics (econometrics in this case) the focus is on causal inference, that is, the effects of the policy are compared with its counter-factual. In other words, the main purpose of econometrics is inference so as to gain insights into how the outcome is related to the input data. Instead, high prediction accuracy is a focal point of machine learning, where attempts are made to identify the most significant predictive variables by using a data-driven model selection (Einav & Levin, 2014). Emphasis on prediction entails the use of complex modeling techniques that outperform at dealing with out-of-sample data. When it comes to a model specification, econometrics is clearly a model-based (with a focus on economic theory), while machine learning is based on a data-first approach where algorithms are supposed to discover hidden patterns in the data that may not be supported by theory yet. As a result, ML workflow involves examining multiple models in order to determine the most effective one, while often paying little attention to a carefully selected theoretical foundation (Athey, 2019). This procedure often entails tuning parameters and hyperparameters to obtain the best fit for the dataset, although there is flexibility and the possibility of changes in case new sample data is included. Noteworthy is to mention, however, that both approaches have certain disadvantages. Econometrics, for instance, does not have the capacity to deal with excessive amounts of data (Merler, 2018), while researchers experience problems with model uncertainty and the performance of the model on unseen data. Machine learning, on the other hand, requires a huge amount of data and heavy computing power. Moreover, ML models are apt to overfitting,

so they could sometimes be difficult to interpret. Hence, researchers should take advantage of both approaches and use machine learning complementary to traditional econometric models in order to improve the precision and reliability of economic analyses. Against this backdrop, a new literature is emerging that applies the strengths and innovations of ML methods to causal inference. This new ML/causal inference literature is mainly focused on the following: 1) Treatment randomly assigned (experimental data); 2) Instrumental variables; 3) Treatment assignment unconfounded (conditional on covariates); 4) Panel data settings (including difference-in-difference designs); 5) Structural models of individual or firm behavior; 6) Regression discontinuity designs. In any of these settings, there are various problems of interest (see Athey (2019) for some highlights from the emerging literature).

4.1. Approaches to Macroeconomic Forecasting: Statistical modelling, Consensus Forecasting and Machine Learning

Macroeconomic indicators can be difficult to predict because they can be affected by a number of other variables. Historically, researchers have tried to overcome these problems by means of two traditional ways of forecasting, that is statistical modeling and consensus forecasting (Hall, 2018). Statistical modeling is a practice of employing statistical analysis to a dataset, or the use of a mathematical representation (or mathematical model) and statistical assumptions to discover relationships between variables, make predictions about the real world and visualize the data so that it can be used by various stakeholders. The autoregressive (AR) model is a standard statistical model for time-series forecasting, which essentially assumes that recent observations are principally used to predict future observations. Additionally, researchers often use a random walk model where the prediction takes a random path, and since this is far from accurate, the model is used as a control or baseline. Consensus forecasting (or model averaging), on the other hand, is a prediction made by combining many different kinds of models (forecasts) which have often been generated by different techniques and methods. It is noteworthy that both traditional forecasting methods involve a range of different choices, which, in turn, can have an impact on model complexity and forecasting performance. “The AR model requires some very clear choices—specifically, the number of lagged variables to include. This choice can have a significant effect on AR forecasting performance. Although many researchers use some metric such as the Bayesian information criterion to determine the number of lags, they still must choose a metric and the maximum number of lags” (Hall, 2018). Consensus forecasts may not seem like they involve many choices, since they are all made by the forecasters themselves. However, researchers “must still make choices about how to use them. Some may decide to use the median forecast instead of the average forecast. Others may choose to average only top-performing forecasters” (Hall, 2018).

As a forecasting approach, machine learning offers a powerful set of tools for discovering optimal model complexity, and thus, frees forecasters from the requirement to employ strong assumptions or judgment to simplify their model. Generally, the domain of machine learning involves a wide range of models. One

way to determine the optimal forecasting model is by decomposing the sources of forecast errors into bias and variance. The bias of a model depicts errors owing to inaccurate assumptions about probability or data. It is mainly a difference between the average forecast of the model and the correct value to predict (Singh, 2018). The variance refers to errors on account of model's sensitivity to small perturbations in the data. Basically, the sources of errors are related to the complexity of the model, which, in turn, depends on the number of variables in the model, the number of parameters a model "learns", the number of parameters the user defines and the number of variable relationships within the model. The relationship between model complexity, bias and variance is mostly represented as a trade-off. When addressing bias and variance, we are actually referring to under- and over-fitting (Fortmann-Roe, 2012). In general, as the complexity of a model increases, it typically shows less bias but more variance. This is precisely why the danger of overfitting arises, since adding too many parameters to the model leads to a raise in error due to variance. On the contrary, too few parameters lead to underfitting (the model is underperforming), which in turn occurs when there is too little data, or when there are efforts to generate a linear model with non-linear data (Singh, 2018). Hence, the question arises as to how to balance between bias and variance, whereby the total error would be the smallest? In Machine Learning this could be achieved by 'disciplining' a model or 'regularization', where certain penalties are introduced for overfitting the data (Hall, 2018).

5. Conclusions

This paper reviews the literature on the basic concepts in machine learning, and more importantly, provides an overview of the various applications of machine learning in macroeconomics and economic policy. Although it cannot replace economic theory, machine learning has the potential to aid in data-driven model selection and can profoundly transform economics by initiating new questions and modified research methodologies, but also by contributing to improved measurements. Machine learning can complement standard econometric tools by detecting complex relationships and patterns in data, however, several limitations must be overcome for this concept to be effectively used in economic research. Finally, by combining the strengths of both machine learning and conventional econometric techniques, researchers can improve credibility of economic analysis and make better decisions.

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DIGITAL TRANSFORMATION OF TOURISM: IMMERSIVE SPACES AND NEW TRAVEL PARADIGMS

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Abstract

In today's dynamic world, where travel is becoming an essential part of life for many people, there is a noticeable trend of growing interest and demand for new forms of tourism and more advanced ways of communication. This evolution not only leads to constant changes in the market but also encourages innovations in the field of search systems and information transport. Information systems are becoming an indispensable tool in creating new communication experiences with potential clients, enabling the collection of valuable information about their desires and movements in tourism demand. In this context, Smart systems, Internet of Things, and increasingly advanced online platforms are gaining more and more significance and becoming key factors in transforming the tourism industry on a global scale. The aim of this paper is to highlight the key advantages and benefits of digitalization in tourism, as well as to provide a deeper insight into how digital technologies impact the tourism economy and shape the dynamics of tourism trends. Special attention will be given to Immersive Spaces in tourism, an area that is increasingly being explored and developed. The goal of this paper is to demonstrate how digitalization enables the creation of new tourism products that not only provide traditional experiences but also foster greater interactions with destinations. This research contributes to understanding the dynamics of tourism trends and offers practical implications for industry stakeholders.

Keywords: Digital transformations, Immersive spaces, Information systems, Internet of things

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1. Introduction

As information systems and new technologies expand, the tourism industry is undergoing a significant transformation. This study explores how these advancements, particularly Smart systems, the Internet of Things (IoT), and immersive technologies like Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), shape tourism trends. By leveraging these innovative solutions, we gain insights into travelers' evolving needs and behaviors, allowing for a personalized approach to tourism products.

We aim to illustrate how the integration of these technologies enhances tourist experiences and drives the emergence of new trends. The analysis will demonstrate that destinations and tour operators increasingly cater to modern tourists' desires for unique, interactive experiences. We will outline specific examples where digital technologies have led to successful new offerings, thereby establishing a clear link between our research objectives and anticipated results.

In conclusion, we emphasize the need for ongoing monitoring and enhancement of evolving digital platforms. The effective integration of smart systems, IoT, and immersive environments provides a robust foundation for understanding and addressing contemporary travelers' needs. These trends not only signify the future of the tourism industry but also highlight how innovative technologies can create tailored experiences that meet individual traveler preferences, ultimately enriching the tourism landscape.

2. Transformation of travel experience through tourism digitalization

The inherent desire for movement and exploration has always been a part of human nature, evolving alongside advancements in technology and transportation. In contemporary times, the most significant transformation has been driven by the emergence of the internet, which has fundamentally reshaped information exchange and opened new avenues for exploration.

Today, online booking systems, communication applications, payment and currency conversion platforms, and voice translation programs have revolutionized the travel planning process. Additionally, transportation apps, online shopping, and real-time updates on weather and road conditions have further enhanced the ease and convenience with which tourists can organize their journeys. This digital landscape not only streamlines travel planning but also enriches the overall experience for travelers. Today's tourists use Artificial Intelligence (AI), mobile apps, and immersive technologies to access desired content through platforms, changing the way they book trips, research destinations, and prepare before arrival. Communication with local guides and service providers has become easier (Buhalis & Amaranggana, 2015; Gretzel et al., 2015).

Easily accessible and often free applications enable tourists to book accommodations that align with their preferences at desired destinations, as well

as to purchase tickets and entry passes for local attractions (Wang et al., 2012). Virtual reality (VR) tours allow users to explore destinations remotely, while augmented reality (AR) platforms provide real-time information, enriching the travel experience and offering unique impressions (Tussyadiah et al., 2018). The digital transformation has introduced a completely new approach to traveler information and advanced data analysis systems, facilitating personalized arrangements and services that enhance user satisfaction (Tussyadiah et al., 2020).

For instance, the Airbnb digital platform has revolutionized the hospitality sector by offering an alternative to traditional hotel accommodations through a sharing economy model, enabling travelers to find exactly what they desire (Guttentag, D., 2015). Platforms like Airbnb have significantly transformed how travelers plan and experience their trips, providing easier access to information through accommodation ratings and simplifying communication between travelers and hosts. These advancements are rooted in developments in mobile technologies, analytics, data processing, and systems designed to foster trust (Tussyadiah, I. P., & Pesonen, J., 2016).This example illustrates how digitalization has transformed the travel experience, allowing travelers to access extensive information and complete reservations effortlessly, all while investing minimal time.

The following Table 1. lists research studies related to various aspects of technology and tourism in the context of modern hospitality and travel industries. These studies explore topics such as IT trends, smart tourism applications, virtual reality, and the impact of digital technologies on tourism experiences. By summarizing the theoretical aspects covered in each study, this table aims to provide research landscape in the intersection of technology and tourism. The literature review highlights several key trends in the adoption of digital technologies in tourism, aligning with our research objectives. Studies indicate a significant increase in the use of AR applications to enhance visitor experiences in cultural sites. Research also shows that smart systems are improving operational efficiencies in hotels and attractions. These findings confirm the growing influence of digitalization on tourism and provide a theoretical basis for understanding its impact.

Table 1. Summary of the characteristics of all included studies

Author, Country, Year	Theoretical Aspect	Summary
Brdar, I., & Gajić, J. Serbia (2019)	IT and tourism trends in Serbia	Examines if Serbian tourism businesses are keeping up with global IT trends.
Brdar, I., et al. Serbia (2018)	Smart tourism and IoT	Explores IoT applications in modern tourism.
Buhalis, D., & Amaranggana,A, Greece and Indonesia, 2015.	Smart tourism destinations	Discusses personalization in tourism through ICT.
Buhalis, D., & Leung, R, Greece and Hong Kong, 2018.	Smart hospitality ecosystems	Investigates interconnectivity in hospitality for ecosystem development.
Cavada, M., et al, United Kingdom, 2019.	Smart city definitions	Analyzes the contradictions in smart city definitions.
Gretzel, U., et al, United	Smart tourism foundations	Provides an overview of smart

States, 2015.		tourism development.
Guo, K., et al, China,2023.	Immersive digital tourism	Examines multisensory cues in digital museum experiences.
Guttentag, D, Canada, 2015.	Airbnb and tourism disruption	Analyzes Airbnb's impact on traditional accommodation sectors.
Guttentag, D. A, Canada, 2010.	Virtual reality in tourism	Explores VR applications and implications in tourism.
Kitchin, R, Irleand, 2014.	Big data and smart urbanism	Discusses the role of big data in urban management.
Koo, C., et al, South Korea, 2016.	Smart tourism competitiveness	Develops a framework for smart tourism destination competitiveness.
Milgram, P., & Kishino, F, Canada and Japan, 1994.	Mixed reality taxonomy	Introduces a taxonomy for mixed reality displays.
Neuhofer, B., et al, Austria, 2015.	Smart tech for personalization	Examines smart technology for personalized hospitality experiences.
Tussyadiah, I. P., et al, Indonesia, 2018.	VR in destination marketing	Studies VR's persuasive power in marketing destinations.
Tussyadiah, I. P., et al. Indonesia, 2020.	VR and tourism attitudes	Investigates the impact of VR on destination attitudes.
Tussyadiah, I. P., & Pesonen, J, Indonesia and Finland, 2016.	Peer-to-peer accommodation	Looks at how peer-to-peer accommodation affects travel patterns.
Wang, D., et al. , China, 2012.	Smartphone use in travel	Explores smartphone usage in daily life and travel.
Yang, X., et al. China, 2021.	COVID-19 and AI tourism	Analyzes COVID-19's impact on tourism and rise of virtual tourism.
Yin, Z.-Y., et al. China, 2024.	Al tourism in heritage	Discusses benefits of virtual tourism for cultural heritage.

The literature review highlights several key trends in the adoption of digital technologies in tourism, aligning with our research objectives. Studies indicate a significant increase in the use of AR applications to enhance visitor experiences in cultural sites. Research also shows that smart systems are improving operational efficiencies in hotels and attractions. These findings confirm the growing influence of digitalization on tourism and provide a theoretical basis for understanding its impact.

3. Smart Systems and the Internet of Things (IoT) in Tourism: Applications and Benefits

The term "smart" has gained popularity, signifying a transformative approach to business that incorporates intelligent information technologies. Smart business practices often necessitate sophisticated analytics. The foundation of integrated systems lies in platforms that connect users, information, and business processes (Brdar et al., 2018). Smart systems and the Internet of Things (IoT) are pivotal in modernizing tourism services.

3.1. Applications of Smart Systems and Internet of things

IoT refers to a network of physical devices equipped with sensors and software that communicate wirelessly via Wi-Fi, utilize Bluetooth for short-range communication, employ cloud technology for data storage and analysis, and leverage GPS for tracking device locations. These devices, which can range from everyday items like smartphones and wearables to specialized machines and sensors, facilitate seamless data exchange without human intervention (Gretzel et al., 2015). Smart systems harness advanced technologies to autonomously adjust their functions based on data analysis, promoting more efficient and secure responses to various situations. Further, it will be given an example of use of these new technologies on Smart Cities and Smart Hotels, as well as data analysis applications.

Using smart cities as a case study, we can observe how urban areas and tourist destinations leverage IoT technology to evolve into "smart destinations". Smart cities integrate advanced technologies to enhance the experience of tourists in several key areas such as Information and Navigation. Mobile applications and interactive maps are commonly employed in smart cities to provide visitors with comprehensive information on attractions, dining options, events, and public transportation. The use of augmented reality (AR) significantly enriches the tourist experience by allowing users to access additional information about landmarks simply by pointing their smartphones at them or scanning QR codes. Furthermore, applications utilizing artificial intelligence (AI) for image recognition can identify landmarks and deliver relevant information with just a photograph. Many smart cities also offer digital tourist cards, which provide discounts and complimentary access to museums, galleries, and other attractions, along with free or reduced transportation. These cards enhance accessibility to various services and attractions, contributing to a more enjoyable and cost-effective visit (Sigala, 2020). Innovations such as smart traffic management systems, public transport monitoring, environmental surveillance, and interactive navigation solutions enhance the overall visitor experience while optimizing resource utilization (Neuhofer et al., 2015).

Smart hotels are characterized by the adoption of advanced technologies, including automated check-in and check-out processes, alongside smart rooms that adjust to guest preferences. These innovations not only enhance the guest experience but also contribute to increased energy efficiency within the hotel environment (Buhalis & Leung, 2018). For instance, guests can leverage smartphone applications to control lighting, temperature, and security systems in their rooms, thereby improving user satisfaction while simultaneously reducing operational costs for the hotel (Neuhofer et al., 2015). Notable examples include smart hotels that automate room controls through IoT integration and smart cities that utilize technology to manage tourist flows and optimize resources (Koo et al., 2016). Features such as smart room keys, connected thermostats, interactive mirrors, and personalized room settings are becoming standard in modern accommodations. These technologies not only provide convenience for guests but

also enable hotels to gather valuable data, allowing for continuous improvement of their services (Buhalis & Amaranggana, 2015).

Applications like TripAdvisor and Google Travel use AI to analyze tourist preferences and provide personalized recommendations for activities, tours, and restaurants based on their interests and online search history. This technology enables tourists to make the most of their time and experience the city in a way that best fits their interests (Tussyadiah & Wang, 2016). Many travel websites and apps utilize AI chatbots that can answer questions, assist in travel planning, and provide useful information in real-time. This equally benefits service providers at the destination by tailoring their programs.

3.2 Benefits of Smart Systems and Internet of things

Smart systems and IoT in tourism offer numerous benefits. Many digital applications aim to address challenges such as crime reduction, traffic management, public health improvements, and carbon emission reduction, all with the goal of enhancing citizens' quality of life through system optimization. These tools find applications across various sectors, including security, mobility, healthcare, energy, water management, waste reduction, economic development, housing, and community engagement (Živković et al., 2019).

Additionally, sensors deployed throughout the city can gather data on visitor numbers at specific locations, thereby supporting effective resource management and event planning. Such technologies enable cities to deliver efficient and sustainable tourist services, ultimately enhancing the overall visitor experience (Gretzel et al., 2015). Moreover, smart traffic management systems help alleviate congestion and improve the efficiency of public transportation, facilitating easier navigation for tourists. Bike and scooter rental systems further promote eco-friendly travel options, allowing visitors to conveniently rent bicycles or scooters for quick mobility throughout the city (Cavada et al., 2019).

Safety and health are enhanced through smart cameras and sensors that play a crucial role in maintaining public safety, enabling the rapid detection and response to incidents. Air quality monitoring sensors provide tourists with real-time information about environmental conditions, along with recommendations for outdoor activities (Kitchin, 2014). Additionally, IoT-enabled surveillance cameras, smart locks, and emergency response systems significantly enhance the safety of both tourists and their belongings. Real-time monitoring and alert systems contribute to the prevention of thefts, accidents, and other emergencies, thereby ensuring a safer travel experience.

Smart cities leverage these technologies to create a more enjoyable, efficient, and personalized experience for tourists while simultaneously promoting sustainability and mitigating the environmental impact of tourism. These innovations not only enrich the visitor experience but also support the sustainable development of urban areas. Notable examples of smart cities include Barcelona, Singapore, Copenhagen, Dubai, and Tokyo, among others. By optimizing resources and improving operational efficiency, smart technologies facilitate a reduction in energy consumption and waste, contributing to the overall sustainability of tourism destinations. This sustainable approach helps cities

manage tourist flows effectively, reducing overcrowding and minimizing the impact on local communities and the environment.

Digitalization also plays a crucial role in preserving and promoting local culture. Through platforms like Airbnb and cultural experience apps, travelers can engage with local communities and access authentic cultural experiences. Tussyadiah et al. (2018) argue that digital platforms provide opportunities for cultural exchange and help sustain local traditions by connecting travelers with local hosts and artisans. This interaction not only enriches the travel experience but also supports local economies by directing funds to community members rather than large corporations.

The integration of smart systems and IoT in tourism not only enhances the visitor experience but also supports the long-term sustainability and development of urban areas, ensuring that both tourists and residents can enjoy improved quality of life and services.

4. Immersive Spaces in Tourism: Definition and Characteristics

Immersive spaces in tourism refer to environments that utilize technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) to provide deeper and more interactive experiences for visitors, for example in digital museums (Guo, Fan, Lehto, Day, & Research, 2021). These technologies enable tourists to engage with destinations in innovative ways, allowing them to explore historical reconstructions, interactive museum exhibits, and virtual tours of natural and cultural landmarks (Buhalis & Amaranggana, 2015; Gretzel et al., 2015). Immersive spaces utilize these technologies to create virtual environments that provide users with the sensation of physical presence within that space. AR integrates digital elements into the real world through devices such as smartphones or AR glasses, while VR constructs entirely virtual environments that users can navigate using VR headsets. MR, on the other hand, combines aspects of both AR and VR to facilitate more intricate interactions between digital and physical objects.

4.1 Application of Augmented Reality, Virtual Reality and Mixed Reality in Tourism

Augmented reality (AR) integrates digital elements into the real world through devices such as smartphones or AR glasses. This technology enables tourists to engage with their surroundings in innovative ways, offering real-time information about historical buildings, artworks, and attractions (Tussyadiah et al., 2018).

A notable example of AR in action is the Google Lens application, which allows tourists to point their smartphones at objects of interest. The app recognizes these objects and displays relevant digital information, including historical data, construction dates, and intriguing facts directly on the screen. One significant site enhanced by AR is the Palatine Hill in Rome. Tourists using the app can direct their smartphones at various parts of the ruins, revealing how these locations appeared in ancient times. This feature includes 3D models of buildings

alongside information about key historical events that occurred there, allowing visitors to experience Rome's rich history in an interactive and visually stimulating manner.

Additionally, the Museum of London offers an AR application that enables visitors to visualize the city's evolution over the centuries, showcasing historical scenes and figures at the actual locations where events transpired. These applications not only enrich the visitor experience but also provide a deeper understanding of local history.

Virtual reality (VR) creates entirely immersive environments that users can explore using VR headsets, allowing tourists to experience destinations they may never physically visit. For example, VR technology facilitates virtual tours of museums, enabling visitors to engage with exhibits up close without being present in the physical space. Additionally, VR can simulate extreme activities such as hiking or diving, providing users with a realistic and engaging experience (Guttentag, 2010).

The COVID-19 pandemic had a profound impact on traditional tourism, as evidenced by the Palace Museum in China, a prestigious world heritage site, which experienced a visitor decline of over 92% (Yang, Ruan, Zhang, & Li, 2021). In response to this challenge, the museum swiftly launched a virtual tourism initiative titled "The Palace Museum," showcasing cultural relics, ancient architecture, exhibitions, and more. Despite the museum's temporary closure, it remained accessible to global audiences, allowing for virtual visits at any time. By 2021, the initiative attracted over 33 million virtual visitors. Although traditional tourism is gradually recovering, virtual tourism continues to thrive, offering unique experiences such as viewing ancient paintings in high detail—an opportunity that is challenging to replicate offline (Yin, Z.-Y., Huang, A.-M., & Huang, Z.-Y., 2024).

Mixed reality (MR) combines elements of AR and VR to create more complex interactions between digital and physical objects. MR allows users to manipulate digital objects in the real world. For example, tourists can use MR to interact with digital reconstructions of historical events or to review architectural plans for future tourist complexes (Milgram & Kishino, 1994). For instance, at Universal Studios Park, visitors can use MR technology to experience attractions in an entirely new way, combining physical elements with digital content that appears through glasses or mobile devices.

5. Conclusion

In the rapidly evolving landscape of global tourism, digital transformation stands out as a pivotal force driving innovation and reshaping how travelers interact with destinations. This paper has explored the profound impact of digitalization, emphasizing the integration of smart systems, the Internet of Things (IoT), and immersive technologies (Buhalis & Amaranggana, 2015; Gretzel et al., 2015). These advancements not only enhance traditional tourism experiences but also facilitate deeper, more personalized interactions with destinations, aligning with the growing demand for innovative communication and engagement.

Our review of existing literature underscores the essential role of information systems in capturing valuable insights into consumer behavior and preferences, thereby informing strategic decisions in the tourism sector. Immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) offer new avenues for engagement, transforming cultural heritage tours and providing real-time, enriched experiences (Tussyadiah et al., 2018).

Digital technologies drive operational efficiency, boost competitiveness, and promote sustainable tourism practices. By fostering new tourism products and experiences, digitalization meets the evolving needs of modern travelers and contributes to the broader tourism economy (Koo et al., 2016; Neuhofer et al., 2015). The findings from this research offer practical implications for industry stakeholders, suggesting that those who effectively leverage these technologies will be better positioned to navigate the complexities of the modern tourism landscape. Future research should continue to explore these dynamic trends, focusing on how emerging technologies can further revolutionize the industry and contribute to sustainable growth.

Ultimately, digital transformation in tourism is not just about adopting new technologies; it's about reimagining the entire travel experience to create more meaningful, engaging, and personalized journeys for travelers worldwide.

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FROM GLOBAL GOALS TO LOCAL IMPACT: CREATING A PATH FOR JUST ENERGY TRANSITIONS THROUGH SDGs' LOCALIZATION

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Abstract

The Sustainable Development Goals (SDGs) established by the United Nations provide a comprehensive framework to tackle climate change and advance sustainable development across various sectors and regions globally. However, translating these global goals into local impacts remains a challenge, particularly in the context of transitioning to environmentally friendly and sustainable energy sources in an equitable and just way.

This paper examines the concept of SDGs' localization as a method to bridge the gap between global goals and local impacts, focusing specifically on regions undergoing energy transitions. It provides a comprehensive literature review to investigate the importance of SDGs' localization in guiding and shaping local energy transition strategies, ensuring that the transition is not only environmentally sustainable but also socially and economically equitable, focusing on public engagement and multi-stakeholder collaboration. Furthermore, the role of policy frameworks and governance structures in aligning local energy transitions with SDGs is analyzed. The study examines the impact of governance policies and underscores the importance of implementing policies that incorporate distributional, recognition and procedural justice while acknowledging the unique challenges faced by local communities.

The paper concludes that SDGs' localization, through empowering local stakeholders, fostering inclusive decision-making processes, and promoting fundamental shifts at the grassroots level, can provide a promising path towards achieving a just energy transition while ensuring that the transition to a sustainable energy future is substantially inclusive and equitable.

Keywords: Sustainable Development Goals, SDGs' localization, just transition

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1. Introduction

As the world recognizes the importance of transitioning to renewable and sustainable energy sources, regions historically depending on fossil fuels are facing major challenges. In the recent years the term *"just energy transition"* emerged to describe the shift from using fossil fuels to renewable energy sources while achieving all-inclusive and equitable results for all stakeholders involved. This term evolved from other concepts such as socio-ecological transition and energy transition. It suggests that focus on prioritizing the needs and concerns of marginalized communities is critical for preventing their further exclusion or displacement. While it is accepted that sustainable energy transition is necessary for mitigating climate change, it also has social and economic implications that should be addressed carefully (McCauley & Heffron, 2018; Gabriel, 2016).

In 2015 the 2030 Agenda for Sustainable Development was adopted by all United Nations' Member States, offering a framework for global sustainable development. The 17 Sustainable Development Goals (SDGs) call for action by all countries - developed and developing - in a global partnership. Especially in regions transitioning to renewable energy sources designing and implementing just and equitable policies is of great importance. This paper delves into the localization of the SDGs with a particular emphasis on regions undergoing energy transitions. By conducting an extensive literature review, the study emphasizes the importance of localizing SDGs to guide and shape energy transition policies that are not only environmentally sustainable but also socially and economically equitable. The question that needs to be answered is: What are the key components of a just energy transition, and how does each one of them contribute to a successful outcome?

On the first section an analysis of the concept of "just energy transition" along with the terms of distributional, recognition and procedural justice is conducted, taking into account the unique challenges faced by local communities. Consequently, the relationship between energy transition and the SDGs is being examined in an attempt to identify the common points of intersection. The second part of the paper focuses on the localization of SGDs within the context of a just energy transition. An important aspect of this is ensuring public engagement and collaboration of local stakeholders. The next issue examined is policy frameworks and governance structures in order to better understand how we can align local energy transitions with the SDGs. Finally, this paper argues that localizing the SDGs through empowering local governments and encouraging inclusive decision-making processes can pave the way to a "*just energy transition*".

2. The concept of a "*just energy transition*"

During the last decades, the techniques of energy production and utilization have attracted significant attention as a result of the world's demand to mitigate climate change. This has resulted in the development of the concept of a "just energy transition" towards sustainable energy sources (McCauley et al., 2019; Araújo, 2014). A "just energy transition" seeks to balance environmental, economic, and social aspects crucial for sustainable development without showing

partiality, while ensuring the rights and well-being of workers. The aim is not to overburden already marginalized groups or workers losing jobs as fossil fuel industries shut down, but rather to enable them to upgrade themselves into new jobs within the growing clean energy sector, as outlined in guidelines by the International Labour Organization (ILO, 2019). The implementation of this transition requires the formulation of principles, tools, and agreements that facilitate a fair and equitable shift for individuals and communities, both in developed and developing regions, ensuring inclusivity and sustainability. The concept of a *"just energy transition"* is crucial in capturing the 'just' process involved in societies transitioning to a carbon-free economy.

The concept of "*just energy transition*" is a subset of broader concepts as specified by Garcia et al. (2020) in Figure 1. Three layers are identified: socio-ecological transition, energy transition and just energy transition. The first layer involves transitioning from one socio-ecological regime to a more sustainable one. Energy transitions, in the second layer, affect the generation, distribution, storage, and use of energy, leading to changes in policies, economies, and societies. The third layer introduces the idea of "*just energy transition*" incorporating justice and equity concerns alongside energy sustainability.

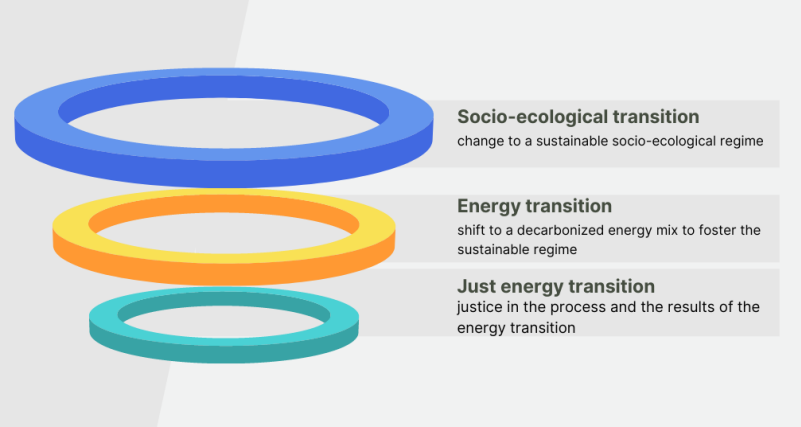


Figure 1. Conceptualisation of a just energy transition. Source: Garcia – Garcia et al., 2020

It is widely recognized that the main focus of a just energy transition is that the consequences of energy policies and practices predominantly impact the most vulnerable populations, including economically disadvantaged individuals, marginalized communities, and developing countries (Jenkins et al., 2018). The long dependence on fossil fuels led to unequal distribution of benefits and impacts especially on marginalized groups and even exacerbation of the existing social and economic inequalities. The justice in energy transition policies implies that addressing these injustices should focus mainly on the needs and concerns of disadvantaged communities. With the justice approach the marginalization or displacement during the energy transition can be avoided (Siciliano et al., 2021). According to many researches, in the process of the energy transition there will be winners and losers with some people as well as regions suffering more than others (Pugach, 2022).

This notion of a *"just energy transition"* therefore highlights the importance of addressing issues of social justice through making sure that the transition to renewable energy is comprehensive and fair for all individuals and societies involved (Sovacool et al., 2017). It recognizes that even though transitioning towards renewable energy is crucial for mitigating climate change and minimizing environmental effects, it also carries social and economic implications that need to be seriously addressed (McCauley & Heffron, 2018).

