

Article

Small and Medium-Sized Enterprises in the Digital Age: Understanding Characteristics and Essential Demands

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Abstract: The article explores the implementation of digital technology in small and medium-sized Slovenian enterprises (SMEs), with a focus on understanding existing trends, obstacles, and necessary support measures during their digitalization progress. The surveyed companies mainly rely on conventional technologies like websites and teamwork platforms, emphasizing the significance of strong online communication and presence in the modern business world. The adoption of advanced technologies such as blockchain is limited due to the perceived complexity and relevance to specific sectors. This study uses variance analysis to identify potential differences in the digitalization challenges faced by companies of different sizes. The results indicate that small companies face different financial constraints and require more differentiated support mechanisms than their larger counterparts, with a particular focus on improving digital competencies among employees. Despite obtaining enhancements such as elevated operational standards and uninterrupted telecommuting via digitalization, companies still face challenges of differentiation and organizational culture change. The study emphasizes the importance of recognizing and addressing the different challenges and support needs of different-sized companies to promote comprehensive progress in digital transformation. Our findings provide important insights for policymakers, industry stakeholders, and SMEs to formulate comprehensive strategies and policies that effectively address the diverse needs and challenges of the digital transformation landscape.

Keywords: digital transformation; digital technology adoption; small and medium-sized enterprises (SMEs); digitalization challenges; digitalization support



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1. Introduction

In an era characterized by rapid technological advancements and global economic integration, the process of digitalization has emerged as a critical catalyst for transforming companies and the entire economy. The digitalization of industries and companies encompasses the adoption and integration of digital technologies into various aspects of business, with the goal of enhancing efficiency, competitiveness, and innovation [1,2]. This concept is multifaceted and involves a wide range of technologies, including cloud computing, big data analytics, the Internet of Things (IoT), and artificial intelligence (AI) [3]. However, the significance of digitalization does not solely stem from the adoption of these technologies but also from the fundamental changes they bring to business models, processes, and strategies. The effects of successful digitalization are manifested through improved operational efficiency, enhanced customer experiences, data-driven decision-making, and access to new markets. Consequently, in today's fast-paced, interconnected world, the ability to exploit the potential of digitalization has become a key determinant of competitiveness and long-term sustainability.

Although digitalization offers vast opportunities for companies, it also presents a unique set of challenges. Issues such as the digital divide, data security concerns, and the rapid obsolescence of technology are among the problems that organizations must navigate. In particular, small and medium-sized enterprises (SMEs), which are the backbone of most

economies and significantly contribute to job creation and economic growth, face distinct challenges in their digitalization processes [4].

In the landscape of European economic research, the categorization of enterprises by size plays a pivotal role in both policy formulation and empirical analysis. According to Commission Recommendation 2003/361/EC, SMEs encompass micro, small, and medium-sized enterprises, collectively constituting a dominant 99% of all EU enterprises. This categorization not only offers structural insights but also serves as a prerequisite for accessing specific EU financial and support mechanisms tailored to SMEs. As per EU Recommendation 2003/361, micro enterprises are defined as those with no more than 10 employees and a turnover or balance sheet total not exceeding EUR 2 million. Small enterprises, on the other hand, are characterized by having fewer than 50 employees and financial thresholds of EUR 10 million in turnover or as the balance sheet total. Meanwhile, medium-sized enterprises fall within the intermediate range. They are companies with fewer than 250 employees and financial figures below EUR 50 million in turnover or EUR 43 million on the balance sheet. Large enterprises, by definition, surpass the parameters set for medium-sized enterprises in terms of both headcount and financial criteria [5].

Therefore, understanding the distinctiveness of digitalization in the context of SMEs is important to enhancing their efforts and results. These enterprises often operate within limited resources, technical expertise, and financial constraints, making digitalization initiatives particularly complex and distinctive. Consequently, it becomes crucial to investigate and understand the specific needs, barriers, and benefits that SMEs encounter during their digitalization processes in order to enable the creation of more effective solutions and strategies tailored to their unique circumstances.

Digitalization holds a significant impact on the operations of SMEs. It positively influences participation in export and import activities and their overall productivity [6]. Furthermore, within the Italian agri-food sector, digitalization enables the adoption of circular economy principles, enabling better resource management and waste reduction [7].

However, the adoption of digitalization in SMEs is not without its challenges. Particular factors, such as performance expectancy, perceived effort, facilitating conditions, and competitive pressure significantly influence the decision to embrace digitalization [8]. Further exploration of the factors influencing whether German SMEs decide on digital transformation addressed the knowledge gap in the context of digitalization [9]. The impact of digitalization on technological innovations varies depending on the form of digitalization and the type of innovation, with the effects potentially being mitigated through intensified internal research and development activities [10].

For successful digital transformation, having a clear strategic vision is also crucial. Some authors [11] have investigated how a strategic vision of digitalization can positively affect the digital transformation of SMEs, with this effect further enhanced through resource orchestration. Concurrently, another group of authors [12] outlined three key objectives—digital strategy, information technology, and employee skills—aimed at illuminating the antecedents, consequences, and challenges associated with the digitalization of SMEs, thus providing substantial contributions to this field.

Providing insights into the digitalization of business processes in Yemen, Saleh and Manjunath [13] conducted a review of existing literature. Their review revealed the potential of SMEs to embark on digitalization endeavors that contribute to economic growth and development. Happonen et al. [14] investigated digitalization-related business models arising from university–SME collaborations, offering fresh perspectives on the symbiotic relationship between academia and SMEs in the digital era. Ghobakhloo et al. [15] contributed to the study of manufacturing SMEs and provided practical guidelines for achieving digital transformation within the framework of Industry 4.0, empowering them with knowledge and tools to navigate through the digital age. Legowo et al. [16] enriched the research field with additional insights about the digitalization of SMEs across diverse contexts.

Although digitalization is a thoroughly researched area, there is a significant gap in the literature when it comes to SMEs. Much of the existing literature primarily focuses on large

companies or explores digitalization in a global context, leaving a significant knowledge gap regarding the specificities of SMEs. This article seeks to bridge this gap by specifically concentrating on SMEs in Slovenia and aims to uncover insights that are often overlooked in more general studies, offering a tailored perspective on digitalization within a particular business environment.

Studies often treat SMEs as scaled-down versions of large companies, overlooking the specific challenges they face during the process of digitalization, such as resource constraints, limited IT expertise, and the influence of unique organizational cultures. The digital ecosystem is diverse and consists of a range of technologies, each varying in complexity and knowledge requirements. Existing literature often groups these technologies together without delving into their individual characteristics.

This article makes a valuable contribution by providing a detailed overview of various digital technologies and their adoption patterns among SMEs. By distinctly differentiating among technologies, the article offers valuable insights into which specific technologies pose challenges or opportunities for such companies. Moreover, understanding the support needs of SMEs during digitalization is also essential. Nonetheless, the existing literature often overlooks this aspect. Thus, this article tries to bridge this gap by exploring the support requirements of SMEs, covering various aspects such as strategy development, employee training, financing, and solution providers, with the aim of providing a more comprehensive understanding of the support ecosystem needed for successful digitalization within SMEs. Although many studies in the field provide theoretical frameworks and present case studies, empirical data directly collected from SMEs in Slovenia are relatively scarce, particularly in terms of including micro companies. To address this gap, this article presents primary empirical data obtained through a survey conducted among SMEs in Slovenia, offering a more grounded and contextually specific contribution to the literature by relying on the real experiences and perspectives of these businesses.

This article also aimed to investigate whether significant differences exist in the challenges and support needs of SMEs based on their size, categorizing them as micro, small, medium, or large companies. Such comparative analysis is often missing in the existing literature, which tends to treat SMEs as a homogenous group. By differentiating between these size categories, this research aims to provide a nuanced understanding of how a company's size influences its digitalization experiences and requirements. The existing literature typically centers on a singular facet of digitalization—be it challenges, benefits, or support mechanisms. This article broadens the understanding by presenting a holistic view of digitalization within Slovenian SMEs, integrating various aspects, including characteristics, challenges, and support needs, and thus delivering a more comprehensive view of the digitalization landscape.

The article is structured as follows. First, the literature review on the use of digital technologies, digitalization effects and challenges for SMEs, and their needs for successful digitalization is provided, with identified gaps and justified hypotheses. This is followed by a methodology explanation and the results of the empirical analysis, including hypotheses testing. The article concludes with a discussion and conclusions.

2. Literature Review

The literature review explores the existing body of knowledge surrounding the digitalization challenges and support needs of SMEs, setting the stage for the hypotheses underpinning this empirical study. Digitalization, as a process of integrating digital technologies, is a transformative force, reshaping industries and economies worldwide. In this context, SMEs have assumed a pivotal role, making significant contributions in many sectors through job creation, economic growth, and innovations [17].

