

Digital Transformation in SMEs Emerging Technological Tools and Technologies for Enhancing the SME's Strategies and Outcomes

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Abstract

This study aims to conduct a comprehensive analysis of digital transformation which involves the integration of digital technology into all sectors of SMEs, resulting in increased efficiency and enhanced customer service, enables SMEs to reduce overall expenditure by optimizing operational and marketing costs, thereby allowing to focus on value-adding activities, supports SMEs' technology innovation development models and strategies for fostering technological innovation within SMEs. The research identifies the difficulties encountered by SMEs during the implementation of digital transformation initiatives. Additionally, it seeks to acknowledge emerging trends in digital transformation that may affect SMEs and offer advice on proactively embracing technological advancements to sustain competitiveness. This is a mixed-method research project utilizing systematic review and deductive methods to gather qualitative data. SMEs currently employing digital transformation were purposefully selected based on criteria such as authorship, publication date, sample size, and variables for this study. Furthermore, this research involved conducting thorough interviews and observations to delve into the technological innovations pursued by the participants. It was found that there are some factors of digital transformation in SMEs' technology innovation: Enhanced Operational Efficiency, Improved Customer Engagement, Global Market Access, Data driven decision making. Hence, Digital transformation in SMEs contribute autonomously to the expenses of technological innovation to foster business sustainability. This necessitates a strategic focus on enhancing consumer services and fostering a favorable attitude toward innovation in SMEs' business practices and development through technology. This study examines obstacles to SME technology innovation in production, business models, technology adoption, and strategic approaches, without analyzing costs related to SME-driven digital transformation. Future studies could investigate obstacles across various SME sectors to enhance digital tools, underscore the significance of SMEs adopting technology, integrating strategic supply chain management, and broadening their business strategies to attain sustainable development.

Keywords: *Digital transformation; SMEs; emerging technological tools; SME's strategies; review paper.*

Introduction

Digital transformation entails the incorporation of digital technologies throughout all aspects of a business, resulting in a fundamental shift in how the firm functions and provides value to its consumers (Yadav & Seranmadevi, 2024). For small and medium-sized enterprises (SMEs), this frequently entails shifting from manual, paper-based procedures to automated digital systems and workflows driven by software, cloud computing, mobile technologies, and data analytics (Tronvoll et al., 2021). The objective is to enhance effectiveness, flexibility, output, and interconnectedness within the business by leveraging digital capabilities (Malik et al., 2022).

In this study, digital transformation is defined as a transformation that is triggered by a transformative information technology (Zhang et al., 2023). This transformation encompasses significant alterations in corporate processes, operational procedures, and organizational capacities, as well as the expansion into new markets or the withdrawal from existing markets (Castro-Lopez et al., 2023). The literature commonly recognizes the significance of a governing agency in digital transformation, but the specific manner in which

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it exercises its impact is still uncertain (Ullrich et al., 2023). Another area of concern pertains to the potential role that digital architectures and associated service providers may play in the process of digital transformation (Islam and Bhuiyan, 2022).

Most of the firms have experienced improvements in productivity and reductions in operational costs as a result of incorporating digital technology into their business functions (Stoeckl, 2004; Islam and Bhuiyan, 2022). There are many brilliant tech tools for entrepreneurs and small businesses to leverage and unlock a competitive edge in today's changing business landscape. They are Cloud technology, Business process automation, AI algorithms and data mining tools, Cybersecurity Tech, Online Payments, Virtual Workspaces (Elmaaty & Ibrahim, 2023). Strategy is taught at every Business School in the world, though different approaches to developing a strategy exist. Strategy grew out of the military and settled well into the competitive world of capitalism. Businesses need competitive strategies in order to win their chosen markets (Mackay et al., 2023; Ryskeldi et al., 2024). Strategy invariably involves setting a direction, exploring different scenarios, locating the business in relation to its competitors (Khanom et al., 2022), collaborating where this serves the interests of the business (Rizqiyani, 2022). It involves deploying “best practice” in terms of business processes, technology and approaches to marketing, managing risk, managing people and developing an appropriate culture to deliver the company’s goals and objectives (Wiedemann et al., 2023).