2.1 Distributional, recognition and procedural justice analysis

As noted by McCauley and Heffron (2018), the principal of justice plays a vital role in energy transitions. Justice has gained prominence as a key focus in energy research, particularly in the past decade. According to Sharma & Banerjee (2021), justice plays an significant role in the way energy transition's economic and social impacts are distributed among different stakeholders and regions. If not managed with a strong sense of justice, this shift may eventually worsen existing socioeconomic disparities (Welton & Eisen, 2018; Hoffman et al., 2021). Thus, special emphasis must be placed on the terms of distributive, recognition and procedural justice.

Distributional justice argues for the just distribution of advantages and disadvantages among all members of society, regardless of factors such as income, race or gender (Jenkins et al., 2016). This brings up spatial justice issues, such as dealing with the placement of new "green jobs" in different areas from where fossil fuel-dependent jobs have been lost. Spatial justice lies on the premise that the organization of space is a crucial dimension of human societies, reflecting social facts and influencing social relations (Levenda et al., 2021). Thus, such mismatches could disproportionately affect certain communities and possibly reduce support for climate policies in regions most affected by the negative consequences of the transition (Sharma & Banerjee, 2021).

Recognition justice, according to Fathoni et al. (2021), takes into account various social, cultural and political contexts that mediate the dynamics and outcomes of energy access and transition projects. Social justice is often undermined by traditional energy decision making patterns that have always been governed by technical and economic concerns. There is now a great deal of literature arguing for a more people centered approach that recognizes the different needs and experiences communities have and examines aspects of society left out or misapprehended in policy making. In order to acknowledge and redress historical injustices inflicted on marginalized populations, recognition justice must play a major role during this shift (Welton & Eisen, 2018).

Finally, the intricate and technocratic aspects associated with energy policy development and governance create obstacles for inclusive participation of stakeholders in it, thus bringing up issues touching on procedural justice. Procedural justice calls for accessible decision-making processes' as well as strong collaboration between policymakers and local communities through the incorporation of local knowledge, transparency and enhanced institutional representation (Jenkins et al., 2016).

2.2 Interlinkages between the SDGs and the just energy transition

A just energy transition is about moving towards sustainable energy while considering the impacts on employment, income distribution and the achievement of Sustainable Development Goals. This process includes prioritizing human well-being and sustainability through decarbonization, efficient resource use, and ecosystem restoration.

As a means to enhance policy coherence regarding transition measures, the ILO introduced a just transition framework. This framework offers guidelines for national authorities to guarantee a just transition. First it emphasizes the necessity of an inclusive social dialogue to achieve a strong social consensus and support transformation, while mitigating significant socio-economic disruptions, in line with SDGs 10 and 16. The second issue mentioned is the importance of conducting evaluations on employment, social, and economic impacts, including the potential for creating green jobs in accordance with SDGs 1, 8, 10 and 12. Subsequently, the essential nature of enhancing skills is highlighted along with implementing strategies to support career transitions, creating green job opportunities for individuals of all gender identities, and fostering environmentally sustainable businesses to meet SDGs 4, 5, 8, 9, 12, 14 and 15. Moreover, the significance of creating policies for social protection to safeguard the well-being of workers and vulnerable populations is underscored, aligning with SDGs 1 and 10. And finally, the importance of technology and knowledge transfer to developing nations, along with advancements in innovation and responsible investments are stated as crucial elements related to SDGs 8, 9, 12 and 17 (ILO 2019; Haegele et al., 2022).

3. Localizing Sustainable Development Goals in Energy Transition Regions

In the regions undergoing energy transition, localizing the Sustainable Development Goals has the potential to ensure an even distribution of sustainable development benefits and impacts to all stakeholders (Nerini et al., 2017). Through a localized approach, stakeholders can address the unique challenges and opportunities present in energy transition regions (Moallemi et al., 2020; Lee, 2020). The localized approach leads to tailored strategies and actions that take into account the local context. As a result it enhances progress towards achieving the SDGs in a way that is both effective and inclusive. Another example is tackling energy poverty using policies that promote equitable economic growth and universal access to affordable, reliable, and sustainable energy sources. This kind of policies consider the unique needs and preferences of areas going through an energy transition. In order to leave no one behind and guarantee equal sharing of benefits in regions under transition, sustainability principles must be integrated into projects. (Neves et al., 2015).

Through this process of localization possible trade-offs and synergies between SDGs can be identified. Some characteristic examples are trying to balance the need for clean energy with the protection of natural ecosystems or to satisfy industry demands while protecting local communities' welfare (McCollum et al., 2018). With a view to ensure a comprehensive and cohesive approach to sustainable

development in these regions, localizing the SDGs in energy transition areas necessitates an all-encompassing and interconnected strategy that primarily takes into account the interplay between SDG 7 (affordable and clean energy) and other goals (McCollum et al., 2018; Koirala et al., 2016).

3.1 The importance of public engagement

The effective localization of the SDGs, especially in regions under transition, demands the participation of all stakeholders involved, such as local governments, community organizations, businesses, and non-governmental organizations. By enabling the active participation of multiple stakeholders the optimal use of local resources and specialized knowledge, the promotion of a sense of ownership and dedication to sustainable energy practices can be achieved. Through the engagement of communities, governments and various stakeholders in regions under transition (Stoeglehner, 2020; Moallemi et al., 2020), trade-offs and synergies between the SDGs can be identified. Such cooperation can also enhance transparency, accountability as well as the inclusion of marginalized communities in energy projects (Smith et al., 2018).

One of the most critical aspects when localizing the SDGs is the active involvement and engagement of local communities (Ortíz et al., 2012; Lee, 2020). Insights from local communities regarding their perspectives, knowledge, or even priorities concerning the relevant policies, can be utilized to design strategies that address the different needs of local societies. The use of a participatory approach, as per Koirala et al. (2016), enhances the possibilities for an effective implementation and long-term sustainability as well as fostering ownership and accountability. Moreover, allowing local communities to decide and manage their own energy needs can lead to considerable cost savings, reduced CO2 emissions and less dependence upon national power grids (Hernandez et al., 2020; Klein & Coffey, 2016).

3.2 The role of local governance in aligning just energy transition with SDGs policies

As the world is struggling with the urgent need to mitigate climate change while meeting the Sustainable Development Goals and transitioning to a more sustainable energy system, the critical role of local governance for ensuring that this transition is just and SDG-aligned has been revealed (Hernandez et al., 2020; Guha & Chakrabarti, 2019). Inclusivity in decision making, assessing social-economic-environmental implications, as well as establishing collaborations within stakeholders and governance levels are some of the key priorities. However, there are still research gaps in analyzing income patterns and job quality during such transformations.

The challenge of meeting the SDGs at the local level can be addressed by promoting decentralization and strengthening local governments. An example of such a challenge is the dependence on locally sourced revenue, which may lead to inequalities in resource distribution and service provision among different regions (Jones & Comfort, 2020). Additionally, the uneffective management of a variety of stakeholders with diverse objectives can hinder the successful implementation of

SDG policies at the local level. Existing literature underscores the significance of strengthening local leadership capacities and clearly defining the roles and responsibilities of local policymakers, a crucial aspect that has often been disregarded in the development and implementation of the SDG agenda (Guha & Chakrabarti, 2019).

A strong local governance structure is, as illustrated in Figure 2, one of the six crucial components leading to a successful *"just energy transition"* that takes into account the needs of local communities and creates equal opportunities for all.

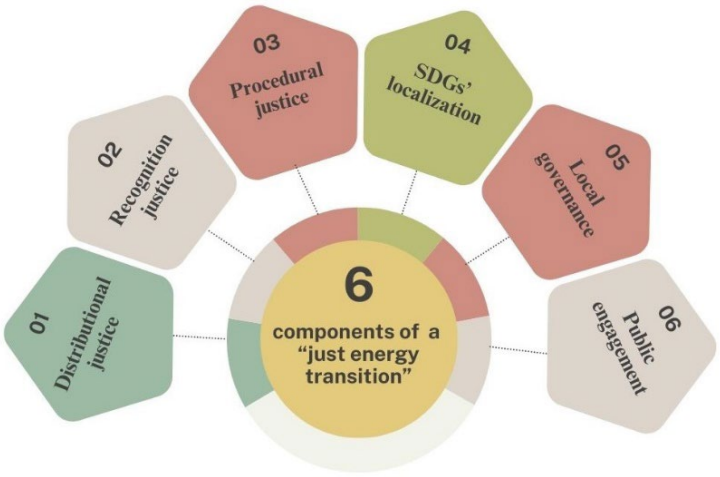


Figure 2. Components of a successful just energy transition. Source: own elaboration.

Policy frameworks and governance structures are essential in facilitating the localization of SDGs. By integrating local policies with the broader goals of sustainable development, governments may create an enabling environment that encourages the transition to sustainable energy systems. This encompasses the formulation and implementation of policies that underscore the importance of distributional justice, ensuring fair allocation of energy resources; recognition justice, acknowledging and valuing the diverse contributions of all community members; and procedural justice, guaranteeing inclusive and participatory decision-making processes (Sovacool et al., 2017).

4. Conclusions

The transition to sustainability is not just a technological challenge, but a complicated socio-political process that must address pressing issues of justice. As the world tries to achieve the Sustainable Development Goals, the localization of these goals through empowering local stakeholders, fostering inclusive decision-making processes and promoting fundamental shifts at the grassroots level can provide a promising pathway towards a *"just energy transition"*.

Recent research has highlighted the need for a more participatory approach to energy governance, acknowledging the necessity of engaging multiple viewpoints and addressing social, cultural, ethical, and gender disparities (Welton & Eisen, 2019). Communities are increasingly empowered to mobilize resources and engage different stakeholders to seek alternative energy paths, motivated by the normative

goals of decreasing carbon emissions. Another important aspect of the just energy transition process is ensuring access to clean and affordable energy for all populations including those suffering from energy poverty. The justice framework, with its human-centered perspective, provides a more focused approach to examining the socio-cultural and political components that mediate the dynamics and consequences of such initiatives (Fathoni et al., 2021).

In conclusion, we identify six critical components that have the potential to contribute to a successful *"just energy transition"* and these are: distributional, recognition and procedural justice, SDGs' localization, strong local governance structures and public engagement. Finally, the localization of SDGs in regions experiencing energy transition is not simply a theoretical exercise but a practical necessity for achieving a just and inclusive energy future. Strengthening local governments, encouraging participatory decision-making, and supporting sustainable strategies that are customized to the local needs, are all effective ways to bridge the gap between global goals and local impacts. This approach ensures that the transition to sustainable energy is not only environmentally beneficial but also socially and economically equitable, paving the way for a more sustainable and just world.

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MEASURING ORGANIZATIONAL PERFORMANCES AND THE ROLE OF THE ARTIFITIAL INTELLIGENCE

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Abstract

The organizational performances refers on how well the organization achieves its goals. It's a tool for assessment, the effectiveness and efficiency of the human and non human resources, one company is using to achieve its mission and deliveres value to the affected stakeholders. The organizational performances can be measured in a very different ways, such as financial metrics, a client's satisfaction, engagement of the employees, the productiveness, inovations and the effect to the environment. Different affected stakeholders can have different perspectives of the organizational performance and can give priority to other metrics, depending on their interest and goals. As a result of a dissatisfaction of the traditional systems for performance measurement, a whole new frames and models for organizational support are developed. The new idea refears on designing a system as a tool for integration on an artificial intelligence in the organizations, to improve a better organizational performances. This means, that artificial intelligence can help measuring performances of the employees in collecting, analizing and interpretation of larg number of database of different sources, such as results of the work, behavior, skills and feedback informations. The goal of this abstract is to present a review of the main methodologies for measuring the organizational performances and to elaborate their individual characteristics and procedures during their implementation. Additional, this review will make systematic and critical analysis to individual models for measuring the organizational performances and make conclusions for the advantages and disadvantages based on the results.

Keywords: organizational performances, models for measuring, artificial intelligence.

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1. Introduction

Organizational performance is a subjective perception of reality, which explains the multitude of critical thinking about the concept and its measuring instruments (Wholey, 1996). Thus, the concept of organizational performance has attracted increasing attention in recent decades, present in almost all spheres of human activity.

The concept of performance measurement is historically focused on financial measures. In order to eliminate criticism of financial measures, new ways of measuring performance are being developed, within which the emphasis is placed on complementing financial measures with measures from other perspectives. In response to dissatisfaction with traditional performance measurement systems, frameworks and models have been developed to support organizations in their performance measurement processes. With the rapid expansion of AI tools, emerging market organizations have initiated the adoption of AI functions to improve their organizational performance and find aspects to increase their business. Artificial intelligence is poised to restructure most emerging economies, such as information systems, finance, labor, human resource management, marketing, advertising, business strategy, supply chain management, and services (Agarwall et al., 2022).

The research of this paper aims to contribute to a better understanding of the importance and meaning of organizational performance. Knowledge will be gained about the basic information about the methodologies for measuring organizational performance, that is, the most commonly used models, advantages and disadvantages, as well as the possibilities of applying artificial intelligence to improve organizational performance.

2. Defining organizational performance

Sangiorgi and Siboni (2017) define organizational performance as the ability to access and handle various resources to achieve the company's goals and objectives.

The main purpose of the performance measurement system is to obtain data useful to the organization in order to improve the overall performance of the organization. All organizations measure their performance – some systematically and thoroughly, others do it ad hoc and superficially (Franceschini et al., 2007).

Organizations measure performance for several different reasons:

- Identification of the organization's success,
- Identification of satisfaction of users' needs,
- Help in understanding the realization of the process: confirmation of what is known or discovery of unknown elements,
- Identification of where there are problems and inconsistencies, as well as where improvements are necessary,
- Ensuring decision-making is based on facts and not assumptions, emotions or intuition,

- Show whether the planned improvement has been implemented (Markovic et al., 2013).

3. Theoretical review of organizational performance measurement

The study by Bakotić, D. (2014) provides an overview of modern models for measuring organizational performance, namely: Balanced Scorecard, Performance Prism, EFQM Organizational Excellence Model, Quality Costs, Activity Costs, Enterprise Macro Process Model, strategic measurement and reporting technique, performance measurement matrix, results causality model and its determinants. Determining their characteristics, Bakotic emphasizes that common to all modern integrated models for determining organizational performance is the attempt to bring the measurement of organizational performance closer to the company's strategy and long-term orientation. However, their common shortcoming is that they do not cover all dimensions of business.

Shackleton's (2007) study tabulates the frameworks, models and tools for measuring organizational performance. The most important thing of this study is the discussion surrounding the changing role of performance measurement models that illustrates the actual moment to include performance measurement components.

Similarly, the study of Taouab & Issor (2019), based on a comparison of traditional and non-traditional measurements, provides an overview of common models for measuring the performance of companies, including: Balanced Scorecard, Performance Prism (PP), National Malcolm Baldrige National Quality Award (MBNQA) and the Performance Pyramid. All this points to the conclusion that performance measurement is very important for the effective management of companies.

Kaplan & Norton (1996), Kaplan (2010) introduced the Balanced scorecard framework at the enterprise level. Their basic idea is that the evaluation of the organization should not be limited to traditional financial evaluation, but should be supplemented with measures related to customer satisfaction, internal processes and the ability to innovate (Pervan & Soče, 2010).

According to the article by Tarver (2024), corporations can use internal methods to develop a Balanced scorecard. For example, they may conduct customer service surveys to identify the successes and failures of their products and services, or they may hire outsource companies to do the work for them.

A study by Bonde & Nyakora (2023) goes a little further by proposing an AI-based framework for achieving organizational performance. This paper clarifies which components of artificial intelligence should be activated to create capabilities for automatisation, decision support, marketing and innovation, all with the goal of designing a system that can be used as a tool to manage and integrate artificial intelligence into organizations to achieve organizational performance. The studies of Mikalef & Gupta (2021), Oke (2008) and Miller (2017) confirmed that artificial intelligence practices have a positive impact on organizational performance. Other studies have documented similar findings: The study by Bag et al. (2021) concludes that artificial intelligence significantly affects the value of the company, that is, it

encourages business flexibility and performance, reinforces the culture of intra-entrepreneurship.

3. Main methodologies for measuring organizational performance

Traditionally, organizational performance has been measured using key performance indicators (KPIs). These KPIs vary from business to business and are difficult to define.

The Performance Prism, developed by Neely, Adams & Kennerley (2002), represents a comprehensive measurement system that addresses major business issues to which a wide variety of organizations (for-profit and not-for-profit) can relate to. It is a tool used by management teams to influence their thinking after strategic objectives are defined. It consists of five interrelated perspectives: Stakeholder Satisfaction, Capabilities, Processes, Strategies, and Stakeholder Contribution (Taouab & Issor, 2019).

The Malcolm Baldrige National Quality Award (MBNQA), introduced in 1987 by the US Department of Commerce, represents a set of interrelated fundamental values and concepts that are incorporated into high-performing organizations to offer a standard of quality and to help companies reach a high level of performance. It analyzes seven categories: leadership, strategic planning, customer focus, measurement, analysis and knowledge management; Focus on workforce, Focus on operations and results (Taouab & Issor, 2019).

A performance pyramid proposed by Cross and Lynch in 1992, has the main purpose of linking an organization's strategy to its operations by implementing top-down goals (based on customer priorities) and bottom-up measures (Tangen, 2004).

The Balanced Scorecard, introduced by Kaplan and Norton (1992), is one of the most well-known and widely used models for implementing and measuring strategies globally. It aims to give managers a comprehensive view of the business and allows them to focus on critical areas that drive the organization's strategy forward (Taouab & Issor, 2019).

3.1 The role of artificial intelligence in organizational performance improvement

Performance management supported by artificial intelligence is a process through which artificial intelligence can be used to make better decisions about how employees should perform now and in the future. It usually involves measuring performance by considering many more factors than a simple grade or score. Additionally, using AI can better identify areas where employees may need improvement and uncover strengths they may not have known they had (Trisca, 2023).

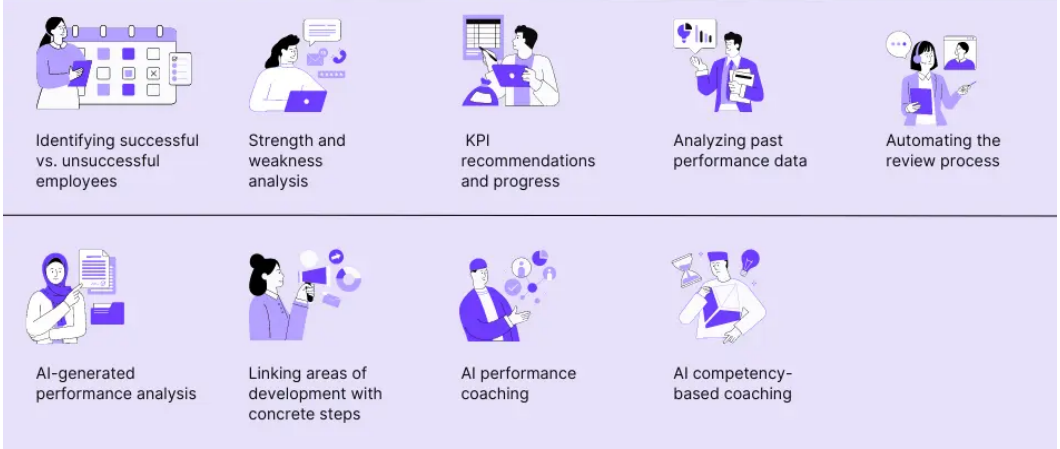


Figure 1. AI in performance management: Key applications

In a healthy organization, performance management goes beyond classic performance reviews by including performance improvement strategies.
Figure 1 shows possible scenarios in which artificial intelligence could be used in performance management (Trisca, 2023):

- Identifying successful vs. unsuccessful employees
- Strength and weakness analysis
- KPI recommendations and progress
- Analysis of past performance data and predictive analysis
- Automating the review process
- Performance analysis generated by artificial intelligence
- Linking areas of development with concrete steps and training resources
- Artificial intelligence – performance coaching
- Competency based trainings on artificial intelligence

In that vein, Bonde & Nyakora (2023) proposed an artificial intelligence-based framework, which is a kind of system that can be used as a management tool to integrate artificial intelligence into organizations to achieve better organizational performance. This framework indicates that in order to achieve the goals, the components of artificial intelligence that create capabilities for automation, decision support, marketing and innovation should be activated (Bonde & Nyakora, 2023). Artificial intelligence, according to Joiner, is both the theory and development of computer systems that can perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (Joiner, 2018).
AI-based automation transforms manual tasks or activities so that machines or systems can perform them without human intervention.
Decision making is constrained by using the key components of artificial intelligence for machine learning, data analyzes and data visualization, resulting in faster and better decisions (Naqvi, 2017).
The marketing function through various techniques, artificial intelligence can enable marketing to fulfill its functions effectively. The key elements that make

artificial intelligence successful in helping marketing are Big Data, Machine Learning, and Natural Language Processing (Bonde & Nyakora, 2023).
Innovation is about developing more efficient ways to solve problems, providing better solutions to replace existing ones, and creating a competitive advantage for organizations (Bonde & Nyakora, 2023).

3. Comparative analysis of organizational performance metrics according to the literature

The basic characteristics of modern approaches to measuring the performance of companies can best be explained by their comparison with the traditional approach to measuring performance (Table 1).

Table 1. Comparative overview of traditional and modern approaches to performance measurement companies

Changes to	Traditional Measurement	Balanced Measurement	Performance Management
FOCUS	Internal	Internal and external	Needs of relevant internal groups
DIMENSIONS	Single	Multiple	Less focus on dimensions and more on the relationships between dimensions
DRIVERS	Cost	Innovation and learning	Improving process capability through resource development
TARGETS	Financial	Financial and non-financial	Comparative-external and anti-competition
DESIRED BENEFITS	Cost control	Strategic direction communication	Improving sustainable performance through improving business processes

The traditional approach to measuring company performance places emphasis on financial parameters that are expressed quantitatively, thus creating the possibility of dynamic observation of the phenomenon in continuous time periods. In contrast to this approach, the modern approach, in addition to financial, uses non-financial performance measures that are expressed and categorized qualitatively, in accordance with the needs of key stakeholders. The focus of the traditional approach is on analyzing and improving the short-term performance of the company, while the modern approach is dominated by the pursuit of long-term company value (Jović & Tomašević, 2021)

Table 2: Comparison of characteristics of modern models for measuring organizational performance

Balanced Scorecard	**Performance Prism**	**Organizational Excellence Model EFQM**	**The AI-based on framework**
emphasizes a strategic orientation	offers a different view of the company's results	emphasizes self-evaluation and improvement planning	Determines which AI components should be activated to create

	and their relation to stakeholders	and uses total quality management (TQM) settings	automation, decision support, marketing and innovation capabilities
helps companies overcome three main issues: effectively measuring organizational performance, increasing intangible assets, and the challenges of strategy implementation	It supports managers in managing the company and can adapt it to their needs	It illuminates the elements that influence performance improvement and indicates the results to be measured, and is based on the premise that customer satisfaction, employee satisfaction, and organizational impact on the social community are achieved through the management function of leadership based on strategy, processes of resource management, and all with a purpose achieving organizational excellence	It is based on 4 capabilities: automation, decision support, marketing and innovation, all with the aim of providing a more comprehensive enabling power of artificial intelligence and establishing the relationships between capabilities and components of artificial intelligence
grouping and measuring four key dimensions of organizational performance	a widely divergent review based on 5 elements	it is based on nine criteria	organized in three blocks
financial perspective, customer perspective, internal processes and perspectives of employees learning and growth.	stakeholder satisfaction, strategies, processes, capabilities and stakeholder input.	leadership, people, policies and strategies and resources, processes, results, employee satisfaction, customer satisfaction and impact on the social community.	enabler, capabilities and results.
More flexible to adapt to specific needs of companies	It analyzes a key, unique and differentiating element - stakeholder input	Its dynamism stands out, i.e. that innovation and learning affect the improvement of drivers that then lead to better results.	More comprehensive, and combining multiple capabilities and their simultaneous application increases the outcome, given that similar frameworks that include one of the following abilities

is a non-prescriptive framework or template for measuring organizational performance	is a framework and tool or instrument, which is not a prescribed system of organizational measures, i.e performance.	is a non-prescriptive framework or template for measuring organizational performance	a system that can be used as a management tool to integrate artificial intelligence into organizations to achieve organizational performance
It analyzes only two stakeholders: customers and shareholders	Numerous stakeholders: investors, buyers and intermediaries, employees, the state and the social community, suppliers, etc.	/	/

Despite the wide application of the Balanced Scorecard, its key drawback is the specificity for individual companies, so while it allows comparability over time, it precludes comparison with similar or reference companies. However, regardless of the many criticisms, its significance lies in the study of the relationship between goals, strategy and performance. Comparatively, the Performance Prism in relation to the Balanced Scorecard concept presents a widely divergent overview that includes as many dimensions and stakeholders as possible in the study of organizational performance. Furthermore, the Balanced Scorecard and the EFQM model derive from the same idea and have a similar structure. Both models are non-prescriptive frameworks or templates for measuring organizational performance, with the Balanced Scorecard being more flexible to adapt to specific business needs (Table 2). In this sense, given the complexity of the performance measurement system itself, a recommendation can be drawn that the ideal performance measurement methodology should be a combination of these methods, tools and techniques. Thus, Schreurs and Moreau (2006) propose to use a unified model for measuring organizational performance, which is a combination of the Balanced Scorecard and the EFQM model of organizational excellence, whereby the primary role of the EFQM model would be self-evaluation, and the determination of indicators and performance measurement should be done through the Balanced Scorecard. In addition, artificial intelligence techniques can provide a way to understand and create review mechanisms that can advise and enable faster and more effective decision making in more complex scenarios.

4. Conclusion

Modern models provide better information when measuring organizational performance than classical models. In this way, it should contribute to a better recognition of this area, as an area that should be given more attention than it currently has.

Based on the collected data and information, it is confirmed once again that measuring organizational performance is essential for organizations that want to achieve their goals, remain competitive and create value for stakeholders. There are various methods and tools available to measure organizational performance, including financial analysis, benchmarking, surveys and feedback, social responsibility reporting, Balanced Scorecard, Performance Prism (PP), Malcolm Baldrige National Quality Award (MBNQA), Pyramid of performance, and more recently, tools based on artificial intelligence.

However, there are also potential dangers associated with measuring organizational performance, such as focusing too much on short-term benefits, neglecting non-financial factors, etc. To avoid these dangers, organizations should establish a balanced set of metrics that consider financial and non-financial factors, incorporate both short- and long-term goals, collect and analyze qualitative data, consider external factors, and establish a strong and ethical framework based on artificial intelligence. In fact, using AI to improve organizational performance can bring a range of benefits to both employees and managers, such as reducing bias and subjectivity by using objective criteria to evaluate performance. Additionally, it can improve the accuracy and relevance of data, feedback and communication, as well as increase motivation and engagement by recognizing and rewarding strong performance, identifying and addressing poor performance, and suggesting learning and development opportunities. The use of artificial intelligence to improve organizational performance must complement the human role, rather than replace it, otherwise the trust and relationship between employees and managers can be threatened.

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KNOWLEDGE SHARING MOTIVATION – GENDER DIFFERENCES

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Abstract

Knowledge sharing is a key process in a company's knowledge management system. As a result of sharing, knowledge possessed by one individual becomes available to other employees of the company. Knowledge is a specific resource whose value decreases if it is not shared. At the same time, knowledge sharing allows companies to gain competitive advantages. To share knowledge, employees in business organizations must be motivated to do so. Although the research interest in the topic of knowledge sharing in the last 2-3 decades has been significant, in Bulgaria this issue has been poorly studied. This fact provoked the conduct of the present study, the purpose of which is to identify the presence (absence) of differences between men and women in terms of attitudes and motivation to share knowledge. To achieve it, an empirical study was conducted in 59 Bulgarian companies, and the results were processed with SPSS, Independent-Samples Mann-Whitney U Test. The study found no differences in women's and men's attitudes toward knowledge sharing, but found some differences from a motivational perspective.

Keywords: Knowledge Sharing, Gender Differences, Motivation Factors.

1. Introduction

Knowledge is a strategic resource and a source of competitive advantage for the company. Its sharing is a key process in the company's knowledge management system. Knowledge sharing is a process in which people exchange their knowledge and mutually co-create new knowledge (Schwaer et al., 2012), a process yielding mutual benefits to employees and organizations (Sitlington, 2012). The benefits of knowledge sharing are numerous and multidimensional. These range from eliminating duplication of effort, saving time and energy (Patriotta et al., 2013), better team performance (Srivastava et al., 2006),

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improving innovative behavior and innovation performance (Gharieb, 2022), to performance sustainability and achieving competitive advantage (Al-Qahtani & Aksoy, 2022).

Knowledge, according to Francis Bacon's popular phrase, is power, but if it is locked in people's heads and not shared, it is useless (Anyacho, 2021). Whether or not knowledge is shared depends on people, and they are very often hostile to knowledge sharing. According to Husted & Michailova (2002), it is perfectly rational for individuals to be reluctant to share their knowledge. People are reluctant to share their knowledge if they are not motivated. This means that managing individual motivation should become a central theme for those in charge of knowledge management within the company. To manage motivation, it is necessary to examine the factors that influence employees' willingness to share knowledge and their behaviour.

Although in the scientific literature there are a number of studies on the influence of motivation on the process of sharing knowledge in an organizational environment, this issue is poorly studied in Bulgaria. This fact provoked the conduct of the present study, the aim of which is to reveal attitudes toward knowledge sharing, the power of influence of the main motivational factors on knowledge sharing, and to identify the presence (absence) of differences between men and women in terms of attitudes and motivation for knowledge sharing.

2. Literature review

Motivation has a key role in the knowledge sharing process (Wasko & Faraj, 2005). Osterloh & Frey (2000) also argue that knowledge sharing is intimately connected to motivation. The motivation to share knowledge, in terms of its source, can be classified into intrinsic and extrinsic (Liu & Fang, 2010). Both intrinsic and extrinsic motivations have been widely studied. Intrinsic motivation reflects the natural human propensity to learn and knowledge assimilate (Ryan & Deci, 2000). This kind of motivation develops in the early stages of a person's life (Nguyen et al., 2019). An intrinsically motivated person shares their knowledge because they find the activity interesting and enjoyable, fun or challenging. At the same time, extrinsic motivation is a construct that pertains whenever an activity is done in order to attain some outcome. Although intrinsic motivation is clearly an important type of motivation, most of the activities people perform are not intrinsically motivated (Ryan & Deci, 2000). As Bénabou & Tirole (2003) note, a fundamental economic tenet is that individuals respond to incentives. Incentives promote effort and performance, and there is a lot of evidence that they often do. Unlike intrinsic motivation, external motivation arises from external pressure (Olatokun & Nwafor, 2012) and comes from certain expectations or targeted reasons for performing a specific activity, determined by various types of rewards (Ipe, 2003), reciprocity (Chang & Chuang, 2011), support from management (Jabbary & Madhoshi, 2014), community status, and reputation (Chang & Chuang, 2011).

