International Journal for Quality Research 19(2) 401-416
ISSN 1800-6450

Miroslav Miškić
Bosiljka Srebro
Milan Rašković
Maja Vrbanac
Boris Jevtić[1]

Article info:
Received 01.05.2024.
Accepted 25.11.2024.

DOI – 10.24874/IJQR19.02-03

KEY CHALLENGES HINDERING SMES' FULL BENEFIT FROM DIGITALIZATION - A CASE STUDY FROM SERBIA

Abstract: *The digitization of enterprises, medium-sized and small, stands as a pivotal pathway for their advancements, facilitated by the integration of novel technologies, business paradigms, and market dynamics. This study delves into the ecosystemic factors impeding this digitization journey, stemming from deficiencies in development, accessibility, and investment in connectivity, financial resources, knowledge acquisition, skill enhancement, and regulatory frameworks. In tandem with theoretical deliberations, an empirical investigation was undertaken, encompassing a survey of 264 SME representatives operating within the tourism, travel, and hospitality sectors in Serbia, conducted towards the close of 2023. Their responses to 24 delineated statements concerning the influence of various factors on their enterprises' digitization endeavors were meticulously examined. The outcomes underscore the pervasive underdevelopment of all selected factors, posing substantial obstacles to digitization within these SMEs. Notably, the paucity of knowledge, skills, and financial resources at the national ecosystem level emerged as the foremost impediment. Employing regression analysis, bolstered by appropriate analytical software, enabled the meticulous processing of findings. This research augments scholarly discourse by enriching our comprehension of digitalization dynamics, SME economics, institutionalization trends, consumer behavior economics, and marketing strategies. Moreover, it furnishes pragmatic insights tailored to inform decision-making processes among stakeholders entrenched within this domain.*

Keywords: *SMEs, digitization, ecosystem, connectivity, finance, knowledge, skills, regulations, tourism industry in Serbia.*

1. Introduction

The term "SMEs' ability to benefit from digitalization" refers to the capacity of firms to effectively utilize digital technologies and leverage them to achieve positive outcomes and improvements in various aspects of their business operations, performance, and competitiveness. This includes adopting digital tools, processes, and strategies to enhance productivity, streamline operations, reach new markets, improve customer experiences, and drive innovation.

Digital technologies and platforms utilize and integrate systems, processes, and digital tools to enhance the operations and

[1] Corresponding author: Boris Jevtić
Email: boris.jevtic10@gmail.com

competitiveness of businesses. This includes the adoption of technologies like cloud computing, data analytics, artificial intelligence, etc., and the transition towards digital business models and strategies. Regionally, the theme studied piques the author's interest in the context of digital platforms in the USA, Ahsan & Musteen, 2021; On the digital transformation of businesses in Italy, Fossen & Sorgner, 2021; On digital technologies context, the work of Elia, Margherita., & Passiante, 2020; and Secundo, Rippa & Cerchione, 2020; On the development of the private sector in Serbia and digitization, Radović-Marković, Grozdanić, & Jevtić, 2017; Miletić & Ćurčić, 2021; Rašković,Vrbanac, & Jevtić, 2024; Jevtić & Srebro, 2024; Grozdanic, Radovic-Markovic & Jevtic, 2012; Vrbanac et al., 2023). It notes that most studies have been carried out in the Americas and Asia, followed by Europe and Africa. The significance of digital transformation in SMEs cannot be overstated, considering that small and medium enterprises constitute over 70% of the global economy and a staggering 98% in Serbia alone. This underscores their importance for the growth and fostering of employment in both national and global economies (Kraus et al., 2018).

Digital technologies are revolutionizing the landscape of SMEs in the tourism and hospitality industries. Among these, artificial intelligence (AI) stands out, offering solutions such as AI-powered chatbots for instant customer support, dynamic pricing models for revenue management, and predictive maintenance for operational efficiency. Additionally, smart technologies play a pivotal role, enabling organizations to streamline operations and enhance guest experiences. IoT technology connects devices for real-time data collection, while AR and VR applications offer immersive virtual experiences. Other tools like CRM systems, BI tools, and ICT technologies like online booking platforms and digital marketing further contribute to digitalization efforts, empowering organizations to meet the evolving needs of travelers and stay competitive in the market. Interoperable technologies facilitate integration and collaboration with various systems and platforms (Buhalis, 2020). Commonly implemented in tourism and hospitality organizations, these technologies include Application Programming Interfaces (APIs), Middleware Solutions, Open Data Standards, Universal Payment Gateways, Semantic Web Technologies, Blockchain Technology, Cross-Platform Compatibility, Collaborative Platforms, and Marketplaces. Additionally, machine learning algorithms enhance functionality and efficiency in data processing and decision-making processes (Buhalis & Sinarta, 2019). Ambient Intelligence Tourism, expected from 2020 onwards, relies on RFID, mobile and wearable devices, 3D printing, apps, Cryptocurrency, Blockchain, sensor networks, and AI-supported analytics disruptive technologies. These technologies establish an information infrastructure and a smart digital grid, facilitating seamless interoperability among stakeholders. This interconnectedness blurs the lines between physical and digital interactions, fostering dynamic networks and disrupting the tourism industry. AmI empowers tourism ecosystems to be adaptable and responsive to stakeholder needs, supporting autonomous devices, robots, and virtual and augmented reality. The introduction of self-driving vehicles, drones, and service robots further disrupts the tourism landscape. Increasingly, AmI enables real-time services, facilitating value co-creation across platforms and engaging consumers when they are most receptive. This emphasis on "nowness" requires re-engineering processes to shape products, actions, and services in real-time, optimizing performance, competitiveness, and value generation for all ecosystem stakeholders.

In 2021, the adoption of digital technologies among SMEs in the European Union (EU) showcased significant trends (Eurostat, 2021): 37% of SMEs embraced ERP

software, demonstrating a substantial integration of enterprise resource planning systems within their operations. A notable portion (28%) of SMEs utilized social media platforms to engage with customers and enhance their online presence. Approximately 18% of SMEs seized e-commerce opportunities, leveraging digital platforms to conduct online sales and expand their market reach. A majority (56%) of SMEs incorporated web sales channels into their business models, highlighting the significance of online commerce in their operations. Around 14% of companies delved into big data analytics, reflecting a growing interest in harnessing data-driven insights to inform decision-making processes. As part of the Digital Decade target, 75% of EU companies aim to adopt big data analytics by 2030, emphasizing the strategic importance of leveraging data-driven approaches for competitiveness and growth. The uptake of artificial intelligence (AI) technologies stood at 8%, indicating a relatively moderate adoption rate among SMEs in the EU (Figure1).