Outcomes for SMEs can be measured in a number of quantitative ways and unlike large enterprises and corporations, the outcomes important for the entrepreneur are often qualitative (Wachira, 2024). Even though traditional profit-motive outcomes are valid for entrepreneurs, there are a host of other reasons for starting a business that include being their own boss, pursuing their own ideas, and pursuing opportunities without regard to their current resources (Yi-Wen Chen et al., 2023). Digital tools offer various business benefits. Digitalization speeds up information access and communication amongst staff, suppliers, and networks, lowering transaction costs (Bhuiyan et al., 2023). It reduces transit and border expenses and expands service trade, helping SMEs reach global markets (Fu et al., 2024). It makes online resources like peer-to-peer financing, training, and recruitment channels, including government services, more accessible (Gilbert, 2023). It fosters innovation, access to innovation assets, and the ability for enterprises to collect data and evaluate their operations in innovative ways to improve performance (Bhuiyan & Akter, 2024). To conclude, multiple studies have shown that digital transformation in SMEs improves strategic outcomes (Jia et al., 2024).

Research Gap

This study the research gap in digital transformation SMEs emerging technological tools for enhancing strategies and outcomes the business activities of present in previous studies (Bhuiyan & Akter, 2024). In this research that uses an index to examine how digital transformation affects the business activity of SMEs (Bhuiyan, 2023). Researchers conduct a comprehensive study on digital transformation and analyze its effects on the ability of small and medium enterprises (SMEs) to contact their customers. There are few longitudinal studies on the long-term effects of digital transformation on SME performance and more study is needed to understand the long-term benefits and risks (Bhuiyan et al., 2023). Research frequently focuses on single technologies rather than the integrative and synergistic potential of many tools, so little is known about how AI combined with IoT or big data analytics affects SME strategy and outcomes (Bhuiyan, 2023). Researchers can better understand how digital transformation might benefit small and medium-sized organizations’ strategy and results by addressing these unexplored study areas.

Objective

The primary research goal of this study:

RO1: To determine the typical obstacles and difficulties SMEs encounter while putting digital transformation projects into practice.

RO2: To identify digital transformation trends that could affect SMEs and offer advice on how to remain ahead of technology and stay competitive.

Literature Review

Advancements in technology, fueled by a robust network of tech companies, research institutions, and venture capital are driving digital transformation (Rogers, 2016). This tech facilitates efficient data storage and processing, seamless collaboration and streamlined application deployment for businesses. By analyzing customer behavior, market trends, operational metrics, small and medium enterprises can pinpoint growth opportunities and adapt quickly to market changes (Denga & Rakshit, 2022). Internal processes have become more efficient through digital tool integration, improving communication and overall operations (Bhuiyan et al., 2023). Digitalization has also heightened SMEs' competitiveness, enabling agile decision-making and optimization of offerings (Butt, 2020). Swift adaptation to technological advancements positions digitally transformed SMEs as agile contenders in the dynamic business arena. However, this transformation journey demands a skilled workforce adept at leveraging emerging technologies (Shakya et al., 2022).

Digital Transformation

Digital transformation refers to the adoption of modern digital technologies like mobile devices, artificial intelligence, cloud computing, block chain, and the Internet of Things to enhance business operations (Gill et al., 2019). It involves a strategic approach to integrating these technologies throughout a company to bring about significant improvements. This shift not only changes how businesses operate but also impacts how individuals and groups interact and create value using technology (Luftman et al., 1993). Digital transformation is a multifaceted process that prioritizes human interactions alongside technological advancements. While it presents opportunities, it also poses challenges, especially for small and medium-sized enterprises which face pressure to innovate and adapt (Trenkle, 2020). Successfully embracing digital transformation requires SMEs to invest in specific technological and organizational capabilities, including knowledge management, information processing, and digital networking (Sabri, 2022).

Digital Transformation in SMEs

Digital transformation in small and medium enterprises deals with overcoming resistance to change among individuals, groups, and broader systems (Kargas et al., 2023). It involves using digital technology to improve a company's ability to use and integrate new tech into its operations. However, coordinating the adoption of different digital tools can be challenging for SMEs (Musyaffi, 2024). Implementing digital tech helps SMEs create new products, reach more customers and perform better. It also changes how SMEs do business by opening up new ways to sell and deliver value to customers (Li & Zhang, 2021). By going digital, SMEs can stay competitive by innovating in how they create, offer, deliver and profit from value. This helps them handle crises better and perform well over time. Being more competitive also lets SMEs adapt more easily to outside disruptions (Wassersug, 2021).