The results of research on the influence of intrinsic and extrinsic motivation on the process of knowledge sharing are not unequivocal. However, the prevailing view is that intrinsic motivation has a more pronounced positive influence on knowledge sharing willingness and behavior. Olatokun & Nwafor (2012) investigated the effect of extrinsic and intrinsic motivation on employees' knowledge sharing attitude and intention. The study concludes that extrinsic motivation (expected organizational rewards and reciprocal benefits) has no significant effect on employees' knowledge sharing intentions, but enjoyment of helping others and knowledge self-efficacy are important motivating factors in determining employees' attitudes and their intentions to knowledge sharing. In their study, Liu & Fang (2010) found that intrinsic motivation had the strongest influence on knowledge sharing willingness and behavior. A study by Nguyen et al. (2019) also show that the effect of intrinsic motivation on knowledge sharing is more pronounced. According to Foss et al. (2009), while intrinsic motivation has a very strong and positive impact on knowledge sent, external motivation is negatively related to the extent of knowledge sent to colleagues.

Hsu et al. (2007) came to the conclusion that self-efficacy (internal factor) has both direct and indirect effects on knowledge sharing behavior, implying that self-efficacy plays a critical role in guiding individuals' behavior. Moreover, the greater the anticipated reciprocal relationships (external motivational factor) are, the more favorable the attitude toward knowledge sharing will be. According to Ipe (2003) motivation to share knowledge is determined by a combination of intrinsic and extrinsic factors and an ideal combination of these factors results in high motivation among individuals to share what they know with others.

Although the influence of motivation on knowledge sharing is well-studied, research aimed at establishing differences between men and women in terms of knowledge sharing attitudes and motivations is scarce. According to Abukhait et al. (2019), females were less inclined to engage in knowledge sharing. At the same time Nguyen et al. (2019) argue that women are more sensitive to motivation to share knowledge than men, they are more likely to share knowledge than men, however, in contrast to expectation, men tend to be more active in sharing knowledge if they have self-enjoyment.

Heisig & Kannan (2020) review for the first time existing research literature about the role of gender in creating, sharing and using knowledge in organizations. 41 papers published in peer-reviewed journals were analyzed. They find that the role of gender in knowledge management (KM) has been rarely addressed in KM journals. The existing research suggests that knowledge sharing might be influenced by gender. Unfortunately, there is a lack of research on the influence of gender on the motivation to share knowledge.

3. Methodology

The research is based on quantitative information generated through an online survey and its subsequent processing through statistical methods and specialized software (SPSS). In line with the set research goal, namely to identify the

presence (absence) of differences between men and women in terms of attitudes and motivation to share knowledge, two research questions were formulated:

Research Question One: Is there a difference between men and women in the propensity to share knowledge in an organizational environment?

Research Question Two: Is there a difference between men and women in terms of motivation and motivational factors for knowledge sharing in an organizational environment?

In order to answer the questions posed in this way, two hypotheses were formulated and tested:

Hypothesis One: There are no differences between men and women regarding the propensity to share knowledge in an organizational setting.

Hypothesis Two: There are differences between men and women regarding the motivation to share knowledge in an organizational setting.

The survey was carried out in the period February 2023 - May 2023 with the assistance of the German-Bulgarian Chamber of Industry and Commerce (GBCIC). A link to the survey card, as well as brief information about the research objectives, were sent by e-mail to 420 companies operating in Bulgaria, and included in the GBCIC database. The response rate was 14.07 (59 business organizations). Of these, 69.49% are from the SME group, and 30.51% are large companies (with over 250 employees). Enterprises from 24 industries are covered, with 52.54% being part of a larger foreign business structure.

The participants were asked to indicate the extent to which they agreed with the provided knowledge-sharing motivating factors, as well as the extent to which they agree to share their knowledge with other colleagues (see Table 1). A five-point Likert scale was used, ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 1. Descriptive statistic

	N	Min.	Max.	Mean	Std. Dev.
Willing to share your knowledge	59	2	5	4,63	0,692
Sharing knowledge motivation factors:					
1. Building strong relationships with colleagues	59	2	5	4,22	0,789
2. Management support	59	1	5	4,14	0,840
3. Recognition from management	59	1	5	4,10	0,941
4. Feel like an expert	59	1	5	4,08	0,934
5. Recognition and respect from colleagues	59	1	5	4,03	0,982
6. Professional growth	59	1	5	3,95	0,990
7. Reciprocity	59	1	5	3,66	1,183
8. Career advancement and growth	59	1	5	3,31	1,103
9. Monetary rewards or bonuses	59	1	5	3,22	1,247
10. Sense of superiority over others	59	1	5	2,71	1,403

To demonstrate the presence or absence of differences between men and women in terms of the propensity to share knowledge and the factors that create motivation for this, the answers to the questions are grouped depending on the gender of the respondent. Average values were then calculated. Because the sample was small, the data were not normally distributed (this was checked with the Kolmogorov-Smirnov and Shapiro-Wilk tests) and extreme values were observed, parametric statistical tests could not be used. Therefore, in order to test the adopted hypotheses, a non-parametric test is used to compare two independent groups. Specifically, it is the Independent-Samples Mann-Whitney U Test. This is the non-parametric alternative to the independent samples t-test, which, however, compares not the arithmetic means of the two groups but their medians. Calculations were done with SPSS.

3. Findings and Discussion

In order to test the first hypothesis, namely that there are no gender differences regarding the propensity to share knowledge in an organizational environment, the mean scores were calculated separately for men and women on the question "Are you willing to share your knowledge?" from the questionnaire (see Table 2). There is a minimal difference between the average scores of men and women, and the scores themselves are close to the maximum. This means that both genders have an equally high tendency to share their knowledge.

Table 2. Descriptive statistic

	Gender	N	Min.	Max.	Mean	Std. Dev.
Are you willing to share your knowledge?	M	21	3	5	4,67	0,658
	F	38	2	5	4,61	0,718

To confirm the conclusion drawn from the comparison of the mean values of the responses of men and women regarding the propensity to share knowledge, the Mann-Whitney U Test was also applied. Its results are presented below the farm in Table 3.

Table 3. Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of "**Are you willing to share your knowledge?**" is the same across categories of "**Gender**" of the respondent.	Independent-Samples Mann-Whitney U Test	0,714	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is 0,050.

Because Sig. = 0.714, which is greater than the significance level (0.050), the **first hypothesis is confirmed**. There are no differences between men and women regarding the propensity to share knowledge in an organizational setting.

A similar approach was used to test the second hypothesis, according to which there are differences between men and women regarding the motivation to share knowledge in an organizational setting. First, the mean scores on individual motivational factors for men and women are compared (see Table 4) and then the Mann-Whitney U Test is applied.

Table 4. Knowledge sharing motivation factors. Descriptive statistic

	Gender	N	Min.	Max.	Mean	Std. Dev.
1. Building strong relationships with colleagues	M	21	2	5	4,05	0,865
	F	38	2	5	4,32	0,739
2. Management support	M	21	3	5	3,95	0,805
	F	38	1	5	4,24	0,852
3. Recognition from management	M	21	1	5	3,81	0,981
	F	38	2	5	4,26	0,891
4. Feel like an expert	M	21	1	5	3,71	1,007
	F	38	3	5	4,29	0,835
5. Recognition and respect from colleagues	M	21	3	5	4,00	0,707
	F	38	1	5	4,05	1,114
6. Professional growth	M	21	1	5	3,52	1,078
	F	38	1	5	4,18	0,865
7. Reciprocity	M	21	2	5	3,62	1,161
	F	38	1	5	3,68	1,210
8. Career advancement and growth	M	21	1	5	3,10	0,995
	F	38	1	5	3,42	1,154
9. Monetary rewards or bonuses	M	21	1	5	3,19	1,327
	F	38	1	5	3,24	1,218
10. Sense of superiority over others	M	21	1	5	2,71	1,488
	F	38	1	5	2,71	1,374

From the data in the table, it can be concluded that, in general, the considered motivational factors influence to a higher degree the tendency of women to share knowledge, i.e. they are more sensitive to the factors and accordingly can be more easily motivated by them. Men are more resistant. In no motivational factor was the mean score of men higher than that of women.

Differences in factor ranks are also observed. They are presented in Table 5. While men put the factor of recognition and respect from colleagues in the second most important place, for women it is only in the sixth place. It is much more important for them to feel like experts. Men, on the other hand, do not attach such importance to a sense of expertise. They rank it fifth in importance. From this it can be concluded that men are more interested in the attitude of colleagues at work than women. For the latter, it is more important how they themselves feel, and not how others perceive them.

Table 5. Ranks of KS motivation factors

Factors	Ranks		
	General	Male	Female
Building strong relationships with colleagues	1	1	1
Management support	2	3	4
Recognition from management	3	4	3
Feel like an expert	4	5	2
Recognition and respect from colleagues	5	2	6
Professional growth	6	6	5
Reciprocity	7	7	8
Career advancement and growth	8	9	7
Monetary rewards or bonuses	9	8	9
Sense of superiority over others	10	10	10

Tables 4 and 5 show that there are certain differences between men and women in terms of the mean values and ranks of the factors motivating knowledge sharing in an organizational setting. However, to determine whether these differences are statistically significant, it is necessary to check with the Mann-Whitney U Test. The results presented in Table 6 show that for two motivational factors there are statistically significant differences between men and women (Sig. < 0.050). These are professional growth and a sense of expertise in sharing knowledge in an organizational setting. For both factors, women give significantly higher ratings of their importance than men.

Table 6. Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of **Career advancement and growth** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,183	Retain the null hypothesis.
2	The distribution of **Recognition and respect from colleagues** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,386	Retain the null hypothesis.
3	The distribution of **Recognition from management** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,058	Retain the null hypothesis.
4	The distribution of **Monetary rewards or bonuses** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,890	Retain the null hypothesis.
5	The distribution of **Professional growth** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,013	Reject the null hypothesis.
6	The distribution of **Management support** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,126	Retain the null hypothesis.
7	The distribution of Sharing knowledge makes me **Feel like an expert** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,030	Reject the null hypothesis.
8	The distribution of **Sense of superiority over others** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,994	Retain the null hypothesis.

9	The distribution of **Building strong relationships with colleagues** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,232	Retain the null hypothesis.
10	The distribution of **Reciprocity** is the same across categories of **Gender** of the respondent.	Independent-Samples Mann-Whitney U Test	0,762	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,050.

The results of the analyzes performed (comparison of the average ratings of the influence of the factors depending on the gender of the respondent, ordering of the motivational factors by rank and the Mann-Whitney U Test) **confirm the second research hypothesis**, according to which there are differences between men and women in terms of motivation for knowledge sharing in an organizational setting.

3. Conclusion

The results of the study confirmed the two hypotheses proposed for verification. In this way, it has been proven that men and women have an equal and high tendency to share knowledge in an organizational environment, but there are differences between the two genders in terms of the motivation to carry out this process. In general, motivational factors influence women more than men, meaning that women can be more effectively motivated to share their knowledge. Furthermore, the Mann-Whitney U Test proved that there were statistically significant differences for two motivational factors. It is professional growth and a sense of expertise that are much more important to women than the motivation to share knowledge. Last but not least, in sharing knowledge, men are more motivated by receiving recognition and respect from colleagues, while women are more motivated by the feeling of being an expert.

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METHODS AND ANALYSIS OF THE INCOME STATEMENT – A POSITIVE INDICATOR IN THE OPERATION OF BUSINESS ENTITIES

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Abstract

One of the essential financial statements is the income statement, which shows the income and expenses. When designing the income statement, the gross principle can be applied, which shows all income and expenses by type. But also, the net principle can be applied, which the balance can show in different ways, or be complete or partial. Of course, this financial statement should always be analyzed together with the balance sheet because of their connection. Here, the main feature of this balance sheet is the presentation of income, expenses, and business results by types, amounts, and the sources of their generation.

Today, when compiling the income statement, the gross principle is accepted as an integral part of the principle of truth. All this is required by the fourth and seventh directives of the European Union for the mandatory use of the gross principle in the compilation and presentation of the income statement. The legal entity should present the income, expenses, and results of the operation for the business year until the balance sheet date. It should contain business income, business expenses, and business results. It is also necessary to include the financial income, financial expenses, and financial result, extraordinary income, extraordinary expenses, extraordinary result, as well as the total result of the business entity.

When determining the business or financial result, it is necessary to take care because errors can occur that multiply certain wrong situations in the positions of the profit and loss account. Therefore, the calculation of the result presupposes a mutual comparison (contrast) of the size of income and expenditure. Any error is inevitably reflected in a certain position on the balance sheet. That is, the comparison of income and expenses means that against the realized income from

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sales, there must be expenses that are delimited according to certain criteria, time of sale, price, time of stock, etc.
We perceive the role and importance of this balance sheet through the control of the achieved success. This means that it is necessary to break down the total success according to the areas of its occurrence.

Keywords: result, gross principle, breakdown, methods, costs.

1. Introduction

The income statement, or profit and loss statement, is a report that summarizes all income and expenses for a specific period, usually a calendar year. The most important figure in the statement is the net profit, which is the amount remaining after deducting total expenses from total revenues. This figure shows the business's performance over a specific period, such as a month, quarter, or longer. It's crucial to specify the exact period covered by the report. In some countries, only semi-annual or annual reports are published, depending on accounting practices. The profit and loss statement is also essential for management when making weekly decisions, and it is used daily by both internal and external stakeholders to improve the company's profitability and performance.
"The income statement shows how the operations of a business entity during a given period increase net assets (assets minus liabilities) through revenues and decrease net assets through expenses. Net profit represents the amount by which the increase in newly acquired funds (income) exceeds the costs from using other funds (expenses). It is understood that in certain cases the expenses may be greater than the income, whereby the company will show a net loss" (Horngren, Sandham, Elliott, Philbrick, Introduction to Financial Accounting, pp. 59,60).
The meaning of the income statement depends on the quality and structure of its components, and how they are valued. Businesses don't calculate their total financial results for their entire existence; instead, they work in short periods where accurately tracking income and expenses is important for determining the periodic financial result. Regardless of the company's type and size, the basic elements found in a profit and loss account are income, expenses, and financial results. The valuation of expenses in the income statement is a result of evaluating costs, with the costs of consumed materials and fixed assets making up a significant portion (sometimes over 90%) of the cost price.
"Namely, given the great importance it has for management, decision-making, and development in the income statement, according to IAS, positions should be included through which the data and information about revenues, results of operational activities, financial costs, participation in profit and loss, tax expenses, profits and losses from regular activities, extraordinary items, minority interests and net profit or loss in the accounting period" (I.Zdravkoski. Standardization and application of financial statements, pp. 69)
It is crucial to ensure that the information used to evaluate a business's financial performance is unbiased. If needed, additional items should be included to gain a

better understanding of the factors affecting the business's performance. When evaluating these factors, it is important to consider principles such as significance and reliability. This is because the various elements of income and expenditure items fulfill different functions in assessing the accuracy and content of the financial results.

2. An income statement provides a clear overview of a successful operation

It demonstrates success through a profit, validating the completion of planned tasks. Specifically, it confirms that the business entity efficiently carried out all activities and achieved profitability in a given business year. The profit or loss statement comprises several segments, each with specific significance, collectively presenting the overall financial outcome. The income, expenses, and results of operations are expressed in the income statement starting from 01.01.20XX to 31.12.20XX.

Operating income includes income from the sale of products, goods, and services to parent, subsidiary, and other related and unrelated companies both domestically and internationally. It also encompasses income from intangible and material investments, such as seeds produced for internal use, increasing the basic herd, advertising, propaganda, representation, internal transportation, and common consumption. Additionally, it covers income from related entities on all grounds, rental income from intangible and tangible investments, and revenue from the sale of materials, intangibles, spare parts, and small inventory, excluding financing revenue.

Financial income comprises income from financing related to entities (parent and its parts), financial investments, interest, positive foreign exchange differences, and other financing income.

Other income includes profits from selling tangible and intangible assets, shares, and securities, as well as revenue from materials, waste, premiums, subsidies, and grants. It also encompasses income from risk protection contracts, cancellation of long-term provisions, surpluses, penalties, awards, and similar sources. Additionally, it involves the write-off of creditors' claims and any other miscellaneous income.

Business expenses encompass operating, financing, and other costs. These costs involve a debtor-creditor relationship as per the relevant laws and are documented properly. They include expenses for raw materials, energy, service charges, employee salaries, depreciation, operating costs, asset devaluation, and other expenses. In addition to being part of the income statement, supplementary information is presented in the Explanatory Notes form.

In Macedonian accounting practices, standardized forms are used for automatic processing in the Central Registry of the Republic of Macedonia. The prescribed format involves selecting the cost type method. Legislation requires business entities to fully adhere to the International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS) when preparing financial statements.

3. Revenues and expenses according to IAS

Revenues are gross inflows of economic benefits during the accounting period, which result from the course of regular activities of an enterprise, when such inflows increase the capital, except for those increases, which refer to the contributions to the capital, by the participants (the founders) (IAS 18). Revenues include only the received gross inflows of economic benefits and receivables by the enterprise on its account. Amounts collected on account of third parties, such as sales taxes, are not economically used, which represent an inflow to the enterprise and do not result in a capital increase. Accordingly, they are excluded from income.

3.1.Determination (measurement) of revenues

Revenues should be measured according to their fair value, consideration received, or receivable. The amount of revenue arising from a transaction is usually determined by agreement between the enterprise and the purchaser or user of the asset. It is measured according to the fair value of the consideration received or receivable, taking into account the reduction of the amount of any trade and quantity discounts granted to the enterprise.

3.1.1. Operating revenues and financial revenues

In many cases, the consideration is in cash or cash equivalents and the amount of proceeds is the amount of cash or cash equivalents received or the receivable. However, when the inflow of cash or cash equivalents is delayed, the fair value of the consideration may be lower than the nominal amount of the cash received or the receivable. For example, if company A gives company B an interest-free loan. Or, if the first enterprise receives a bill of exchange as compensation for goods sold, which has a lower interest rate than the market rate.

3.2. Determination (recognition) of revenues

The determination, that is, the recognition of revenues is carried out by IAS 18. This standard determines when the conditions are met, inflows, that is, possible inflows from certain transactions, to be recognized as revenues.

International Accounting Standard 18 covers the following revenues:

- ★ Sale of products, which includes commercial goods purchased for sale and own products;
- ★ The provision of services, except for services that are directly related to construction contracts and are regulated by IAS 11; and
- ★ The use of other assets of the subscription, with which interest, royalties (patents, trademarks, copyrights and computer software) and dividends are

earned, except those from affiliated companies (IAS 28), insurance with insurance companies (IFRS 4), changes in the fair value of financial assets and liabilities (IAS 39) and other current assets, the natural increase of the herd, agricultural and forest products and the extraction of mineral ores (IAS 41).

4. Methods of Income Statement Analysis

The income statement analysis involves two key techniques for assessing a company's financial health as a potential investment. The first technique is horizontal analysis, which identifies historical trends and growth rates of crucial items like revenues, expenses, and earnings. The second technique is vertical analysis, which compares profit margins over different reporting periods and against competitors.

Vertical analysis is a helpful tool for examining a company's financial statements when assessing them for investment. It involves converting all items in the income statement into percentages of revenue, enabling easy comparison across companies and time periods. This analysis allows for the evaluation of key ratios and margins both historically for a company and in comparison to industry competitors.

For instance, when examining a potential stock investment, an investor can review the company's gross margin over time to determine if it is improving or declining. They can also compare it to industry averages and competitors. This approach quickly reveals areas where a company excels or falls short. Vertical analysis enhances the comparability of financial statements for stock analysis and brings attention to trends and relative performance. Standardizing all line items to a common revenue base makes it much simpler to evaluate a company's underlying operations and efficiency.

Horizontal analysis is a great method for assessing a company's financial performance over time, especially when considering it as a potential investment. By examining year-over-year changes in income statement items, investors can observe trends in revenue, expenses, and profitability. This analysis helps to identify areas where the company is improving or declining, and can assist in predicting future performance.

For instance, an investor may examine the revenue growth and EPS growth rates over the past five years. If revenue is increasing at a rate of 5% per year, but EPS is only growing at 2%, this could indicate a problem with costs rising too rapidly. Additionally, comparing these trends horizontally to industry competitors can provide insight into relative performance. In general, horizontal analysis focuses on a company's historical trends, which are crucial for determining valuations and evaluating growth potential. When used alongside vertical analysis, investors gain a comprehensive understanding of both a company's profit margins and its performance over time—both critical factors when evaluating potential stocks. A concentration on horizontal changes complements the vertical comparisons of common size.

4.1. What does the income statement analysis represent and show?

Analysis of the income statement through vertical and horizontal analysis provides crucial insights into a company's financial performance for potential investment evaluation.

Analyzing an income statement involves verifying the accuracy of the numbers presented. The analyst forms initial conclusions and then compares the income statement with previous period balance sheets or financial statements from other companies.

Various analysis techniques can be used to extract valuable information from the income statement. However, it's important to focus on the quality of the information rather than the quantity.

The income statement is the first thing to analyze to determine if the company made a profit or a loss during the period covered by the financial report.

The analysis of the income statement should involve examining all categories of income and expenses, understanding how individual expenses and income contribute to the overall financial picture, identifying reasons for the presence or absence of specific categories, considering the impact of competition on the company, and similar factors.

A useful tool for delving deeper into the analysis of the elements of the income statement is expressing it as a percentage.

In this form, each item on the income statement is shown as a percentage of the total sum (revenues and expenses), which is represented as 100%.

Converting the figures in this manner allows analysts to make important comparisons with the income statement of the same company from previous periods and with the balance sheets of other companies in the same branch or industry.

When analyzing an income statement qualitatively, it's important to consider that financial reports are prepared at the request of clients and that management can influence the presentation of results through various accounting methods. This can create a perception of competitive advantage or disadvantage for the company in the market.

It's crucial to note that public and private companies have conflicting interests when it comes to the creation of the income statement. Publicly held companies seek to maximize reported net profit in their financial statements, as investors use this information to evaluate the company's stock.

As a result, they may use accounting rules that offer flexibility and reduce costs, such as capitalizing costs whenever possible and depreciating fixed assets over longer periods.

These practices, intended to avoid misleading investors, could lead to a lower market valuation of the reported earnings. On the other hand, privately owned companies, not having publicly traded stock, are not concerned with making an impression.

They typically prepare one set of financial statements primarily for tax purposes. Unlike publicly traded companies, they prioritize minimizing reported profit to reduce their tax burden.
Analysts need to consider all of these factors when examining the income statement and strive to understand the economic reality accurately, which can be quite challenging.

5. Analyzing the Limitations and Shortcomings of the Income Statement

The income statement analysis involves determining the accuracy of the numbers it presents. To begin, the analyst draws initial conclusions and then compares the income statement with the balance sheets of previous periods or those of other companies. Various analysis techniques are available to the analysts to extract valuable information from the income statement. However, it's essential to prioritize the quality of information over its quantity.
Income statements only show financial information for a specific period, like a quarter or a year. However, they do not fully consider long-term trends, seasonal changes, or shifts in business conditions that impact profitability. Income statements offer a historical view of financial performance and do not predict future strategic direction or expectations. Additionally, income statements heavily depend on accounting standards and rules for recognizing revenue, classifying expenses, and reporting profits.
The income statement can be difficult to understand because it doesn't provide a complete picture. It doesn't take into account important information from the balance sheet like cash, debts, and assets, even though these factors can impact profit. Additionally, income statements don't consider qualitative factors such as management skills, company culture, competitive advantages, industry trends, economic conditions, and technological advancements, which all play a role in business performance.

It is important to look at performance over longer periods of time instead of just focusing on one reporting period. Income statements may not consistently show trends over time, especially for businesses with seasonal sales or production cycles. Therefore, it is necessary to make seasonal adjustments and compare similar calendar periods for accurate assessments.
It's important to keep in mind that certain items on the income statement, like restructuring charges, impairments, legal settlements, and investment gains/losses, can make it difficult to accurately assess a company's regular operating performance. To make fair comparisons, adjustments are needed. Income statement analysis has its limitations and should be combined with other financial statements, qualitative evaluations, and a broader context to fully understand a company's overall performance and strategic outlook.

Vertical Income Statement[5]

Company Name:

Address:

Phone No.: Email ID:

Time Period: Branch Name if any:

Particulars	Amount
Sale (+)	20000
Credit Note (-)	1000
Sale Fixed Assets (+)	10000
Purchase (-)	10000
Debit Note (+)	2000
Purchase Fixed Assets (-)	10000
Direct Expenses (-)	**400**
Other Direct Expenses (-)	200
Payment-in Discounts (-)	200
Tax Payable	**2200**
GST Payable (-)	2000
TCS Payable (-)	200
Tax Receivable (+)	**2200**
GST Receivable (+)	2000
TCS Receivable (+)	200
Opening Stock (-)	5000
Closing Stock (+)	4500
Opening Stock Fixed Assets (-)	2000
Closing Stock Fixed Assets (+)	1000
Gross Profit	**9100**
Other Income (+)	4800
Indirect Expenses (-)	**800**
Other Expenses	200
Loan Interest Expenses	200
Loan Processing Fee Expenses	200
Loan Charges Expense	200
Net Profit	**13100**

The components of an income statement are crucial for understanding a company's financial performance. These components typically include revenue, expenses, gains, and losses, and provide essential insights for investors, analysts,

[5] https://vyaparapp.in/income-statement-format/vertical

and other stakeholders. Understanding these components is vital for making informed decisions about the company's financial health and prospects.

6. Conclusion

In the paper, we emphasize that the Income Statement is a summary of the company's income, expenses, and profitability during a specific period. This report is crucial for various users of financial statements, especially investors, as it offers valuable insights into a company's financial health and potential earnings.

The profit and loss statement outlines the main sources of income, such as revenue from product or service sales, and details key expenses including cost of goods sold, research and development, marketing, interest, and taxes. It provides essential profitability indicators, such as gross profit, operating income, income before tax, and net income.

Analyzing a company's income statement helps understand its profitability, performance, and ability to generate income. Income statement analysis involves studying trends and ratios over time to identify key drivers of profitability and compare performance to competitors. It assesses whether revenue growth is driving profits or if cost management and efficiency improvements are boosting the bottom line.

The income statement offers insights into a company's financial performance, allowing for the analysis of important metrics such as margin ratios, earnings per share, and revenue growth. These metrics help evaluate a company's capability to generate income from its investments and capital. However, it's important to note that income statement analysis has limitations, as it does not provide qualitative insights into management competence and strategic direction.

The analysis identifies any deficiencies that may indicate issues with sales or cost control. Assessing profit margins helps determine if a company is operating efficiently. Comparing margins to historical averages and industry benchmarks can reveal areas of strength or weakness. Horizontal analysis of income statements tracks changes in income, expenses, and profit over successive periods, showing whether the business is growing. Ratio analysis, such as gross margin, operating margin, and return on assets, provides insight into profitability relative to revenue and investment.

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DIGITALIZATION OF SHAREHOLDERS MEETINGS: DO MACEDONIAN JOINT-STOCK COMPANIES KEEP STEP WITH MODERN COMPANIES?

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Abstract

Digitalization has become a very important part of everyday living of people, also an immanent part of companies working. This process has fostered the development of every segment of society. Trade companies and Macedonian Law on trade companies are not resistant to the digitalization and use of digital technologies in their operations. The author will make a profound analysis of the Macedonian Law on trade companies and the aspects of digitalization of the operations of joint stock companies in the manner of convening the joint stock company assembly; participation of shareholders on a session of an assembly by electronic means, remote voting etc. The emphasis will be given to the companies whose stocks are listed on the Macedonian stock exchange, companies which in accordance with the Law on Securities have special notification obligations. Macedonian legal framework will be compared with some legal solutions of the countries from the region and some well-developed countries. The analysis also will include the practical implications of digitalization in the operations of Macedonian joint-stock companies, the level of incorporation of distance voting at general meetings of the companies whose shares are components of the MBI10 index before Covid-19 and after Covid-19 pandemic. The research will show how Macedonian MBI10 companies are complying with digitalization in the voting process at general meetings. As a result of the research, will be given some recommendations about greater practical application of digital means by Macedonian joint stock companies and broader implementation of the best trade practices in this field.

Keywords: Digitalization, shareholders general meeting, Law on trade companies, remote voting, MBI10.

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1. Introduction

The process of digitalization is an inevitable process in modern society. A few decades ago, it was impossible to imagine that the process of creating some company policies or approving the results of the previous year would be done without physical attendance of the shareholders, but the internet and similar innovations convinced us in the opposite. Digitalization as a contemporary trend did not pass by corporate law. The globalization of the capital, needs of the foreign investors, perspectives and advantages of digital communication contribute for implementation of the digital culture into daily operations of the companies. The advantages such as cost reduction, and possibility to be present and to express your attitudes without traveling were the most significant triggers for implementation and use of digital means in company law and corporate governance. Digitalization in company law now days it is evident in few aspects of the operations of joint stock companies in manner of registration and incorporation of the company; meetings of the management bodies; convening the joint stock company assembly; participation of shareholders on a session of an assembly by electronic means, voting, electronic communications etc.

The need for using a remote voting increased due to the persistence of the Covid-19 pandemic, when all unnecessary physical contacts were reduced to minimum. This trend was confirmed in Italy where overall, 95% of the meetings called in 2021 have been held without the physical attendance by shareholders, who conveyed all their proxy votes to a special delegate attendance to shareholders' meetings (Linciano, et al. 2022). The experience in North Macedonia shows that most of the companies in 2020, to implement the health protocols, hold their annual shareholders' meetings by encouraging the possibility of voting by correspondence (Koevski, et al., 2020).

The author will make a profound analysis of the selected problem; thus, the paper is divided into 6 sections. The first section is an introduction. Section 2 presents the notion of virtual shareholders meeting (VSM), the types of remote voting and Literature Review at the same time. Section 3 is dedicated to comparative normative analysis of participation and voting in the general meetings from distance. In Section 4, the author presents the legal framework of the Republic of North Macedonia. In order to draw a broader conclusion about the holding of virtual shareholders meetings and the trends of digitalization of joint-stock companies after defuse of the Covid-19 pandemic, the analysis of annual meetings and statutory provisions of companies whose shares are components of the MBI10 index will be object of comprehensive research, presented in Section 5.In section 6 are presented the conclusions and recommendations of the research.

2. Definition of virtual shareholders meeting (VSM) and literature review

The main aim of the assembly of the companies is shareholders to exercise their rights in the company. Each shareholders registered in the shareholders list shall have, from the day of the entry, the right to participate in the operations of the assembly and the right to vote. The main purpose of a general assembly such

as a form of direct democracy is the opportunity for any shareholders to be involved in the creation of the policies and into the process of adaptation of the main decisions of the company. Annual general meetings provide shareholders with the opportunity to discuss the company's past performance and future strategy with management, to ask questions and to express their views i.e. use their "voice" (Cuñat et al. 2015).

The right to ask questions and voice their opinions at annual general meetings represents one of the few avenues for shareholders to communicate directly and publicly with the firm's management. (Auzepy, Bannier, and Martin, 2023) Thus, it is very important for the joint stock companies to be more open and collaborative with their shareholders. The approach that companies should make a commitment to support the participation of shareholders can be found in the Belgian Code on Corporate Governance Code where: "The company should encourage the shareholders to participate in the general shareholders' meeting. The general shareholders' meeting should be used to communicate with shareholders. Those shareholders who are not present should be able to vote in absentia, such as by proxy voting." (Van der Elst, 2011, pg.3)

According to Chia and Lee depending on the type of the presence of the shareholders there are three types of Annual Meetings: In-Person, Virtual and Hybrid Meetings (2021).

Virtual general assembly is the meeting in which the shareholder or his representative, in other words, the right holder, can attend the general assembly meeting by using technical means, not physical" (Malkoç & Badak, 2022). That means that shareholders may express their will legitimately from anywhere if they use the internet and the proper link, platform or email to vote for all of the items that are on the agenda of the general meeting, to ask a question, to raise some problem etc.