2.1. Use of Digital Technologies in SMEs

Digital technologies and tools are increasingly being used by SMEs to enhance their competitiveness and productivity. These technologies include social media, digital communication

tools, online platforms, and digital marketing tools. SMEs are leveraging social media and digital tools to engage international prospects and enhance customer relationship management [18]. They are incorporating digital marketing tools, especially online ones, to increase their competitiveness [19,20]. Furthermore, digital tools are being used for customer-based innovation in SMEs, which is crucial for their success and resilience [21]. In the manufacturing sector, digital manufacturing technology is being employed to improve processes and machine tools, with the objective of reducing human error, cost, and time [22]. However, the adoption of digital technologies by SMEs is still limited, with many facing challenges in understanding and experimenting with this technology [23]. Digitalization encompasses a wide array of digital technologies, each with its own complexity and knowledge requirements. These technologies include but are not limited to cloud computing, big data analytics, the Internet of Things (IoT), artificial intelligence (AI), and blockchain. Understanding the differences among these technologies is crucial for SMEs as they navigate their digitalization processes.

2.1.1. Internet Adoption and E-Commerce

One of the fundamental aspects of digital technology adoption among SMEs is the use of the internet, which serves as a backbone for various digital applications. A study conducted by Khan [24] emphasizes that access to the internet is foundational for businesses to engage in e-commerce, digital marketing, and online communication. It underscores that SMEs with a robust online presence are more likely to expand their customer base and enhance their competitiveness. E-commerce, as a subset of digital technology usage, has garnered significant attention. SMEs that engage in e-commerce can tap into a broader market, both domestically and internationally. Those who have adopted e-commerce platforms have experienced higher revenue growth compared to those who have not, demonstrating the tangible economic benefits of digital technology utilization [25,26].

2.1.2. Cloud Computing and Data Analytics

Cloud computing and data analytics are pivotal tools in the digital arsenal of SMEs. Cloud-based solutions provide businesses with cost-effective and scalable infrastructure for data storage and access to software applications [27]. These solutions require less upfront investment in hardware and infrastructure, making them accessible to micro and small enterprises as well. This accessibility can lead to improved operational efficiency and reduced IT infrastructure costs, especially for SMEs with limited resources [28]. On the other hand, data analytics allows SMEs to extract actionable insights from the wealth of data they generate. Data analytics tools enable SMEs to make data-driven decisions, optimize processes, and personalize customer experiences [29]. The adoption of these technologies is associated with increased competitiveness and innovation. The complexity of big data analytics can vary depending on the scale of data processing required. SMEs may need to tailor analytics solutions to their specific needs, with micro and small companies focusing on more straightforward data analysis, and larger enterprises engaging in more extensive data mining and predictive analytics.

2.1.3. Digital Marketing and Social Media

Digital marketing channels, including social media platforms, offer SMEs innovative avenues for customer engagement and brand promotion. SMEs effectively leveraging digital marketing activities experience increased customer loyalty and higher sales growth [30]. Specifically, social media has emerged as a prominent platform for customer interaction. SMEs that actively utilize social media for marketing and customer engagement are more likely to expand their reach and maintain a competitive edge [31]. This aligns with the findings of Chaffey et al. [32], who emphasize the central role of social media in the digital marketing strategies of SMEs.

2.1.4. Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain

IoT implementations can range from simple sensor networks to complex industrial application [33]. SMEs typically focus on smaller-scale IoT deployments, such as inventory tracking, whereas large companies engage in comprehensive IoT ecosystems with extensive data integration. AI technologies, including machine learning and natural language processing, vary in complexity. SMEs may adopt AI for relatively straightforward applications like chatbots or automated customer support [34]. In contrast, large companies often explore more advanced AI applications, such as predictive analytics and autonomous systems. Adopting blockchain technology can be resource intensive and is primarily suited for large companies or industry-specific use cases [35]. SMEs may engage with blockchain for simpler applications like supply chain traceability but often encounter scalability challenges.

2.2. Digitalization Effects and Challenges for SMEs

Digitalization has a range of impacts on SMEs. Firstly, it facilitates the optimization of exports and imports and enhances productivity [36]. Secondly, virtual integration, as an aspect of digitalization, offers strategic benefits, improving the financial performance of SMEs [26]. Thirdly, considering the transition to a sustainable and digital economy, digitalization becomes key, enabling digital processes, waste reduction, and the provision of digital products and services [37]. Additionally, digital literacy also plays a crucial role in enabling the sustainability of SMEs, particularly in the culinary sector, aiding adaptation to challenges such as the COVID-19 pandemic [38]. Finally, digitalization is essential for the sustainable business of SMEs, fostering innovation and development [39].

Although digitalization offers numerous benefits to SMEs, it also presents a variety of challenges, stemming predominantly from restricted financial means, underdeveloped IT infrastructure, and distinctive organizational cultures.

SMEs often find themselves at a disadvantage compared to larger companies when it comes to investing in advanced digital technologies due to their financial constraints [40]. These limitations can hinder the ability of SMEs to develop and implement comprehensive digitalization strategies, thereby affecting their competitive edge and growth potential. Difficulties in obtaining finances are particularly manifested in micro enterprises, making their process of digitalization distinct. It is not easy to compete in a market where digitalization is becoming the standard. SMEs are required to navigate through the intense competition from well-resourced large companies on one side and startups with established digital competencies on the other. Additionally, acquiring funds for digitalization proves to be a substantial obstacle, especially for entities without a history of digital accomplishments. SMEs often find themselves in a challenging position due to financial constraints and a lack of in-house IT expertise [41]. The rapid evolution of digital technologies demands highly qualified professionals capable of managing complex technological systems, implementing digitalization initiatives, and maintaining the stability of operational processes. Due to such requirements, SMEs often struggle to attract and retain skilled professionals, which is crucial for successfully managing digital transformation processes. The gap in knowledge and skills can lead to inefficiencies and delays in their efforts to digitalize [42]. Specifically, micro and small companies, as previously mentioned, are usually in an even more unfavorable position because they have limited access to resources and experts from the IT sector, further deepening the difference in digitalization challenges between them and large companies.

The pace of technological obsolescence is another aspect that distinguishes SMEs in digitalization. SMEs often find it challenging to keep up with the rapid advancements in digital technologies [43]. This kind of limitation can lead to challenges in maintaining competitiveness and relevance in their respective markets. The speed at which technological innovations are developing means that digital tools and platforms can become outdated in a short amount of time. This creates a situation where SMEs may fall behind due to lack of resources and infrastructure necessary to keep up with these rapid advancements.

As a consequence, these companies might experience difficulties in maintaining their competitiveness and staying relevant in the market.

Cybersecurity concerns also vary significantly between companies of different sizes. SMEs, despite being appealing targets for cyberattacks, often lack robust cybersecurity measures and resources needed to adequately protect their sensitive information and digital systems [44]. Cybersecurity vulnerabilities pose significant risks to digitalization efforts, potentially leading to data breaches and financial losses. Research conducted by Ray et al. [45] underscores that data security and privacy issues pose significant challenges in the digital age. SMEs, particularly micro and small companies, often lack the resources to invest in robust cybersecurity measures, making them more exposed to digital threats. In contrast, large companies typically have dedicated cybersecurity departments and greater financial resources to strengthen their resistance, ensuring their information and digital systems are well protected.

Integrating digital systems with existing processes and legacy systems can pose complex and costly challenges [46]. SMEs frequently encounter challenges in ensuring seamless connectivity between various digital tools, platforms, and databases, which can hamper operational efficiency. Managing the vast amounts of data generated in the digitalization process can also be a challenging task. Many SMEs struggle with collecting, storing, analyzing, and leveraging data for informed decision-making, subsequently limiting the potential benefits of digitalization.

Furthermore, complying with regulations is a pivotal concern. SMEs need to navigate a complex landscape of data privacy and security regulations, such as GDPR and industry-specific standards [47]. Non-compliance can lead to legal and financial penalties, making regulatory challenges a significant consideration in digitalization efforts.

The transition to a digitalized environment often requires changes in organizational culture, workflows, and employee roles. Resistance to such changes is a common obstacle, necessitating effective change management strategies to mitigate disruptions and foster adoption [48]. Moreover, SMEs face challenges in selecting the right technology vendors and solutions that align with their specific needs and budget constraints.