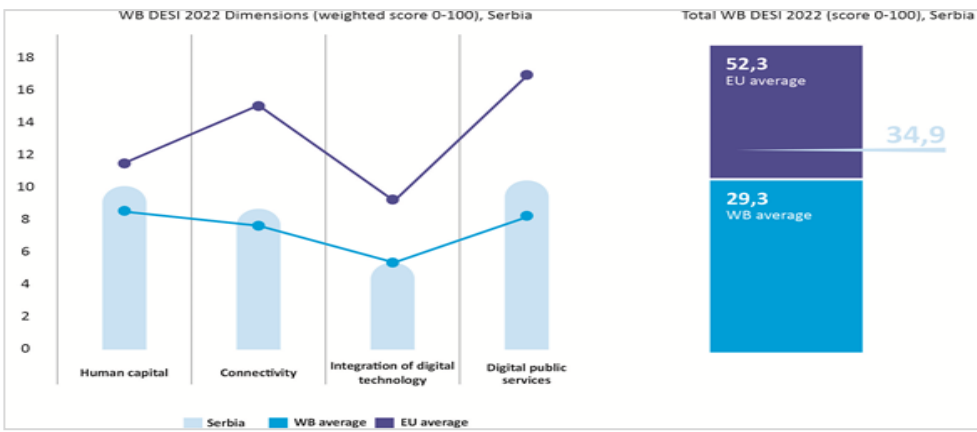

Figure 1. Serbia DESI 2022 Dimensions (Source: Authors, based on the EU data)

In 2021, SMEs operating within the tourism, hospitality, and travel sectors in Serbia exhibited notable trends in their adoption of digital technologies (SOS, 2024; Zakić, 2023). Approximately 10.7% of companies utilized CRM software, while 22.4% implemented ERP systems. All surveyed companies had access to the Internet, with usage rates varying across different segments: approximately 21.5% of small firms with up to 24% of employees utilized the Internet, and 28.2% of enterprises conducted product and service sales online. Furthermore, 100% of businesses had broadband connectivity. Regarding cloud services, 37.0% of companies utilized online payment systems, with usage rates of 44.9% among small enterprises and 44.7% among medium-sized ones. A substantial portion (87.2%) of SMEs had websites, with higher adoption rates observed among medium-sized enterprises (94.2%) compared to small ones (82.4%). Over 53% of companies utilized social networks, with usage rates particularly high among small firms (72.8%) and medium-sized ones (81.3%). Additionally, 19.1% of enterprises maintained blogs, while 23.3% of small and 39.1% of medium-sized firms utilized platforms like YouTube, Flickr, and Picasa. Data analytics tools were employed by 12.3% of small enterprises and 46.2% of medium-sized ones. The majority of SMEs (77.8% of small and 86.2% of medium-sized firms) sent invoices electronically, reflecting a growing trend towards digitalization in financial processes. However, there's a lack of research in the Balkan region. The authors

chose Serbia as an exemplary study location due to the scarcity of research in the Balkans and the perceived external hindrances to digital transformation in SMEs within the region. This study aims to investigate factors inhibiting digital transformation in SMEs within Serbia's ecosystem, highlighting the growing interest in understanding how the main factors of the national ecosystem impact SMEs in the tourism sector, with a specific focus on exploring the challenges for digital transformation (Basulo Ribeiro et al., 2023) in the Balkan region, as exemplified through a study in Serbia.

Small and medium businesses (SMEs) within the national ecosystem focus on how enterprises operate and thrive within the digital environment, which encompasses various digital platforms, networks, and technologies (Braune & Dana, 2021; Soluk, Kammerlander., & Darwin, 2021; Gupta & Bose, 2019; Arvidsson & Mønsted, 2018). For the national ecosystem of SMEs, digitalization can be said to primarily refer to the overarching framework and infrastructure established within a country to facilitate the process of digitization. The ecosystem comprises various components and stakeholders working together to enhance the competitiveness of SMEs in the modern technological age. Key components of the national ecosystem for SME digitalization may include:

- Government Initiatives and Policies, involving government-led programs, policies, and regulations aimed at fostering an environment conducive to SMEs' digitalization. It may include incentives, funding schemes, regulatory frameworks, and support structures to encourage SMEs to adopt digital technologies.
- Digital infrastructure, such as broadband networks, internet connectivity, ICT investments, smartphone usage, ICT imports, and digital platforms, is necessary for SMEs to access and utilize digital technologies effectively (Microsoft, 2024).
- Support Services which includes a range of support services provided to SMEs to assist them in their digital transformation journey. These services may include training and capacity-building programs, advisory services, mentorship, and networking opportunities.
- Financial resources, as access to financing is crucial for SMEs to invest in digital technologies, The national ecosystem may include mechanisms such as grants, loans, venture capital, and public-private partnerships to facilitate SMEs' access to financial resources for digitalization.
- Education and Skills Development, which involves initiatives to enhance digital literacy and skill development among SMEs' workforces to enable them to effectively use digital technologies, It may include training programs, workshops, and educational resources tailored to the needs of SMEs.
- Research and development, encouraging innovation and research in digital technologies relevant to SMEs, is another component of the ecosystem. This may involve supporting research institutions, innovation hubs, and collaborative partnerships between academia and industry.
- Networking and collaboration, where facilitating collaboration and knowledge sharing among SMEs, industry associations, government agencies, academia, and other stakeholders is essential for fostering a vibrant digital ecosystem, This may include industry clusters, business networks, collaborative platforms, and

- Continuous monitoring and evaluation of the effectiveness of digitalization initiatives are crucial for refining policies and strategies within the national ecosystem. This may involve collecting data, conducting surveys, and assessing the impact of digitalization efforts on SMEs' growth and competitiveness.