The theory makes some distinctions on the forms of remote voting depending on if any of the shareholders is present physically at the meeting and the forms of voting by using some electronic means. Virtual shareholder meetings (VSMs) are defined as a meeting of shareholders where no shareholder is present at the usual meeting location, but all shareholders participate formally by digital means. VSMs need to be distinguished from: (1) hybrid where some of the shareholders participate in person, while others exercise their rights as if they were present by digital means (legally termed as "electronic participation"); (2) online voting forms where the digital exercise of voting rights is enabled by legal tools while company law still requires an in-person meeting and (3) voting-by-mail where the votes are sent to the company by those not attending the in-person meeting (Zetzsche et al., 2020, pg.12-13). Also, the VMS need to be distinguished from *In person with live internet streaming meetings* where the meeting has live internet streaming for non-attendees or non-shareholders but these shareholders are not counted towards a quorum, have no right to vote etc. (Chia and Lee, 2021).

Zetzsche in his study makes a distinction on the types of electronic voting such as: a) Electronic Proxy Voting, b) Electronic Direct Voting and c)Virtual Shareholder Meetings (VSM) (Zetzsche, 2007).

Gao, Huang and Zhang, stress out the positive effect of annual shareholder meetings conducted online in a way of significantly increasing the participation of shareholders, especially minority shareholders. This finding is more evident when the cost of physically attending the annual meeting is higher, and when the firm's ownership is more dispersed (Gao et al., 2019).

As a disadvantage of virtual general meetings some authors emphasized that if any technical problem occurs during the voting, the chances for annulment of the decisions adopted on the VSM may increase (Ararat & Eroglu, 2012). Beside technical issues and problems, cost and fear of excessive questions are also mentioned as a disadvantage. Costs of the company that involves installing and maintaining a secure electronic system may be immoderate resource demanding. Fear of excessive questions covers worries among companies that electronic participation may lead to excessive questioning because shareholders may act less restrained in a digital setting (ICLEG, 2022). An analysis of the current legal framework and practices in the European Union (EU) as regards the use of digital solutions in the interaction between companies and shareholders was profoundly made into the Study of European Commission entitled: "Identification and assessment of legal and practical impediments for the use of digital tools for interaction between companies and their shareholders", published in 2018. The survey also assesses legal and practical impediments and risks to the use of digital solutions and any possible solutions which have been found to overcome these impediments and risks. According to the results the types of impediments that respondents usually face in the use of digital solutions for participating in and voting at general meetings without physical attendance are: 1) the risk that possible technology failure could affect the validity of the resolutions, acts, or of the general meeting, 2) risks linked to uncertainty of the legal framework, 3) the explicit interdictions of restriction, 4) the need to provide for equal access to all shareholders and the difficulty in verifying the identity of the shareholder (European Commission, 2018. p.179).

On the soil of the Republic of North Macedonia, a pioneer in the research dedicated to virtual only annual shareholders meeting are Koevski, Tushevska-Gavrilovik and Spasevski (2020). In their research they are focused on the experiences arising from the application of this model in 2020. Unfortunately there are missing researches about VSMs after defuse of Covid-19 pandemic in the Republic of North Macedonia.

3. Comparative legislative framework

The G20/OECD Principles of Corporate Governance are the leading international standard for corporate governance. The reviewed principles, adopted in 2023 are structured in 6 Chapters, dedicated to ensuring the basis for an effective corporate governance framework, equitable treatment of shareholders, facilitating and supporting institutional investors, stock markets and other intermediaries, disclosure and transparency, the responsibilities of the board, sustainability and resilience. These principles reflect a strong desire and

commitments of all OECD and G20 Members for better corporate governance. The II.C.3. principle prescribes that:" General shareholder meetings allowing for remote shareholder participation should be permitted by jurisdictions as a means to facilitate and reduce the costs to shareholders of participation and engagement. Such meetings should be conducted in a manner that ensures equal access to information and opportunities for participation of all shareholders." In this manner the company reduces time and costs of shareholders participation at General shareholders meetings especially for foreign shareholders. The same conclusion is for minority shareholders. Some research shows that online shareholder meetings provide minority shareholders a cost-effective way to participate in governance issues (Gao et al., 2019).

On European legislative soil, Directive 2007/36/EC of the European Parliament and of the Council of 11 July 2007 on the exercise of certain rights of shareholders in listed companies and the Directive (EU) 2017/828 of the European Parliament and of the Council of 17 May 2017 amending Directive 2007/36/EC as regards the encouragement of long-term shareholder engagement, allows Member States to permit companies to offer to their shareholders any form of participation in the general meeting by electronic means. Regarding article 8 of the Directive, companies form EU members states may use the following forms of participation:

real-time transmission of the general meeting; real-time two-way communication enabling shareholders to address the general meeting from a remote location; a mechanism for casting votes, whether before or during the general meeting, without the need to appoint a proxy holder who is physically present at the meeting. The process of transposition of the Directive into members states legislative was till 3 of August 2009.

Comparative analysis of the legal-framework of some European Members shows that there are two types of legislation approaches about participation and voting in the general meetings from distance without physical attendance. The first group that is more numerous is the group of countries where participation and voting in the general meetings from distance without physical attendance is allowed. European Member countries that allow voting without physical attendance are: Austria, Belgium, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden. The regulation varies and laws contain different details and prerequisites. Some legislators prescribe the possible forms of distance participation; some countries strictly prescribe that companies beside the legal allowance need to precise the procedure in their Statutes; some countries determine the conditions and prerequisites for distance participation etc. The second group of member countries is smaller and it contains only a few countries where this issue is not expressly regulated such as: Czech Republic and Ireland. (European Commission, 2018).

Turkey also alows participation and voting in the general meetings from distance without physical attendance is allowed. According to Turkish commercial code art. 1527/5 (amended by Code No. 6335) electronic participation

and electronic voting in joint-stock companies shall bear the same legal consequences as physical participation and voting (Hamamcıoğlu, 2016, p.196).

The Covid-19 crisis has become a gamechanger. For a istance, only few countries allowed VSMs already before the crisis of Covid-19, such as Delaware, Canada, Hong Kong, Luxembourg etc. (Zetzsche, Anker-Sørensen, Consiglio & Yeboah-Smith, 2021). The situation was similar with EU member countries prior to the pandemic, when Member States had regularly implemented distance voting options, but only a few Member States had provided an opportunity for listed companies with a broad shareholder base to hold a virtual-only shareholder meeting (BETTER FINANCE – DSW, 2020).

By numbers it looks like this: the statistics in USA shows that number of virtual only shareholders meetings from 266 in 2018, has increased to 318 in 2019 and up to 2367 in 2020 (Rutgers Center for Corporate Law and Governance Council of Institutional Investors Society for Corporate Governance, 2020).

The ILEG (The Informal Company Law Expert Group, 2022) in the Report on virtual shareholders meetings and efficient shareholders communications points out that some European member states apply the same rules to all sorts of companies, which means that purely virtual meetings in unlisted or private companies are possible in Denmark, Ireland and Spain, and are possible but not uncontroversial in Italy. One of the recommendation of the report is adopting a broader approach by the legislator and making a electronic participation and virtual meetings available to all types of limited liability companies, including non-listed and private companies.

4. Macedonian normative framework about digitalization of shareholders meetings

The assembly is a company's body where the shareholders can exercise their rights that are correlated with the decision-making process of the companies' policies, also with their individual rights and benefits of being part or investor in a joint stock company.

The process of digitalization in joint stock companies' operations is more and more evident nowadays in diverse segments of their operation. Thirty years ago, it was unreal and maybe only someone's fantasy that general assembly meetings in the Republic of North Macedonia may be conducted without physical presence, by using some electronic means.

These days, according to the Law on trade companies, digitalization is present in a few segments. The number of these activities is not *numerus clasusus*, that means that operations which may be conducted by electronic means are not explicitly enumerated. But our main interest in this research is the digitalization in general assembly meetings. The scope of the digitalization in convening of the assembly is broader when a company whose shares are listed on the stock exchange and the company which in accordance with the Law on Securities has special notification obligations operates. The Law on Securities defines the companies which have special notification obligation as a company that publicly

announced recording of the stocks or has basic capital of 1 million euros in denar counter value and more than 50 shareholders.

The digitalization in operations of Joint stock general assembly according to the Law on trade companies appears in following segments:

1. *Electronic publication of the public announcement regarding the convening of the assembly*: The public announcement regarding the convening of the assembly shall be published on a half spread in at least one daily newspaper, printed on the territory of the Republic of North Macedonia. The company whose stock are listed on the stock exchange and the company which in accordance with the Law on Securities has special notification obligation also shall have to publish the content of the public announcement on the front page of their official web page, and when their stocks are listed on the stock exchange to submit it for publication on the internet page of the Macedonian Stock Exchange.
2. *Electronically available information and materials about company's assembly on its web page*: 1) the content of the public announcement, that is the invitation for convening a session of the company's assembly 2) the total number of sheres and the total number of voting rights arising from the shares with voting rights on the day of publication of the public announcement, that is the day of sending the invitation, including the total number of each type and class; 3) documents and materials that are to be reviewed on the session of the company's assembly; 4) proposed decision that are to be adopted or when such decisions are not proposed, opinions from an authorized body or a company's body on each point from the proposed agenda of the session of the company's assembly; 5) proposed decisions of the shareholders of the company that need to be published by the company immediately upon their receiving, and 6) the forms for voting via representative or the forms for voting via correspondence prepared for electronic take over by the shareholders.
3. *Participation of shareholders on a session of an assembly by electronic mean at a company whose shares are listed on the stock exchange, that is the company which in accordance with the Law on Securities has special notification obligations*: according to Article 391-a (1) of the Macedonian Law on trade companies, "company whose shares are listed on the stock exchange and the company which in accordance with the Law on Securities has special notification obligations can enable the shareholders to participate on a session of the meeting by using at least one of the following electronic means:1) direct broadcast of the meeting; 2) two-way audio and video communication in live, enabling the shareholders to address the meeting from any remote location, and 3) electronic means for voting, before or during the meeting without a need to authorize a representative who would attend the session. According to the law, legislator prescribes some prerequisites that companies should fulfill such as an established system of electronic registration and recording of the shareholders for the purpose of their identification and preservation of electronic security during the participation of the shareholders at an assembly. The legislator also prohibits companies to require the shareholders to submit documents verified by a notary or verified by another domestic or foreign authorized authority. That means that electronic voting and participation in meetings by using some electronic means

provides the same effect such as physical presence at the meeting. According to the Law on amending the Law on trade companies (Official Gazeta No. 42/2010), the provisions that enable shareholders to use some of the options for electronic means entered into force on 1 January 2011. These possibilities are not still allowed to companies whose shares are not listed on the stock exchange. This article is proposed to be completely the same in new Draft of Law on trade companies.

4. *Obligation for publishing shareholders' questions and answers*: The company whose shares are listed on the stock exchange and the company which in accordance with the Law on Securities has special notification obligation shall be obliged to answer the raised questions of the session of the company's assembly to publish on its web page in the format of a question and an answer.

5. *Voting via correspondence:* The company can enable the shareholders to vote via correspondence before the day of holding the assembly. Prior to enabling the shareholders to vote via correspondence, the company can require from them to confirm their personal identity by submitting original personal identification document or a copy from the original chosen by the shareholders without an obligation to be verified by a notary or confirmed by a domestic or foreign competent body. The company that has an established system of internal recording and registration of the shareholders being available to all, can be used as a means for identification of the shareholders.

5. Practical implementation by MBI10 companies

For the purpose of quantification and statistical observation, the Macedonian Stock Exchange Commission started to calculate the MBI index, price, non-weighted index, whose function is to quantify the stock exchange movements. The Stock Exchange Index Commission has decided that the first ten shares-components of MBI10 are: Alkaloid AD Skopje, Stopanska banka AD Skopje, Granit AD Skopje, Komercijalna banka AD Skopje, Makpetrol AD Skopje, TTK banka AD Skopje, Makedonijaturist AD Skopje, Makedonski telekom AD Skopje, NLB banka AD Skopje and UNI banka AD Skopje (Macedonian stock exchange, Structure of index MBI10 (mse.mk).

According to the data publicly available in annual reports for the operations of MBI10 companies listed on MSE, minutes of the annual general meetings conducted in 2019, 2023 and in 2024 and a Statutory provision of these 10 companies, the author will provide an analysis on the situation in the practices; is it any statutory provision for distance voting, and how were the previous 3 meetings conducted. The annual meeting in 2019 is chosen because these general meetings were conducted before the expansion of Covid-19 pandemic and before Security and Exchange Commission of the Republic of North Macedonia in March 2020 issued press releases where companies were encouraged to hold a virtual meeting or to conduct a voting by correspondence.

Table1. Types of remote voting on Annual general meeting of MBI10 companies in 2019, 2023 and 2024 and Statutory provisions about remote voting

Company	**Statutory provisions**	**Shareholders meetings in 2019**	**Shareholders meetings in 2023**	**Shareholders meetings in 2024**
Komercijalna banka AD Skopje	electronic means for voting, before the meeting without a need to authorize a representative who would attend the session and correspondence before the meeting	correspondence before the meeting	electronic means for voting, before the meeting without a need to authorize a representative who would attend the session and correspondence before the meeting	electronic means for voting, before the meeting without a need to authorize a representative who would attend the session and correspondence before the meeting
Makpetrol AD Skopje	participation of shareholders via correspondence	participation of shareholders via correspondence	participation of shareholders via correspondence	participation of shareholders via correspondence
Granit Skopje AD	participation of shareholders via correspondence	No Only in-person voting or by proxy voting	participation of shareholders via correspondence	participation of shareholders via correspondence
Alkaloid AD Skopje	1) direct broadcast of the meeting; 2) two-way audio and video communication in live, enabling the shareholders to address the meeting from any remote location, and 3) electronic means for voting, before or during the meeting without a need to authorize a representative who would attend the session, participation of shareholders via correspondence	No Only in-person voting or by proxy voting	participation of shareholders via correspondence	participation of shareholders via correspondence

Makedonski Telekom AD Skopje	Missing provisions for any kind of remote voting	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting
NLB Banka AD Skopje	participation of shareholders via correspondence	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting
TTK Banka AD Skopje	Voting by telephone or other electronic mean that is a part of public communication network and participation of shareholders via correspondence	No Only in-person voting or by proxy voting	participation of shareholders via correspondence	participation of shareholders via correspondence
UNI Banka AD Скopje	Missing provisions for any kind of remote voting. Authorization of Proxy by using electronic system	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting	No Only in-person voting or by proxy voting
Stopanska Banka AD Skopje	Missing provisions for any kind of remote voting	No Only in-person voting or by proxy voting	participation of shareholders via correspondence	participation of shareholders via correspondence
Makedonija turist AD Skopje	N/A	No Only in-person voting or by proxy voting	participation of shareholders via correspondence	participation of shareholders via correspondence

Source: Own research based on reports published on MSC, SEInet or companies' web pages.

The results of the research for the general meetings conducted in 2019, 2023 and 2024 graphicly are shown in the chart below.

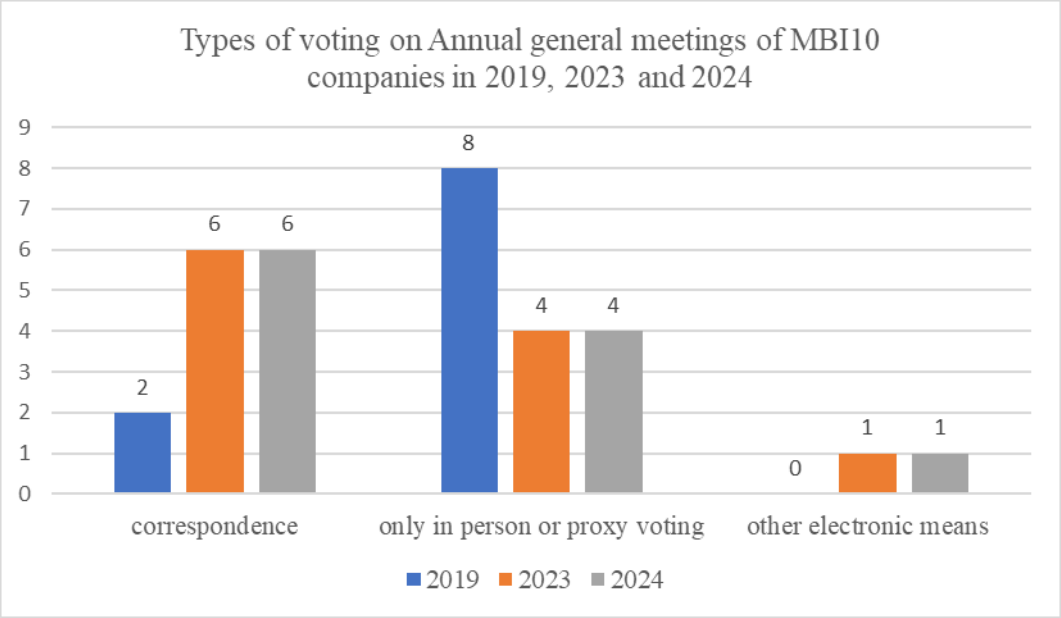


Figure 1: Types of voting on Annual general meetings of MBI10 companies in 2019, 2023 and 2024

The analysis shows that the number of companies that allow voting via correspondence has increased in 2023 and 2024, and the number of companies that allow only in person or proxy voting has decreased in the last 2 years. These change may be the result not only from the increasing process of digitalization but also as a result of people's behevioural changes after pandemic Covid-19. Only one company allows voting by other electronic means. Komercijalna Banka AD Skopje in 2023 and 2024 allowed the shareholders to vote by electronic means or via correspondence. None of MBI10 companies in the analyzied period have conducted annual general meetings by videoconference or other type of virtual only shareholders meeting.

The analysis of the statutory provisions unfortunately shows that only one MBI10 company's Statute consist provisions that enable the shareholders to participate on a session of the meeting by using at least one of the following electronic means: 1) direct broadcast of the meeting; 2) two-way audio and video communication in live, enabling the shareholders to address the meeting from any remote location, and 3) electronic means for voting, before or during the meeting without a need to authorize a representative who would attend the session and only one MBI10 company's Statute consist provisions that enable the shareholders to participate by using electronic means for voting, before or during the meeting without a need to authorize a representative who would attend the session.

None of leading joint stock companies whose shares are components of MBI10 index have conducted their annual meetings via virtual meetings and only one of them has a statutory provision for the possibility of conducting virtual meetings. The most common type of remote voting is voting via correspondence. It seems that Macedonian companies whose shares consist MBI10 index are not

still prepared to conduct virtual only shareholders meetings. The same conclusion can not be made when we are talking about management bodies meetings.

6. Conclusion

The digitalization process with all its advantages and disadvantages is present in every segment of our life. Covid-19 pandemic as a catalysator enforced management of the companies to adjust their operations into the new reality. But a few years after the pandemic, the society needs to use the advantages of digitalization. The benefits of conducting virtual general shareholders meetings such as time and cost reduction are the main reasons why shareholders and companies should comply with.

The legislative framework in the Republic of North Macedonia allows companies whose shares are listed on the stock exchange and the companies which in accordance with the Law on Securities have special notification obligations to use the process of digitalization broader. The results of analyzed general meetings of MBI10 companies conducted in 2019, 2023 and 2024 shows that no one of the meetings is conducted virtually and the most common type of remote voting is voting via correspondence. The analysis of the Statutes of the same companies shows that except one company, the rest of the companies have no normative prerequisites for conducting virtual general shareholders meetings. In line with the worldwide accepted process of digitalization as a recommendation the legislator could take a broader approach and try to make electronic participation and virtual meetings available to all types of limited liability companies, including non-listed and private companies. It is obvious that the transition into the digitalized world at MBI10 companies is not completed yet. It may be done a lot in this field but it depends on some circumstances. Composition of shareholders base (e.g. foreign shareholders, digital educated shareholders) are some of the circumstances that have important influence on process of digitalization of companies. The circumstances such as: precise normative and statutory framework, stable technical support and well-developed electronical platform or network, will of the management of the companies and openness and proper education of the corporate lawyers, have a directly proportional influence on the level of digitalization of the companies including digitalization of shareholders meetings and unfortunately these curcimstances show that in our country there is a lot of room for its improvment.

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THE IMPACT OF THE COVID -19 PANDEMIC ON REDUCING THE DIGITAL DIVIDE OF THE POPULATION OF SERBIA

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Abstract

The emergence of the "Covid-19" pandemic causes a higher digitization of countries and the improvement of digital skills of vulenrable cohorts within the entire population. During the pandemic, an increase in the value of indicators of the development of the digital economy of countries is achieved, such as the number of interner users, the use of digital devices, the volume of information about products and services through electronic sales platforms, as well as the level of development of digital skills of the population. The aim of this research is to confirm the effect of the "Covid-19" pandemic on reducing the gap in the adoption of digital technology by vulenrable cohorts of the population in comparison with the application of digital technology by the entire population of Serbia. Vulnerable groups include residents over 55 years of age, female persons aged 16 to 74, persons without formal or primary education and the persons without permanent employment. The subject of this research refers to the analysis of the impact of digitization on the reduction of the digital divide of vulnerable groups compared to the entire population. The methodological part of this paper was carried out by calculating the index of the digital divide of the population, i.e. DIDIX index. For the purposes of obtaining research results, the digital divide index is calculated in the period from 2017 to 2023. The calculation of the DIDIX index is carried out through four different socio-demographic factors in relation to three individual indicators of the development of the digital economy of countries. The results of this research suggest a confirmation of the reduction of the digital divide of vulnerable cohorts compared to the total population of Serbia, due to the onset of the pandemic "Covid-19".

Keywords: Digitization, "Covid 19" pandemic, Digital Divide index, Republic of Serbia

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1. Introduction

The emergence of the "Covid-19" pandemic in March 2020, caused significant changes in the functioning of interpersonal interactions, the execution the business activities, access to services, with an emphasis on physical distance between people (World Health Organization, 2021). In the mentioned period, the use of information and communication technologies becomes an important part of the daily life of individuals, households and the implementation of work activities of companies (Anderson, Perrin, Jiang & Kumar, 2021). In the first months of the pandemic, the number of internet users and the use of digital devices to maintain social interaction achieved a rapid increase (Kemp, 2020). According to Branscombe M. (2020), internet traffic has increased by 30% compared to pre-pandemic usage, the number of mobile calls has doubled and the volume of e-commerce has never been greater. Therefore, this research aims to confirm the impact of the "Covid-19" pandemic on reducing digital divide of vulnerable groups, within the entire population of Serbia.

Analysis of the digital divide of vulnerable population cohorts during the "Covid-19" pandemic indicates a significant increase in internet users, information about products and services through electronic sales platforms and the development of digital skills (Eurostat, 2020). According to Mitrović Đ. (2022), the emergence of the pandemic caused the acceleration of the digitization process in Serbia and the higher use of digital technology in the daily activities individuals, households and work operations of companies. Within the second decade of the 21st century, there is a divergence in the adoption of digital technology between developing countries and developed European countries (Mitrović, 2020). However, according to Eurostat data, vulnerable groups achieve digital convergence towards the entire population of Serbia, which will lead to growth of digital literacy of citizens and convergence with the population of the European Union countries, in terms of the use of digital devices, development of digital skills and adoption of new technologies.

For the purposes of confirming the impact of the "Covid-19" pandemic on the process of adoption of digital technologies by population, we propose the following hypothesis:

Ho: The emergence of the "Covid-19" pandemic affects the reduction of the gap in the level of adoption of digital technology by vulnerable population cohorts compared to the use of digital technology by the entire population of Serbia.

The theoretical part of the research includes an analysis of the gap in the level of use of digital technologies by vulnerable groups in relation to the adoption of digital technologies by entire population. Within the literature review chapter, key scientific studies are presented that prove the effect of the pandemic on the reduction of the digital divide of the population, and which were the motive for the realization of this research. In the methodological part of this research, the index of the digital divide of population was calculated, based on data on the use of the internet, conducting electronic commerce and the development of digital

skills of the population of Serbia, in the period from 2017 to 2023. In the last part of the research, conclusions will be presented based on the obtained results and implications for future research.

2. Theoretical background

In the research of Aissaoui N. (2022), various factors are presented, which cause the digital divide of the population of a certain country. As part of this research, a three-level classification of digital divide is carried out. The first level refers to the assessment of digital skills, the second level involves measuring the number of internet users, while the third level refers to access i.e., development of ICT infrastructure. According to Amankwah-Amoah J., Khan Z., Wood G. & Knight G. (2021), the ”Covid-19” pandemic accelerated the digitization process of countries, which caused a change in the lifestyle of the population and the performance of business activities. The positive effect of the pandemic on the adoption of digital technologies by the population has been confirmed.

Research by Vargo D., Zhu L., Benwell B. & Yan Z. (2021), confirms the increase in the use of digital technologies during the ”Covid-19” pandemic. In this empirical research, the number of hours spent on the internet and the number of digital devices per respondent were measured. During the pandemic, it was determined that 73.81% of respondents performed more than two digital activities, while 48.51% of respondents used several types of digital devices. The use of digital devices more than six days a week was achieved by 65.66% of respondents. The use of more digital devices per respondent and longer time spent on digital device was proven.

According to Staboulis M. & Lazaridou I. (2020), in the first months of the ”Covid-19” pandemic, the population was instructed to use personal digital devices, for the purposes of informing and maintaining social interactions. Within this research, the impact of the pandemic on digital skills has been proven, thereby reducing digital illiteracy and developing electronic commerce, online education, creating web applications and internet content. The aforementioned research confirms the effects of the pandemic on internet use and digital literacy.

Through the results of research by Xu A., Qian F., Pai C.H., Yu N. & Zhou P. (2022), the statistically significant and positive impact of the ”Covid-19” pandemic on the development of the digital economy is proven, in a sample of the provinces of the People´s Republic of China. The results refer to the value of the indicators, which are used to measure the digitization of the population. The research confirmed that the central provinces achieved an increase in the adoption of digital technologies during ”Covid-19”, which affected the economic development of the country.

In the framework of research by Sixsmith A., Horst B. R., Simeonov D. & Mihailidis A. (2022), the impact of the ”Covid-19” pandemic on the adoption of digital technologies by vulnerable population cohorts was confirmed. The formation of the research sample included the older part of the population, while measuring their adoption of digital devices, since the beginning of the ”Covid-19”

pandemic. The results of this research indicate an increase in the benefits of the adoption of innovative technologies, with an incentive for further use of digital devices and the implementation of digital technologies, in the observed countries.

3. Data and Methods

For the purpose of reaching a conclusion about the diffusion of new technologies of a certain country and the reduction of the digital gap within vulenarable groups of the population, the value of the digital divide index will be used, i.e. DIDIX index. The DIDIX index is a quality instrument for the formation of the economic policy framework. The DIDIX index is a composit index, which was formed on the basis of a number of different sub-indices, i.e. individual indices.

The calculation of the DIDIX index is carried out through four different sociodemographic factors in relation to three individual indicators of the development of the digital economy of countries. The sociodemographic division of the population refers to the determination of four different vulnerable groups within the entire population. Therefore, the DIDIX index represents a composite indicators, which testifies to the level of adoption of digital technologies by the population. Didix index is formed using the following indicators:

1) Percentage of internet users.
2) Percentage of users of the e-platform for information about products and services.
3) Percentage of users without basic or basic digital skills.

After determining three individual indicators of the development of the digital economy, an analysis of the digital divide was conducted within vulnerable population cohorts:

1) Persons older than 55 years.
2) Female persons in the age interval from 16 to 74 years.
3) Persons without primary education or with primary education.
4) Working-age population without permanent employment.

Table 1. A model for calculating the individual and composite indices of the digital divide

Country	A		B		C		Subindex
Time period	Number of internet users		Information about products/services via digital device		Development of digital skills		
Total usage	%	(%) of total users	%	(%) of total users	%	(%) of total users	
Age structure	S_{1A}	S_{11A}	S_{1B}	S_{12B}	S_{1C}	S_{13C}	$0.5*S_{ijA} + 0.25*S_{ijB} + 0.25*S_{ijC}$
Gender structure	S_{2A}	S_{21A}	S_{2B}	S_{22B}	S_{2C}	S_{23C}	
Education level	S_{3A}	S_{31A}	S_{3B}	S_{32B}	S_{3C}	S_{33C}	
Unemployment rate	S_{4A}	S_{41A}	S_{4B}	S_{42B}	S_{4C}	S_{43C}	

Subindex	S_{iA}	S_{ijA}	S_{iB}	S_{ijB}	S_{iC}	S_{ijC}	DIDIX INDEX

Source: Hüsing, T., & Selhofer, H. (2004). DIDIX: A digital divide index for measuring inequality in IT diffusion. *It & society*, *1*(7), 21-38.

In the continuation of the methodological part of this research paper, the calculation of the DIDIX index is carried out, which is used for the purposes of comparing the use of digital devices and the adoption of technological achievements by vulnerable groups compared to the adoption of digital technology by the entire population. The difference between the use of new technologies by the average part of the population and the use of technological innovations by vulnerable cohorts is defined by the term ”digital gap”. The process of achieving higher rates of growth and economic development requires reducing the digital divide, which causes insufficient digital literacy and low digital skills of the population. For the purposes of determining the digital gap of the population of Serbia, the values of the digital divide index will be calculated and analyzed.

The DIDIX index was calculated using the following equation:

$$\text{DIDIX INDEX} = \frac{1}{n}\sum_{i=1}^{n} D_i \quad (1)$$

,where D_i implies the value of individual indices for each of the four vulnerable population groups (i) (i = 1, 2, 3, 4).

The value of individual indices is calculated using the formula:

$$D_i = 100 * \sum_{j=1}^{m} W_j * \frac{S_{ij}}{S_j} \quad (2)$$

,where W_J implies the value of the indicator (j) (j=1,2,3, Sw=1), S_{ij} detonates the value of the indicators (j) within the vulnerable groups (i=1, 2, 3, 4), S_j refers to the value indicator (j) for the entire population.

In a situation where the value of the indicator of the use of digital devices and the adoption of technological innovations within four vulnerable groups is equivalent to the value of indicator that refers to the entire population, then the calculated value of the digital divide index is equal to the number 100 (Vehovar, Sicherl, Husing & Dolnicar, 2006). A complete deviation in the adoption of digital technologies by vulnerable cohorts in relation to the entire population means that the value of DIDIX index will be equal to zero. Therefore, a higher value of DIDIX index implies a greater reduction of the digital divide within the population (Vehovar *et al*., 2006).

Table 2. presents the values of the digital divide index, which was calculated in two-years intervals, and in the time period from 2017 to 2023. For the purposes of calculating the value of the digital divide index, data were used on the total number of internet users, the percentage of users who used digital devices to information about products and services, as well as the number of users with basic digital skills. The research sample was collected based on the Eurostat database.

Through the calculation of the observed index and an insight into the movement of the DIDIX index value before and after the onset of the ”Covid-19” pandemic, in order to confirm the impact of the pandemic on reducing the digital gap of the population of Serbia.