Additionally, geographical location and the industrial sector can influence access to digital resources and infrastructure. SMEs in rural areas or those within less digitally developed sectors may face additional barriers to digitalization [49]. Understanding and addressing these multifaceted challenges are essential for SMEs to embark on successful digital transformation journeys and remain competitive in an increasingly digital world. Based on the review and analysis of the literature, we propose the following hypothesis:

H1. *There is a significant difference in the mean scores for challenges faced by companies in digitalization among at least one of the four groups (micro, small, medium, and large companies).*

The empirical evidence presented in recent studies aligns with hypothesis H1, suggesting that there are indeed significant differences in the challenges faced by micro, small, medium, and large companies during digitalization. By examining these differences, researchers and policymakers can gain insights into tailoring support mechanisms and strategies that address the specific needs of each category of companies, ultimately facilitating more effective digital transformation initiatives.

2.3. Support Needs for Digitalization in SMEs

Supporting SMEs in their digitalization efforts involves addressing a range of critical needs. Access to financing is one of the most critical, as SMEs often require financial support to invest in digitalization initiatives, covering expenses like hardware, software, and employee training. Additionally, training and skill development programs are essential to equipping SME employees with the digital skills necessary for effective technology utilization. SMEs often lack the in-house expertise required to navigate the complexities of digitalization, making consulting and advisory services a valuable resource. These services

can guide SMEs in technology selection, strategy development, and risk management, ensuring a smoother digitalization journey.

Government initiatives and policies have a key role in fostering digitalization among SMEs [50]. They can offer tax incentives, grants, and regulatory frameworks that help ease the financial burden associated with digital transformation. Ensuring access to digital infrastructure, including high-speed internet and cloud computing, is fundamental for SMEs to leverage digital tools effectively. Collaborative opportunities and networking with other businesses, research institutions, and technology providers can lead to knowledge sharing and innovative solutions. Tailored digital solutions that are scalable and budget-friendly are vital to SMEs' successful digitalization efforts. As highlighted by Atkinson [51], government policies are increasingly acknowledging the importance of tailored support for digitalization. Recent initiatives in various countries have sought to address the specific needs of different-sized companies, acknowledging that one-size-fits-all policies are often ineffective at promoting digital transformation.

Recent studies, such as those by Chen et al. [52] and Aamer et al. [53], have emphasized the significance of tailored support mechanisms for different-sized companies, recognizing that micro, small, medium, and large companies often have distinct digitalization needs that arise from variations in their resource base, operational complexities, and strategic objectives. SMEs, for instance, often require more accessible and cost-effective training and skill development programs due to limited budgets. These smaller entities face a pronounced skill gap, necessitating customized, affordable, and easily accessible training solutions [54,55]. In particular, financing for research and development (R&D) activities related to digitalization is crucial for SMEs aiming to develop innovative digital products or services. Grants and programs boosting R&D efforts can spur digital innovations within these entities. In essence, a comprehensive support ecosystem tailored to SMEs' unique needs and circumstances is essential to empowering them to thrive in the digital age. By addressing these support needs, supportive environment organizations can facilitate the successful digitalization of SMEs, unlocking their potential for growth and competitiveness in an increasingly digitalized world. Moreover, SMEs often require more extensive consulting and advisory services as they navigate the complexities of scaling digitalization efforts and express the need for customized strategies and expert guidance to meet the unique challenges they face [56].

Likewise, support for data security and privacy is crucial, as SMEs are increasingly collecting and managing sensitive data. Assistance with data encryption, vulnerability assessments, and compliance with privacy regulations is vital for them [57]. SMEs also benefit from support in expanding their market reach through e-commerce platforms and digital marketing strategies, including training in online sales techniques, search engine optimization, and digital advertising [58]. Also, awareness and educational campaigns are necessary to help SMEs recognize the value of digital technologies and the competitive advantages they offer.

After the review of the literature above, we propose the following hypothesis:

H2. *There is a significant difference in the mean scores for support needs for digitalization among at least one of the four groups (micro, small, medium, and large companies).*

Hypothesis H2 is supported by recent research and evolving trends in the context of digital transformation. Recent empirical evidence highlighted in various studies reveals clear variations in digitalization support needs among micro, small, medium, and large companies. These findings underscore the importance of a tailored approach to fostering digitalization initiatives. By investigating these disparities in support requirements, researchers and policymakers can develop tailored strategies and interventions that cater to the unique demands of each company size category. Such targeted support measures have the potential to enhance the efficacy of digitalization efforts, leading to more successful and sustainable outcomes across diverse business landscapes.

3. Materials and Methods

3.1. Data Collection

To obtain information on the digitalization needs and characteristics of SMEs in Slovenia, we conducted a direct primary research study among companies. We employed a web-based survey using the 1KA tool, which was implemented in 2022. We received a total of 474 appropriately completed surveys, comprising 343 fully completed surveys and 131 partially completed surveys. The response rate for the survey was 9.5%. The survey questionnaire consisted of 13 closed-ended questions.

3.2. Sample Characteristics

Among the respondents, 69% represented service-oriented companies, whereas 31% represented manufacturing companies. To provide insights into the size distribution of the surveyed companies, respondents were given the option to select their company's size category. The results show that 50% of the respondents represented micro enterprises, 33% represented small enterprises, 13% represented medium-sized enterprises, and 4% represented large enterprises (Table 1 below).

Table 1. Distribution of company sizes by business sector.

Company Size	Service Oriented	Manufacturing	Total
Micro enterprises	40%	10%	50%
Small enterprises	22%	11%	33%
Medium-sized enterprises	5%	8%	13%
Large enterprises	2%	2%	4%

3.3. Variables Analyzed

In our analysis, we considered the following variables (the questionnaire in Appendix A), which included:

- Technological solutions used: Respondents were presented with 15 different digital technologies and could select all of the technologies they currently use. These technologies ranged from well-established solutions like websites to advanced or newer technologies like blockchain, 3D printing, and industrial and service robots.
- Achieved effects of digitalization: We examined the results that the companies aimed to achieve through digitalization, including seamless remote work, improved access to information, enhanced quality and efficiency of operations, differentiation, changes in company culture, and integration into supply chains.
- Challenges faced by companies: We assessed the challenges encountered during the digitalization process. Key challenges included the need for financial resources for digitalization and a shortage of suitable employees. Additionally, we considered the financial aspects of digitalization, including initial investments and ongoing maintenance costs.
- Support needs for digitalization: We explored the support needs of companies in various aspects of digitalization, including the preparation of the digitalization strategy, enhancement of the digital competencies and knowledge of employees, financing digitalization, the digitalization process, the use of digital solutions (tools), and finding suitable solution providers.

3.4. Statistical Analysis

To test the hypotheses formulated, we employed the analysis of variance (ANOVA) statistical technique, which allowed us to determine whether there were statistically significant differences in the mean scores for the challenges faced by the companies and their support needs for digitalization among the four groups (micro, small, medium, and large companies). ANOVA evaluates whether the variations between groups are greater than what would be expected due to random sampling variability [59]. Within the context of

our research, the company size was used as an independent variable, classified into four distinct categories: micro, small, medium, and large companies. Each group was analyzed independently, meaning that the results of one category did not influence the results of another. This ensured that interpretations and conclusions were based on actual differences among groups, without the interplay of results from different categories.

4. Results

As noted in the Introduction, digital transformation encompasses the development and adoption of various technologies. In our research, we examined which technological solutions have been employed by the companies. Respondents had the option to choose from 15 different technologies and mark all of the ones they use (Figure 1). The results indicate that the companies predominantly utilize simple, widely accepted, and long-standing technological solutions, such as websites (91%), tools for team support (87%), paperless business programs (79%), and social networks (73%). On the other hand, advanced or newer technologies like blockchain (10%), 3D printing (15%), and industrial and service robots (18%) were least represented among the companies' responses.