Emerging Technological Tools in SMEs

Technological advancement plays a pivotal role in determining a company's competitiveness both domestically and globally (Fedyunina et al., 2024). Small and medium enterprises (SMEs) are increasingly leveraging a variety of emerging technological tools to enhance their operations, improve efficiency, and stay competitive in the market (Oyewole et al., 2024). Some of these tools include Cloud Computing, Big Data Analysis, Internet of Things, Artificial Intelligence and Machine Learning, Block chain, Robotic Process Automation, Cybersecurity Solutions. For firms aiming to stay ahead or expand into new markets, embracing new technologies is imperative (Vasile & Iriart, 2023). Innovation in technology significantly impacts a company's competitive edge.

Various theories have been proposed to understand how technology is adopted, ranging from individual-level models like the technology acceptance model to broader theories like the theory of planned behavior (Addy et al., 2024). However, while these theories enhance our understanding, they don't offer a comprehensive view of technology adoption (Ayanwale & Ndlovu, 2024). SMEs that innovate with technology can now consider expanding beyond domestic markets to compete internationally, even against large corporations (Simba et al., 2024). Despite efforts to explain technology adoption, studies often focus on specific technologies, making it hard to generalize findings. Social media and virtual communication platforms, initially designed for personal connections, have become vital for disseminating information, especially for SMEs (Murugappan & Jeyshankar, 2023). Our research aims to bridge this gap by exploring various factors influencing SMEs' adoption of a wide range of digital technologies. Some experts argue that

SMEs in developing countries often struggle with low productivity, subpar product quality, and limited local markets. Improving productivity and product quality, as well as accessing new markets, hinges on developing human capital in these countries (Ruiz et al., 2024).

Technologies for Enhancing the SMEs Strategies

The adaptability of business processes greatly relies on the integration of the latest technology to perform essential functions such as rectifying internal inconsistencies, ensuring swift and efficient service delivery and maintaining effective communication channels (Zheng et al., 2024). However, simply adopting and using IT tools is insufficient for achieving optimized communication strategies. It's crucial to measure the integration of IT infrastructure with SMEs' internal communication strategies (Bhuiyan, 2017). The effectiveness of SMEs' internal communications can either positively or negatively impact their productivity and sustainability (Tuegeh, 2024). Nonetheless, inflexible communication cultures or strategies can hinder innovation. Technological literacy emerges as a powerful tool essential for ensuring organizational performance in a digitalized business environment. This technology offers improved transparency, traceability and security, potentially streamlining processes and reducing inefficiencies (Cavaliere et al., 2024). Its secure and collaborative data-sharing framework facilitates real-time information exchange among authorized parties, preventing information silos that often lead to bottlenecks (Bhuiyan, 2019). This heightened visibility along with the technology's ability to anticipate and mitigate disruptions result in a synergistic relationship that not only enhances supply chain efficiency but also promotes streamlined operations, reduced lead times, cost optimization, and heightened levels of customer satisfaction within the complex network of modern supply chain dynamics (Taheri et al., 2024).

Technologies for Enhancing the SMEs Outcome

The integration of Artificial Intelligence and automation is anticipated to be crucial in the digital transformation journey of SMEs (Panchal et al., 2024). As concerns regarding data privacy escalate, SMEs are expected to prioritize compliance with data protection regulations more rigorously. This entails ensuring transparent data practices, obtaining explicit consent from users, and implementing measures to safeguard customer privacy (Akanfe et al., 2024). The future of digital transformation underscores inclusivity, aiming to make technology accessible to all segments of society. SMEs are projected to concentrate on developing digital solutions that cater to diverse user needs including those with disabilities or limited digital literacy (Raji, Olodo, Oke, Addy, Ofodile, & Oyewole, 2024). This trend aligns with a broader commitment to digital inclusion, ensuring that the advantages of technology are accessible to everyone. By achieving these goals, the research aims to provide a comprehensive understanding of how block chain technology enhances SMEs' operational efficiency, export capabilities and financial stability (Purwaningsih et al., 2024). Despite the availability of financing strategies like crowd financing to mitigate financial risks for SMEs in this digitalized business landscape, insufficient technological literacy can hinder these opportunities (Bhuiyan et al., 2023). Therefore, SMEs must possess technical competence to improve their performance in this digitalized business environment (Le et al., 2024).

Methodology

A systematic review is a methodical approach to literature review that involves using a clearly defined algorithm and a multi-stage review process to gather and evaluate a collection of research studies. The primary objective of this systematic review is to investigate digital transformation through the development of technological tools aimed at enhancing SME strategies and outcomes (Purwaningsih et al., 2024). Employing the systematic review methodology allowed for the identification of relevant literature by adhering to specific procedures designed to select and present research findings aligned with the study's goals (Bhuiyan, 2017).