Table 2. Calculation of the population digital divide index

2017	**A**		**B**		**C**		**Subindex**
Serbia	Use of the internet platforms		Electronic commerce		Digital skills		
	%	% of total	%	% of total	%	% of total	
Total internet users	68%	100	53%	100	19%	100	
Residents (55+)	34%	50%	24%	45.28%	8%	42.10%	46.84%
Females (17-74)	65%	95.58%	51%	96.22%	22%	115.78%	100.7%
Low education	38%	55.88%	25%	47.16%	8%	42.10%	50.25%
Unemployment	67%	98.52%	51%	96.22%	12%	63.15%	89.04%
Subindex	74.99%		71.22%		65.28%		**71.85%**
2019	**A**		**B**		**C**		**Subindex**
Serbia	Use of the internet platforms		Electronic commerce		Digital skills		
	%	% of total	%	% of total	%	% of total	
Total internet users	76%	100	53%	100	20%	100	
Residents (55+)	47%	61.84%	25%	47.16%	9%	45%	53.96%
Females (17-74)	72%	94.73%	50%	94.33%	21%	105%	97.19%
Low education	51%	67.10%	32%	60.37%	8%	40%	58.55%
Unemployment	81%	106.5%	54%	101.88%	15%	75%	97.51%
Subindex	82.56%		75.94%		66.25%		**73.53%**
2021	**A**		**B**		**C**		**Subindex**
Serbia	Use of the internet platforms		Electronic commerce		Digital skills		
	%	% of total	%	% of total	%	% of total	
Total internet users	81%	100	60%	100	41%	100	
Residents (55+)	52%	64.19%	31%	51.66%	10%	24.39%	50.91%
Females (17-74)	79%	97.53%	58%	96.66%	39%	95.12%	96.71%
Low education	57%	70.37%	29%	48.33%	16%	39.02%	54.61%
Unemployment	90%	111.1%	65%	108.33%	45%	109.75%	110%
Subindex	85.80%		76.25%		67.07%		**78.73%**
2023	**A**		**B**		**C**		**Subindex**
Serbia	Use of the internet platforms		Electronic commerce		Digital skills		
	%	% of total	%	% of total	%	% of total	
Total internet users	85%	100	65%	100	34%	100	
Residents (55+)	62%	72.94%	38%	59.46%	13%	38.23%	60.89%
Females (17-74)	84%	98.82%	65%	100%	32%	94.11%	97.94%
Low education	61%	71.76%	41%	63.07%	18%	52.94%	64.88%

Unemployment	93%	109.4%	67%	103.07%	33%	97.05%	104.7%
Subindex	88.23%		81.41%		70.58%		**82.12%**

Source: Calculation by the author of the paper, based on data from the Eurostat database, for the observed time period (2017-2023).

4. Results and Discussions

Analysis of the obtained results, based on the calculated values of the index of the digital divide of the population of Serbia. The research includes the values of the DIDIX index immediately before, during and after the onset of an infectious disease, i.e. the "Covid-19" pandemic. Table 3. presents the results of the methodological part of the research.

Table 3. Percentage increase in the value of the DIDIX index by time intervals.

Serbia	Order number	Time period	DIDIX Index
Composite index of digital divide	1	2017 - 2019	1.68
	2	2019 – 2021	5.21
	3	2021 – 2023	3.39
	4	2017 - 2023	10.27
	Time interval = 2		(%)

Source: Calculation by the author of the research paper, based on Eurostat data.

In the direction of reducing the digital gap of vulnerable cohorts within the population of Serbia, in the period from 2017 to 2023, the calculation of the percentage change in the value of the digital divide index, i.e. DIDIX index. Within vulnerable groups of the population, the number of internet users, platforms for information about products and services, purchasing products and services via digital devices has increased, as well as the development of digital skills through the adoption of digital technologies. In this research, the percentage change in the value of the index of the digital divide of the population was calculated, which achieved a growth of 10.27%, in the time interval from 2017 to 2023. Namely, the results of the calculation of the index indicate that the adoption of digital technology by vulnerable population cohorts has increased by more than 1/10 of the adoption of digital technology in the country.

By calculating the value of the digital divide index, a three-fold increase in the value of the index was calculated in the period from 2019 to 2021, compared to the period from 2017 to 2019. In the period from 2017 to 2019, the value of the digital gap of vulnerable cohorts of the population of Serbia was reduced by 1.68%. In the period from 2019 to 2021, the reduction of the digital gap in the use of digital technologies by vulnerable groups amounted to 5.21%. Therefore, it was concluded that the "Covid-19" pandemic caused a reduction in digital differences within vulnerable population groups (population over than 55 years old, woman aged 16 to 74, persons without formal education or with primary education,

unemployed population) compared to the adoption of digital technologies in the country.

According to the obtained results, we observe that during the pandemic, a reduction in the digital gap of vulnerable cohorts compared to the entire population was measured by 3.53%. With that, it was concluded that the emergence of the ”Covid-19” pandemic has a positive impact on the development of digital skills and the adoption of digital technologies. In the continuation of the research, the increase in internet users, the use of digital devices for information about products or services on internet platforms, users who purchase products or services via personal digital devices was measured.

Based on the results from table 2., it was determined that before the emergence of ”Covid-19” pandemic, the value of the sub-index that measures the education of the population was 58.55%, while after the pandemic the index was 64.88%. Namely, the value of the index that measures the adoption of digital technologies by the population without formal education or elementary school has increased. From the obtained results, the observed digital divide for the population over 55 years old was 53.96% before the pandemic, and after the pandemic it was 60.80%. The measured adoption of digital technologies by the older part of the population is 3/5 of the use of digital technologies of the entire population.

From the moment of the outbreak of the infectious disease ”Covid-19” in Serbia, which began on March 15 (2020), until the end of the pandemic on May 5, (2023), the adoption of digital technologies by vulnerable groups was significantly reduced compared to entire population of Serbia. During the period of the pandemic, an increase in the value of the index of digital divide of the population was observed by 3.39%, which is reflected in the positive impact on the development of digital skills and the diffusion of new technologies among the population of Serbia.

5. Conclusion

The process of achieving higher rates of economic growth and development of countries is based on the diffusion of new technologies and the stimulation of the knowledge economy. According to the endogenous model of economic growth, technological progress and digitization of countries is singled out as an important cause of convergence in the level of economic growth of a developing countries towards developed countries. The ”Covid-19” pandemic occurred in the period from March 2020 to May 2023. In that period, structural breaks in the movement of time series of macroeconomic variables of countries are identified. However, the effect of the ”Covid-19” pandemic is the growth of the adoption of digital devices and the development of digital skills of the population. Based on the calculated values of the index of the digital divide of the population, it was concluded that during the ”Covid-19” pandemic, the gap in adoption of digital technology by vulnerable population cohorts was reduced compared to the use of digital technology by the entire population of Serbia.

The adoption of digital technologies and the development of digital skills within vulnerable groups of the population amounted to less than 4/5 of the total use of digital technologies by the population of Serbia, which was measured

before the onset of the ”Covid-19” pandemic. After May 2023, which is considered as the date of the end of the ”Covid-19” pandemic in Serbia, the measured adoption of digital technologies by vulnerable groups of the population amounted to more than 4/5 of the total use of digital technologies in the country. With that, we conclude that during the pandemic, the population was focused on the use of digital devices to maintain social interactions and a more efficient flow of information.

The consequence of the increased number of internet users and the use of digital devices implies a greater development of the population´s digital skills. Within the vulnerable groups of the population of Serbia, the number of internet users for information purposes about products and services has increased, as well as the growth in the volume of purchases on electronic platforms. In this sense, the previously stated hypothesis was confirmed, which represents the positive impact of the pandemic ”Covid-19” on the use of digital devices, the development of digital skills of the population and the reduction of the gap in adoption of digital technology between vulnerable groups and the rest of population of Serbia.

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SMEs AND GREEN ECONOMY CONCEPT – CASE OF NORTH MACEDONIA

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Abstract

SMEs are the engine of economic development, they are the key driver of employment, GDP, export and innovation. Green economy is a new strategy for enhancing human well-being and reducing environmental risk, being defined as low-carbon, resource-efficient and socially inclusive. This concept is a new and a big challenge for SMEs. The main aim of the paper is to point the importance of this concept and to analyze the awareness and implementation of green practices by SMEs in North Macedonia. To achieve the aim a review of this concept was made and also a survey was conducted. At the end of the paper conclusion and recommendations are presented.

Key words: SMEs, green economy,

1. Intruduction

SMEs are the backbone of the socio - economical development. They have a key role in job creation, GDP, export and innovation. According to the World Trade Organization (2019) SMEs represent about 90% of businesses and contribute up to 40% of national income (GDP). They create more than 50% of employment, most formal jobs are generated by SMEs, which create 7 out of 10 jobs. The number of SMEs is increasing permanently in developed countries, but also in developing countries. SMEs have numerous advantages and disadvantages, as well as numerous barriers and challenges during their operation. Green economy is a new strategy for enhancing human well-being and reducing environmental risk, being defined as low-carbon, resource-efficient and socially inclusive. The UN defines the green economy as "low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution,

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enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services". (UN Environment Programme)
Many SMEs see a green economy as a highly strategic target, so they need to adapt their financial and operational planning in order to transform to green business.

The main purpose of the paper is to analyze the awareness and implementation of the green economy concept by the SMEs in Republic of North Macedonia. To achieve the aim, a survey was conducted and the target group was micro, small and medium enterprises mostly from the Pelagonia region.

The rest of the paper is organized as follows. Section 2 is literature review. Section 3 gives theoretical overview for SMEs, section 4 introduce briefly the readers with green economy concept and programs, plans to promote green behavior among SMEs. Section 5 provides insights into the data, methodology, and results of the analysis and the last section concludes.

2. Literature review

It's widely recognised that SMEs have a significant role in economic development. SMEs are crucial in the 21st century for the development of the countries. Many studies have attempted to explore the importance of SMEs for economic development. According to the World Trade Organization (2019) SMEs represent about 90% of businesses and contribute up to 40% of national income (GDP).

SMEs play an ever more imperative role towards market evolution locally and overseas, influencing sustainable growth in the trading, production and service areas via attracting investments.

Gherghina et all (2020) said that SMEs are crucial for local economic development, playing a noteworthy role in job creation, poverty alleviation and economic growth, but they encounter many funding barriers.

Also, Sipa et all (2015) claim that SMEs play an ever more imperative role towards market evolution locally and overseas, influencing sustainable growth in the trading, production and service areas via attracting investments.

In his research, Homohom has explained the following reasons for SMEs contribution to economic development: SMEs are more labor-intensive and tend to lead to a more equitable distribution of income than larger enterprises; SMEs contribute to a more efficient allocation of resources in developing countries; SMEs support the building of systemic productive capacities.

Throughout the years, SMEs are facing with numerous challenges during their operations. Today, the big challenge for SMEs is the implementation of green economy concept.

A green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services. (UNEP, 2011). The green economy requires a new mindset for doing

business, a new level of skilled workers and professionals who have the ability to work across sectors, and work as part of multidisciplinary teams. (Hadi Hassan Al-Taai, 2021)

Hadzi Naumova-Mihajlova and Petroska –Angelovska (2023) in their paper, have made analysis for the implementation green economy concept in SMEs and the results shows that SMEs have lack of information on how can apply this concept in their operations and also they are facing with complex administrative procedure in implementing environmental practices. Besides that most of the surveyed companies take measures for more efficient use of resources in order to save and reduce costs. They recommend that it is necessary to create a regulatory framework for green economy in North Macedonia by bringing clear and appropriate documents with specific activities and measures, harmonized with EU standards.

3. Theoretical overview for SMEs

Nowadays, the modern conditions of the market economy characterized by increasingly pronounced dynamism, technological discoveries and competition arise the need for the development of a dynamic sector that can quickly and easily adapt to changes. Small and medium-sized enterprises with their characteristics, such as: simple organizational structure, greater centralization in decision-making, greater flexibility, short-term orientation in operations, more efficient coordination in operations, etc. can adapt much faster to these modern business conditions, compared to large companies.

Considering the fact that small enterprises are a heterogeneous group, it is hard to determine a single criteria or a unique combination of criteria, which will give a definite and unique response. There is no single, uniformly accepted definition of a small firm (Storey, 1994). European Commission has given the definition for SME, and according to the last modification (in 2003), these are the quantitative criteria: number of employees, annual turnover and annual turnover and annual current assets. Medium firms are those with fewer than 250 employees, turn over less or equal of 50 mil €, and total balance sheet less or equal € 43mil €, while small have at most 50 workers, turn over less or equal 10 mill. € and total balance sheet less or equal € 10mil €, and micro firms are those with 10 workers, turn over less or equal of 2 mil €, and total balance sheet less or equal 2mil.€.

The key advantages of SMEs are: (Tomash, 2010)

- *flexibility and increased reaction capacity to adapt to market changes.* The structure of these entities allows them to adapt faster and better to market needs and consumer preferences, compared to large companies.
- *Making quick and timely decisions.* Most often, due to individual decision-making, decision-making is quick and timely.
- *Simple and low hierarchical structure.* This kind of organizational structure makes it possible control and other functions to be performed immediately;

- *Contribution to the increase competition*. SMEs due to their large number, contribute to maintaining a satisfactory level of competition, and development of products and services that meet the needs of consumers;
- *Better access to market information*. Due to direct communication, they have better contact with consumers and are aware of new challenges on the market, unlike them, large companies have indirect communication with consumers;
- *Encourage and increase the innovation*. Due to their flexibility, SMEs have the opportunity to constantly innovate, introduce new products to the market, services or promotions without too much risk, which is not the case with large companies that have a complex organizational structure and a wide production program;
- *Increased ability to correct errors*. Due to the size of the structure, SMEs have opportunities for quick correction of products and other errors. The exchange of experiences contributes to the fact that these errors do not appear in large companies because they will cause huge costs;
- *Team work*. Namely, there is a small number of employees who know and communicate with each other, so they work as a team, unlike large companies that can have thousands of employees who do not know each other at all;
- *Higher worker productivity.* Employees in SMEs are usually more motivated due to direct communication with responsible persons and personal motives for making a profit.

The main reasons for SMEs failure are: lack of access to the financial market; limited access to the market; lack of skilled workers or poor access to public and private institutions for the development of workers skill; restricted access to new and advanced technology and equipment; reduced access to information vital to have strong and affective business management; absence of business management skills. (Pedraza, 2021)

SMEs make up over 99% of European Union (EU) businesses and have gone through significant challenges over the past year such as pandemic, the global supply chain disruptions during the post-pandemic era, Russia's war aggression against Ukraine, transition to green and digital economy.

Table 1. Economic structure of enterprises per size class, in EU-27 for 2023

	Number of enterprises		**Number of persons employed**		**Value added**	
Class - size	Number	Share	Number	Share	Billion €	Share
Micro	24,209,297	93.6%	40,803,310	30.0%	1,799	19.8%
Small	1,387,888	5.4%	26,770,763	19.7%	1,527	16.8%
Medium	210,551	0.8%	21,156,339	15.5%	1,512	16.6%
SMEs	**25,807,736**	**99.8%**	**88,730,412**	**65.2%**	**4,839**	**53.1%**
Large	43,420	0.2%	47,355,823	34.8%	4,265	46.9%
Total	**25,851,156**	**100%**	**136,086,235**	**100%**	**9,104**	**100%**

Source: Annual Report on European SMEs 2023/2024

Table 2. Proportion of EU-27 NFBS SMEs in industries of different knowledge and technology intensities by EU Member State – 2023

	High-technology industries	**Medium-technology industries**	**Low-technology industries**	**Knowledge-intensive services**	**Less knowledge intensive services**
EU – 27	0.2%	4.5%	5.2%	31.0%	59.1%

Source: Annual Report on European SMEs 2023/2024

According to the data in Annual Report on European SMEs 2023/24 ((European Commission, 2024) in 2023, there are 25.8 million SMEs in the EU-27 and they create 65.2% of employment and more than half of the EU-27 value added.

4. Green economy concept

In 2008 was launched Green Economy Initiative which provides analyses and policy support for green sector investments and in the greening of environmentally unfavorable sectors. In the United Nations Environment Programme the green economy is defined as economy which results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. According to UNEP growth in income and employment should be driven by public and private investments that reduce carbon emissions, enhance resource efficiency, and prevent biodiversity loss and ecosystem services. These investments, should be supported by targeted public expenditure, policy reforms, and regulation changes because they maintain rebuild natural capital as a critical economic asset and as a source of public benefits, especially for poor people whose livelihoods and security depend on nature. National economies should take urgent measures in order to transition from a brown to a green economy because a green economy: recognizes the value of, and invests in, natural capital; is central to poverty alleviation; creates jobs and enhances social equity; substitutes renewable energy and low-carbon technologies for fossil fuels; promotes enhanced resource and energy efficiency; delivers more sustainable urban living and low-carbon mobility; grows faster than a brown economy over time, while maintaining and restoring natural capital. (UNEP, 2011)

The five principles of green economy are: (Partners for Inclusive Green Economy, 2019)

- The Wellbeing Principle. A green economy enables all people to create and enjoy prosperity.
- The Justice Principle. The green economy promotes equity within and between generations.
- The Planetary Boundaries Principle. The green economy safeguards, restores and invests in nature.
- The Efficiency and Sufficiency Principle. The green economy is geared to support sustainable consumption and production.
- The Good Governance Principle. The green economy is guided by integrated, accountable and resilient institutions.

The transition from brown to green economy is necessary, but on the other hand, it is difficult to measure the progress towards a green economy because "conventional economic indicators, such as GDP, provide a distorted lens for economic performance particularly since such measures fail to reflect the extent to which production and consumption activities may be drawing down natural capital. By either depleting natural resources, or degrading the ability of ecosystems to deliver economic benefits, in terms of provisioning, regulating or cultural services, economic activity is often based on the depreciation of natural capital". (UNEP, 2011)

SMEs are essential element of the European economy, they provide over 133 million jobs and creating over half of the gross value added, so using efficiency practices among SMEs and involving them in ecoinnovations and new business models will have significant impact in making the EU green, competitive and sustainable economy.

Also, transformation the busieness to green business is a big challenge but also there are many benefits. Hillary (2004) classified the benefits of greening a business into *internal* and *external*. Internal benefits are related to the internal operation of SMEs, while external benefits are related to external interaction. The internal benefits are categories as follow: organizational benefits (e.g., improved working conditions and safety); financial benefits (e.g., cost savings from materials efficiencies) and people benefits (e.g., improved employee ethical behavior). External benefits are also divided into three categories: commercial benefits (e.g., gaining competitive marketing advantage); environmental benefits (e.g., reduced pollution), and communications benefits.

In EU, a numerous plans, programs, projects have been adopted to promote green behavior among small and medium-sized enterprises.

For example, the European Union Green Action Plan for SMEs introduced in 2014 (GAP) aims "to contribute to the re-industrialization of Europe by enhancing SMEs competitiveness and supporting green business developments across all European regions, notably in view of the fact that, at this stage, significant differences in resource efficiency exist between sectors and Member States". (European Commission, 2014).

The GAP is expected to raise SMEs' awareness of resource efficiency improvements and circular economy's potential and to inform SMEs about EU resource efficiency actions. The objectives and actions in GAP are divided in five areas: (European Commission, 2014)

- *Greening SMEs for more competitiveness and sustainability*. Improving the resource efficiency for reducing production costs and increasing productivity gain.
- *Green entrepreneurship for the companies of the future*. GAP aims to create business environment where SMEs can develop green ideas..
- *Opportunities for SMEs in a greener value chain*. The activities in GAP are focus on addressing barriers to green value chain collaboration, and promoting new green business models.

- *Access to the markets for green SMEs*. The activities in GAP are focus on promoting a greener internal market and enabling access to international markets.
- *Governance.* Governance ensures monitoring and updating of the actions supporting SMEs, as well as coordination, cooperation and best practices exchange at European, national and regional level.

Also the 9th dimension of the Small Business Act is *SMEs in a green economy* which presents the two sub-dimensions: 1) framework for environmental policies targeting SMEs, which considers the greening aspects in national SME, sectoral and innovation policy frameworks and 2) incentives and instruments for SME greening, which looks at the various tools and instruments in place – such as regulatory and information-based instruments, financial incentives, and green public procurement – to support SMEs in their greening efforts. (OECD, ETF, European Union and EBRD, 2019)

5. SMEs and green economy – Case of North Macedonia

SMEs have a crucial role in the economy of the Republic of North Macedonia. The data of the State Statistical Office shows that the number of active enterprises in the Republic of North Macedonia in 2022 was 71 228. The highest share of 84.2% belongs to enterprises with 1-9 persons employed, followed by enterprises with no persons employed and enterprises with unascertained number of persons employed (no data on persons employed) with 5.9%, and enterprises with 10-19 persons employed with 4.6%. The share of enterprises with 20-49 persons employed was 3.0%, those with 50- 249 persons employed participated with 2.0%, while enterprises with 250 or more persons employed had a share of only 0.3%. (State Statistical Office, 2024).
According to the data of OECD in 2020 SMEs create 73.9% of employment, 67.9% of added value and 26% of export.

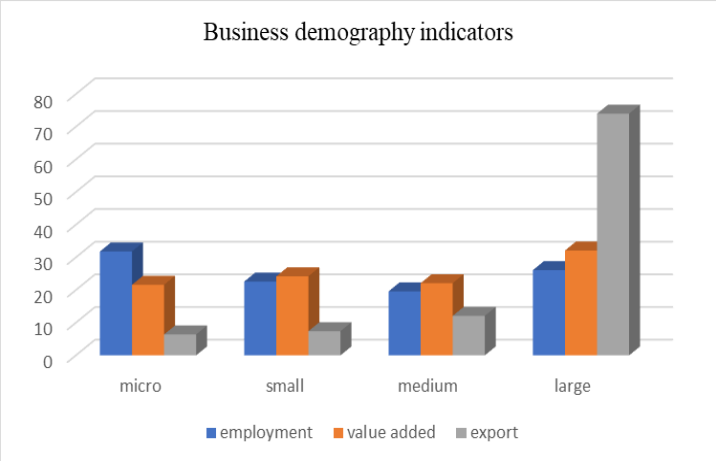


Figure 1. Business demography idicators
Source: SME Policy Index: Western Balkans and Turkey, OECD 2022

North Macedonia is a small economy with natural endowments, so achieving sustainable and green economic growth is essential. The concept of green economy offers a new approach to work dedicated to the principles of environmental sustainability, to meet the human needs by using the sources efficiently and also using renewable energy source.

The Republic of North Macedonia is a party to the United Nation Framework Convention on Climate Change (UNFCCC) (Official Gazette of RM – 61/97) and its Doha Amendment (2019), ratified the Kyoto Protocol (Official Gazette of Republic of North Macedonia - 49/04), the Paris Agreement (Official Gazette of Republic of North Macedonia – 161/2017) and has associated itself with the Copenhagen Accord (2009). The Country has agreed to the following contribution to the global efforts for GHG emissions reduction (Macedonian NDC): "To reduce the CO2 emissions from fossil fuels combustion for 30%, that is, for 36% at a higher level of ambition, by 2030 compared to the business as usual (BAU) scenario." (Ministry of Environment and Physical planinig, 2020)

The green economy concept is a new concept for SMEs in North Macedonia. Our country signed international agreements related to environmental protection and sustainability.

North Macedonia has improved its score under 9th dimension of Small Business Act (SMEs and green economy) from 2.72 in 2019 to 3.16, with the main progress achieved in scaling up its financial incentives for SME greening (table 3). To fully implement the related SBA Principle 9 (Enable SMEs to turn environmental challenges into opportunities), North Macedonia will need to ensure effective implementation and monitoring of its greening measures.

Table 3. North Macedonia ranking - SBA

Dimension	**Sub - dimension**	**Thematic Blocks**		**North Macedonia**
Dimension 9: SMEs and green economy	Sub-dimension 9.1: Framework for environmental policies targeting SMEs	Planning and design		3.70
		Implementation		2.62
		Monitoring and evaluation		1.89
		Weighted average		2.80
	Sub-dimension 9.2: Incentives and instruments for SME greening	Planning and design		4.40
		Implementation		3.23
		Monitoring and evaluation		2.60
		Weighted average		3.46
North Macedonia's overall score for Dimension				3.16

Source: SME Policy Index: Western Balkans and Turkey, OECD 2022

The SME Strategy (2018-2023), has a special focus on environmental policies but none of the measures planned has been implemented so far. The adopted Plan for Accelerated Growth (2022-2026) is expected to provide a stronger impulse for greening SMEs. Also elements of the green economy targeted at SMEs are part

of several sectoral strategies in the Waste Prevention Plan (2021-2031), which is harmonised with the Law on Waste Management.

5.1 Methodology and research

The methodology of research is based on primary data obtained from previously prepared, structured questionnaire. The survey comprised 100 SMEs from North Macedonia, and there were 67 questionnaires. In order to perceive the current situation, questions were referred to awareness and knowledge of SMEs on environmental regulation and application of environmental practices and principles of green economy in their operations.

The businesses that were part of the research are usually from the manufacturing industry, wholesale and retail trade. The questions were divided into 3 groups. The first set of questions concerns general company data. The second group of questions refers to the awareness of managers about the concept of green economy and it's benefits. The third group of questions are related to the implementation of the green economy concept.

On the basis of data analysis from the first group of questions, the following results have been obtained: from the businesses-respondents, 31 were older than 10 years, 36 were older less than 10 years. Most of the respondents, were micro business 45%, 38% small and 17% were medium bisiness. The most of the managers of the businesses that were part of the survey had more than 10 years of work experience. The second group of questions refers to the awareness of managers about the concept of green economy and it's implementation. On the question "How much do you know about the green economy concept?" 7% of the respondents answered that is an expert, 26% that are informed, 37% knows a little about it and 30% doesn't heard .

The results of the next questions shows that only 15% of the respondents was involved in green economy and 69% don't have a strategy for implementing the green economy concept. Also on the question "Do you believe in the positive feedback from green products" 64% of the respondents replied with yes and 36% with no.

The results of the question "How can a green practices benefit your business?" are as follow: 27% of the respondents thought that the benefit is revenue, 19% resource productivity, 27% competitive advantage, 25% of the respondents answered reduce waste is a key benefit and 2% other. (Fig. 2)

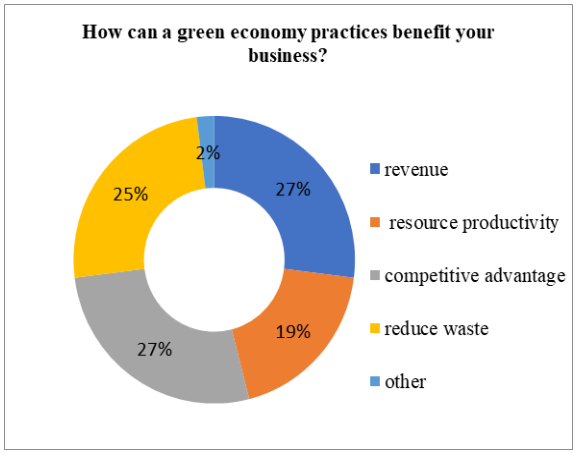


Figure2

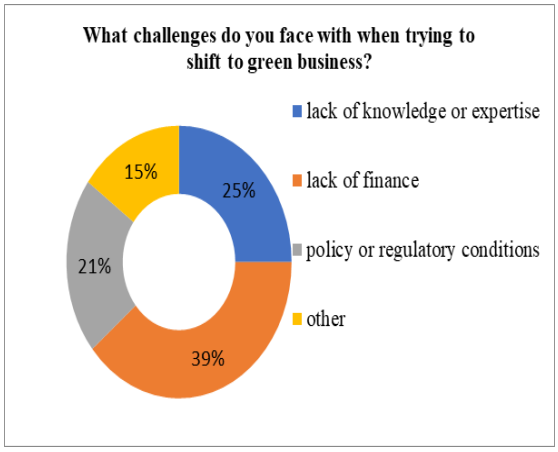


Figure 3

For applying the green economy concept businesses have been faced with numerous challenges and according to the research results the biggest challenge is lack of finance (See Fig. 3).

The results that emerged allow to formulate conclusion that a very small number of SMEs implement some green practices during their operations, hence it's necessary to encourage awareness among managers, employees and consumers about the benefits of this concept and the need for its implementation as soon as possible. Also, the government should take measures to stimulate businesses to switch into green business.

6. Conclusion

The green economy concept is a big challenge for SMEs in Macedonia. Green economy can generate as much growth and employment as a brown economy. But the green economy transition means involving many actors and and undertaking of numerous reforms, measures and policies.

The results of the research shows that very small number of SMEs know about this concept or implement some green practices. The SMEs in North Macedonia are facing with numerous barriers and challenges such as: lack of knowledge or expertise, financial or economic barriers, policy or regulatory conditions, leadership within the organization not supportive, lack of an overarching body responsible for coordinating SME greening policies and corresponding funds, etc.

In order to encourage and increase awareness for the importance of this concept, the following measures should be taken: establishing regulatory frameworks, financial support, limiting spending in areas that deplete natural capital, using sustainable supplier and production chains etc.

Future studies may focus on exploring the ways for improving company competitiveness through green solutions.

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SPACE MATRIX METHOD APPLICATION IN THE STRATEGIC ANALYSIS OF THE VOLATILE ENVIRONMENT

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Abstract

The aim of this paper is to elaborate the application of the SPACE Matrix method in the strategic research and analysis of the organisational environment.
This method could significantly contribute to developing effective organisational strategies by providing a solid informational foundation concerning the company's positioning in the market and gaining a competitive advantage in a volatile environment.
This method pays significant attention to future forecasting in the processes of strategic management and control, evaluation and choice of strategic alternatives, as well as their impact assessment.
In this paper, in addition to the theoretical discourse, the benchmarking and case study methods are used to vividly illustrate the practical implementation of the Space Matrix method. These examples demonstrate its efficacy in evaluating and selecting strategies and exploring diverse opportunities for company strategic positioning.
The application of the SPACE Matrix method represents a significant contribution to the understanding and refinement of strategic marketing in a volatile marketing environment.
Furthermore, the paper focuses on the practical application of this method in real-world strategic marketing scenarios, exploring their advantages, challenges and opportunities for advancement.

Keywords: SPACE Matrix Method, Volatile Environment, Strategic Market Analysis, Strategic Marketing Management.

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1. Introduction

This paper is based on extensive knowledge and numerous theoretical and practical research studies conducted in many countries, which indicate that the marketing management strategy is crucial for achieving high operational results in the company. The current business environment is highly complex due to increasing consumer awareness, competitive pressures, and technological advancements, which require companies to adapt their strategies. It is now essential for businesses to closely monitor environmental changes and trends to identify both threats and opportunities. Businesses that closely follow the current developments can easily see threats and opportunities. In this way, they develop strategies for these threats and opportunities (Cengiz, 2020). Internal and external environmental factors need to be anticipated, monitored, assessed, and incorporated into the decision-making process in such a way (Musfah, 2020).

Strategic environmental analysis is a critical process for companies for several reasons, including identifying opportunities and challenges (Grant, 2019). Through strategic analysis of the environment, companies identify opportunities for growth and development, as well as challenges and obstacles that may arise (Johnson et al., 2020). It also provides companies with information about their surroundings, which helps them adapt their strategies according to changes in the market, technology, legislation and other aspects of the environment. Companies that regularly perform strategic environmental analysis are prepared to anticipate and adapt their activities according to trends in their industry and society as a whole (Wheelen & Hunger, 2020). This gives them a competitive edge in a rapidly changing business environment.