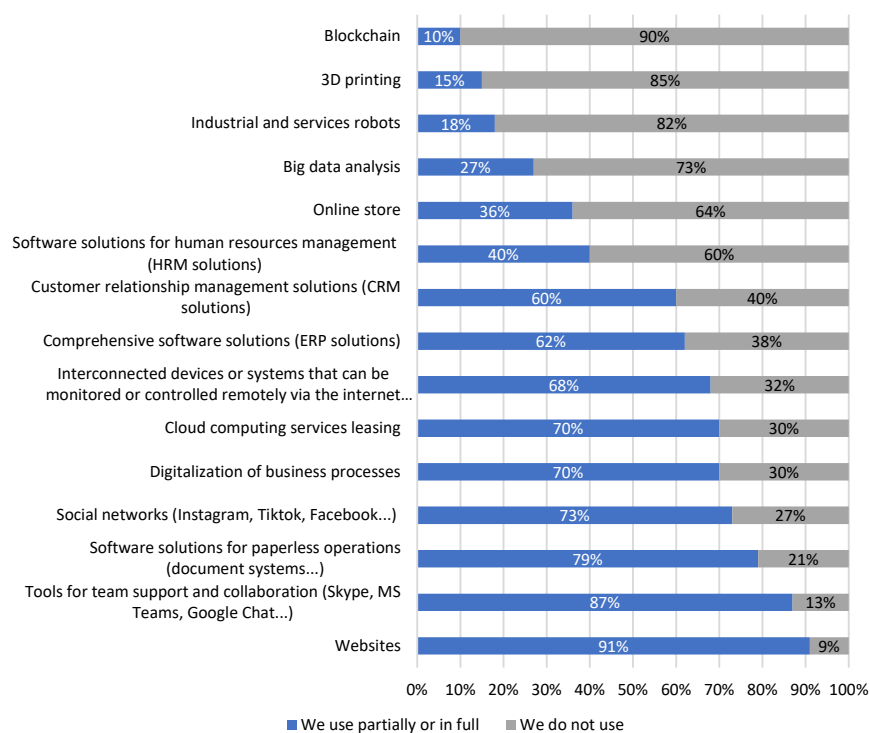


Figure 1. The use of various digital solutions and technologies.

The effects that companies aim to achieve through digitalization are highly diverse and dependent right on their needs and the technological solutions they employ. Table 2 illustrates this using a 5-point Likert scale, where 1 signifies “no effect” and 5 denotes “a very large effect”. It shows that the surveyed companies have predominantly achieved seamless remote work, evidenced by an average rating of 3.64, closely followed by improved business efficiency and then by enhanced access to information and overall operational quality. As previously noted, the companies extensively utilize tools for team support (87%, Figure 1), and their assessment of achieving smooth remote work indicates the successful implementation of this technology. The companies have achieved the least in terms of differentiation, integration into supply chains, and changes in company culture.

Table 2. Descriptive statistics of achieved effects of digitalization.

Variable	Mean	Std. Error	Std. Deviation Statistics
Seamless remote work	3.64	0.07	1.27
Improved business efficiency	3.46	0.06	1.13
Improved access to company information and enhanced quality	3.42	0.06	1.16
Improved user experience and customer retention	3.25	0.06	1.17
Cost reduction and product quality improvement	3.13	0.06	1.14
Expanding the customer base	2.89	0.07	1.26
Changing company culture	2.75	0.06	1.15
More effective integration into supply chains	2.67	0.07	1.21
Company differentiation	2.64	0.07	1.21

All companies face various challenges when adopting new initiatives, and this holds true for digitalization as well. As illustrated in Table 3, the results from a 5-point Likert scale, where 1 signifies “does not represent a problem” and 5 denotes “represents a significant problem”, reveal that the most significant issues for companies are the necessary financial resources for digitalization (mean value: 3.13) and the lack of suitable employees (mean value: 3.08). A similar observation was made by Pucihar et al. [60] in a study among Slovenian SMEs.

Table 3. Descriptive statistics of challenges with digitalization faced by companies.

Variable	Mean	Std. Error	Std. Deviation Statistics
Lack of financial resources for digitalization	3.13	0.07	1.36
Lack of suitable employees for digitalization due to overwork	3.08	0.07	1.34
Challenges in implementing digitalization	2.97	0.06	1.20
Lack of adequate knowledge in the field of digitalization within the company	2.92	0.06	1.22
Unfamiliarity with the digital transformation process	2.83	0.06	1.23
Difficulties in planning digitalization	2.83	0.06	1.23
Lack of appropriate digital solutions for the company	2.69	0.07	1.31

The financial resources aspect consists of two dimensions, with the second often being overlooked. First, the (initial) investment in digital technologies or tools represents an initial cost. Although companies have various measures available for such investments, this initial cost is typically high. The second aspect, often overlooked by companies, especially in the beginning, is the maintenance of technological solutions. These costs can be relatively high for small companies and represent ongoing expenses. Additionally, technology needs occasional upgrades, requiring further investments. From a financial perspective, the aspects of technological solutions can place a significant burden on companies.

Another common challenge highlighted by the surveyed companies is the lack of suitable employees due to overwork. Given that the survey primarily focused on small businesses, this result was expected since they often grapple with resource shortages, and employees end up handling multiple roles within the company, leading to overwork. Interestingly, companies perceive fewer issues with the adequacy of knowledge compared to employee overwork. The least significant difficulty the companies face is in finding suitable digital solutions, indicating that there are enough technological solutions available on the market that companies can leverage or that there are specialized solution providers tailored to individual company needs. This observation aligns with the findings of studies in Slovenia by SURS [61] and Pucihar et al. [60], who identified a shortage of skilled personnel as the primary reason for the slow pace of digitization in SMEs. Therefore, based on this, we tested the following hypothesis:

H1. *There is a significant difference in the mean scores for challenges faced by companies in digitalization among at least one of the four groups (micro, small, medium, and large companies).*

In the context of our study, ANOVA helped us assess whether there were statistically significant differences in the mean scores for challenges faced by companies in the four groups (micro, small, medium, and large) concerning digitalization. The results from Table 4 enabled us to ascertain whether significant differences exist in the challenges encountered by these groups, providing valuable insights into how company size impacts digitalization challenges.

Table 4. ANOVA results for digitalization challenges.

		Sum of Squares	df	Mean Square	F	Sig.
Lack of financial resources for digitalization	Between groups	16.657	3	5.552	3.047	0.029 *
	Within groups	610.546	335	1.823		
	Total	627.204	338			
Lack of suitable employees for digitalization due to overwork	Between groups	11.688	3	3.896	2.218	0.086 **
	Within groups	586.608	334	1.756		
	Total	598.296	337			
Challenges in implementing digitalization	Between groups	1.107	3	0.369	0.249	0.862
	Within groups	496.333	335	1.482		
	Total	497.44	338			
Lack of adequate knowledge in the field of digitalization within the company	Between groups	3.015	3	1.005	0.657	0.579
	Within groups	508.962	333	1.528		
	Total	511.976	336			
Unfamiliarity with the digital transformation process	Between groups	1.602	3	0.534	0.35	0.789
	Within groups	506.395	332	1.525		
	Total	507.997	335			
Difficulties in planning digitalization	Between groups	3.043	3	1.014	0.709	0.547
	Within groups	474.85	332	1.43		
	Total	477.893	335			
Lack of appropriate digital solutions for the company	Between groups	6.777	3	2.259	1.341	0.261
	Within groups	560.742	333	1.684		
	Total	567.519	336			

Note: * significance level $p \leq 0.05$; ** significance level $p \leq 0.1$.

The ANOVA results indicate a statistically significant difference among groups concerning the perceived lack of financial resources for digitalization. The F-statistic is a measure that assesses the variance ratio between group means compared to within-group variance. An elevated F-value indicates a deviation greater than what we might expect due to random chance [62]. Notably, our analysis of various variables revealed pronounced F-values for two specific factors: “lack of financial resources for digitalization” ($F = 3.047$) and “lack of suitable employees for digitalization due to overwork” ($F = 2.218$). These F-values indicate distinct variations in challenges perceived by companies of different sizes. In statistical terms, a high F-statistic theoretically corresponds to a reduced p -value, which suggests a notable difference in group means. The calculated F-statistic of 3.047 exceeded the critical value ($p \leq 0.05$), suggesting the presence of significant difference between the groups. This finding is further supported by the robust test of equality of means, affirming this difference ($p \leq 0.05$).

The mean square between groups of 5.552 and the mean square within groups of 1.823 provide additional insight. The mean square deviation between groups represents the differences in responses between the different company size groups. On the other hand, the within-group mean square value reflects the differences within each group. The fact that the mean square deviation between groups was higher than the mean square deviation within groups suggests that differences in perceived lack of financial resources are more pronounced between groups than within groups [63]. Degrees of freedom refer to the data points that can vary when estimating parameters. In our analysis, we had 3 degrees of freedom for the “between groups” component, which signifies that we studied four company size groups. On the other hand, the “within groups” metric was calculated as the difference between the total number of observations and the number of groups.

Moreover, with a significance level of 0.1, the ANOVA results indicate there might be a potential difference in the perceived lack of suitable employees for digitalization due to overwork among the groups. The calculated F-statistic was 2.218, with an associated p -value of 0.086. This suggests that there is some statistical evidence to support the hypothesis, indicating that there might be meaningful differences in the groups concerning the perceived lack of suitable employees for digitalization due to overwork. Additionally, the robust test of equality of means also pointed to a statistical difference at a significance level of $p \leq 0.1$.