This study adopts a deductive approach, leveraging empirical evidence and associated theories to support explanations and arguments. Within this Qualitative research framework, emphasis is placed on understanding the evolving nature of reality shaped by individuals' experiences, where the researcher and participants interact closely and are intertwined (Panchal et al., 2024). Furthermore, the research conducted searches across various electronic databases, including Business Source Premier (EBSCO), Scopus, Science Direct, Research gate and Google Scholar among others. However, prominent publishing companies such as Emerald, Elsevier, Taylor & Francis, and MDPI were prioritized for journal selection based on their

relevance to the central theme of the review as determined by the research problem (Joel et al., 2024). Additionally, the review considered published working papers and reports from multilateral organizations such as the World Bank, WTO, and IMF (Bhuiyan et al., 2023).

The main goal of this study is to identify research that investigates the process of digital transformation in small and medium-sized organizations (SMEs) and studies how the use of technical tools might improve the strategies and outcomes of these businesses. The overall methodology employed in this study is outlined as follows: Initially, an extensive web search was conducted focusing on journal publications related to SMEs, yielding over one million results. Subsequently, two key terms, "Technology" and "Technological Challenge," were used as inclusion criteria for selecting papers to be included in the review.

These studies, which provided empirical results, were categorized based on authorship, publication date, sample size, and variables (Hamedani et al., 2024). The findings were then presented comprehensively. The research's applicability to similar developing countries was highlighted. Papers were included in the final sample if they met three criteria: they addressed digital transformation rather than just business model innovation, they didn't merely offer popular recommendations to business leaders, and they didn't focus solely on the rise of home-based online businesses (Fernandes & Burcharth, 2024). The paper took a conceptual approach, supported by empirical evidence, and concluded by discussing future research directions suggested by the synthesized discussions.

Discussion

Initial Conditions of Digital Transformation

Digital transformation involves integrating digital technology into every aspect of an organization, leading to a significant change in operations and customer value provision (Onesi-Ozigagun et al., 2024). It is also a cultural transformation that needs organizations to consistently question established norms, engage in experimentation, and become accustomed to the possibility of failure. Given the unique nature of each firm, defining digital transformation in a way that universally applies can be challenging (Fernandes & Burcharth, 2024). Digital transformation generally refers to the integration of digital technology into all facets of an organization, resulting in significant changes in business operations and customer value provision (Bhuiyan et al., 2024). Moreover, it necessitates a culture shift that compels organizations to consistently question established norms, frequently engage in experimentation, and become accustomed to the possibility of failure (Hamedani et al., 2024). Occasionally, this entails abandoning established business procedures that organizations were founded on in favor of more recent practices that are still in the process of being defined.



Figure 1. Digital Transformation.

Transformation and Strategic Changes

During our analysis, we found that the majority of the SMEs we examined had made significant progress in their digital transformation (Clemente-Almendros et al., 2024). This was evident in their transition to becoming SMEs, as well as their intention to pursue more strategic improvements (Bhuiyan et al., 2023).

SMEs frequently utilize information systems (IS) to aid in business management. However, large enterprises observe the majority of new applications of information systems (IS), while inventive high-tech start-ups also emerge. Major corporations utilise information systems and information technology to enhance value rather than solely focusing on cost reduction. SMEs typically adopt information systems (IS) in a similar way to how large corporations initially used them, with a focus on reducing costs (Andrade-Rojas et al., 2024).

Impact on Business Strategies in SMEs

Small firms can enhance their agility and speed through the process of digital transformation. This enables them to promptly adapt to market fluctuations, consumer demands, and industry trends (Joel et al., 2024). Amidst the ever-evolving digital landscape, businesses and organizations face challenges in maintaining their relevance and competitiveness. SMEs must prioritize digital transformation in order to stay competitive and take advantage of growth opportunities in today's rapidly changing economic landscape (Bhuiyan et al., 2024). This landscape is influenced by factors such as the quickening pace of technological innovation, evolving customer expectations and purchasing habits, the emergence of data-driven business models, and the growing interconnectedness of the global economy through digital means (Chandra & Panda, 2024).

Table 1. Key Impacts factors for Business Strategies in SMEs.