By nurturing a comprehensive national ecosystem for SME digitalization a country can create an enabling environment that empowers SMEs to embrace digital technologies, drive innovation, and thrive in the digital economy in any industry sector. The authors have chosen further factors of the ecosystem: connectivity gap, financial shortages, knowledge and skills lack, and regulatory constraints to be researched on the level of their impact on the digitalization process of SMEs in Serbia.In pursuit of understanding the current landscape of digital technology adoption among conventional SMEs in both the European Union and Serbia, this study seeks to shed light on the prevailing state of acceptance and integration of digital tools.

Specifically, it aims to address pertinent research questions revolving around the national ecosystems:

1. ***Research Question 1 (RQ1***): What are the perceptions of representatives from SMEs in the tourism, transport, and hospitality sectors regarding potential obstacles hindering their firms' ability to leverage digitalization? These obstacles may include connectivity gaps, financial constraints, a lack of knowledge and skills, and regulatory barriers.
2. ***Research Question 2 (RQ2):*** To what extent do the behaviors exhibited by these SMEs influence the success or failure of their digitalization efforts in fostering sustainable development within the realms of tourism and hospitality? This inquiry delves into the nuanced dynamics of digital transformation as a catalyst for sustainable business development in these sectors.

These refined research questions aim to explore the multifaceted challenges and opportunities surrounding digitalization in SMEs, particularly within the context of tourism and hospitality, while emphasizing the significance of sustainable business practices in the digital age (Mariani, 2020; Mariani, Perez -Vega., & Wirtz, 2022).

The paper adheres to a structured format, commencing with an introductory section, followed by the exposition of the theoretical framework. Subsequently, empirical research is conducted, encompassing an examination of the perspectives of 264 representatives from SMEs operating within the tourism, travel, and hospitality sectors in Serbia. This inquiry pertains to the impediments encountered in the digitalization of their respective organizations, conducted online in Serbia during the latter half of 2023. The subsequent sections include the presentation of findings and discussion, the formulation of research conclusions, and the compilation of references cited within the text, which are provided after the paper.

2. Theoretical bacground

This section of the paper provides a comprehensive literature review focusing on selected factors within the national ecosystem (Figure 2).

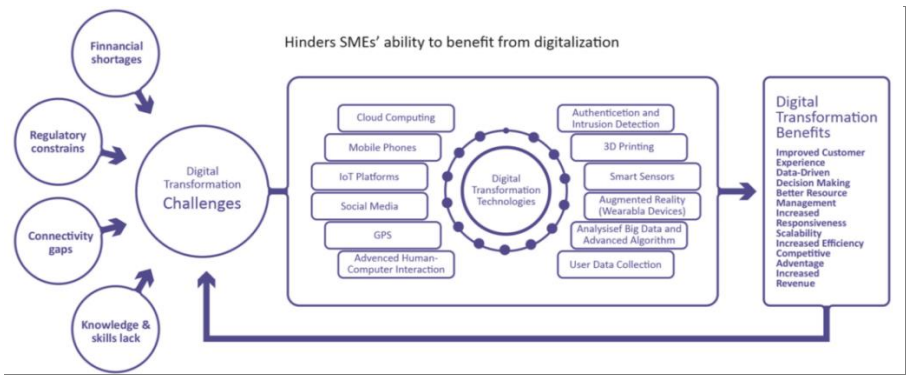

Figure 2. Hinders SMEs ability to benefit from digitalization (Source: Authors)

This review serves as the foundation for defining research hypotheses and constructing the theoretical model of the study.

Knowledge and skills. For SMEs' digitalization, knowledge and skills are ecosystem factors of great importance (Srebro et al., 2023) for their: Competitive Advantage: Strong digital expertise empowers SMEs to outperform competitors by optimizing operations, expanding market reach, and fostering innovation and adaptability. Equipped with the right knowledge, SMEs can swiftly embrace new technologies and adapt to shifting market dynamics, ensuring resilience in a rapidly evolving digital environment and innovation:. Digital tools enable SMEs to drive innovation by automating processes, streamlining workflows, and enhancing overall productivity, thereby fostering a culture of continuous improvement; Efficiency and Productivity Improvement: By leveraging digital solutions, SMEs can streamline operations, optimize workflows, and boost productivity, leading to cost savings and enhanced performance; Resilience and Sustainability: Digitalization equips SMEs with the agility to withstand disruptions and navigate challenges effectively, while also promoting sustainable practices that minimize environmental impact (Jevtić et al., 2020; Jevtic, Vucekovic., & Tasic, 2023), Digital Challenges for SME Organizations in Human Capital Investments and Change, Economic and Social Development, and Customer Experience: Digital capabilities enable SMEs to deliver personalized experiences, seamless interactions, and responsive customer service, driving satisfaction and loyalty. and Collaboration: Digital platforms facilitate collaboration and partnerships with stakeholders, enabling SMEs to leverage collective expertise, resources, and networks for mutual benefit and growth. Key challenges SMEs face due to the lack of knowledge and skills for digitalization are (Klohs & Sandkuhl, 2020; Edvardsson & Durst, 2013; Colin et al., 2016): Fast Technology Changes: Keeping up with rapid tech changes is tough for SMEs with limited resources and tech know-how; Complex Tools: Digital tools are complex, and SMEs may struggle to use them effectively without the right expertise; Lack of Awareness: Many SMEs aren't aware of the benefits of digital tech; Education Gap: SME owners and employees may lack digital skills, hindering tech adoption; Limited Resources: SMEs may lack funds for training or hiring skilled tech professionals; Training Access: It's hard for SMEs to find affordable and relevant tech training programs.