Based on the obtained results, significant differences among the groups were evident. Table 5 below provides a detailed overview of these specific group differences. Using the Games–Howell post hoc test [64], we identified a significant difference between micro and medium-sized companies regarding the perceived lack of financial resources for digitalization ($p = 0.098$; $p \leq 0.1$). No significant differences were found for other group combinations.

Table 5. Multiple comparisons for perceived lack of financial resources.

Dependent Variable		Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval		
					Lower Bound	Upper Bound	
Lack of financial resources for digitalization	Micro companies	Small companies	0.342	0.165	0.162	−0.04	0.72
		Medium-sized companies	0.525 **	0.224	0.098	0.00	1.05
		Large companies	0.685	0.328	0.205	−0.14	1.51
	Small companies	Micro companies	−0.342	0.165	0.162	−0.72	0.04
		Medium-sized companies	0.183	0.234	0.863	−0.36	0.73
		Large companies	0.342	0.334	0.738	−0.50	1.18
	Medium-sized companies	Micro companies	−0.525 **	0.224	0.098	−1.05	0.00
		Small companies	−0.183	0.234	0.863	−0.73	0.36
		Large companies	0.159	0.367	0.972	−0.74	1.06
	Large companies	Micro companies	−0.685	0.328	0.205	−1.51	0.14
		Small companies	−0.342	0.334	0.738	−1.18	0.50
		Medium-sized companies	−0.159	0.367	0.972	−1.06	0.74

Note: ** significance level $p \leq 0.1$.

Small businesses often face a lack of various resources necessary for effective business development, indicating a pronounced need for support within a functional entrepreneurial ecosystem. To provide adequate support, the supportive environment must align with the needs of SMEs. Based on data collection through a 5-point Likert scale, the surveyed companies identified financial support in digitalization process as their most pressing need, with a mean value of 3.91 (Table 6). This finding is consistent with previously identified challenges related to a lack of financial resources.

Table 6. Descriptive statistics of the support needed for digitalization.

Variable	Mean	Std. Error	Std. Deviation Statistics
In financing digitalization	3.91	0.07	1.24
In the process of digitalization	3.48	0.07	1.22
In enhancing the digital competencies and knowledge of employees	3.42	0.07	1.26
In the use of digital solutions (tools)	3.35	0.07	1.24
In the preparation of the digitalization strategy	3.29	0.08	1.38
In searching for suitable solution providers for companies	3.17	0.07	1.35

Following the need for financial resources, companies also expressed a need for support during the digitalization process, particularly when conducting the implementation process themselves. However, it must be noted that the companies rated all of the listed areas as above average, indicating a broad need for support across various facets of digitalization. Their needs extend beyond financial aspects, also encompassing knowledge and skills both in managing digitalization projects and in utilizing digital and technological solutions. Therefore, based on these findings, we tested the second hypothesis:

H2. *There is a significant difference in the mean scores for support needs for digitalization among at least one of the four groups (micro, small, medium, and large companies).*

To test the hypothesis, the ANOVA statistical technique was used again to evaluate whether there were significant differences among the means of the groups. The results are shown in Table 7 below.

Table 7. ANOVA results of support needs for digitalization.

Variables		Sum of Squares	df	Mean Square	F	Sig.
In the preparation of the digitalization strategy	Between groups	4.184	3	1.395	0.733	0.533
	Within groups	626.141	329	1.903		
	Total	630.324	332			
In enhancing the digital competencies and knowledge of employees	Between groups	11.819	3	3.94	2.525	0.058 **
	Within groups	518.011	332	1.56		
	Total	529.83	335			
In financing digitalization	Between groups	4.357	3	1.452	0.949	0.417
	Within groups	511.323	334	1.531		
	Total	515.68	337			
In the process of digitalization	Between groups	6.105	3	2.035	1.393	0.245
	Within groups	483.555	331	1.461		
	Total	489.66	334			
In the use of digital solutions (tools)	Between groups	7.856	3	2.619	1.721	0.162
	Within groups	502.159	330	1.522		
	Total	510.015	333			
In searching for suitable solution providers for companies	Between groups	2.256	3	0.752	0.414	0.743
	Within groups	604.414	333	1.815		
	Total	606.671	336			

Note: ** significance level $p \leq 0.1$.

The results imply that there is some evidence indicating the possibility of significant disparities among group means concerning the support needed for digitalization. The ANOVA results for the variable “In enhancing the digital competencies and knowledge of employees” show that there was a noteworthy finding. The calculated F-statistic was 2.525, and the associated p -value was 0.058. With a significance level set at $p \leq 0.1$, the p -value was just slightly above this threshold, suggesting a borderline result. The robust test of equality of means also confirms this observation, indicating a significant difference ($p \leq 0.05$).

Table 8 provides a comprehensive analysis of specific group differences. The results from a post hoc test reveal statistically significant divergence in the perceived need for support in digitalization between micro and medium-sized enterprises ($p = 0.04$; $p \leq 0.05$).

Table 8. Multiple comparisons for enhancing the digital competencies and knowledge.

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	90% Confidence Interval	
						Lower Bound	Upper Bound
In enhancing the digital competencies and knowledge of employees	Micro companies	Small companies	−0.048	0.158	0.990	−0.41	0.32
		Medium-sized companies	−0.511 *	0.188	0.040	−0.95	−0.07
		Large companies	−0.518	0.230	0.150	−1.09	0.05
	Small companies	Micro companies	0.048	0.158	0.990	−0.32	0.41
		Medium-sized companies	−0.463	0.201	0.103	−0.93	0.00
		Large companies	−0.471	0.240	0.238	−1.06	0.12
	Medium- sized companies	Micro companies	0.511 *	0.188	0.040	0.07	0.95
		Small companies	0.463	0.201	0.103	0.00	0.93
		Large companies	−0.007	0.261	1.000	−0.64	0.62
	Large companies	Micro companies	0.518	0.230	0.150	−0.05	1.09
		Small companies	0.471	0.240	0.238	−0.12	1.06
		Medium-sized companies	0.007	0.261	1.000	−0.62	0.64

Note: * significance level $p \leq 0.05$.

5. Discussion

5.1. Digital Technology Adoption

The results of our analysis reveal intriguing patterns in the adoption of digital technologies among the surveyed companies. It is evident that companies participating in our research predominantly rely on well-established and widely accepted technologies. Websites, used by 91% of respondents, were the most prevalent digital solution, underscoring the enduring importance of having a strong online presence in today’s business landscape. Moreover, it was shown that tools for team support (87%), paperless business programs (79%), and social networks (79%) are also widely utilized among the surveyed companies. These findings suggest that SMEs are prioritizing technologies that facilitate communication, efficiency, and information management. Conversely, more advanced or emerging technologies like blockchain (10%), 3D printing (15%), and industrial and service robots (27%) exhibited lower adoption rates in SMEs. These technologies were perceived as less relevant to the surveyed companies, possibly due to their complexity, cost, or limited applicability within their specific industries. This finding aligns with the notion that SMEs often gravitate towards established and accessible digital solutions rather than riskier, cutting-edge technologies.

5.2. Achieved Effects of Digitalization

Companies embark on the digitalization process with various expectations and objectives. The results of our study show a diverse range of outcomes in SMEs, highlighting the multifaceted nature of digital transformation. In this research, the most frequently reported achievements include seamless remote work, improved access to information, and enhanced operational quality and efficiency. Notably, the high utilization of team support

tools (87%) corresponded to the success of remote work implementation, underscoring the importance of these tools in facilitating remote collaboration.

However, it appeared that companies encounter challenges in areas such as differentiation, changes in organizational culture, and integration into supply chains. These outcomes suggest that, despite potential operational improvements through digitalization, profound organizational or strategic transformations do not always occur. This finding underscores the need for companies to align their digitalization strategies with specific, clearly defined objectives to maximize the benefits of digital transformation.

5.3. Challenges Faced by Companies

Our analysis uncovers several significant challenges companies face during their digitalization efforts. Among the most pronounced issues are the need for financial resources and the lack of suitable employees. The initial investment in digital technologies can be substantial, and the ongoing costs of maintenance and updates emphasize the need for strategic financial planning and supportive mechanisms, especially for SMEs. Furthermore, there is also the prevailing challenge of overwork among employees in small businesses, which hinders successful digitalization efforts due to a lack of resources and difficulties with adaptation, with companies showing more concern for overwork than the adequacy of knowledge or skills. These findings mirror other studies among Slovenian SMEs, which similarly identified financial constraints and a shortage of skilled personnel as main obstacles.