Various methods and tools can be used to perform a strategic analysis of the environment. Several important methods and tools for analysing the company's strategic environment, with the main emphasis placed on the SPACE matrix, are listed in this paper. SPACE matrix helps companies analyse their strategic options and determine the most favourable strategies for growth and development in the appropriate strategic environment (Dess et al., 2019). SWOT analysis identifies strengths, weaknesses, opportunities, and threats that the company faces (Neolaka et al., 2023). BCG matrix helps companies analyse their portfolio of products or business units, categorising them into stars, cash cows, question marks, and dogs. This helps them determine which parts to invest their resources in (Satria et al., 2023). Similar to the BCG matrix, the McKinsey matrix classifies business units according to their market attractiveness and their competitive position. PESTEL analysis analyses the political, economic, social, technological, environmental, and legal aspects of the environment and their impact on the company. Many methods are part of this component of the possibility of analysing and identifying the future of the organisation that has been used in traditionalist and modern times, such as the Delphi method, woodworking techniques, nominal techniques and groups of focus, and others (Elezaj, 2021).

Moreover, it is important to highlight managers' crucial role in successfully developing and implementing effective strategies. This includes adapting to changes in all business processes, making sound business decisions, and ensuring

the effective implementation of marketing strategies. For a company to create value and sustain a competitive advantage, it is essential to achieve positive results strategically. Furthermore, companies that understand their environment through strategic analysis are driven to innovate and develop new products, services, and processes that meet market needs and outperform competitors (Gluck et al., 2024).

2. Literature Review

Nowadays, ensuring the ongoing sustainability and enhancement of the company poses several challenges in the face of global economic competition. However, with effective marketing strategies, all challenges can be overcome. Effective resource allocation is another significant application of the Space Matrix. Kaplan and Norton (1996) argue that strategic management tools like the Space Matrix are essential for prioritising investments and allocating budgets. Organisations can optimise resource utilisation by identifying areas where investments will likely yield the highest returns. Pearce and Robinson (2013) emphasise that the Space Matrix aids in human resource planning by pinpointing areas needing additional personnel or expertise, thereby enhancing overall productivity. Of particular importance in this research is the attempt to answer how the company's position in the competitive environment can be determined, aiming to devise a rational strategy based on the method employed, which involves evaluating the company's strategic marketing position and taking action accordingly. The Strategic Position and Action Evaluation Matrix or SPACE Matrix is a four-quadrant framework that shows whether an organisation fits to aggressive, conservative, defensive, or competitive strategies (David, 2009). SPACE Matrix shows two internal dimensions, Financial Strength (FS) and Competitive Advantage (CA), against two external dimensions, Environmental Stability (ES) and Industry Strength (IS). All four factors are the most important determinants of a company's overall strategic position and are measured on a six-point Likert scale to corresponding axes (Gurbuz, 2013).

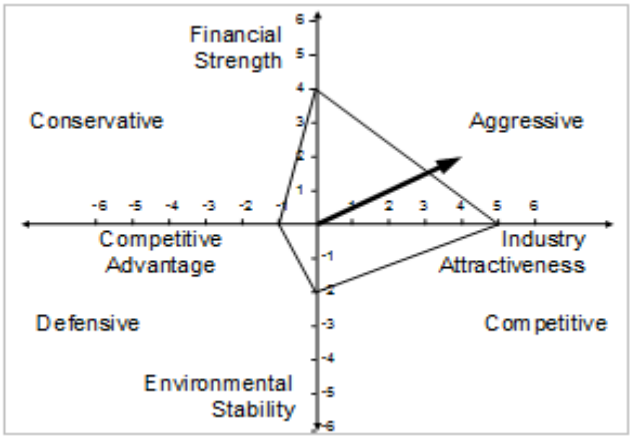


Figure 1: SPACE matrix – basic model

Source: Gordon, J. (2024) *SPACE Analysis – Explained,* The Business Professor.

Accessed on: https://thebusinessprofessor.com/en_US/business-management-amp-operations-strategy-entrepreneurship-amp-innovation/space-analysis, 07.05.2024.

According to Ding Ba Hung Anh, the SPACE matrix helps companies choose the appropriate method for an aggressive, conservative, defensive, or competitive strategy. The SPACE matrix's axis represents the organisation's two internal factors, financial strength and competitive advantage, while the two external factors are the industry and strength. These four factors are essential in determining the company's overall strategic position. Depending on the type of company, many different possibilities may appear in the framework of the elements that represent the subjects of the SPACE matrix.

In addition, performance evaluation is enhanced through the use of the SPACE matrix. The tool provides a framework for benchmarking against industry standards and competitors, allowing organisations to track the progress of strategic initiatives over time (Hill & Jones, 2013). By identifying gaps between current performance and strategic objectives, managers can make necessary adjustments to improve organisational performance (Thompson et al., 2015).

According to Nadezhda Nikiforovna Krupina, the dynamic market environment and active digital value increase the scientific level to the level of making strategic marketing decisions. Of particular importance is the SPACE matrix, which demonstrates the ability to use additional structured diagnostics to investigate the validity and reliability of the choice of strategy and the posture of the principals. The SPACE matrix of a wide range of factors allows it to comprehensively reflect the current state of the situation in the area of demand for all, potential resources and position with competitors. The combination of strategies on the matrix makes it possible to see the visualised factor that shows what strategy should be applied to satisfy the demands and needs of the buyers in price and quality. At the same time, the manufacturer does what he did. The solution is the result of a complex professional analysis of cause-and-effect

relationships, identifying reserves, detailing the risks of different markets and predicting the level of costs of the seller and the buyer. The evidence for the relevance of the selected factors of the matrix study is the identified trends and patterns, developed forecasts and expert opinions. To monitor complex relationships, it is important to maintain control and simplicity of perception of monotonous series of numbers, texts, regulations, forecasts and expert judgments.

Additionally, the Space Matrix enhances competitive edge by identifying and leveraging competitive advantage, which aligns with Barney & Hesterly's (2015) view that understanding and exploiting competitive strengths is crucial for achieving long-term success. The matrix also promotes adaptability and flexibility in strategic planning, allowing organisations to adjust strategies in response to changing market conditions (Grant, 2016). Furthermore, the Space Matrix offers a holistic view of the business by considering multiple dimensions, ensuring a balanced approach to strategy development (Pearce & Robinson, 2013). It aligns strategies with organisational goals, helping to set realistic and achievable targets (Thompson et al., 2015). Lastly, it aids in risk mitigation by identifying potential risks and providing strategies to manage uncertainties and disruptions (Johnson et al., Exploring Strategy: Text and Cases, 2011).

Referring to these results that create diversity in doing business and various organisational analytics, companies today tend to be closer to these and more adaptive to the changes the environment brings. However, not only does this imply adaptation and acceptance of change, but it is also a concept of accepting the challenges to further develop and empower creativity within the organisation. This is important because managers today are faced with daily challenges and changes, as well as the ability to solve problems, whether routine or unstructured (Elezaj, 2021). The Space Matrix is a versatile and valuable tool in strategic management, offering significant applications and benefits. It aids in strategic planning, resource allocation, performance evaluation, risk management, competitive analysis, and operational efficiency. The Space Matrix helps organisations achieve their objectives and maintain a competitive advantage in dynamic market environments by providing a structured strategy formulation and implementation approach.

3. SPACE Matrix for company strategy in a volatile environment

The Strategic Position and Action Evaluation (SPACE) Matrix offers a structured and insightful framework for companies to assess their strategic posture, particularly in volatile environments. The method's comprehensive approach, which includes evaluating financial strength, competitive advantage, environmental stability, and industry strength, enables companies to deeply understand their current position and the external challenges they face.

The SPACE Matrix helps companies navigate uncertainty and achieve long-term success when combined with continuous monitoring and adaptation. The insights gained from the SPACE Matrix help prioritise resource allocation. Companies can direct their investments toward areas that will strengthen their strategic position, such as R&D, cost management, or strategic alliances. The SPACE Matrix is a versatile and powerful tool for strategic analysis, especially in volatile environments. Its structured approach helps companies navigate uncertainty, make informed decisions, and develop strategies that align with their strengths and the realities of the external environment. By integrating the SPACE Matrix into their strategic planning processes, companies can enhance their resilience, maintain their competitive edge, and achieve sustainable growth even amidst volatility.

4. Discussion

The primary focus of the topic revolves around the research results. Coca-Cola, the world's largest beverage company, offers consumers nearly 500 brands. It has the most extensive beverage distribution network globally, with its products being consumed in over 200 countries, averaging almost 1.6 billion drinks per day. Coca-Cola's effective advertising campaign represents American culture and is known for sponsoring various games and teams, as well as being featured in numerous television programs and movies.

SPACE MATRIX OF COCA-COLA				
	Internal Strategic Position		External Strategic Position	
	Financial Position		Stability Position	
Y AXIS	(+1 Worst, +7 Best)		(-1 Best, -7 Worst)	
	Cash Flows	5	Competitive Pressure	-3
	Earnings Per Share	4	Price Elasticity	-2
	Efficiency Ratios	6	Competitor Price Range	-3
	Liquidity	4	Demand Variable	-2
	Return to Equity	5	Technological Change	-1
	Revenue Increase	4	Inflation Rates	-2
	Inventory Turnover	5	Taxation	-4
	Average Score: 4.7		Average Score: -2.4	
	Total Y Axis Score: 2.3			
	Competitive Position		Industry Position	
X AXIS	(-1 Best, -7 Worst)		(+1 Worst, +7 Best)	
	Product Quality	-1	Barriers to Entry	5
	Brand Image	-1	Access to Financing	6
	Customer Service	-2	Industry Profits	5
	Customer Loyalty	-1	Growth Potential	6
	Manufacturing	-1	Profit Potential	7
	Market Share	-1	Resource Utilization	5
	Productive Life Cycle	-2	Consolidation	5
	Average Score: -1.2		Average Score: 5.5	
	Total X Axis Score: 4.3			

Figure 2: SPACE Matrix analysis of the Coca-Cola Company

Source: The Coca-Cola Company, A strategic management case study, 2021.
Available at: https://bcbntg.tumblr.com/post/651236173026590720/group1 accessed 01/13/2024

When assessing Coca-Cola's financial position, several key aspects are typically considered. These include revenue and profitability, which are significant due to the company's global beverage sales. Analysis of revenue and profit margins provides valuable insight into the company's financial performance. Profitability reflects the performance of its products, operational efficiency, and competitive market position. Additionally, Coca-Cola's liquidity refers to its ability to cover current financial obligations and pay on time. The company also invests in research and development, marketing, and operations. Effective capital management involves efficiently handling the company's resources, such as returning capital, paying dividends to shareholders, and managing the investment portfolio. Coca-Cola is one of the most famous and valuable brands in the world. Their global presence and strong brand have solidified their position in the market and stabilised their income. Although the company faces competition and changes in the soft drink market, its strong and dominant competitive position is reinforced by creative and appealing marketing campaigns that increase its market influence. With a broad global presence and innovative marketing and distribution approaches, Coca-Cola remains one of the most competitive players in the soft drink industry.

The above figure shows that Coca-Cola's direction vector is positioned in the upper right quadrant of the matrix. This indicates that the company is in an excellent position to leverage its strengths to overcome weaknesses while gaining the advantage of opportunities and avoiding threats. As a result, the company can consider employing strategies such as market development, market penetration, product development, vertical integration (both forward and backwards), and diversification strategies depending on the specific business environment.

Marketing strategy is essential for any company as it provides the foundation for managerial decision-making and achieving positive outcomes. Marketing planning involves making choices, setting priorities, allocating resources for strategic projects, and coordinating efforts to achieve desired outcomes. The dynamic and evolving nature of the marketing environment requires ongoing research and development, as well as the collection of vital operational data. It is crucial for managers and employees to work together cohesively and continually analyse their efforts.

Table 1 SPACE Matrix ranking of indicators of the company Vitaminka

Financial Position		Stability Position	
Cash Flows	3	Competitive Pressure	-5
Earnings Per Share	2	Price Elasticity	-4

Efficiency Rations	5	Competitor Price Range	-3
Liquidity	3	Demand Variable	-2
Return to Equity	3	Technological Change	-1
Revenue Increase	5	Inflation Rates	-2
Inventory Turnover	4	Taxation	-1
Average Score	3,6	Average Score	-2,6
Total Y Axis Score		2,3	
Competitive Position		Industry Position	
Product Quality	-1	Barriers to Entry	5
Brand Image	-2	Access to Financing	6
Customer Service	-2	Industry Profits	3
Customer Loyalty	-2	Growth Potential	4
Manufacturing	-2	Profit Potential	6
Market Share	-3	Resource Utilisation	5
Productive Life Cycle	-3	Consolidation	5
Average Score	-2,1	Average Score	4,9
Total X Axis Score		2,8	

Table 1 analyses various aspects of the company, divided into four basic categories: financial position, position stability, competitive position, and industry position. Each aspect is measured by numbers, where positive numbers indicate the desired state, while negative numbers indicate the undesired state or challenges the company is facing. According to the data from the first part of the table, the company has a good financial position. However, it is essential to continue improving some aspects to increase income, return on capital, and liquidity. The company's competitors have a wide range of prices, creating

challenges in maintaining a competitive position. While the company may not be significantly exposed to technological changes, it may still be required to monitor and incorporate new technologies into its products or services.

Vitaminka is in an excellent position and applies an aggressive marketing strategy. It can use its internal strengths rationally while taking advantage of external opportunities. Just like the analysis of the previous company, Vitaminka has the opportunity to apply the following marketing strategies: market development strategy, market penetration, product development, forward and backward vertical integration as well as horizontal integration, concentric, conglomerate, and horizontal diversification or a mix of strategies, depending on the specific environment that the company is practicing at a given time.

5. Conclusion

The SPACE matrix has been proven to help companies strategically position themselves in the market or industry so they can take appropriate action and improve performance. Space Matrix Analysis in marketing management helps organisations determine their strategic posture in terms of market attractiveness and competitive position. By evaluating factors such as industry growth, competitive intensity, financial strength, and market stability, companies can make informed decisions about which strategies to pursue. The study concludes that the Coca-Cola company has a strong and stable position in the SPACE Matrix model and employs an aggressive market strategy. The study also analysed the Macedonian company Vitaminka, which was found to employ an aggressive strategy for market performance. It is important to emphasise that no strategy is applied according to a specific so-called "recipe", but it is a set of research, analysis of data and information, and implementation of actions and processes during the operation. Therefore, it is crucial to establish clear company objectives, which should be linked to the different levels of the strategy in a cause-and-effect manner. Strategies are a central component of companies; every company applies a strategy according to its needs. The strategy involves different actions, meaning that operational activities are an integral part of the company.

The importance of using Space Matrix Analysis lies in its ability to provide a clear and concise visual representation of a company's strategic position. It helps in identifying growth opportunities and potential threats, facilitating better resource allocation, strategic planning, and risk management. Overall, it enables organisations to craft strategies that align with their strengths and market conditions, ultimately driving sustained competitive advantage in a volatile business environment.

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DIGITALIZATION PRACTICES IN COOPERATIVES IN TURKİYE: KOOPBIS and KORBIS

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Abstract

The digital transformation resulting from today's technological advances is affecting the traditional business models, leading to more technological business processes. Digital applications provide regular and uniform statistics on cooperatives and can contribute to the make of plans, programs and policies. It also provides a structure within which members can supervise their cooperative, control its operation and implement cooperative values. Digital technologies help to reduce the use of dwindling natural resources, provide new business and service opportunities, and thus contribute to the development of the economy and the environment. It also makes businesses stronger by improving competitiveness. Business processes are accelerated and costs are reduced. These developments affect cooperative enterprises as they do all businesses. Digital applications provide product and service diversity especially for cooperative members, contribute to the strengthening of the member-cooperative relationship, and ensure the participation of members in business processes. Cooperatives are trying to adapt to the digitalization process in order to maintain their competitiveness in the market, increase efficiency and customer (member) satisfaction. Accordingly, this study focuses on the digitalization practices of cooperatives in Turkey. These practices are important examples. KOOPBIS is Turkey's cooperative database and covers all cooperatives in the country, while KORBIS is Turkey's first digital cooperative and is an important application with its number of members and variety of products/services.

Key words: Dijitalization, cooperatives, Türkiye, KOOPBIS, KORBIS

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1. Introduction

Cooperatives, which are formed around the understanding of meeting the needs of their members through cooperation and solidarity, have an important function in terms of the economic, social and democratic development of society and the country. Solidarity and joint action contribute to efficiency and success in economic activities, as well as to social peace (Turkey Cooperatives Report, 2014).

Cooperatives are critical to the livelihoods of millions of people working in agriculture, finance and housing. However, it is only through coordinated and timely action that cooperatives can meet the challenges of the future of work (Ministry of Trade, 2019). The role of cooperatives in job creation and local economic development is widely recognized. Cooperatives have a unique and special role in promoting sustainable economic growth, high quality employment, decent work and social justice. This is because, through the cooperative ownership model and democratic governance principles, cooperatives' activities are guided by the needs of their members-workers, consumers and community members (International Labour Organization (ILO), 2022 p.6).

In recent years, the international cooperative movement has begun to realize that it needs to be more advocated for and represented in global policy debates involving the future of work. However, cooperative enterprises face a number of challenges. The lack of comparable cross-country and cross-regional statistics on cooperatives and their broader impact on employment and the economy prevents the use of cooperatives as a unit of analysis in research that can inform policy and practice. In addition, the focus of cooperatives on the needs of local members and beneficiaries prevents them from participating in policy debates at the national and international level (Ministry of Trade, 2019). Quality statistics on cooperatives can be collected from the cooperatives themselves or from other sources such as administrative records, censuses or surveys of organizations registered as cooperatives. In some countries, such statistics are produced by cooperative umbrella organizations or government agencies responsible for cooperatives. These statistics cover the number and types of cooperatives, the number of members, the number of staff employed by cooperatives, and economic performance (such as value added, turnover, equity and assets). Cooperative statistics compiled by these institutions are often not fully comparable with official statistics on the overall economy and the labor market, or with statistics from other countries. They are not always produced on a regular basis, e.g. annually, and may vary depending on the scope of the data collected. Statistics for which the source of information is the cooperatives themselves can only provide relatively basic information about the people who work in or are members of cooperatives, such as age and gender (ILO, 2022 p.7). To this end, the ILO has published Measuring Cooperatives: An information guide on the ILO Guidelines on Cooperative Statistics. The guidelines were first implemented in pilot countries. These countries are Costa Rica, Italy, the Republic of Korea, the United Republic of Tanzania and Turkey.

In Turkey, cooperatives are established, operated and supervised by three different ministries (Ministry of Trade, Ministry of Agriculture and Forestry, Ministry of Environment, Urbanization and Climate Change) depending on their purpose and activities. The Ministry of Trade is the ministry that determines policies for cooperatives. Following the ILO Recommendation No. 193 and the implementation in pilot regions, efforts were initiated to harmonize statistics on the contribution of cooperatives to the economy and social life, which is a significant problem in Turkey, and to make them visible in national statistics. The Ministry of Trade has established an electronic database where all cooperatives in Turkey are registered. This database is called the Cooperative Information System (CIS). This database is an important step towards digitalization for cooperatives.Among cooperatives, agricultural credit cooperatives have also launched KORBIS (Cooperative Member Information System), Turkey's first digital cooperative. This study examines developments in the digitalization of cooperatives in Turkey (*database-Koopbis and digital cooperative-Korbis*).

2. Material and Method

The material for the study was drawn from reports, official websites and a small number of studies. Since not all cooperatives in the country have been transferred to the Koopbis database, there is a shortage of data on this subject and no literature studies were found. The information on Koopbis was obtained from the Turkish Cooperatives reports, official websites of Koopbis and the Ministry of Trade, and legislative studies on the subject.
Korbis, on the other hand, is not a database but a digital cooperative for agricultural credit cooperative members. It is also Turkey's first digital cooperative. The information obtained from the very little literature on this subject and the official website of the Central Union of Agricultural Credit Cooperatives was used in this study. Accordingly, this study is based on a literature review.

3. Cooperative Database in Turkey: KOOPBIS (Cooperative Information System)

In Turkey, cooperatives are subject to registration regulations as they are commercial memberships with legal personality. Unlike other commercial memberships, their establishment requires authorization from the relevant public authority and a ministry representative must be present at general assembly meetings. These regulations and registration procedures ensure up-to-date administrative records for cooperative statistics (ILO, 2018). Also, the ministries to which cooperatives are affiliated keep records of the cooperatives and upper organizations under their responsibility. Although efforts have been made to provide these records on an annual basis, up-to-date data was not available on the official websites of the ministries. As of June 2021, the Ministry of Trade had 13. 030 cooperatives of 34 types and 1.583.226 members; as of January 2024, the Ministry of Agriculture and Forestry had 11.369 cooperatives of 5 types and 3.341.390 members; and as of 2020, the Ministry of Environment, Urbanization

and Climate Change had 35.730 cooperatives of 5 different types and 1.838.150 members. In addition, only the Ministry of Trade statistics distinguish between active and inactive cooperatives (Ministry of Trade,2021; Ministry of Agriculture and Forestry, 2024; sivilsayfalar.org, 2021).

In Turkey, the unique characteristics of cooperatives, their separate legislation, and the need for objective decisions on service delivery and development make it necessary to regulate and policy-make this area in a special way. Therefore, in order to create a favorable climate for cooperatives, it is crucial that public policies are evaluated in a holistic framework with the participation of sector representatives.

In addition, accurate statistical information on cooperatives is essential for the formulation of sound policies on cooperatives and the sectors in which they operate. In this context, the Turkish Cooperatives Strategy and Action Plan (2012-2016) aims to reorganize public organization and service delivery and take other necessary measures to create a cooperative environment that has the interest and trust of the public. To this end, one of the activities was the establishment of an e-cooperative database in order to enable surveillance, audit and enforcement services for cooperatives, to produce reliable statistical data, to provide faster and more effective public services and to increase transparency. Within the scope of this activity, the Cooperative Information System (KOOP-BIS) Project was launched in 2012. In this database, a common software is used by the relevant ministries to ensure the integration of systems (Turkish Cooperative Strategy and Action Plan 2012-2016**,** pp.38-39).

The Cooperative Information System (KOOP-BIS) enables the preparation of attendance lists, finalization of general assembly applications, electronic execution of trade registry transactions such as establishment, abandonment, liquidation and amendment of articles of association, and receipt of complaints and requests for information and documents via the internet. In addition, detailed monitoring and auditing of information on cooperatives and their supreme organizations in an appropriate database will also be carried out on this system. The establishment of a central cooperative database will also ensure that information is managed from a single source and statistics are produced in a sound manner. Thanks to the services provided by the system, it is easier for the cooperative to keep track of its members, and the electronic production of the attendance lists prior to the general assembly meetings secures the rights of the members. Thanks to the electronic environment that provides transparency in cooperative management, audit and control mechanisms can be operated more effectively and efficiently. In addition, a communication infrastructure was created by giving each cooperative the opportunity to create a website with a simple interface (Turkey Cooperatives Report 2014, pp.60-61).

With the Law No. 1163 on Cooperatives, KOOPBIS has been made legally mandatory. Criminal penalties for board members who fail to fulfill their obligations have also been legalized. With the new regulation, a centralized information system is being implemented to store data on all cooperatives in Turkey. With the implementation of the system, transaction costs and time loss will be reduced. Moreover, this system, which will include information on all

cooperatives in Turkey, will prevent many problems encountered in practice and make cooperatives more transparent. Thus, effective policies will be developed with up-to-date statistical data (Koopbis, 2024). A regulation on the procedures and principles governing the use of the Cooperative Information System (KOOPBIS) by cooperatives and upper organizations subject to the Cooperatives Law No. 1163 dated 24/4/1969, cooperatives and upper organizations subject to the Agricultural Credit Cooperatives and Unions Law No. 1581 dated 18/4/1972, managers of cooperatives and upper organizations subject to the Law No. 4572 dated 1/6/2000 on Agricultural Sales Cooperatives and Unions, and the relevant Ministries and provincial organizations. The Regulation states that "Members of the board of directors of cooperatives and supreme organizations are obliged to transfer the cooperative's trade registry records, financial statements, annual activity reports of the board of directors, general assembly meeting documents, information on the identity, contact, shares and payments of its members to KOOPBIS within one year following the establishment of KOOPBIS". It is stated that the period may be extended up to 6 months by the Ministry of Trade (TBMM, 2024).

Access to KOOPBIS is realized through identity verification methods on the e-Government Gateway, through the address koopbis.ticaret.gov.tr or through www.turkiye.gov.tr services. The Ministry of Trade can access the personal data of the users of the Cooperative Information System, such as name, surname, place of birth, date of birth, parents' names, Turkish ID No, place of residence, contact information and cooperative membership information;

- Providing cooperative services electronically and increasing automation,
- Electronic production of general assembly documents,
- Protection of the rights of cooperative members,
- Use in audit activities,
- Production of statistics in the field of cooperatives,
- Use in the coordination of government support and economic policies,
- It is processed limited to the development of cooperatives in the country.

These personal data are shared with authorized public institutions and organizations for these purposes. The KOOPBIS authorized person who is notified to the Provincial Directorate of Trade is responsible for entering this information into the system.

As of December 31, 2016, 674,172 member and manager records had been added to the system (Turkey Cooperatives Report, 2016, p.56). The transfer of cooperatives' information to the system is still ongoing.

3.Turkey's First Digital Cooperative: KORBIS (Cooperative Member Information System)

Agricultural cooperatives, which have a great importance for the agricultural sector, need to keep up with the changes and transformations in the world in order to provide better service to producers, fulfill their requests and demands, and survive by competing with competitors. In this direction, information

technologies, which have come to the forefront in recent years, are important for agricultural cooperatives to provide faster and higher quality services, to access information faster, to reduce time and labor loss, and to reduce other expenses (Fasal, 2022, p.204).

In Turkey, competition is increasing day by day in meeting the needs of producers for agricultural production, investment and social welfare. Actors in the sector can market their digital applications to producers with attractive opportunities. Today, many businesses in agricultural banking, agricultural input sector, agricultural extension and consultancy offer services to producers through digital applications. Considering that the number of farmers is around 2 million and the number of members of agricultural credit cooperatives is around 853 869 (42.7% of the total number of producers are cooperative members), it can be said that these cooperatives have a competitive advantage over their competitors.

Agricultural Credit Cooperatives is an important cooperative for the Turkish economy with 1615 cooperatives, 19 subsidiaries (5 subsidiaries, 2 of which are sector leaders among Turkey's largest companies), approximately 20,000 employees and 853,869 members (Tarım Kredi Group, 2024). The cooperative offers a wide range of services from fertilizers to seeds, from pesticides to feed, from irrigation systems to logistics services, from animal husbandry to plant nutrition, plastics, IT, food, foreign trade, petrochemicals and licensed warehousing, from pre- and post-production input supply to insurance and delivery of products to the market (Agricultural Credit Cooperatives of Turkey, 2024). Agricultural credit cooperatives' use of information technology began in 2009, and to date they have introduced digital transformation applications in many areas. These applications include the e-koop automation system and its integrated EBYS, the member card, and most recently KORBIS. Thanks to these applications, the internal processes of agricultural credit cooperatives have accelerated, time and labor losses have decreased, and paper and stationery costs have been greatly reduced. Thanks to these systems, customer demands and needs were met in a shorter time and under more favorable conditions. (Fasal, 2022 p.213) KORBIS enables agricultural credit cooperative members to conduct their business with cooperatives in a mobile environment without going to the cooperative. Thanks to KORBIS, the infrastructure for transactions such as instant tracking of member information, interactive information, online order-collection and subsidies has been created by providing fast and easy access. In addition, the application for cash loans needed by the member is also taken within the application and the loan is automatically uploaded to the member's account. In addition to cash loans, a credit infrastructure has also been created for in-kind loans. Insurance transactions are also carried out through the application. Korbis main menu consists of the following tabs. My Contracts *(Sözleşmelerim)*, My Debt *(Borç Durumum)*, My purchases (Alışverişlerim), My Field *(Tarlam/Arazim)*, My Member Card (Ortak Kartım), Ask us *(Bize Sor)*, My Insurances *(Sigorta Poliçelerim)* and Livestock Information System *(HayBis)*. The application can be downloaded free of charge from the App Store and Google Play to members' smartphones. (Agricultural Credit Cooperatives of Turkey, 2024a). The Satellite Field Monitoring System (TARKİP) within KORBIS helps

producers remotely monitor their fields, monitor plant development and identify their needs, be aware of possible risks, compare yields according to the season, and decide on harvest time through remote sensing and data processing.

In a study conducted by Karsu (2022), it was determined that farmers mostly benefited from the KORBIS application of the Agricultural Credit Cooperative, which they included among their socioeconomic guarantees, in the following areas: economic use of time, communication with cooperative administrative staff and agricultural engineers, monitoring their financial status, crop detection with the satellite field tracking system developed with remote sensing technologies and analysis of instant satellite images, productivity map modeling, land risk classification, early learning of meteorological information.

Table 1. General Evaluation about Koopbis and Korbis

KOOPBIS (Cooperative Information System)	**KORBIS (Cooperative Member Information System)**
-It is a database.	-It is a digital cooperative.
-Covers all types of cooperatives in Turkey.	-Only for agricultural credit cooperatives.
-Covers the cooperative structure from the cooperative unit to the highest level of organization.	-Covers data/requests of agricultural credit cooperative members.
-It is included in the basic cooperative law (1163) and the database officer is designated by law.	-It also processes digital data related to agricultural production in addition to membership transactions.
-General assemblies of cooperatives are conducted through this database.	-Provides all kinds of inputs (cash and in-kind loans, insurance, etc.) needed by its members.
Provides up-to-date statistical information to policy makers on cooperatives.	-It can be easily downloaded from the applications.
-Contributes to the inclusion of cooperative statistics in national statistics.	
-Contributes to the harmonization of cooperative statistics with international cooperative statistics.	

4. Conclusion

In today's digital age, businesses need to follow and adopt the innovations required by this age in order to survive. In this period when competition is very intense and access to information is very easy and fast, it is imperative for businesses to renew themselves and keep up with the age (Fasal, 2023 p.218).

Today, digital applications are seen in every sector and every type of business. Digitalization in agriculture will play an important role in supporting the

work of farmers as well as dramatically transforming lives in rural areas. The farmer's earnings are maximized as the farmer, guided by the right information, fertilizes, sprays and irrigates with the right tools at the right rate, and the productivity and quality of the product increases. In this way, production patterns in agriculture will be improved and more production will be realized with less input by using resources correctly and effectively (Agricultural Credit Cooperatives of Turkey, 2024b). In Turkey, digital applications are becoming widespread among producers with the influence of private sector companies, the public sector, cooperatives and technology companies. Some companies offer their digital applications free of charge (Başaran and Er Ülker, 2022 p.201).

Within the framework of digital transformation, cooperatives have restructured their business processes in order to communicate more easily with their producer members, and have aimed to move away from traditional lines by implementing applications such as the member information system (MIS) and enterprise resource planning. With the further development of information technology, cooperatives have become internationally competitive by using the tools of technology, turning today's opportunities into advantages, and are on their way to integrating the possibilities of new technology into their structures. Digitalization in agricultural cooperatives and unions is helping to reduce the extent of environmental damage caused by traditional agriculture, while reducing expenditures for members and cooperatives (Tutkunca and Haydar, 2022 p.60). Tutkunca and Haydar (2022) also found that agricultural cooperatives and unions recognize the need to adapt to the digital transformation process in order to survive and compete effectively.