Regulatory constraints. Regulatory constraints pose significant barriers to SMEs' digitalization efforts, as highlighted by various authors, and further compound the challenges faced in achieving successful

digital transformation (George & Bock, 2011; Fiebig, 2024; Al-Somali et al., 2009; Palvia, 2009; Punjaisri & Wilson, 2007; Hashim, 2011; Hsieh & Wang, 2014; Dong, 2019; Soluk et al., 2021; Song, 2019**).** Regulatory Hurdles: Strict regulations can stifle SME innovation by imposing constraints on new tech and business models; Compliance Costs: SMEs face high costs and complexity in meeting data privacy, cybersecurity, and other regulatory requirements, diverting resources from digital efforts. Legal Risks: Non-compliance risks fines and damage to SME reputation, discouraging digitalization; Legal Uncertainty: Unclear regulations and bureaucratic processes slow SME digitalization, creating hesitancy and inefficiency; Fragmented Rules: Inconsistent regulations across sectors hinder SMEs' ability to scale and compete; Limited Support: SMEs lack guidance and support for navigating complex regulatory landscapes, hindering digitalization; Uncertain Future: Rapid regulatory changes in AI, data governance, and digital commerce make digital planning difficult; Lack of Standardization: Varying regulations across jurisdictions make it hard for SMEs in multiple markets to comply uniformly.

Financaital shortages. Financial shortages hinder SMEs' digitalization in various ways (Khan et al., 2021): Limited Investment Capacity: SMEs lack the financial resources needed to invest in digital technologies like hardware, software, and infrastructure upgrades. Difficulty Accessing Funding: SMEs struggle to secure loans or financing from banks for their digitalization projects; Inability to Afford Skilled Talent: Hiring skilled personnel proficient in digital technologies is costly for SMEs, resulting in a shortage of qualified staff. Constraints on Research and Development: Financial limitations restrict SMEs' investment in R&D for digital innovation; High Opportunity Costs: Risk Aversion: Limited financial reserves make SMEs hesitant to invest in digital technologies with uncertain ROI; Difficulty Scaling Operations: Financial constraints limit SMEs' capacity to expand their digital efforts and compete in digital markets; Lack of Access to Capital Markets: SMEs struggle to access capital markets or venture capital funding for digitalization projects; Dependency on External Financing: SMEs heavily rely on inconsistent external funding sources like government grants, hindering comprehensive digitalization efforts; Strategic Constraints: Financial shortages restrict SMEs' strategic flexibility, making it challenging to adapt to market changes or technological advancements.

Connectivity gaps. Connectivity gaps refer to disparities in access to and quality of internet connectivity among different regions, communities, or demographic groups. In the literature, these gaps are widely recognized as barriers to digital inclusion and economic development, including: Economic Impact: Research has shown that areas with limited internet access tend to have lower economic growth and development compared to those with better connectivity. Businesses in these areas often face challenges in accessing online markets, customers, and growth opportunities. Social Inclusion: Connectivity gaps can exacerbate social inequalities, widening the digital divide, including socioeconomic factors, infrastructure limitations, and policy barriers. For SMEs, connectivity gaps can hinder their ability to compete in the digital economy and access online markets. Research examines the impact of limited connectivity on SMEs' digitalization efforts, identifying barriers and potential solutions to improve access to digital tools and resources. Comparative studies explore connectivity challenges across different regions and countries, identifying common trends and unique challenges faced by each region. Technological solutions to bridge connectivity gaps, such as satellite internet, wireless broadband, and community networks, offer alternative approaches to expanding internet access, particularly in

remote or underserved areas. Connectivity gaps pose significant barriers to SMEs' digitalization efforts, limiting their access to essential online resources and tools. These gaps restrict the effective use of cloud-based services, online marketing platforms, and digital communication tools, exacerbating disparities in digital adoption among businesses (McAdam et al., 2020).

Drawing from existing literature and national practices regarding SMEs' digital transition, additional hypotheses for the empirical research can be formulated:

- H_0= connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills ***do not hinder*** SMEs' ability to fully capitalize on the digital transition.
- H_a= connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills ***negatively impact*** SMEs' ability to fully benefit from the digital transition.

3. METHODOLOGY

3.1 Research desctiption

In the fourth quarter of 2023, an empirical online research study was conducted in Serbia to investigate factors within the national ecosystem that hinder the digitalization process of SMEs. The research sample included 264 respondents representing organizations in the tourism, travel, and hospitality sectors from various regions of Serbia. Data was collected through online quantitative surveys consisting of 7 questions regarding the respondents' SME profiles and 24 questions in the form of statements related to predefined search variables. The respondents assessed the level of hindrance to SMEs' digitalization using a weighted Pearson scale, where values varied between 1 and 5: 1: strongly oppose, 2: oppose, 3: indecisive, 4: acknowledge, and 5: strongly support. Multiple correlation and regression analyses were performed using the statistical software SAS JMP 17 to analyze the data and identify significant relationships between variables. Additional variables have been identified for the study, encompassing four independent factors: connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills. These variables are analyzed in relation to a single dependent variable: SMEs' ability to fully capitalize on the digital transition, forming the basis for the theoretical model (Figure 3).

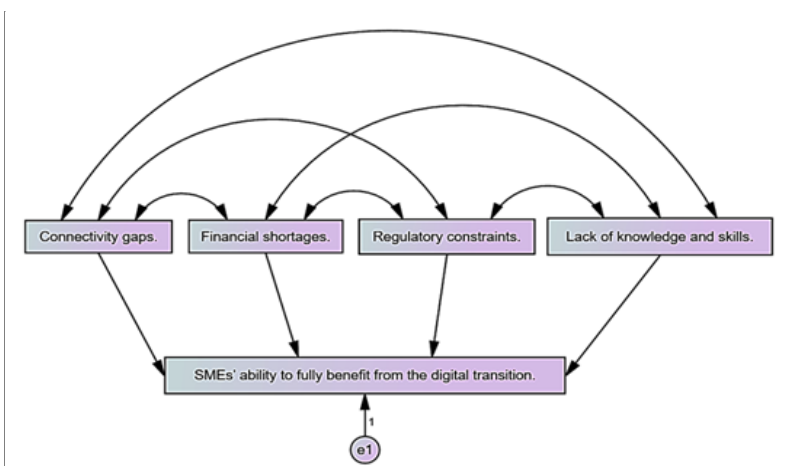

Figure 3. Theoretical Model (Source: Authors)

Here are the values and percentage representations of respondents according to various categories:

- Business activity: The majority of respondents were from the tourism sector, comprising 98, or 37.12%, of the total, followed by travel, with 87, or 32.95%, and hospitality organizations, with 79, or 29.92%, out of a total of 264 respondents.
- Company size: Among the respondents, 187, or 70.83%, represented SMEs with up to 50 employees, while fewer respondents came from companies with 50–250 employees out of a total of 264 respondents.
- Years of operation: The highest number of respondents, 98, or 37.12%, were from companies in operation for up to 10 years, followed by those in operation for over 10 years with 87, or 32.95%, and the least from companies in operation for up to 5 years, with 79, or 29.92%, out of a total of 264 respondents.
- Revenue: The majority of respondents, 111 or 42.05%, reported revenue of their SMEs up to 200,000 euros, followed by those reporting revenue from 201,000 to 500,000 euros, with
- Investments in digital technologies in the last five years: More respondents, 158 or 59.85%, reported investing over 10% of their SMEs' yearly revenue in digital technologies, followed by those investing up to 10% of their yearly revenue, with 79 or 29.92%, and the least investing 27 or 10.23%, out of a total of 264 respondents
- Own assessment of the level of digitalization reached in their SMEs: More respondents, 111 or 42.05%, assessed their level of digitalization as 20%, followed by those assessing it as 30%, with 61 or 23.11%, and 10%, with 58 or 21.97%, out of a total of 264.79 or 29.92%, then from 501,000 to 1 million euros, with
- Investments in digital technologies by function in tourism, travel, and hospitality organizations: The majority of respondents, 106, or 40.15%, reported investing in production and business functions, followed by those investing in products and services, with 103, or 39.02%, and digital marketing and communication with customers, with 55, or 20.83%, out of a total of 264 respondents.

3.2 Results and disccusion

In Table 1, mean scores and standard deviations were calculated for attitudes towards various statements. The statement with the highest mean score was "Legal uncertainty hampers digital innovation and SME investment in digital solutions" with a mean value of 4.47, while the statement with the lowest mean score was "Data privacy, cybersecurity, and consumer protection rules burden SMEs, taking resources away from digitalization" with a mean value of 3.61. The statement with the highest standard deviation was "Data privacy, cybersecurity, and consumer protection rules burden SMEs, taking resources away from digitalization" with a standard deviation of 1.19, whereas the statement with the smallest standard deviation was "SMEs struggle with using digital tools due to a lack of digital skills among owners and employees, slowing their transition to digital" with a standard deviation of 0.69.

Table 2 illustrates the average scores and deviations for the variables.

Table 1. Mean Scores and Standard Deviations for Stated Claims (Source: Authors)

	Claims		
	Connectivity gaps	**Mean**	**Std Dev**
1	Disparities in internet access and infrastructure hinder the pace and extent of the digitalization of SMEs.	3.9583333333	1.1345618854
2	Connectivity gaps restrict SMEs' ability to participate fully in the digital economy, limiting access to digital services, online markets, e-commerce platforms, and opportunities for remote work or entrepreneurship.	4.0757575758	1.0545661146
3	SMEs face significant challenges in their digitalization journey due to a lack of access to essential digital tools, limiting SMEs' competitiveness and growth potential.	4.2045454545	1.101251527
	Financial shortages	**Mean**	**Std Dev**
1	Lack of funds stop SMEs from innovating with new digital solutions to meet market needs.	4.1136363636	1.0832125665
2	Financial shortages prevent SMEs from investing in essential digital tools, slowing down their digital progress.	4.1818181818	0.9967108021
3	Tight budgets discourage SMEs from forming partnerships with tech providers, limiting their digital growth.	4.3257575758	0.8676370789
	Regulatory constraints.	**Mean**	**Std Dev**
1	Data privacy, cybersecurity, and consumer protection rules burden SMEs, taking resources away from digitalization.	3.6174242424	1.193072285
2	SMEs in multiple markets struggle with digital tech adoption due to a lack of standards and compatibles.	4.1818181818	1.1223155166
3	Legal uncertainty hampers digital innovation and SME investment in digital solutions.	4.4734848485	0.8889143931
	Lack of knowledge and skills.	**Mean**	**Std Dev**
1	SMEs struggle with using digital tools due to a lack of digital skills among owners and employees, slowing their transition to digital.	4.4583333333	0.6963830145
2	Siloed information and limited sharing of best practices within SMEs prevent collaborative learning, hindering the acquisition of digital skills.	4.2348484848	0.9258423232
3	Rapid technological advancements often leave SMEs behind in skill development as they struggle to keep up with the pace of change.	4.4734848485	0.9307064122
	SMEs' ability to fully benefit from the digital transition.	**Mean**	**Std Dev**
1	SMEs' ability to fully benefit from the digital transition depends on enhanced market access and business continuity.	4.0946969697	0.9993012307
2	SMEs' ability to fully benefit from the digital transition depends on enhanced customer engagement and personalization.	4.5416666667	0.7284069462
3	SMEs' ability to fully benefit from the digital transition depends on facilitated innovation and product and service development.	3.9659090909	1.0938702035

Table 2. Scores and deviations for the variables (SD = 0.646).

Variables	**Mean**	**Std Dev**
Connectivity gaps	4.0795454545	0.6754697341
Financial shortages	4.2070707071	0.7718432205
Regulatory constraints	4.0909090909	0.6584935107
Lack of knowledge and skills	4.3888888889	0.6456335634
SMEs' ability to fully benefit from the digital transition	4.2007575758	0.7448566454

The variable with the highest mean value is 'Lack of knowledge and skills' (mean = 4.388), while the variable with the lowest mean value is 'Connectivity gaps' (mean = 4.080). Regarding standard deviation, the variable 'Financial shortages' exhibits the largest deviation (SD = 0.772), whereas 'Lack of knowledge and skills' shows the smallest deviation (SD = 0.646).

A multiple correlation and regression analysis for a variable assessing how well the combination of predictor variables predicts the variability in the outcome variable is presented as follows:

According to a fundamental evaluation of the theoretical model the R-squared value stands at 0.66, denoting that 66.00% of the

variance in the dependent variable is accounted for by the independent variables.SMEs' ability to fully benefit from the digital transition can be explained by connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills as independent variables. The correlation among the variables is strong. The correlation coefficients are also provided, showing that the largest correlation exists between the independent variables of financial shortages and lack of knowledge and skills, with a value of 0.59. The independent variable with the greatest impact on the dependent variable is lack of knowledge and skills, with a coefficient of 0.53, followed by financial shortages with 0.24, connectivity gaps with 0.15, and regulatory constraints with a lesser impact of 0.14.