5.4. Comparative Analysis across Company Sizes

To explore the potential differences in the challenges faced by companies based on size, an analysis of variance (ANOVA) was implemented. The analysis indicated significant differences among micro, small, medium, and large enterprises concerning the perceived lack of financial resources for digitalization. The findings imply that smaller companies may face distinct financial challenges compared to their larger counterparts, which may relate to differences in available resources, budgets, or financial strategies. Understanding these disparities is crucial to formulating adaptive support mechanisms and interventions, meticulously tailored to meet the distinct needs and perceptions of companies of different sizes in their digitalization processes. Recognizing and addressing these variations is pivotal to fostering holistic advancement in digital competencies across the spectrum of enterprise scales.

5.5. Support Needs for Digitalization

The companies in our study expressed diverse support needs for digitalization, reflecting the multifaceted nature of this process. Financial support emerged as the most pressing requirement, aligning with the identified lack of financial resources. Additionally, companies articulated the need for support throughout the digitalization journey, including strategy development, enhancing employee competencies, financing, process implementation, and the selection of digital solutions and solution providers. The ANOVA results indicate that there might be significant differences in the support needs for digitalization among different company size groups, with a notable finding for enhancing employees' digital competencies and knowledge. Micro and medium-sized companies appeared to exhibit the most substantial disparity in their perceived support requirements in this regard. Smaller companies, particularly micro and small enterprises, as previously mentioned, often struggle with limited resources, which can lead to overwork and a shortage of suitable employees able to adapt to and implement new digital technologies effectively. This might lead to a higher reliance on external support to compensate for internal inadequacies and to facilitate the enhancement of digital competencies and knowledge within the organization. On the other hand, larger companies, potentially with more abundant resources and a more diverse employee skill set, may perceive less need for external support in digitalization processes, being able to leverage internal capabilities to adapt to digital advancements. These companies might also

have more structured training and development programs in place, allowing for the continual enhancement of digital competencies and knowledge among employees. This suggests that tailored interventions aimed at improving the digital skills of employees should consider the unique challenges faced by micro and medium-sized enterprises.

6. Conclusions

SMEs' digitalization is characterized by distinct attributes, such as resource constraints, limited IT expertise, and a unique organizational culture, distinguishing them from large companies. Understanding these particularities is essential to addressing their specific challenges and support needs when adopting diverse digital technologies. Each technology comes with its own complexities and knowledge prerequisites, requiring tailored strategies for SMEs based on their size and resource capacity.

The literature supports the hypothesis that there exist significant disparities in the challenges faced by different-sized companies during the digitalization process. This underscores the importance of empirically testing this hypothesis to provide specific insights into the nature of these differences among micro, small, medium, and large companies within the digitalization context. Recent research further emphasizes the importance of acknowledging and accommodating the distinct support requirements of micro, small, medium, and large companies throughout digitalization. The evidence aligns closely with hypothesis H2, indicating substantial differences in the support needs of these four categories. Empirical validation of this hypothesis offers valuable insights into the precise nature of these distinctions, enabling policymakers and supportive environment organizations to allocate resources effectively and provide support mechanisms to the diverse needs of companies along the digitalization spectrum.

Our study contributes valuable insights into the digitalization landscape of SMEs in Slovenia. It not only underlines the widespread use of established digital technologies but also highlights the diverse outcomes of digitization efforts. It also provides insights into the significant challenges and support needs faced by companies on this transformational journey. The comparative analysis across different company sizes underlines the importance of recognizing the differences in challenges and support requirements associated with company size. These findings serve as an important navigational guide for policymakers, industry stakeholders, and SMEs as they navigate the complex territory of digital transformation.

Our study aligns with a significant body of literature concerning the challenges and support needs of SMEs in their digitalization efforts. The literature review section highlighted the transformative nature of digitalization in various sectors, emphasizing the pivotal role of SMEs in driving economic growth and innovation, consistent with previous research [17]. In terms of digital technologies adopted by SMEs, our findings corroborate earlier studies that indicate SMEs' increasing use of social media, digital marketing, and online platforms to enhance competitiveness [18–20]. Similarly, our study supports previous research highlighting the importance of cloud computing and data analytics in improving SMEs' operational efficiency and competitiveness [27–29]. Additionally, our findings align with the role of digital marketing and social media in enhancing customer engagement and loyalty for SMEs, consistent with prior studies [30–32]. The findings resonate with prior research that has identified a fundamental challenge for SMEs—the lack of financial resources—as the most pressing need [40,41]. This consistency underscores the ongoing significance of this issue for small businesses as they navigate the complexities of digitalization. Small businesses, which typically operate with limited financial means, often find themselves at a disadvantage when attempting to invest in advanced digital technologies.

Where our study diverges from existing research is in the specific challenges and support needs identified for different company sizes during digitalization. Although the challenges related to the lack of financial resources and suitable employees due to overwork have been acknowledged in prior studies [39,42], our research goes further to reveal significant variations in these challenges across different company sizes. This

nuanced understanding is crucial for tailoring support mechanisms effectively, addressing the unique needs of each category of companies. Moreover, our study highlights the importance of technological solutions in addressing the challenges SMEs face during digitalization. Although previous research has recognized the general challenges faced by SMEs, our study delves into the specifics of which technologies are predominantly used by companies and how they relate to the challenges faced. For example, our findings indicate that companies predominantly use widely accepted technologies like websites and tools for team support, suggesting that these technologies are instrumental in addressing certain challenges.

What is notable from the results is that companies rated all of the listed support areas as above average, indicating a broad and multifaceted need for support across various dimensions of digitalization. Although financial support is paramount, the companies also expressed a need for assistance during the actual implementation process. This suggests that they require not only the means to fund their digitalization initiatives but also guidance and expertise to effectively execute these projects.

Moreover, the study highlights the importance of knowledge and skills in managing digitalization projects and utilizing digital and technological solutions. The need for support extends beyond financial aspects and encompasses building the necessary competencies to harness the full potential of digitalization. This aligns with the broader understanding that successful digital transformation is not solely about financial investments but also about acquiring the expertise to make the most of these investments [29]. However, we acknowledge the limitations of our study, which focused on small companies. This limitation narrows the broad interpretation of digitalization challenges across companies of different sizes, with a predominant focus on size-related differences. Further research should examine sector-specific nuances and analyze companies of specific sizes to gain a more precise understanding of digitalization challenges. In addition, the research was conducted as a one-time cross-sectional analysis within the framework of the Slovenian Entrepreneurship Observatory project in 2022. Although external validity was enhanced through random and stratified sampling and the use of generalizable variables, the focus was specific. However, these limitations are not considered obstacles but rather opportunities for future research to further the understanding of digital transformation and its effects on SMEs. To address this limitation, the analysis could be extended to different countries and regions, enabling the exploration of long-term digitalization trends by analyzing data from various time periods. Analyzing how SMEs in various countries manage the challenges and support requirements of digitalization can offer valuable cross-cultural perspectives and enhance our overall comprehension of the global digitalization landscape.

To improve the reliability of the findings, future studies should consider introducing measurable criteria to evaluate actual versus perceived needs and challenges. The use of advanced statistical methods, potentially combined with ANOVA, will enhance the result validation, particularly when multiple dependent variables (MANOVA) are present. A comprehensive understanding of the subject matter should be achieved by integrating qualitative insights with quantitative approaches. To ensure a constantly evolving understanding of the subject, conducting longitudinal studies is imperative. Such studies facilitate the monitoring of changes in necessities and challenges, as well as the assessment of the continual effectiveness of support interventions, thus providing a constantly developing viewpoint on companies' digitalization.

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Institutional Review Board Statement: Ethical review and approval were waived for this study due to its design as a non-invasive, survey-based research focusing on corporate practices and needs, without involving sensitive personal data or direct human subjects' interventions. The methodology employed voluntary participation from companies, and the data collection was centered around their digitalization processes and support needs, thus presenting minimal ethical risks typically associated with human subject's research.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Survey Questionnaire

Q1—Please indicate which digital solutions and technologies you use in your company.

	1 We do not use	2 Partially used	3 We use it in full
Comprehensive software solutions (ERP solutions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer relationship management (CRM) solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Software solutions for paperless operations (document system)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human resource management software solutions (HRM solutions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tools for team support and collaboration (Skype, MS Teams, Google chat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social networks (Instagram, Tik Tok, Facebook)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cloud computing services leasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Websites	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interconnected devices or systems that can be monitored or controlled remotely via the internet (Internet of Things)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industrial and service robots	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Big data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3D printing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digitalization of business processes			
Blockchain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2—On a scale of 1 to 5, please rate the effect of digitalization on your company.

	1 No effect	2	3	4	5 Very high impact
Seamless remote work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved business efficiency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved access to company information and enhanced quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved user experience and customer retention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost reduction and product quality improvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expansion of the customer base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changing company culture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More effective integration into supply chains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Company differentiation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3—On a scale of 1 to 5, please specify how strongly each digitalization challenge relates to your company.