Key points	Description	Reference
Enhanced Operational Efficiency	It is possible for small firms to benefit greatly from the utilization of digital technologies and automation. They are able to assist them in reducing the amount of time spent on administrative activities, minimizing errors, and lowering expenditures. Solutions that are hosted in the cloud make it possible to work remotely, which results in enhanced flexibility and scalability.	(Neely, 2020)
Improved Customer Engagement	When it comes to engaging with customers, CRM, email marketing, and social media are all effective tools. Additionally, the most effective way for small firms to reap the benefits of digital transformation is to invest in the development of long-lasting connections.	(Falcone et al., 2024)
Global Market Access	The internet makes it easy for small businesses to sell their products and services to people all over the world through online marketplaces and shipping services. Innovation-driven global businesses need strong local capabilities to achieve competitive success. However, multiple market and institutional failures impede the development of capabilities.	(Macca et al., 2024) (Mohammad et al., 2024)
Data-Driven Decision Making	By utilizing analytical tools, small businesses have the ability to make well-informed decisions, enhance their products, and maximize the effectiveness of their advertising. Additionally, they assist in stock management as well as the acquisition of insights about customer behavior and market conditions.	(Raji et al., 2024)

By leveraging digital tools, small and medium-sized enterprises (SMEs) may enhance efficiency, expedite data-driven decision-making, improve customer experiences, expand their market reach, and stay competitive with larger rivals. Choosing to remain analog in a digital world exposes SMEs to the danger of lagging behind when industries undergo digital disruptions. Long-term resilience and growth are contingent upon digital transformation (J Nair et al., 2024).

The Digital Technologies for SMEs

Digital technologies provide numerous opportunities for small and medium-sized firms (SMEs) to optimize operations, expand their client base, and foster innovation (Bhuiyan et al., 2024). Below are several essential technologies that small and medium-sized enterprises (SMEs) can utilize: Cloud Computing, Artificial Intelligence, Internet of Things (IoT).

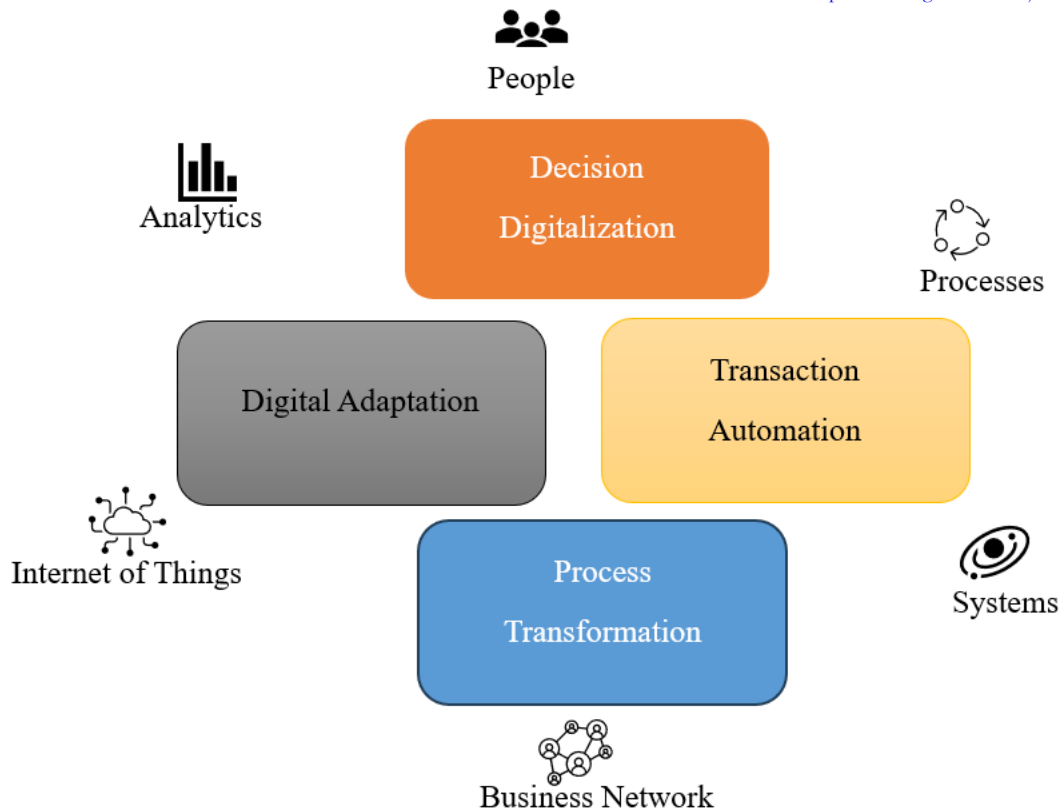


Figure 2. Digital Transformation for SMEs.