The assessment of statistical significance denoted as [F (4, 259) = 125.776, p <0.0001], indicates that the results are highly significant. Based on these data, the null hypothesis (H_0) cannot be confirmed, suggesting that connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills do not affect SMEs' ability to fully benefit from the digital transition. Conversely, the alternative hypothesis (H_a) is confirmed, indicating that these factors do indeed impact SMEs' ability to fully benefit from the digital transition. Non-standard contribution values for the theoretical model are presented in Figure 4.

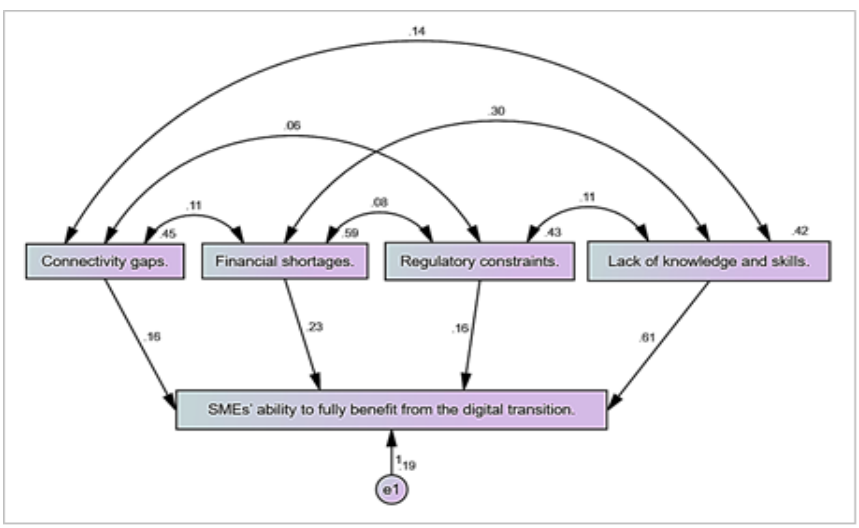

Figure 4. Non-standard contribution sizes of the theoretical model

The smallest covariance value is observed between the independent variables' connectivity gaps and regulatory constraints, at 0.06, while the largest covariance value is between the independent variables's financial shortages and lack of knowledge and skills,

at 0.30. A multiple regression equation can be derived from the data provided in Graph 4, denoted as Formula 1, which is represented as:

$$SMEs'\ ability\ to\ fully\ benefit\ from\ the\ digi = -0.817 + 0.164 \cdot Connectivity\ gaps + 0.235 \cdot Financial\ shortages + +0.164 \cdot Regulatory\ constraints + 0.613 \cdot Lack\ of\ knowledge\ and\ skills \quad (1)$$

A diagram represents the multiple regression model for the variables: connectivity gaps, financial shortages, regulatory constraints, lack of knowledge and skills, and SMEs' ability to fully benefit from the digital transition (Figure 5). The findings confirm the alternative hypothesis (Ha.), which asserts that factors within the national ecosystem, including connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills, serve as significant impediments to SMEs' ability to adopt digitalization effectively. This hypothesis contradicts the belief that SMEs can easily overcome these challenges, highlighting them as substantial barriers that hinder SMEs from fully embracing and benefiting from digital technologies.

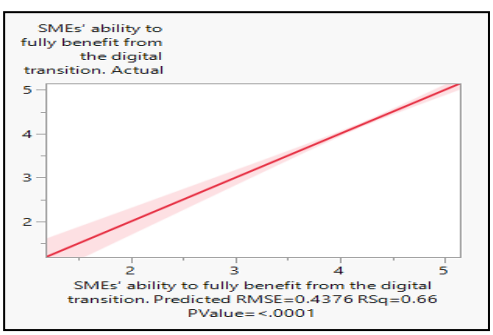

Figure 5. Diagram of the equation for multiple regression with the variables

4. CONCLUSION

The research examining SMEs' digitalization processes and potential obstacles serves as both a theoretical and practical contribution. It underscores the significance of the national ecosystem in driving SME transformation, with factors such as connectivity gaps, financial shortages, regulatory constraints, and a lack of knowledge and skills playing crucial roles in SMEs' ability to embrace digitalization effectively. For SMEs in Serbia, connectivity gaps can pose significant barriers to digitalization efforts. Limited access to reliable internet services may hinder SMEs' ability to fully leverage digital tools and technologies for business operations, marketing, and customer engagement. This can lead to disparities in digital adoption and competitiveness between SMEs located in urban versus rural areas. Overcoming these challenges is not easily achievable by national SMEs alone. Among these obstacles, financial shortages and a lack of knowledge and skills stand out as major hindrances, posing significant barriers to digitalization efforts. Despite SMEs' investments in digital technologies, there is a notable discrepancy in resource allocation, particularly in functions related to customer satisfaction (Rašković, Vrbanac.,& Jevtić, 2024; Jevtić et al., 2024).which is vital for sustainability and competitive advantage, especially in sectors like tourism, travel, and hospitality. As technology continues to evolve, ongoing research is needed to monitor connectivity trends, evaluate the impact of policy interventions, and identify emerging challenges and opportunities for bridging connectivity gaps. Bridging these gaps is crucial for SMEs to leverage emerging technologies, enhance productivity, and diversify revenue streams through e-commerce channels. Improved connectivity infrastructure facilitates smoother digital transactions, real-time data sharing, and collaboration among SMEs and their partners. Reliable internet access is essential for accessing online learning resources and upskilling the workforce. Public-private partnerships and government initiatives are needed to invest in broadband infrastructure and expand internet coverage,