	1 Not a problem	2	3	4	5 It is a major problem
Lack of financial resources for digitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of suitable employees for digitalization due to overwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenges with implementing digitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of adequate knowledge in the field of digitalization within the company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfamiliarity with the digital transformation process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulties with planning digitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of appropriate digital solutions for the company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4—On a scale of 1 to 5, please rate the area where you would need the most support with digitalization.

	1 No support required	2	3	4	5 Much needed support
In enhancing the digital competencies and knowledge of employees	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the process of digitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In financing digitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the preparation of digitalization strategy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the use of digital solutions (tools)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In searching for suitable solution providers for companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5—Please specify the size of your company.

<input type="radio"/>	Micro enterprise
<input type="radio"/>	Small enterprise
<input type="radio"/>	Medium-sized enterprise
<input type="radio"/>	Large enterprise

Q6—Please indicate which industry sector you belong to.

<input type="radio"/>	Service-oriented enterprises
<input type="radio"/>	Manufacturing companies

References

1. Yin, S.; Yu, Y. An Adoption-Implementation Framework of Digital Green Knowledge to Improve the Performance of Digital Green Innovation Practices for Industry 5.0. *J. Clean. Prod.* **2022**, *363*, 132608. [\[CrossRef\]](#)
2. Kwilinski, A.; Lyulyov, O.; Pimonenko, T. Unlocking Sustainable Value through Digital Transformation: An Examination of ESG Performance. *Information* **2023**, *14*, 444. [\[CrossRef\]](#)
3. Li, J.; Herdem, M.S.; Nathwani, J.; Wen, J.Z. Methods and Applications for Artificial Intelligence, Big Data, Internet-of-Things, and Blockchain in Smart Energy Management. *Energy AI* **2022**, *2022*, 100208. [\[CrossRef\]](#)
4. Mittal, S.; Khan, M.A.; Romero, D.; Wuest, T. A Critical Review of Smart Manufacturing & Industry 4.0 Maturity Models: Implications for Small and Medium-Sized Enterprises (SMEs). *J. Manuf. Syst.* **2018**, *49*, 194–214.
5. European Commission. Commission Recommendation 2003/361/EC Concerning the Definition of Micro, Small and Medium-Sized Enterprises. EUR-Lex. Available online: <https://eur-lex.europa.eu/eli/reco/2003/361/oj> (accessed on 13 October 2023).
6. Añón Higón, D.; Bonvin, D. Digitalization and Trade Participation of SMEs. *Small Bus. Econ.* **2023**, 1–21. [\[CrossRef\]](#)
7. Farace, B.; Tarabella, A. Exploring the Role of Digitalization as a Driver for the Adoption of Circular Economy Principles in Agrifood SMEs—An Interpretive Case Study. *Br. Food J.* **2023**. [\[CrossRef\]](#)

8. Ikumoro, A.O.; Jawad, M.S. Intention to Use Intelligent Conversational Agents in E-Commerce Among Malaysian SMEs: An Integrated Conceptual Framework Based on Tri-Theories Including Unified Theory of Acceptance, Use of Technology (UTAUT), and TOE. *Int. J. Acad. Res. Bus. Soc. Sci.* **2019**, *9*, 205–235. [CrossRef]
9. Kilimis, P.; Zou, W.; Lehmann, M.; Berger, U. A Survey on Digitalization for SMEs in Brandenburg, Germany. *IFAC-PapersOnLine* **2019**, *52*, 2140–2145. [CrossRef]
10. Radicic, D.; Petković, S. Impact of Digitalization on Technological Innovations in Small and Medium-Sized Enterprises (SMEs). *Technol. Forecast. Soc. Change* **2023**, *191*, 122474. [CrossRef]
11. Cheng, S.; Fan, Q.; Dagestani, A.A. Opening the Black Box Between Strategic Vision on Digitalization and SMEs Digital Transformation: The Mediating Role of Resource Orchestration. *Kybernetes* **2023**. [CrossRef]
12. Eller, R.; Alford, P.; Kallmünzer, A.; Peters, M. Antecedents, Consequences, and Challenges of Small and Medium-Sized Enterprise Digitalization. *J. Bus. Res.* **2020**, *112*, 119–127. [CrossRef]
13. Saleh, M.A.K.; Manjunath, K.R. Review of Historical and Temporary Challenges Facing Small and Medium Enterprises in Yemen. *Int. J. Trend Sci. Res. Dev.* **2020**, *4*, 752–764.
14. Happonen, A.; Santti, U.; Auvinen, H.; Räsänen, T.; Eskelinen, T. Digital Age Business Model Innovation for Sustainability in University Industry Collaboration Model. *E3S Web Conf.* **2020**, *211*, 04005. [CrossRef]
15. Ghobakhloo, M.; Iranmanesh, M. Digital Transformation Success under Industry 4.0: A Strategic Guideline for Manufacturing SMEs. *J. Manuf. Technol. Manag.* **2021**, *32*, 1533–1556. [CrossRef]
16. Legowo, M.B.; Prayitno, D.; Indiarito, B. Digital Economy Inclusiveness Information System Model to Encourage National Economic Recovery: Recover Together, Recover Stronger. In *Proceedings of the Conference Towards ASEAN Chairmanship 2023 (TAC 23 2021)*; Atlantis Press: Amsterdam, The Netherlands, 2021; pp. 61–67.
17. OECD. Managing Shocks and Transitions: Future-Proofing SME and Entrepreneurship Policies: Key Issues Paper. Available online: <https://www.oecd.org/cfe/smes/key-issues-paper-oecd-sme-andentrepreneurship-ministerial-meeting-2023.pdf> (accessed on 11 September 2023).
18. Marolt, M.; Zimmermann, H.D.; Žnidaršič, A.; Pucihar, A. Exploring Social Customer Relationship Management Adoption in Micro, Small and Medium-Sized Enterprises. *J. Theor. Appl. Electron. Commer. Res.* **2020**, *15*, 38–58. [CrossRef]
19. Pollák, F.; Markovič, P. Size of Business Unit as a Factor Influencing Adoption of Digital Marketing: Empirical Analysis of SMEs Operating in the Central European Market. *Adm. Sci.* **2021**, *11*, 71. [CrossRef]
20. Kwarteng, M.A.; Jibril, A.B.; Nwaiwu, F.; Pilik, M.; Chovancova, M. The Prospects of Internet-Based Channel Orientation for the Competitiveness of Service Companies on the Domestic Market. *Int. J. Inf. Manag.* **2021**, *58*, 102223. [CrossRef]
21. Hogeferster, M. Future Challenges for Innovations in SMEs in the Baltic Sea Region. *Procedia-Soc. Behav. Sci.* **2014**, *110*, 241–250. [CrossRef]
22. Palange, A.; Dhattrak, P. Lean Manufacturing a Vital Tool to Enhance Productivity in Manufacturing. *Mater. Today Proc.* **2021**, *46*, 729–736. [CrossRef]
23. Zamani, S.Z. Small and Medium Enterprises (SMEs) Facing an Evolving Technological Era: A Systematic Literature Review on the Adoption of Technologies in SMEs. *Eur. J. Innov. Manag.* **2022**, *25*, 735–757. [CrossRef]
24. Khan, S.A. E-Marketing, E-Commerce, E-Business, and Internet of Things: An Overview of Terms in the Context of Small and Medium Enterprises (SMEs). In *Global Applications of the Internet of Things in Digital Marketing*; IGI Global: Pennsylvania, PA, USA, 2023; pp. 332–348.
25. Tolstoy, D.; Nordman, E.R.; Vu, U. The Indirect Effect of Online Marketing Capabilities on the International Performance of E-Commerce SMEs. *Int. Bus. Rev.* **2022**, *31*, 101946. [CrossRef]
26. Gao, J.; Siddik, A.B.; Abbas, K.; Hamayun, M.; Masukujjaman, M.; Alam, S.S. Impact of E-Commerce and Digital Marketing Adoption on the Financial and Sustainability Performance of MSMEs During the COVID-19 Pandemic: An Empirical Study. *Sustainability* **2023**, *15*, 1594. [CrossRef]
27. Kumar, H.K.; Naveen, B.R.; Savitha, J. Business Factors Challenging SMEs for Adopting Cloud-Based Solutions. *Int. J. Glob. Bus. Compet.* **2022**, *17*, 203–214. [CrossRef]
28. Nassoura, M.B.; Hassan, S. Factors Affecting the Adoption of Cloud-Based Human Resource Management on Innovation Behaviour among SMEs in Jordan. *Glob. Bus. Manag. Rev.* **2021**, *13*, 1–17. [CrossRef]
29. Saleem, H.; Li, Y.; Ali, Z.; Mehreen, A.; Mansoor, M.S. An Empirical Investigation on How Big Data Analytics Influence China SMEs Performance: Do Product and Process Innovation Matter? In *Corporate Performance and Managerial Ties in China*; Routledge: London, UK, 2021; pp. 9–34.
30. Thaha, A.R.; Maulina, E.; Muftiadi, R.A.; Alexandri, M.B. Digital Marketing and SMEs: A Systematic Mapping Study. *Libr. Philos. Pract.* **2021**, 1–19. Available online: <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=9450&context=libphilprac> (accessed on 10 September 2023).
31. Kaplan, A.; Haenlein, M. Rulers of the World, Unite! The Challenges and Opportunities of Artificial Intelligence. *Bus. Horiz.* **2020**, *63*, 37–50. [CrossRef]
32. Chaffey, D. Global Social Media Research Summary 2016. Available online: <https://www.thevideocompany.sg/blog/global-social-media-research-summary-2016> (accessed on 10 September 2023).