Today, while cooperatives are called upon to continue their commitment to “returning to the core”- that is, to preserve their own history and identity - the effective utilization of their distinct business advantages and the addition of new ones through innovation remain the core principles of cooperative strategies for the future in all parts of the world. The sustainability of cooperatives' raison d'être - to serve their members - depends first and foremost on strengthening cooperative distinctiveness. The key to making cooperatives the business of tomorrow is to strengthen cooperative distinctiveness (Polat, 2017 p.274). It is only through adequate research, data and information gathering, and the generation of new information, policies and solutions, that new proposals for the development of cooperatives can be formulated, practices can be mastered and an appropriate and effective position among public institutions can be ensured. Therefore, it is of utmost importance to monitor the markets in which cooperatives operate, economic conditions, implementation problems, and developments in domestic and international economic activities, and to maintain the information obtained at the institutional level (Turkish Cooperative Strategy and Action Plan 2012-2016). The Koopbis database is an important step forward for cooperatives in Turkey. However, the fact that not all cooperatives have adapted to the system yet and the planned registration deadlines have been delayed is hampering the functionality of the database. At this point, it is important for Turkish cooperatives to complete the transfer of active cooperatives to the system as soon as possible.

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EXPLORING DELIBERATIVE DEMOCRACY MODELS IN JUST ENERGY TRANSITIONS

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Abstract

In the context of just energy transitions towards sustainable and inclusive futures, the effectiveness of public engagement strategies, through the lens of deliberative democracy models, plays a crucial role. This study offers a comparative analysis of various deliberative democracy models employed in the realm of just transitions, focusing on their impact on public participation, inclusivity, and decision-making processes. Through the examination of case studies, this research delves into the strengths, challenges, and outcomes of different deliberative democracy settings that integrates the principle 'leave no one behind'. The analysis sheds light on best practices, lessons learned, and opportunities for enhancing public engagement in the pursuit of sustainable development and social justice. In addition, this study utilizes visualization modeling to analyze the relationships between key concepts and themes, further enhancing the understanding of public engagement strategies. Through this endeavor, policymakers, practitioners, and researchers are equipped on effective strategies for fostering meaningful public engagement towards just transitions.

Keywords: Deliberative democracy, just energy transition, Public engagement, Inclusion, Sustainable development.

1. Introduction

The shift towards "just energy transitions" aims to address climate change while ensuring equity and inclusion by balancing environmental and social justice goals (Siciliano et al., 2021). This involves protecting vulnerable communities and incorporating diverse stakeholder perspectives, where deliberative democracy plays a crucial role (Abram et al., 2022). Deliberative democracy fosters meaningful public engagement, allowing citizens to actively participate in decisions affecting their lives (Pimbert & Wakeford, 2001). By promoting informed and inclusive dialogue, these models can improve the legitimacy and

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fairness of policies, particularly in just energy transitions (Topaloglou et al., 2024). This paper examines and compares various deliberative democracy models in the context of just energy transitions, analyzing their effectiveness in public participation and equity. It includes a theoretical overview, case study analysis, and visualization using VOSviewer to identify best practices for enhancing public engagement I n sustainable development.

1.1 Methodology

This paper employs a mixed-methods approach to explore and evaluate the effectiveness of deliberative democracy models in just energy transitions. The methodology integrates a comparative analysis of case studies with bibliometric visualization modeling to gain a comprehensive understanding of public engagement strategies. The case studies include Germany's Energiewende, Scotland's Climate Assembly, South Africa's Just Energy Transition Dialogues, and Spain's Coal Transition Roundtables. These cases are analyzed based on criteria such as public participation, inclusivity, deliberation quality, and policy impact. Additionally, VOSviewer software is used to construct a visualization model based on a bibliometric analysis of existing literature. This model identifies and analyzes the interrelationships between key concepts, themes, and clusters related to governance, democratic processes, and energy transitions, offering insights into the interconnectedness and complexity of public engagement in this context.

2. Theoretical Framework: Understanding Deliberative Democracy in the Context of Just Energy Transitions

Deliberative democracy is a political theory that emphasizes the role of reasoned discussion and debate in decision-making, prioritizing the quality of dialogue among citizens, experts, and policymakers (Munton, 2003). Unlike traditional democratic models that focus primarily on voting, deliberative democracy gains legitimacy through collective deliberation, where participants exchange arguments, consider diverse perspectives, and seek consensus or well-reasoned agreement (Mansbridge, 2007). Key features include inclusiveness, ensuring all affected parties, particularly marginalized groups, are heard; reason-giving, where participants justify their positions; mutual respect, fostering civil discourse; and decision-making that reflects the majority's will but is grounded in reasoned deliberation (Drake, 2021).

This approach is particularly relevant for just energy transitions, which involve shifting from fossil fuels to renewable energy sources in a fair and inclusive manner (Wahlund & Palm, 2022). Such transitions can disproportionately impact vulnerable populations, like low-income communities and workers in traditional energy sectors (Carley & Konisky, 2020). Deliberative democracy provides a framework for managing these transitions by ensuring that the voices of all stakeholders, especially those most affected, are included in decision-making. Through inclusive and reasoned dialogue, it helps develop solutions that are equitable, sustainable, and broadly accepted, aligning with the

principle of "leaving no one behind" by crafting policies that protect and benefit vulnerable groups in the shift to a sustainable energy system (Honing, 2023).

3. Case Studies of Deliberative Democracy Models in Just Energy Transitions

Deliberative democracy has been used in various contexts to facilitate just energy transitions, ensuring that diverse stakeholder voices are heard in decision-making (Suboticki, I., et al., 2023). This section explores several case studies, highlighting how these models have been implemented to address the challenges of transitioning to sustainable energy systems. The selected examples demonstrate different approaches to involving the public in energy policy decisions. Each case study is evaluated on public participation, inclusivity, quality of deliberation, and impact on policy decisions.

3.1 Case Studies

1. Germany's Energiewende and Citizen Assemblies: Germany's energy transition is a prominent example of using citizen assemblies to deliberate on energy issues. These assemblies, involving randomly selected citizens, facilitated discussions on the social and economic implications of energy policies. While these assemblies have been praised for geographic inclusivity, challenges remain in translating their outcomes into actual policy decisions (Yildiz, Ö., 2014).

2. Scotland's Climate Assembly: Convened to gather public input on how Scotland should achieve net-zero emissions by 2045, this assembly included a cross-section of Scottish society. The assembly allowed citizens to learn from experts, deliberate on energy transition issues, and present recommendations to the Scottish Parliament, demonstrating the potential of deliberative democracy to influence national policy (Riley, R., et al., 2021).

3. South Africa's Just Energy Transition Dialogues: These dialogues, initiated by civil society organizations, focused on how South Africa can transition from coal while addressing the needs of workers and communities dependent on the coal industry. The emphasis on inclusivity, particularly involving marginalized communities, highlighted the importance of integrating social justice into energy transition policies (Strambo, C., et al., 2019).

4. Spain's Coal Transition Roundtables: In Spain, the government convened roundtables to discuss the challenges of phasing out coal, focusing on economic diversification and job creation in coal-dependent regions. Although inclusive, the effectiveness of these roundtables in influencing policy outcomes has been mixed, with concerns about how well participant input was reflected in final decisions (Nacke, L., 2020).

3.2 Evaluation of Public Participation and Inclusivity

The success of these models hinges on several factors. Broad participation is crucial, requiring efforts to engage diverse groups and provide support, such as financial assistance and translation services, to enable marginalized groups (Lasker, R. D., & Weiss, E. S., 2003). The quality of deliberation is also essential,

ensuring that participants can voice their opinions, engage in meaningful dialogue, and consider different perspectives (Abelson, J., et al., 2003). Finally, the impact on policy and decision-making is the ultimate measure of success. While all the case studies show potential for public deliberation to influence policy, the extent to which this influence is realized varies (Papadopoulos, Y., & Warin, P., 2007).

4. Strengths and Challenges of Deliberative Democracy Models

Deliberative democracy offers a valuable approach to inclusive decision-making, particularly in the context of just energy transitions, but it has both strengths and challenges that must be navigated (Droubi, S., et al., 2022). One of its primary strengths is the potential to include diverse voices in decision-making, ensuring broad representation. Achieving this inclusivity, however, requires active outreach to marginalized groups and the removal of barriers such as financial constraints, language differences, and childcare needs (Landemore, H., 2017). For example, Scotland's Climate Assembly successfully enhanced its legitimacy by intentionally involving underrepresented communities.

Another strength lies in the structured nature of deliberation, where facilitated dialogues and expert input ensure focused, respectful, and informed discussions. The impact of these deliberations depends on whether their outcomes influence formal decision-making. Processes like Scotland's Climate Assembly demonstrate the importance of clear pathways connecting deliberative outcomes to policy actions, fostering transparency and public trust (Culyer, A. J., & Lomas, J., 2006).

Despite its strengths, deliberative democracy faces several challenges. Achieving genuine inclusivity can be difficult, as even targeted outreach might not fully capture the diversity of affected populations. Resource constraints further complicate efforts to provide the necessary support for all participants, potentially limiting the effectiveness of the process (Briggs, X. D. S., 2008).

Managing power dynamics within deliberative processes is another challenge. There is a risk that more powerful stakeholders may dominate discussions, overshadowing less influential voices (King, R. C., et al., 2010). Even with skilled facilitation, power imbalances can persist, leading to unequal participation.

Translating deliberation into concrete policy actions poses a significant hurdle. Political will may be lacking, as seen in some instances within Germany's Energiewende citizen assemblies, where clear recommendations did not lead to corresponding policy changes (Lage, J., et al., 2023). Institutional barriers and conflicting interests can further hinder the implementation of deliberative outcomes (Fung, A., 2007).

5. Impact on Decision-Making Processes and Social Justice

Deliberative democracy has a significant influence on decision-making, particularly in the context of just energy transitions, where it promotes social justice and ensures inclusivity. It enhances the legitimacy, inclusivity, and quality of decisions. When diverse voices are involved, as in Scotland’s Climate Assembly, policies gain greater public trust and legitimacy (Cherry, C., et al.,

2021). By incorporating a wide range of perspectives, decisions become more informed and balanced, as seen in Germany's citizen assemblies. Additionally, these processes foster consensus-building, crucial for addressing contentious issues, exemplified by South Africa's Just Energy Transition Dialogues (Ghorbani, Y., et al., 2023).

It is also essential for addressing social inequalities that could be exacerbated by energy transitions (Droubi, S., Heffron, R. J., & McCauley, D., 2022). It gives marginalized groups a voice, ensuring their concerns are fully considered, as demonstrated in Spain's Coal Transition Roundtables (Sorman, A., et al., 2020). By empowering vulnerable populations to influence policies directly affecting them, these processes foster social cohesion and reduce potential conflicts, a result observed in both South Africa and Scotland. The principle of "leaving no one behind" is also an integral part, and leads to more equitable solutions, such as those developed in Spain's roundtables, which focused on supporting coal-dependent communities (Piggot, G., et al., 2019). Additionally, embedding accountability in these processes, as seen in Scotland's Climate Assembly, ensures that all voices are acknowledged and considered, leading to more just and inclusive outcomes.

6. Visualization Modeling of Public Engagement Strategies

This chapter highlights how VOSviewer will be utilized to analyze and interpret key concepts within deliberative democracy models, particularly in the context of just energy transitions. By applying VOSviewer to a collection of 109 scholarly papers that focus on the intersection of deliberative democracy and just transition we will create network maps that visualize the relationships between critical themes such as public participation, inclusivity, social justice, and policy influence (McAllister, J. T., et al., 2022). The bibliometric analysis identifies clusters of related terms, offering insights into the current academic discourse on how inclusive and deliberative practices can shape just and effective energy policies. The insights from these visualizations will illuminate the connections between key concepts, such as the link between inclusivity and social justice. Additionally, the analysis may reveal underexplored areas, indicating research gaps and opportunities for further study.

6.1 Model Analysis

The VOS viewer model constructed from the bibliometric analysis reveals a complex network of interconnected concepts that illustrate the multifaceted nature of governance, policy, and democratic engagement in the context of climate and environmental issues.

The model identifies eight distinct clusters, each representing a unique thematic area, yet these clusters are highly interlinked, reflecting the interconnectedness of the concepts within the broader discourse.

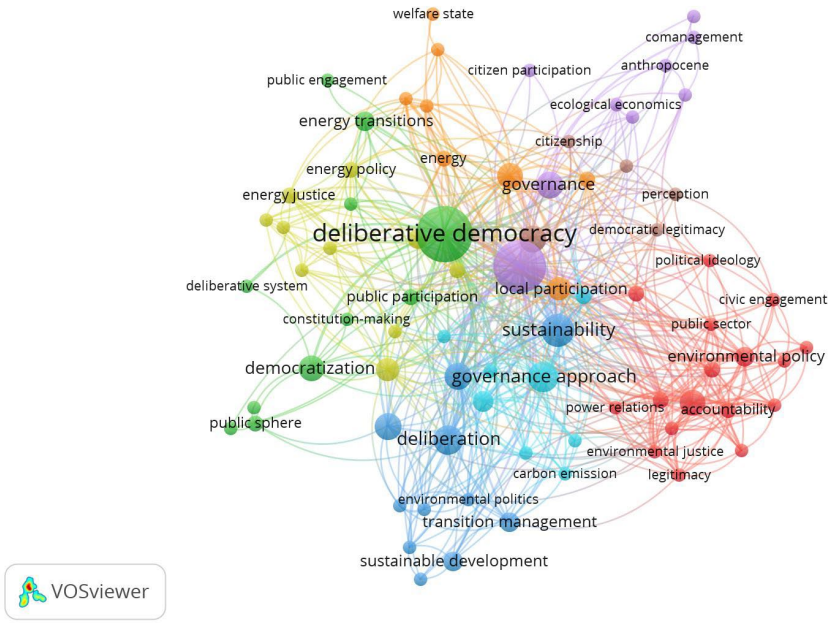


Figure 1. VOS viewer Model

Cluster 1: Governance and Environmental Policy

The first cluster focuses on governance and policy frameworks critical for addressing climate change and environmental challenges. Central concepts include "climate change," "climate policy," and "environmental justice," surrounded by terms like "accountability," "civic engagement," and "advocacy," which emphasize public participation and transparency. The link between "climate governance" and "institutional framework" highlights the need for strong structures to implement policies effectively. Terms like "just transition," "legitimacy," and "public conflict" point to balancing diverse interests and mitigating social impacts, while connections to "political ideology," "power relations," and "public sector" reveal the influence of political contexts on environmental policy.

Cluster 2: Democratic Processes and Public Engagement

The second cluster centers on the democratic processes and public engagement mechanisms critical to policy-making and managing transitions. The terms "deliberative democracy," "deliberative system," and "deliberative theory" are prominent, reflecting the importance of reasoned discourse in shaping policy. This cluster is tightly linked to "public engagement" and "public participation," highlighting the role of citizens in decision-making. The term "energy transition" serves as a bridge to the first cluster, while "Constitution-making" and "democratization" extend the discussion to broader political changes.Finally, "Habermas" anchors the cluster in theoretical foundations of the public sphere.

Cluster 3: Decision-Making and Governance Processes

The third cluster centers on decision-making mechanisms and governance structures essential for advancing sustainability and addressing environmental challenges. Key terms like "civil society" and "communication" highlight the role of non-governmental actors and information exchange, while "decentralization" and "decision making" emphasize power distribution and inclusive dialogue. The cluster's connection to "environmental politics" and "reform process" points to the need for systemic change, with "sustainability" and "sustainable development" as overarching themes linking to broader discussions on long-term environmental health and equity.

Cluster 4: Democratic Practices and Energy Issues

The fourth cluster delves into the intersection of democratic practices and energy-related challenges, with a focus on both the crisis of democracy and the transition to sustainable energy systems. The term "crisis of democracy" suggests concerns about the effectiveness of democratic institutions, which is critical for the successful implementation of "energy policy and transition". "Energy justice" is a key concept, highlighting the need for equitable distribution of energy resources and benefits. It also includes "local government" and "participation," emphasizing the role of local governance and citizen involvement. The term "modernization" reflects broader societal changes accompanying energy policy reforms.

Cluster 5: Governance and the Anthropocene

The fifth cluster explores governance in the context of the Anthropocene, an epoch characterized by significant human impact on the environment. Central terms like "democracy" and "citizen participation" underscore the importance of inclusive governance. The terms "co-management" and "governance" suggest collaborative approaches to managing resources, while "expertise" and "ecological economics" highlight the integration of scientific and economic considerations. The cluster also incorporates "cultural politics" and "social theory," linking governance practices to broader socio-cultural dynamics.

Cluster 6: Sustainable Development and Carbon Emissions

The sixth cluster is centered on sustainability transitions and the critical role of reducing carbon emissions. Key terms include "carbon emissions," "sustainability transition," "food system transformation," and "transportation policy," which represent the various sectors requiring systemic change to achieve sustainability goals. "Innovation" is highlighted as a driving force behind these transitions, while "governance" and "urban climate" emphasize the need for effective policies and adaptations at multiple levels of government.

Cluster 7: Democratic Engagement and Energy Planning

The seventh cluster emphasizes the role of democratic engagement in shaping sustainable energy policies. The terms "energy planning," "local participation," and "democratic participation" are central, reflecting the need for inclusive decision-making processes in energy governance. This cluster is linked to the concept of the "welfare state," suggesting that energy policies should promote social well-being and equity.

Cluster 8: Citizenship and Democratic Legitimacy

The eighth cluster focuses on the relationship between citizenship, democratic legitimacy, and participatory governance. The terms "citizenship," "democratic legitimacy," and "participatory governance" are central, highlighting the importance of public involvement in legitimizing governance processes. The inclusion of "democratic transition" and "perception" suggests a focus on how changes in political systems and public perception influence the effectiveness of democratic governance.

7. Conclusion

In conclusion, this study underscores the importance of deliberative democracy in achieving just energy transitions through inclusive public engagement. The case studies show that while these models can enhance participation and influence policy, their success depends on thoughtful design, sufficient resources, and managing power dynamics. Integrating these models into decision-making processes is key to developing policies that promote social justice and sustainability. The bibliometric analysis further reveals the links between governance, democratic engagement, and environmental policy, highlighting the challenges and opportunities in pursuing equitable and sustainable energy transitions. Future research should focus on exploring innovative deliberative mechanisms that can better address these complexities, especially in diverse socio-political contexts. Additionally, there is a need to investigate how deliberative democracy and just transition principles can be more effectively intertwined to ensure that energy transitions are not only environmentally sustainable but also socially equitable. By bridging these concepts, future studies can contribute to a more integrated framework for understanding and implementing just energy transitions that are participatory, fair, and aligned with long-term sustainability goals.

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(NON) ETHICAL ASPECTS IN WRITING SCIENTIFIC PAPERS WITH THE HELP OF ARTIFICIAL INTELLIGENCE

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Abstract

This paper explores the use of artificial intelligence, specifically ChatGPT, among economics PhD students across all years of study at public universities in North Macedonia. Artificial intelligence is beginning to significantly reshape higher education, profoundly influencing both work and study methods. The paper employs descriptive analysis and synthesis, including a survey conducted by the author. It examines the use of ChatGPT by PhD students at public universities in the country, focusing on their usage patterns and ethical concerns.
Doctoral students in North Macedonia extensively use AI and ChatGPT. They are proficient in operating these tools and leverage the platform to assist with their research and studies. Regarding the ethical implications of using such applications, most students believe that ethical use largely depends on the individual. The majority of students are mindful of ethical standards when writing and publishing their papers.

Keywords: Scientific Papers, ChatGPT, PhD students

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1. Introduction

The educational process is dynamic, evolving in response to changing study needs and the surrounding circumstances. Over time, education has constantly transformed, and we are now witnessing changes in the educational process. Artificial intelligence is fundamentally altering the ways we learn, solve problems, and help in the teaching process in higher education. Since the term "artificial intelligence" was first used in the mid-20th century, it has undergone significant changes. Today, artificial intelligence is increasingly present in universities, assisting with various processes such as facilitating education, solving problems, providing 24/7 support, and offering vast amounts of information. Besides its role in scientific disciplines, it also greatly benefits the arts, creative industries, and medicine. One of the tools of artificial intelligence, ChatGPT, directly engages with all stakeholders in the educational process. This tool can significantly and accurately assist students in their educational journey. According to some researchers, the platform also yields good results in learning foreign languages, which can be highly beneficial. My survey indicated that many doctoral students occasionally use the ChatGPT platform for writing scientific papers, learning, and problem-solving. In terms of ethics, a significant number of students believe that there is a need for regulatory ethical norms regarding the use of artificial intelligence.

2. Literature review

Artificial intelligence plays a major role in the process of higher education and changes the way and process of learning. Computer scientist John McCarthy and colleagues first coined the term artificial intelligence in 1956 at a conference in Dortmund. (McCarthy J, et.al, 1956) According to Mannury 2023, the potential of artificial intelligence is huge and plays a big role in the educational process of the current generations, and with a high probability that it will remain so in the future. AI has the capacity to enhance interpersonal communication and the availability of information and this could represent a positive impact on individuals in higher education. In his 2020 research, Houde also claims that artificial intelligence contributes a lot to creative industries in addition to standard sciences. One of the tools that has revolutionized AI is the ChatGPT platform. According to Encyclopedia Britannica “GPT (Generative Pre-training Transformer), which is a type of neural network designed for natural language processing tasks, ChatGPT says its primary goal "is to generate human-like text that can be used for a variety of applications, such as chatbots, automated content creation, and language translation." ChatGPT as an AI tool can help with academic writing and research. It has the ability to generate paper summaries, extract key points, and even provide citations. Additionally, ChatGPT-3 has the

ability to understand and respond to complex instructions, making it an effective teaching and learning tool. (Konstantis, 2023) It can be used as a tool to aid academic writing, rather than replace it. In addition, the output generated by ChatGPT-3 should be fact-checked and reviewed by the user, as it is not always 100% accurate. (Aljanabi, 2023) However, with the development of artificial intelligence, it is necessary to pay attention to ethics in the work with its application. According to Resnik 2019, in every domain of work ethical principles such as honesty, objectivity, integrity, vigilance, openness, respect for intellectual property, confidentiality, and responsible publication must be respected.

3. What is artificial intelligence?

Artificial Intelligence (AI) is playing a huge role in the development level in this decade and is used in a very wide variety of fields, such as financial markets, the banking sector, supply chains, education, manufacturing, commerce, and healthcare. Artificial intelligence is also a major enabler of many business innovations and is becoming commonplace in business, academia, and people's lives. In the simplest explanation, it is used in Google's web searches, recommendations for various content by Netflix, ads on Instagram and Facebook, and so on. Artificial intelligence is the branch of computer science that deals with building smart machines capable of performing tasks that normally require human intelligence. In addition to these capabilities, some applications of artificial intelligence include automated interfaces for visual perception, speech recognition, decision-making, and translation between languages. Artificial intelligence belongs to the group of interdisciplinary sciences. (Geron A, 2017)

The term artificial intelligence was first used by computer scientist John McCarthy and colleagues in 1956. (McCarthy J, et.al, 1956) Prior to this, work in the field of artificial intelligence included the Turing Test proposed by Alan Turing as a measure of machine intelligence and a chess-playing program written by Dietrich Prinz. (Computer History Museum. Mountain View, California) Artificial intelligence is a broad field of study that includes many theories, methods, and technologies, as well as the following major subfields: (Valavanidis, 2023) Machine learning, Neural Networks, Deep Learning, Computer vision, and Natural language processing. Many researchers argue about the potential for job replacement opportunities and how the change itself will affect the labor market. Artificial intelligence has great potential to revolutionize employment opportunities by tackling language barriers, improving digital literacy, and automating tasks (Lund BD, 2023). On the other hand, some downsides may be caused by artificial intelligence such as job automation and targeted demand for certain skilled positions. Understanding these dynamics is essential in harnessing the benefits of generative artificial intelligence while

mitigating potential employment challenges in developing countries (Manuru et.al 2023).

3.1 The Role of Artificial Intelligence in Higher Education

Since the beginning of the 21st century, Artificial Intelligence has begun to penetrate higher education through learning management systems. (Lin& Chen, 2024)

With the passage of time and technological progress, its use has changed and improved. To a large extent, AI has helped both students and lecturers. In the late 2010s, higher education institutions began using analytics to identify students at risk of dropping out or falling behind (Seidel & Kutieleh, 2017). AI models analyze data such as attendance, grades, and engagement to support early interventions, allowing professors and technical staff to provide support to students who are struggling in their studies. (Shilbayeh & Abonamah, 2021). During the pandemic years at the beginning of 2020, Artificial Intelligence has increased its influence and importance in the work of higher education institutions and the higher education process even more. During this period, a large part of the teaching processes also changed, so online lectures and exercises became a reality at all Universities. The potential of artificial intelligence is huge and plays a big role in the educational process of the current generations, and with a high probability it will remain so in the future. AI can enhance interpersonal communication and can improve the availability of information. This process has a positive impact on individuals in higher education.

Artificial intelligence can help with a variety of tasks in higher education such as communication, curriculum, writing, and administrative work. It can also contribute to writing, facilitating personal learning experiences, enhancing research capabilities, improving available learning opportunities, and optimizing assessment, scheduling, and enrollment processes. One of the examples is the application Wordtune as well as Grammarly, which helps authors when writing in English. (Manury, 2023)

Artificial intelligence has the potential to enhance writing by providing automated suggestions to improve word choice, sentence structure, flow, and overall text coherence. Additionally, AI is increasingly utilized in the corporate sector, particularly in customer service and support. By analyzing large datasets of text, AI can identify patterns and relationships between words and phrases, allowing it to offer informed suggestions to improve writing quality. AI is also valuable in the fine arts, including art academies and design, and plays a significant role in the creative industry, such as architectural design. One of its powerful capabilities is generating images from the past and providing high-

quality speech solutions for individuals with severe communication disabilities. (Houde et al., 2020; Qadir, 2022) (Houde S, 2020) Artificial intelligence has a wide application in the educational process and certainly plays a big role in several stages in higher education. Figure 1 shows the segments in which artificial intelligence is used.

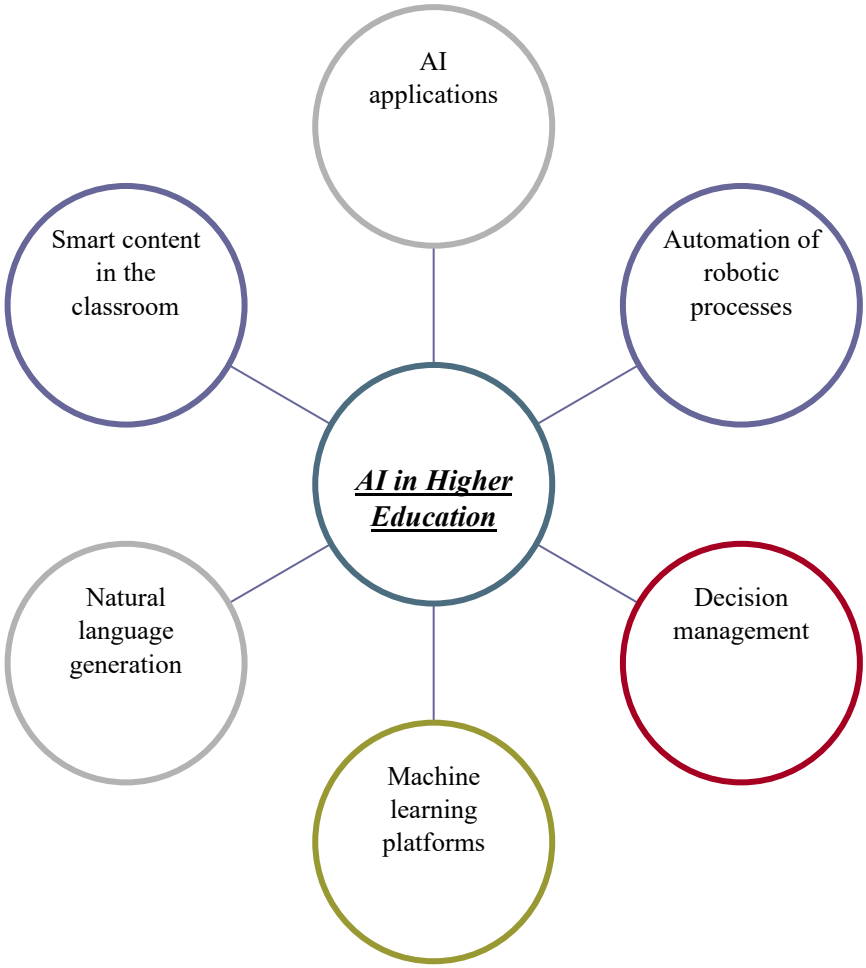


Figure 1
Author: Netragainkar, 2024

According to Netragainker, Artificial Intelligence in higher education is mostly used in several segments namely AI Applications, Robotic Process Automation, Decision Management, Machine Learning Platforms, Natural Language Generation, Smart Content in a classroom, as presented in the scretch. Many authors agree that artificial intelligence in higher education plays a positive role. According to a study by Chaika 2023, the integration of artificial intelligence (AI) in education can be seen as a powerful driver and great potential from various aspects, both in the teaching and learning areas. It is also possible to

notice a great influence of AI on the strengthening of student engagement, data collection and analysis of teaching and administrative purposes. In the study of the role of AI in higher education, it is also stated that the students have a great benefit in the process of their education. AI systems adapt to individual learning styles, and tools can be used to advance their work and understanding of tasks, and facilitating their learning process. It should also be taken into consideration that AI-based virtual teaching, as well as chatbots, can greatly assist students in obtaining information and assistance with their assignments. (Chaika,2023) AI-powered chatbots offer accurate and precise answers to student questions and shorten administrative procedures. (Chaika, 2023)

4. ChatGPT as part of artificial intelligence and its application in higher education

If we consult the ChatGPT platform about what ChatGPT is, we will get the following answer: ChatGPT is a natural language processing model that is trained to generate text responses based on input text messages. This technology is used to create conversational agents, automatic text generators, chat assistants, and other applications that involve human interaction through natural language. As part of AI, ChatGPT can analyze and generate text, making it part of the general field of natural language processing in artificial intelligence. (ChatGPT 3.5) ChatGPT, is software that allows the user to ask questions using conversational or natural language. It was released on November 30, 2022 by the American company OpenAI and almost immediately caused concern among the public, journalists and others over concerns that it was impossible to distinguish human-generated text from ChatGPT. Language models produce text based on the probability that a word will appear based on the previous words in the sequence. By being trained on about 45 terabytes of text from the Internet, the GPT-3 language model used by ChatGPT calculates that some sequences of words are more likely to occur than others. ChatGPT calls itself a "language model developed by OpenAI, a leading artificial intelligence research lab." The model is based on the GPT (Generative Pre-training Transformer) architecture, which is a type of neural network designed for natural language processing tasks. ChatGPT says its primary goal "is to generate human-like text that can be used for a variety of applications, such as chatbots, automated content creation, and language translation." (Britannica, 2023) ChatGPT as an AI tool can help with academic writing and research. It has the ability to generate paper summaries, extract key points and even provide citations. These things can be an advantage and save considerable time and effort to the researchers themselves. ChatGPT-3 is capable of generating text for a variety of academic documents, including research papers, essays, and dissertations. It can also provide feedback on grammar, style, and coherence, assisting writers in improving their work. Additionally, ChatGPT-3 is

adept at understanding and responding to complex instructions, making it a valuable tool for teaching and learning. For instance, it can help students comprehend and summarize challenging texts, as well as generate prompts for writing assignments. However, it is important to recognize that ChatGPT-3 is not a replacement for human intelligence and creativity. It should be utilized as an aid in academic writing, not as a substitute. Moreover, the content generated by ChatGPT-3 should be fact-checked and reviewed by the user, as it may not always be entirely 100% accurate. (Aljanabi, 2023)

5. The Ethics in Scientific Research Work

The primary intention in ethical research, when discussing the definition of the term "ethics," is to be guided by the general belief that it pertains to ethos/ēthos, that is, what relates to ethos/ēthos. This raises the question of what exactly these two terms signify and what their place and role are in the process of constructing the term "ethics." (Donev, 2019) (Ethics Handbook, UKIM) Just as in everyday aspects of ethics, in science and scientific research, it plays a significant role. In the context of research, the importance of ethics cannot be overstated, which is why many professional associations, government bodies, and academic institutions have established detailed codes, rules, and policies to ensure ethical conduct. Government agencies like the National Institutes of Health (NIH), the National Science Foundation (NSF), the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and the U.S. Department of Agriculture (USDA) have implemented ethical guidelines that funded researchers must follow. Additionally, other critical ethical frameworks have been developed by influential organizations, including the International Committee of Medical Journal Editors, the American Chemical Society, the American Society for Clinical Laboratory Science, the American Psychological Association, the American Anthropological Association, and the American Association of University Professors. Foundational documents such as the Nuremberg Code and the Declaration of Helsinki also guide ethical practices in research (Resnik, 2007).