fostering a more resilient and competitive business environment. Closing connectivity gaps supports economic growth, job creation, and digital inclusion. Various technologies, like AI, robotics, cashless payments, AR, and VR, are already changing industries worldwide. These advancements are driving significant changes, particularly in how data is formatted and understood, leading to the emergence of Web 3.0, or the semantic web. By linking and integrating big data from different sources, data management is improved, fostering creativity, innovation, and collaboration. Smartphones have revolutionized communication and interaction, especially in tourism, where they shape the tourist experience. Smart tourism, enabled by interconnected technologies, facilitates value co-creation and maximizes stakeholder value. It enhances inclusiveness and accessibility for travelers, addressing physical and service barriers. Gamification further enhances visitor satisfaction and engagement. Interoperability and ubiquitous computing ensure seamless integration and value generation through dynamic co-creation and personalization. Technology-driven tourism experiences enable travelers to actively contribute to value creation at every step of their journey. This shift towards smart environments is reshaping industry norms and practices, disrupting service innovation, strategy, management, marketing, and overall competitiveness. Future research should delve into areas like human-computer interaction, natural language processing, AI, neuromarketing, and the dynamics of ecosystem business management to foster collective agility and gain a competitive edge. Future studies may also explore the intersection of connectivity gaps with other factors, such as socioeconomic development and environmental sustainability. Efforts to address connectivity gaps in Serbia may involve initiatives such as expanding broadband infrastructure to underserved regions, improving network reliability and speed, and promoting digital literacy and skills development among SME owners and employees. Public-private partnerships and government investments may bridge gaps and realize a more inclusive digital ecosystem for SMEs across the country.

References:

Ahsan, M., & Musteen, M. (2021). International opportunity development on crowdfunding platforms: a spatial, temporal, and structural framework. *International Business Review, 30*(6), Article 101912. doi: 10.1016/j. ibusrev.2021.101912.

Arvidsson, V., & Mønsted, T. (2018). Generating innovation potential: How digital entrepreneurs conceal, sequence, anchor, and propagate new technology. *Journal of Strategic Information Systems, 27*(4), 369–383. doi: 10.1016/j.jsis.2018.10.001.

Al-Somali, S. A., Gholami, R., & Clegg, B. (2009). An Investigation into the Acceptance of Online Banking in Saudi Arabia. *Technovation 29*(2), 30–141. doi:1016/j.technovation.2008.07.004.

Basulo Ribeiro, J., Amorim, M., & Teixeira, L. (2023). How To Accelerate Digital Transformation in Companies With Lean Philosophy? Contributions Based on a Practical Case. *International Journal of Industrial Engineering and Management*, *14*(2), 94–104. https://doi.org/10.24867/IJIEM-2023-2-326

Braune, E., & Dana, L. P. (2021). Digital entrepreneurship: some features of new social interactions. *Canadian Journal of Administrative Sciences.* doi:1002/ cjas.1653.

Buhalis, D., & Sinarta, Y. (2019). Real-time co-creation and nowness service: lessons from tourism and hospitality. *Journal of Travel & Tourism Marketing, 36*(5), 563-582. doi:10. 1080/10548408.2019.1592059

Buhalis, D. (2020). Technology in tourism—from information communication technologies to eTourism and smart tourism towards ambient intelligence tourism: a perspective article, Tourism Review, 75(1). DOI:1108/TR-06-2019-0258.

Colin, M., Galindo, R., & Hernández, O. (2016). Information and communication technologies, strategy, and supply chain management in manufacturing SMEs in Aguascalientes, México. *Annals of Data Science, 3*(1), 71–88. doi: 10.1007/s40745-016-0071-2.

Dong, J. Q. (2019). Moving a mountain with a teaspoon: Toward a theory of digital entrepreneurship in the regulatory environment. *Technological Forecasting and Social Change, 14*, 923–930. doi:1016/j.techfore.2018.07.050.

Edvardsson, I., & Durst, S. (2013). The benefits of knowledge management in small and medium-sized enterprises. *Procedia-Social and Behavioral Sciences, 81*, 351-354. doi: 10.1016/j.sbspro.2013.06.441.

Elia, G., Margherita, A., & Passiante, G. (2020). The digital entrepreneurship ecosystem: how digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological Forecasting and Social Change, 150*, Article 119791. doi:1016/j.techfore.2019.119791.

Eurostat, (2021). Database: Eurostat (europa.eu); ICT users isoc_sku).

Fiebig, D. G. (2024). *Ddigital Business and E-Commerce*, Springer Publishing., doi: 10.1007/978-3-031-50289-7.

Fossen, F. M., & Sorgner, A. (2021). Digitalization of work and entry into entrepreneurship. *Journal of Business Research, 125*, 548–563. doi:1016/j.jbusres.2019.09.019.

George, G., & Bock, A. J. (2011). The Business Model in the Practice of Strategic Decision Making: Insights from Incumbent Firms in Germany. E*ntrepreneurship Theory and Practice, 34*(1), 83–111. doi::10.1111/j.1540-6520.2010.00424.x

Grozdanic, R., Radovic-Markovic, M., & Jevtic, B. (2012). Investment in Innovation of SMEs: Evidence from Balkan Countries. *Metalurgia International, 17* (10), 176-179. Retrieved from https://www.researchgate.net/publication/297278580_INVESTMENT_IN_ INNOVATION_OF_SMES_EVIDENCE_FROM_BALKAN_COUNTRIES).

Gupta, G., & Bose, I. (2019). Strategic learning for digital market pioneering: Examining the transformation of Wishberry's crowdfunding model. *Technological Forecasting and Social Change, 146*, 865–876. doi:1016/j.techfore.2018.06.020.

Hashim, M. K. (2011). E-commerce and government policy initiatives for Malaysian SMEs: The need for assessment. *Science and Public Policy 38*(10), 807-816. doi:10.1093/spp/38.10.807

Hsieh, Y.-C., & Wang, Y.-S. (2014). User-switching behavior in social network sites: A model perspective with drill-down analyses. *Computers in Human Behavior 33*, 92–103. doi:10.1016/j.chb.2013.12.030.

Jevtić, B., Zakić, N., Popović, J., Corić, G., & Kvrgić, G. (2020). Digital Challenges for SME Organizations in Human Capital Investments and Change, Economic and Social Development, Book of Proceedings, ISSN 1849-75352020, 20–29.

Jevtic, B., Vucekovic, M., & Tasic, S. (2023). The Effects of Digitalization and Skills on Women's Labor Market Inclusion—Serbian Gap Study, JWEE, 58–75. doi: 10.28934/jwee23.pp58-75.