33. Moeuf, A.; Lamouri, S.; Pellerin, R.; Tamayo-Giraldo, S.; Tobon-Valencia, E.; Eburdy, R. Identification of Critical Success Factors, Risks, and Opportunities of Industry 4.0 in SMEs. *Int. J. Prod. Res.* **2020**, *58*, 1384–1400. [CrossRef]
34. Wei, R.; Pardo, C. Artificial Intelligence and SMEs: How Can B2B SMEs Leverage AI Platforms to Integrate AI Technologies? *Ind. Mark. Manag.* **2022**, *107*, 466–483. [CrossRef]
35. Murimi, R.; Bell, G.; Rasheed, A.A.; Beldona, S. Blockchains: A Review and Research Agenda for International Business. *Res. Int. Bus. Financ.* **2023**, *66*, 102018. [CrossRef]
36. Añón Higón, D.; Bonvin, D. Information and communication technologies and firms' export performance. *Ind. Corp. Change* **2022**, *31*, 955–979. [CrossRef]
37. Ciurea, J.; Dinu, L.; Dinu, G. The Influence of Digitalisation on SMEs. *Ovidius Univ. Ann. Econ. Sci. Ser.* **2021**, *21*, 490–495.
38. Jati, H.; De Rosary, P.E.; Fanggidai, A.H.; Makatita, R.F. The Importance of Financial Literacy and Technological Literacy for the Sustainability of the Culinary Business in Kota Kupang during the COVID-19 Pandemic. *Int. J. Econ. Bus. Manag. Res.* **2021**, *5*, 15–41.
39. Broccardo, L.; Zicari, A.; Jabeen, F.; Bhatti, Z.A. How Digitalization Supports a Sustainable Business Model: A Literature Review. *Technol. Forecast. Soc. Change* **2023**, *187*, 122146. [CrossRef]
40. Laursen, K.; Salter, A. Open for Innovation: The Role of Openness in Explaining Innovation Performance among UK Manufacturing Firms. *Strateg. Manag. J.* **2006**, *27*, 131–150. [CrossRef]
41. Holopainen, M.; Saunila, M.; Ukko, J. Value Creation Paths of Organizations Undergoing Digital Transformation. *Knowl. Process Manag.* **2023**, *30*, 125–136. [CrossRef]
42. Nambisan, S.; Lyytinen, K.; Majchrzak, A.; Song, M. Digital Innovation Management. *Manag. Inf. Syst. Q.* **2017**, *41*, 223–238. [CrossRef]
43. Porter, M.E.; Heppelmann, J.E. How Smart, Connected Products Are Transforming Competition. *Harv. Bus. Rev.* **2014**, *92*, 64–88.
44. Lloyd, G. The Business Benefits of Cyber Security for SMEs. *Comput. Fraud Secur.* **2020**, *2020*, 14–17. [CrossRef]
45. Ray, G.; Muhanna, W.A.; Barney, J.B. Information Technology and the Performance of the Customer Service Process: A Resource-Based Analysis. *MIS Q.* **2005**, *29*, 625–652. [CrossRef]
46. Dutta, G.; Kumar, R.; Sindhwani, R.; Singh, R.K. Digitalization Priorities of Quality Control Processes for SMEs: A Conceptual Study in Perspective of Industry 4.0 Adoption. *J. Intell. Manuf.* **2021**, *32*, 1679–1698. [CrossRef]
47. Taherdoost, H. Legal, Regulatory, and Ethical Considerations in E-Business. In *E-Business Essentials: Building a Successful Online Enterprise*; Springer Nature: Cham, Switzerland, 2023; pp. 379–402.
48. Ahmad, M.M.; Cuenca, R.P. Critical success factors for ERP implementation in SMEs. *Robot. Comput.-Integr. Manuf.* **2013**, *29*, 104–111. [CrossRef]
49. Philip, L.; Williams, F. Remote Rural Home-Based Businesses and Digital Inequalities: Understanding Needs and Expectations in a Digitally Underserved Community. *J. Rural Stud.* **2019**, *68*, 306–318. [CrossRef]
50. Rupeika-Apoga, R.; Bule, L.; Petrovska, K. Digital Transformation of Small and Medium Enterprises: Aspects of Public Support. *J. Risk Financ. Manag.* **2022**, *15*, 45. [CrossRef]
51. Atkinson, A. *Financial Education for MSMEs and Potential Entrepreneurs*. OECD Working Papers on Finance, Insurance and Private Pensions, No. 43; OECD Publishing: Paris, France, 2017. [CrossRef]
52. Chen, C.L.; Lin, Y.C.; Chen, W.H.; Chao, C.F.; Pandia, H. Role of Government to Enhance Digital Transformation in Small Service Business. *Sustainability* **2021**, *13*, 1028. [CrossRef]
53. Aamer, A.; Sahara, C.R.; Al-Awlaqi, M.A. Digitalization of the Supply Chain: Transformation Factors. *J. Sci. Technol. Policy Manag.* **2023**, *14*, 713–733. [CrossRef]
54. Kabanda, S.; Tanner, M.; Kent, C. Exploring SME Cybersecurity Practices in Developing Countries. *J. Organ. Comput. Electron. Commer.* **2018**, *28*, 269–282. [CrossRef]
55. Coleman, S.; Göb, R.; Manco, G.; Pievatolo, A.; Tort-Martorell, X.; Reis, M.S. How Can SMEs Benefit from Big Data? Challenges and a Path Forward. *Qual. Reliab. Eng. Int.* **2016**, *32*, 2151–2164. [CrossRef]
56. Wang, C.; Zhang, N.; Wang, C. Managing Privacy in the Digital Economy. *Fundam. Res.* **2021**, *1*, 543–551. [CrossRef]
57. Han, H.; Trimi, S. Towards a Data Science Platform for Improving SME Collaboration through Industry 4.0 Technologies. *Technol. Forecast. Soc. Change* **2022**, *174*, 121242. [CrossRef]
58. Achmad, W. MSMEs Empowerment through Digital Innovation: The Key to Success of E-Commerce in Indonesia. *Daengku J. Humanit. Soc. Sci. Innov.* **2023**, *3*, 469–475.
59. Statistics. One-Way ANOVA in SPSS Statistics. Available online: <https://statistics.laerd.com/spss-tutorials/one-way-anova-using-spss-statistics.php> (accessed on 10 September 2023).
60. Pucihar, A.; Mohar Bastar, K.; Lenart, G. Digital Transformation Journey of Organizations in Slovenia. In *Znanstvenoraziskovalni Izzivi na Poti Digitalne Preobrazbe*; Kljajić Borštnar, M., Pucihar, A., Eds.; Univerzitetna Založba: Maribor, Slovenia, 2022; pp. 1–20.
61. SURS. Težave pri Digitalni Preobrazbi Poslovanja in Uporaba Tehnologij Umetne Inteligence v Podjetjih. Available online: <https://www.stat.si/StatWeb/News/Index/9885> (accessed on 12 September 2023).
62. Janssens, W.; Wijnen, K.; De Pelsmacker, P.; Van Kenhove, P. *Marketing Research with SPSS*, 1st ed.; Pearson Education: London, UK, 2008; pp. 72–75.

63. Morrisette, R.N. Statistics for the Behavioral Sciences: One Way ANOVA. Available online: <https://www.palomar.edu/users/rmorrisette/Lectures/Stats/OneWayANOVA/OneWayANOVA.htm> (accessed on 10 September 2023).
64. IBM. One-Way ANOVA Post Hoc Tests. Available online: <https://www.ibm.com/docs/en/spss-statistics/saas?topic=anova-one-way-post-hoc-tests> (accessed on 10 September 2023).

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