Resnik identifies key principles that should govern scientific research: honesty, objectivity, integrity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication, responsible mentoring, respect for colleagues, social responsibility, non-discrimination, competence, legality, care for animals, and the protection of human subjects.

Ethics is essential in all work environments, particularly in academia and scientific research. For any profession aiming to maintain its professional status, five key dimensions are crucial (Hodzic, 2005):

- The development of core theories and techniques that form a cohesive, systematic whole.

- The monopoly on specialized expertise within the field.
- The profession's recognition and reputation in the public sphere.
- The level of organization within the profession.
- The development of professional ethics.

Professional ethics is vital to a profession as it addresses the moral aspects of work, explaining the importance of the relevant activities and advocating for the general norms of work ethics. It highlights the ethical significance of specific tasks, their benefit to society, and the integration of these tasks into broader human actions. Professional ethics also emphasizes the professional's responsibility to perform their duties well, addresses the ethical challenges inherent in the work, and underlines the need for quality and ethical conduct in professional activities (Temkov, 2007).

6. Analysis of the Surveys from the Survey Research

This survey questionnaire was sent to doctoral students at public universities in the Republic of North Macedonia pursuing doctorates in the field of economic sciences. The questionnaire was distributed to the universities and provided to the students. The questionnaire consists of closed, combined, and open-ended questions. The purpose of this research is to analyze, through a survey, the impact of artificial intelligence via the ChatGPT application on ethics in scientific research, to explain the risks, advantages, and disadvantages of its use. The most commonly used methods for data collection in qualitative research include document analysis, conducting interviews, and focus groups with respondents (Burnard et al., 2008), and some of these techniques were also employed in this specific case study. The research was conducted with full assurance of the respondents' anonymity and the confidentiality of their data. The research consisted of 12 questions, of which one was open-ended, one was combined, and 10 were closed-ended with predefined answers. The 12th question offered a Likert scale for ranking five possible options, ranging from least to most. In the analysis below, we will examine the responses and provide information question by question. Although the questionnaire was sent to all of the public Universities only three Universities participated in the research and two of them did not respond to the questionnaire. The largest part of the respondents are from the University of St. Cyril and Methodius from Skopje, i.e. 41.7% of the respondents. Second in terms of the number of responses are the students from the University of St. Kliment Ohridski (38,9%), while in third place are the students from the Goce Delchev University in Shtip (19,4%). No participants from the State University of Tetova or the University of Mother Teresa took part in the survey. Of the active PhD students from the universities that participated in the survey, 88 in total, 51 took part in the survey. In terms of the year, first-year students made

up the smallest group, accounting for 30.6% of the responses. 36,1% of students were in their second year, while 33,3% were in their third year. The third question was regarding the number of papers published by PhD students. Regarding the number of papers indicated by the respondents, most of them or 57% have published only one paper, 35% of students have none, three papers have been published by 2%, six papers have been published by 4%, and ten papers by 2%. In response to the question of whether they have used the ChatGPT application so far, 77.8% of PhD students indicated that they have used the application, while 22.2% stated that they have not used it. However, the majority of PhD students work with the help of this application. The fifth question referred to the students' frequent usage of ChatGPT.

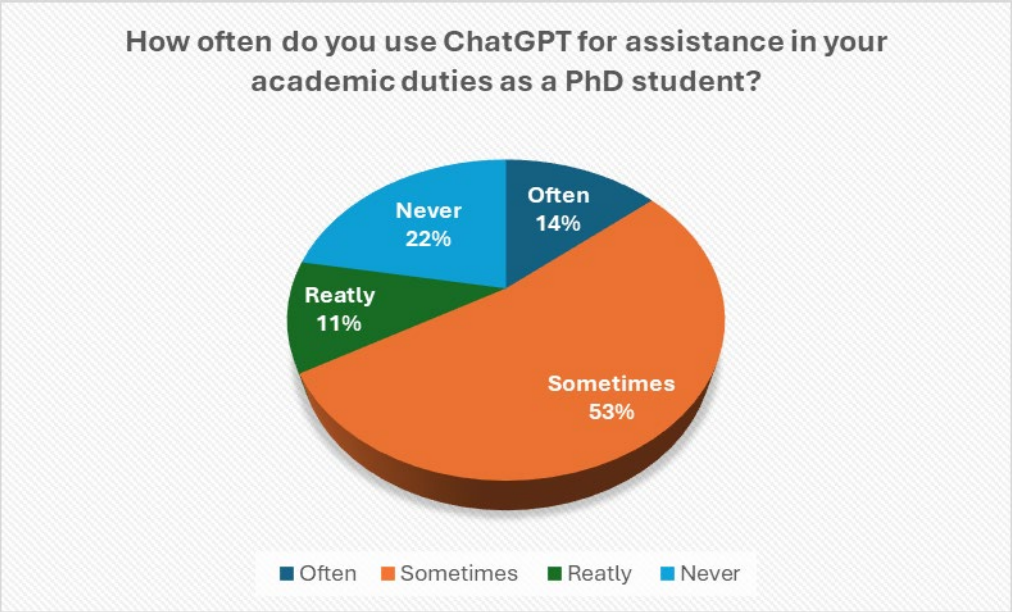


Figure 2

The analysis shows that while ChatGPT is a valuable tool for PhD students, its usage varies widely. Over half of the students use it occasionally, indicating its growing role in academic work. However, a sizable minority of students either rarely or never use it, pointing to potential areas where the tool could be better integrated into academic workflows or where additional training and awareness could be beneficial. Overall, the data suggests a trend toward increased adoption but also highlights the diverse approaches students take in leveraging technology for their studies.

The sixth question referred to the specific academic duties for which students most often used the ChatGPT application. 35.3% of them responded that they used it for research and literature analysis, while the majority, 38% of respondents, indicated that they used it for solving academic tasks. Only 8%

reported using the application to assist in writing scientific papers. 32.4% of students stated that they used ChatGPT to generate ideas and concepts. Since this question was also semi-open, allowing respondents to add their own answers, one of the participants indicated that they use the application to improve their English language skills. The remaining students stated that they did not use this application.

Regarding how familiar the students are with the ethical aspects of writing scientific papers with the help of artificial intelligence, which was the seventh question, 58.8% of respondents indicated that they have only partial information. 35.3% of students were uninformed about the ethical aspects, while the remaining students stated that they were sufficiently informed.

PhD students share the general belief that they pay attention to ethics in writing during their research work.

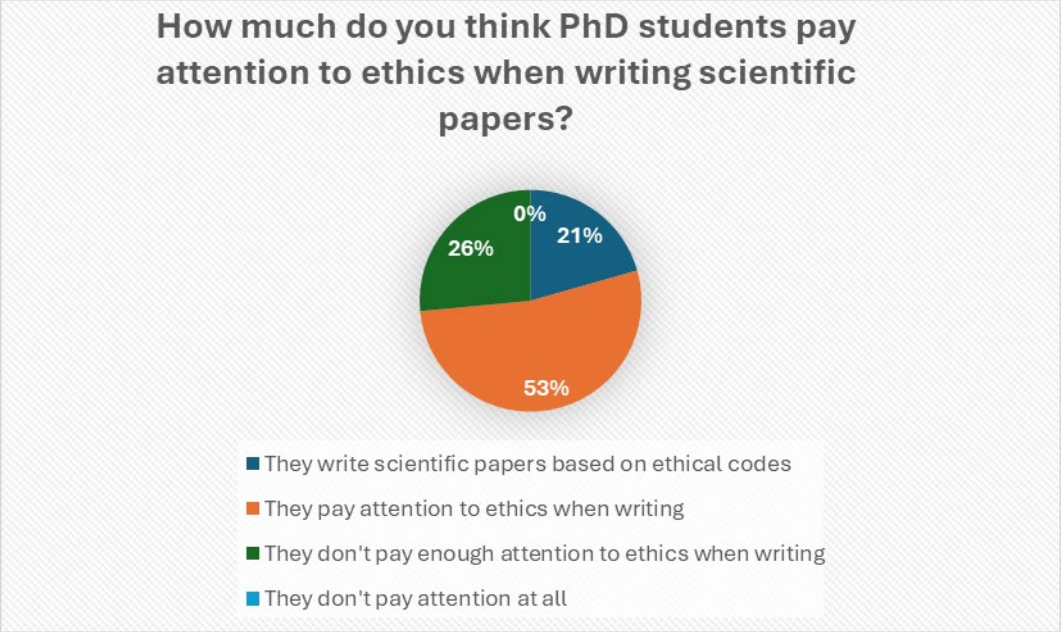


Figure 3

The analysis reveals that most PhD students are mindful of ethics in their scientific writing. However, 26.5% feel they don't focus on it as much as they should. This highlights a need for enhanced ethical training and awareness to ensure that all students fully understand and consistently apply ethical principles in their research. While it's positive that no students entirely disregard ethics, the significant number who feel they could improve suggests there's still work to be done in promoting a strong culture of ethical standards in academic writing.

In response to the question about how often you pay attention to ethical codes when writing, the majority of students (71.8%) indicated that they pay significant attention to their writing. Meanwhile, 25.3% of students reported paying less

attention. Additionally, 2.9% admitted to paying even less attention, while none of the students stated that they did not pay attention at all.

Figure 4 shows the opinion of the students regarding the assessment of the application of artificial intelligence in writing scientific papers from an ethical perspective.

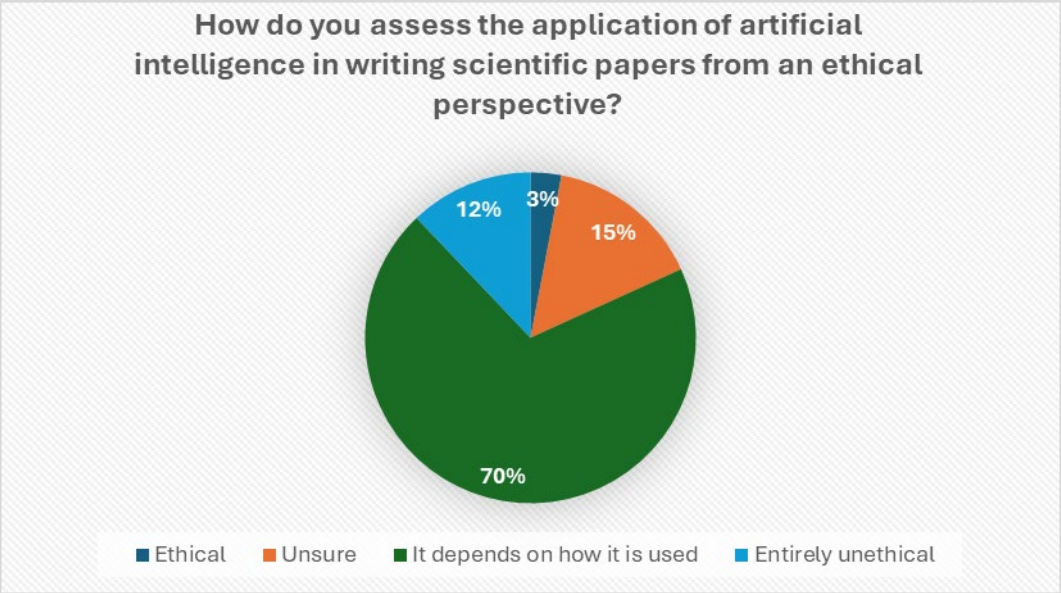


Figure 4

The survey results reveal a nuanced view on the ethical implications of using artificial intelligence in writing scientific papers:

A small percentage of respondents (3.00%) consider the application of AI in this context to be ethical. This indicates that only a few view AI as inherently compatible with ethical research practices.

A significant portion (15.20%) remains unsure about the ethical aspects of AI usage, suggesting a level of uncertainty or lack of clear guidelines on this issue.

The majority (69.70%) believe that the ethicality of AI in scientific writing depends on how it is used. This highlights the importance of context and application in determining whether AI practices align with ethical standards.

Lastly, 12.10% view the use of AI in this context as entirely unethical, reflecting concerns about potential ethical breaches or misuse.

Overall, the results indicate that while a substantial number of respondents are open to AI's ethical use depending on its application, there is still a notable divide in opinions, with some expressing clear concerns about its ethical implications.

The following question asked whether you believe there should be regulations or ethical standards to govern and oversee the use of artificial intelligence in writing scientific papers the results were as follows. The majority of students, or 68.6%, believe that there should be regulations and ethical standards to control and regulate the activities of artificial intelligence in writing scientific papers.

8.6% of respondents answered that they do not think such regulations are necessary, while 22.9% of doctoral students were uncertain in their responses.

Regarding the final question, "Which part do you pay the most attention to when writing papers from the given options?", the results were as follows.

The question utilized a scale from 1, representing the lowest value, to 5, representing the highest, with 2 indicating a poor rating, 3 a neutral or fair rating, and 4 a good rating.

From the collected responses, we can conclude that doctoral students focus the least on non-discrimination, with six respondents rating it as 1. Citation, however, is considered quite important by doctoral students, with 39 respondents giving it a rating of 5. The lowest value for citation was a rating of 2, with two respondents indicating this. Regarding research methodology, 23 students stated that they assign the highest importance to this aspect, while one respondent rated it a 2. Copyright is a segment where the majority of doctoral students gave a rating of 2, with a total of 3 respondents. Additionally, 8 students gave a rating of 3, which was the most common rating for this aspect.

7. Conclusion

Artificial intelligence plays a significant role in the educational process, particularly impacting higher education and research. AI has the potential to enhance interpersonal communication and the accessibility of information, which could positively influence individuals in higher education. One of the most prominent AI-based tools is ChatGPT. As an AI tool, it can assist in academic writing and research by generating paper summaries, extracting key points, and even providing citations. These capabilities can be advantageous, saving researchers considerable time and effort. However, the development of AI also raises the question of ethical research practices. Ethics is crucial in any work environment and must be carefully considered, especially in academic and scientific research.

-The survey, which included three state universities and responses from 51 doctoral students—most of whom were from "Saints Cyril and Methodius University"—found that most respondents have occasionally used the ChatGPT tool. A significant percentage of respondents also agreed that they pay close attention to ethics in their writing. The surveyed doctoral students agreed that the ethicality of research depends on how the tool is used. A substantial portion, or 68% of respondents, agreed that ethical standards are necessary for the use of artificial intelligence in writing scientific papers. Citation, research methodology, and copyright were rated highest as the areas where doctoral students focus most in the research process.

To ensure the ethical use of AI in scientific writing, it is essential for universities, educators, and researchers to establish clear guidelines and training programs that emphasize responsible AI practices. AI-generated content should be critically evaluated, and proper citations must be given to maintain academic integrity. Institutions should establish protocols that define acceptable practices for AI usage, including transparency in how AI tools contribute to the writing process. Furthermore, fostering an awareness of the ethical implications of AI will help researchers make informed decisions that uphold the credibility and authenticity of their work. Ethical considerations should be an integral part of research methodology, including a focus on accuracy, originality, and respect for intellectual property rights. By integrating these practices, the academic community can harness the benefits of AI while upholding the highest standards of ethical research.

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THE NEXUS BETWEEN INEQUALITY AND ECONOMIC GROWTH IN EUROPEAN TRANSITION COUNTRIES

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Abstract

The main objective of this paper is to empirically investigate the impact of income inequality on economic growth and its determinants in transition countries (Albania, Kosovo, Serbia, Hungary, Estonia, Czech Republic, Poland, Russia, and North Macedonia) during the period 2000-2020. This research employs econometric methods, including Ordinary Least Squares (OLS) with robust standard errors, random and fixed effects models, and the Hausman-Taylor model with instrumental variables (IV). The findings from this empirical research highlight two key conclusions: first, that reducing income inequality positively influences economic growth; and second, that subsidies and transfers play a crucial role in decreasing income inequality, which in turn fosters economic growth in transition countries.

Keywords: Gini index, economic growth, subsidies and transfers

JEL: B41, D63, H20

1. Introduction

Recent research investigates the relationship between inequality and economic growth (Aghion et al. 1999; Brueckner and Lederman 2018; Mo 2003; Quintana and Royuela2014; Bouincha and Karim 2018; Kennedy et al. 2017). However, most of this research claims that inequality hasa negative effect on economic growth. Conversely, some researchers suggest that inequality may have positive or ambiguous effects on growth (Forbes 2000; Chen 2003; Barro 2000; Rauch 1993). Barro (2000) analyzes the impact of inequality on economic growth in various contexts and suggests that inequality might have positive effects in the short run by stimulating investments and innovations among individuals and entrepreneurs motivated to improve their positions. Rauch (1993) argues that a moderate level of inequality could contribute to the enhancement of human capital

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and b Xts7hryg$%Rnsive analysis: Does the reduction of income inequality have a positive effect on economic growth in transition countries? Does subsidies and transfers positively influence the reduction of the Gini indexin transition economies? By answering these questions, the study seeks to offer insights into how reducing inequality and implementing specific policies like subsidies and transfers can impact economic growth, providing information for policy-making in transition economies.Utilizing econometric methods such as Ordinary Least Squares (OLS) with robust standard errors, random and fixed effects models, and the Hausman-Taylor model with instrumental variables (IV), the research aims to shed light on the dynamics between income inequality and economic growth.The contribution of the paper is that there are only few studies that assess the effect of inequality on economic growth, using Hausman Taylor IV in the transition countries: Albania, Kosovo, Serbia, Hungary, Estonia, Czech Republic, Poland, Russia, and North Macedonia from 2000 to 2022. The data, for this paper, have been collected from World Bank, Standardized World Income Inequality Database (SWIID).

The remaining sections of the study are organized as follows: section 2 reviews relevant literature; section 3 discusses the research methodology and data; section 4 presents the findings and a discussion; and section 5 concludes.

2. Literature Review

A considerable body of research examines the intricate relationship between income inequality and economic growth, offering a range of insights and perspectives.Aghionet al. (1999) investigate the dual effects of income inequality on economic growth. They find that while income inequality generally has a negative impact on growth, redistributive policies can enhance economic performance. Additionally, they explore how growth may worsen income disparities among different educational groups.Mdingiand Ho (2021) identify that the relationship between income inequality and economic growth can be positive, negative, or ambiguous, depending on the model employed. Their findings indicate that some models show a positive link, others an ambiguous effect, and a few suggest a negative relationship. Brueckner and Lederman (2018) highlight a differentiated impact of income inequality on growth. Their research reveals that increased income disparity promotes transitional growth in low-income countries, while it significantly impedes growth in high-income countries. They estimate that a one percentage point increase in the Gini coefficient could reduce GDP per capita growth by over one percentage point within a five-year period for the median country, with a long-term impact of approximately -5%. Mo (2003), Quintana (2014) find a substantial negative effect of income inequality on GDP growth rates, particularly in developing countries. They note that while agglomeration processes can spur growth, high levels of inequality can undermine these benefits. Bouincha and Karim (2018) demonstrate a statistically significant negative relationship between economic growth and inequality in developed countries, reinforcing the adverse effects of inequality on growth.

Barro (2000) explores how inequality can both stimulate and hinder economic growth. He references the Kuznets Curve, which suggests that inequality initially rises during early development stages but decreases as economies mature. Supporting this view, Benhabib (2003) shows that growth may initially increase with rising inequality but eventually decline as inequality grows further.Chen (2003) argues that increased inequality can initially boost capital accumulation and efficiency but may later undermine these gains, affected by factors such as human capital, openness, and government consumption. Forbes (2000) finds a robust positive link between rising income inequality and economic growth over the short and medium terms. This association holds across various samples and model specifications.Halter (2014) suggests that while increased inequality may enhance economic performance in the short run, it generally slows GDP growth over the long term. Kennedy et al. (2017) find that inequality has a negative impact on growth over time, consistent with research in the US and Europe. They propose that enhancing human capital could help mitigate this negative impact. Jakob et al. (2018) shows that inequality has a negative effect on growth at lower to moderate levels of financial development, but this effect becomes negligible at higher levels. Piketty (2014) examines the relationship between labor and capital inequality, finding weak or negative correlations in societies with high capital inequality. Wolff and Zacharias (2009) support this by indicating that income from capital often exceeds income from labor.

Stiglitz (2012) analyzes the complex dynamics between inequality and economic outcomes, arguing that income redistribution might be perceived as an unnecessary expense. He also discusses the impact of the 2008 financial crisis on the housing market.Kuhof and Rangiere (2010) highlight that rising inequality exacerbates financial instability by reducing middle-class purchasing power and increasing debt propensity, while wealthy individuals and banks exploit financial systems for profit.Piketty (2014) explores the relationship between labor inequality and capital inequality, finding that the two are often weakly correlated or even negatively correlated in societies where capital inequality is pronounced, allowing capital owners to avoid working. When measuring income inequality, capital inequality consistently proves to be more severe than labor inequality. Empirical analysis shows that in societies with relatively low labor income inequality, the top 10% of earners receive about 25% of labor income, the bottom 50% or working class receive around 30%, and the middle 40% receive about 45%. The Gini coefficient for such societies is 0.26. In contrast, in societies with significant capital ownership inequality, the wealthiest 10% control about 60% of wealth, the bottom 50% own roughly 5%, and the middle 40% hold about 35%. The Gini coefficient in these societies is 0.67. This indicates that inequality remains substantial even in theoretical ideal societies.

3. Research Methodology and Data

The estimated empirical model is analyzed in order to investigate the relationship between Gini index on economic growth in European transition countries. Since the best estimator could be provided by Hausman Taylor IV, we

choose to use this approach in our research.Lambert and Decoster (2005) discuss in detail the dimensions and applications of the Gini coefficient, one of the most popular and often-used measures of inequality.Ao (2009) explains that the Hausman-Taylor (1981) model employs a mixed approach to address the need for including time-invariant variables and accounting for unobserved individual differences. This approach combines aspects of both fixed and random effects, offering a hybrid solution.

In this section, we examine how other variables influence the Gini coefficient, while below we present GDP as the dependent variable, with the other variables being independent.Below is the Hausman-Taylor empirical model specification:

$$Yit = c + \beta 1(Yit - 1) + B2\,(Growth_Rateit) + \beta 3(Sub_Tr.it) + \beta 4(Gov_Expit) + \beta 5(Corrupti_Indexit) + \beta 6(Consump_coefit) + \beta 7(Public_Revit) + uit$$

The dependent variable, denoted as Yit, is the Gini coefficientfor each county i and t represent the years, c is the constant term. The explanatory variables include GDP per capita, subsidies and transfers, government spending, public revenues, consumption expenditure, and the corruption index, while uitrepresents exogenous disturbances.The second model, with GDP as the dependent variable, follows the Hausman-Taylor empirical model specification:

$$Yit = c + \beta 1(Yit - 1) + B2\,(Gini_index\ it) + \beta 3(Sub_Tr.it) + \beta 4(Gov_Expit) + \beta 5(Corrupti_Indexit) + \beta 6(Consump_coefit) + \beta 7(Public_Revit) + uit$$

The dependent variable, denoted as $\boldsymbol{Yit}$, is GDP per capita. The explanatory variables include the Gini coefficient, subsidies and transfers, government spending, public revenues, consumption expenditure, and the corruption index.

The variables that are part of the empirical model's statistical data are described by the descriptive statistics. The public revenues, government expenditures, consumption expenditure, subsidies and transfers, GDP per capita, and the corruption index are the independent variables, whereas the GINI index is the dependent variable.The sample consists of 90 observations, and table I displays the mean, standard deviation, minimum and maximum values.

Table:1 Summary statistics

Variable	Observations	Mean	SD	Min	Max
Gini	90	32.35778	5.303868	26	44.1
Cons	90	64.75813	14.12746	46.3269	90.46334
GovExp	90	17.85189	2.932144	10.13493	22.45116
PublicR	90	21.59096	7.436287	10.94278	42.85
SubTRans	90	51.73235	15.32375	19.55294	76.66972
TotalExp	90	33.43062	6.395292	18.91544	46.75614
GDPgrowth	90	2.581111	3.712447	-14.7	10.3

Source: Author's calculation

4. Empirical Results

Table 2 employs a variety of econometric approaches in European countries in transition(Albania, Kosovo, Serbia, Hungary, Estonia, Czech Republic, Poland, Russia, and North Macedonia).

Our analysis concludes that an increase in subsidies will lead to a 0.13% decrease in the Gini coefficient c.p.. Given that the standard error of this coefficient is less than 0.05, the result is statistically significant. This confirms that increasing subsidies and transfers in transition countries has a direct and statistically significant effect on reducing inequality. Furthermore, economic growth is another variable in our econometric model. The regression analysis indicates that a 1% increase in GDP results in a 0.15% decrease in the Gini coefficient, holding other factors constant. This result is also statistically significant, suggesting that economic growth plays a direct role in reducing inequality. Lastly, the reduction of inequality also positively impacts economic growth. This dual effect of inequality reduction and economic growth highlights the importance of policies that address inequality as a strategy for promoting sustainable economic development.

Table 2: Results of regression analysis

Variables	OLS	Fixed effects	Random effects	HausmanTaylor-IV
gini_coef				-.1856211**
				0.017
fconsmp_coef	-.1441836	-.4155313 **	-.422484**	-.3877691**
	0.503	0.019	0.013	0.021
gov_expendgdp	-2.108303***	.2298482	.16047	.1793724
	0.000	0.412	0.556	0.513
subs_and_transf	-.1963023	-.1172821 **	-.1184476 **	-.1340512**
	0.102	0.038	0.031	0.015
growth_rate	-.4187307	-.1377778 **	-.148437 **	-.1549144**
	0.168	0.040	0.022	0.019
corrup_index	-.3310938 ***	-.0844119 **	-.0879617 **	-.0803462**
	0.004	0.045	0.030	0.048
public_revgdp	-.0155794	-.4879105***	-.4567091 **	-.4031934***
	0.952	0.009	0.015	0.009
_cons	131.7857	93.62611	95.54142	114.8435
Observations	86	86	86	86
R-Squared	0.5209			
F	14.32	4.68		
Chi2	N/A	N/A	28.81	45.02
Model	OLS	FE	RE	HT-IV

*Note that the symbols *,**,and *** signify significance at 10%, 5% and 1% respectively.*

Source: Author's calculations

Based on the results of our models, we found that an increase in the Gini index is associated with a 0.513 percent decrease in economic growth. This confirms the hypothesis that reducing inequality has a positive effect on economic growth, indicating that any increase in inequality negatively impacts GDP. Furthermore, our analysis of subsidies and transfers reveals that an increase in these variables results in a 0.189 percent decrease in economic growth, ceteris paribus. It is important to note that subsidies and transfers encompass various forms of social assistance, such as free healthcare, income support for individuals without sufficient means, social protection for the elderly and children, scholarships, and other public expenditures dedicated to social transfers and subsidies. In examining the impact of subsidies on economic growth in transition countries including Albania, Kosovo, Serbia, Hungary, Estonia, Czech Republic, Poland, Russia, and North Macedonia, several concrete analyses illustrate how subsidies have influenced economic performance.

Table 3: Results of regression analysis

Variables	OLS	Fixed effects	Random effects	HausmanTaylor-IV
Growth_rate				-.324184 0.003***
fconsmp_coef	.10001 0.206	.0271279 0.932	.10001 0.203	.0367128 0.872
gov_expendgdp	-.5721311*** 0.001	-1.802646*** 0.000	-.5721311*** 0.001	-1.425911*** 0.000
subs_and_transf	-.0480723 0.280	-.1460599 0.143	-.0480723 0.277	-.1898642** 0.034
Gini_coef	-.0570707 0.168	-.4221238** 0.040	-.0570707 0.164	-.5134185*** 0.001
corrup_index	.0136851 0.756	-.1732761** 0.018	.0136851 0.756	-.1452039** 0.018
public_revgdp	-.1089799 0.252	-.0793218 0.813	-.1089799 0.248	-.1692095 0.408
_cons	17.33255	77.39312	17.33255	85.05302
Observations	86	86	86	86
R-Squared	0.1558			
F	2.43	8.37		
Chi2	N/A	N/A	14.58	47.43
Model	OLS	FE	RE	HT-IV

*Note that the symbols *,**,and *** signify significance at 10%, 5% and 1% respectively.*

Source: Author's calculations

4. Conclusion

This research provides a comprehensive understanding of the relationship between subsidies, economic growth, and economic inequality. Our findings indicate that increasing subsidies and transfers significantly reduces inequality in transition countries. Additionally, the analysis shows that economic growth directly contributes to reducing inequality. Our study supports the hypothesis that reducing inequality has a positive effect on economic growth, aligning with established observations that inequality can hinder economic progress. Furthermore, the impact of subsidies and transfers on economic growth illustrates the complexity of their role in economic development. While intended to support specific sectors, these subsidies can sometimes lead to unintended negative effects, such as inefficiencies and reduced sectoral growth. In examining various transition countries, the research reveals that subsidies, particularly in agriculture and energy, have had mixed outcomes. For instance, subsidies in the agricultural sector have sometimes led to inefficiencies, while energy subsidies have affected

investment and consumption patterns. These effects highlight the need for a balanced and strategic approach to subsidy policies. Overall, the contribution of this paper lies in its empirical analysis of how subsidies and economic growth intersect with inequality. It underscores the importance of designing targeted policies that address economic disparities while promoting sustainable economic development. The insights provided can assist policymakers in transition countries in crafting strategies that balance economic support with the need for effective resource allocation and long-term growth.

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Description of variable

Nr.	Variables	Details	Code
1	Government expenditures	Government expenditures expressed in % GDP	gov_expendgdp
2	Corruption	Index of institutional factors (corruption)	corrup_index
3	Public revenue	Public revenue expressed in % GDP	public_revgdp
4	Subsidies and Transfers	Subsidies and other transfers as % of expenses	subs_and_transf
5	Gini Coefficient Coefficient that measures Inequality gini_coef	Coefficient that measures Inequality	gini_coef
6	Economic growth	Economic growth, GDP per capita growth_rate	growth_rate
7	Consumer price index	Final consumption	fconsmp_coef

Appendix: Countries

No.	**Transition Countries**
1	Albania
2	Kosovo
3	Serbia
4	Macedonia,FYR
5	Hungary
6	Russian F.
7	Czech Republic
8	Poland
9	Estonia

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