Jevtić, B., Beslać, M., Janjušić, D., & Jevtić, M. (2024). The Effects of Digital Natives' Expectations of Tech Hotel Service Quality on Customer Satisfaction. *International Journal for Quality Research, 18*(1), 1–10. doi: 10.24874/IJQR18.01-01.

Jevtić, B., & Srebro, B. (2024). The Influence of ICT Technologies on High Entrepreneurship Education in the Pandemic Era, Book- Education through the COVID-19 Pandemic, ISBN 978-86-7849-341-6, Ch. 42, 604-624.

Klohs, K., & Sandkuhl, K. (2020). Digitalization of Small and Medium-Sized Enterprises: An Analysis of the State of Research. Lecture Notes in Business Information Processing (Vol. 394). Springer International Publishing, doi:10.1007/978-3-030-61146-0_2.

Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., & Spitzer, J. (2018). Digital entrepreneurship: A research agenda on new business models for the twenty-first century. International *Journal of Entrepreneurial Behavior and Research.* doi:1108/IJEBR-06-2018-0425.

Khan, M. Z., Khan, Z. U., Hameed, A., & Zada, S. S. (2021). On the upside or flipside: Where is venture capital positioned in the era of digital disruptions? *Technology in Society, 65*, Article 101555. doi:1016/j.techsoc.2021.101555.

DOI:1108/TR-06-2019-0259.

Mariani, M.(2020). Big Data and analytics in tourism and hospitality: a perspective article. *Tourism Review, 75*(1), 299–303. doi: 10.1108/TR-06-2019-0259.

Mariani, M. M., Perez-Vega, R., & Wirtz, J. (2022). AI in marketing, consumer research, and psychology: A systematic literature review and research agenda. *Psychology & Marketing, 39*(4), 755–776. oi:1002/Mar. 21619.

McAdam, M., Crowley, C., & Harrison, R. T. (2020). Digital Girl: cyberfeminism and the emancipatory potential of digital entrepreneurship in emerging economies. *Small Business Economics, 55*(2), 349–362. doi:1007/s11187-019-00301-2.

Microsoft, 2024 (Digital Futures Index: Serbia is one of the leaders in ICT exports and the percentage of women in ICT): CEE Multi-Country News Center (microsoft.com).

Miletić, V., & Ćurčić, N. (2021). Građenje strateških alijansi - faktor internacionalizacije poslovanja nacionalnih preduzeća. *Ekonomija: teorija i praksa, 14*(3), 64–82. doi:10.5937/etp2103064M

Palvia, P. (2009). The role of trust in e-commerce relational exchange: a unified model. *Information & Management, 46*, 213-220. doi:10.1016/J.IM.2009.02.003.

Punjaisri, K., & Wilson, A. (2007). Internal Branding Process: Key Mechanisms, Outcomes, and Moderators. *European Journal of Marketing, 45* (9/10), 1521–1537. doi:10.1108/03090561111151871.

Radović-Marković, M., Grozdanić, R., & Jevtić, B. (2017). Razvoj privatnog sektora u zemljama zapadnog Balkana u poređenju sa EU, Institut ekonomskih nauka: ISBN 978-86-89465-11-2.

Rašković, M., Vrbanac, M., & Jevtić, B. (2024). Customer Satisfaction with Digital Technologies Level in Marketing—Serbian Tourism and Travel Industry, Limes plus 1 (2023), 105–1341. HESPERIAedu. Retrieved from https:// www. ceeol. com/search/article-detail?id=1269925.

Secundo, G., Rippa, P., & Cerchione, R. (2020). Digital Academic Entrepreneurship: A structured literature review and avenue for a research agenda. Te*chnological Forecasting and Social Change, 157,* Article 120118. doi:10.1016/j. techfore.2020.120118.

Soluk, J., Kammerlander, N., & Darwin, S. (2021). Digital entrepreneurship in developing countries: The role of institutional voids. *Technological Forecasting and Social Change, 170,* Article 120876. doi:10.1016/j.techfore.2021.120876.

Song, A. K. (2019). The Digital Entrepreneurial Ecosystem—a critique and reconfiguration. *Small Business Economics, 53*(3), 569–590. doi:1007/ s11187-019-00232-y.

SOS, (2024). Upotreba IKT tehnologija u predzuećima RS, 2024 Retrieved from https:// www. stat.gov.rs/sr-latn/ vesti/ 20241025-upotreba-ikt-a-preduzeca-2024/ ?s= 2703.

Srebro, B., Janjušić, D., Miletić, V., Dzafić, G., Jevtić, B., & Milenković, D. L. (2023). Shaping the textile woman's digital work sustainability by legislative and taxation adjustments. *Industria Textila*, 2023, *74*(1), 21-27. doi:10.35530/IT.074.01.202262.

Vrbanac, M., Rašković, M., Jevtić, B., & Damnjanović, A.(2023). Unveiling the Drivers of Digitalization in Small Tech Firms, a Serbia Case, Limes plus 1, 31-57. HESPERIAedu Retrieved from https://www. ceeol.com/ search/ viewpdf?id = 1322905.

Zakić, N. (2023). Digitalizacije usluga u hotelima u funkciji unapređenja zadovoljstva korisnika, doktorska disertacija, Retrieved from https://nardus.mpn. gov.rs/handle/123456789/21990.

Miroslav Miškić
Faculty of Technical Sciences,
Novi Sad,
Serbia
miroslav.miskic@outlook.com
ORCID 0000-0002-4917-1623

Maja Vrbanac
Faculty of Entrepreneurial Business and Real Estate Management,
Belgrade,
Serbia
majavrbanac86@gmail.com
ORCID 0000-0002-8143-6011

Bosiljka Srebro
Academy of Applied Technical Studies (AATSB),
Belgrade,
Serbia
bsrebro@atssbl.edu.rs
ORCID 0000-0003-3642-7981

Milan Rašković
Faculty for Business and Law,
Belgrade,
Serbia
milan.raskovic@bureaucube.com
ORCID 0009-0007-1533-597X

Boris Jevtić
Computing Faculty, RAF
Belgrade,
Serbia
boris.jevtic10@gmail.com
ORCID 0000-0001-5789-4728