Source: Author work.

- **Cloud** businesses to remotely access critical data from any location with an internet connection (Atadoga et al., 2024). This implies that employees are no longer restricted to working in the office or adhering to traditional working hours. Instead, they have the ability to convert kitchens, restaurants, beaches, and cars into viable workspaces. Cloud computing encompasses a range of services such as storage, backup, software, and hosting. The main goal is to provide unrestricted and limitless access to data whenever needed. Cloud computing has become increasingly crucial since it allows several firms to maintain operations while working remotely and facilitates a smooth shift from office-based labor to remote work (Namasudra, 2023). The Internet of Things will revolutionize industries by connecting the planet. Cloud analytics-based business intelligence will help small businesses make better decisions. Effective, on-demand workplaces without commuting, high-cost IT staff, or employee needs will replace expensive offices. Silos will be broken, fragmented data will be integrated and accessible, and teams will have trusted real-time data. This data can help SMEs create unique customer journeys, improve employee experiences, and improve decision-making (Dlamini & Botha, 2024).
- **Artificial intelligence of SMEs:** By leveraging AI technologies, SMEs can achieve performance and innovation boosts across multiple areas of the business, from financial management to sales and marketing to human capital management and product development (Cubric & Li, 2024). The subjects of digitization and Industry 4.0 are ever-present, constantly reminding company leaders of the opportunities and repercussions of a delayed or missed implementation. Small and medium-sized firms (SME) now find it necessary to actively participate in and influence this development. Currently, the process of converting society and the economy into a digital format is progressing rapidly, providing organizations in various industries with multiple opportunities for growth at all levels. Artificial intelligence (AI) is an advanced technology that opens up new possibilities and resolves challenges beyond human and system capabilities (Hevner & Storey, 2023).
- **Internet of Things for SMEs:** The implementation of IoT for SMEs provides a tangible edge in the market, allowing firms to leverage advanced technology and enhance their operations by reducing the need for manual chores through automation (Thekkoote, 2024). The Internet of

Things (IoT) refers to a network of interconnected physical objects that are capable of collecting and exchanging data via the internet. It allows individuals and organizations to establish stronger connections with the world and complete more significant and intelligent jobs. The Internet of Things (IoT) will persistently impact the functioning of management systems and the way we do business. The potential for connectivity is limitless, enabling the transformation of everything into an Internet of Things (IoT) device. Examples of IoT applications that aid in the automation and control of daily operations include an application that enables heating system management and a motion sensor that activates closed-circuit television (CCTV) cameras. By applying identical technologies and logical reasoning, businesses can obtain up-to-the-minute data and enhance productivity in their work processes (Ragazzini et al., 2024).

Challenges in Implementation in Digital Transformation in SMEs

Entrepreneurs frequently encounter challenges in recruiting and retaining personnel with proficiency in digital competencies, and they also face limited options for providing training to current employees on emerging technology (Khoo et al., 2024). The skills gap presents a challenge for SMEs in implementing digital transformation plans and fully utilizing emerging technology. Implementing digitalization necessitates modifications to both business processes and organizational culture, which can provide a significant challenge for small and medium-sized enterprises (SMEs) compared to bigger corporations (Hossain et al., 2024). The following are the primary obstacles that small and medium-sized enterprises (SMEs) face in implementing digital transformation:

Table 2.

Keywords	Description	Reference
Lack of Digital Talent and Skills	SME owners like you, whom we've worked with since 1994, experienced these challenges such as "Have you wondered, 'How do I find and attract digital experts?'" or "How can I train my team with these new technologies, let alone retain technical experts?" You're not alone. Business owners have less possibilities to train staff on new technology and struggle to acquire and retain digitally skilled workers. SMEs may struggle to implement digital transformation plans and use emerging technologies due to the skills gap.	(Hossain et al., 2024)
Lack of Digital Tools and Know-How	Large organizations utilize enterprise-grade digital technologies to transform operations, but SMEs frequently lack them. They have limited funds to buy, integrate, and manage new software, hardware, and innovation. It can be difficult to compete with minimal funds. Small firms struggle to digitize workflows, collect and analyze customer data, and automate repetitive tasks without the necessary tools. They struggle to stay up with digital transformation and innovation in their industries. It can drain your time, energy, and resources.	(Abbas & Myeong, 2024)
Keeping Up and Navigating Change	New technologies emerge daily, making it difficult for SMEs to keep up and choose the most valuable ones. It's overwhelming, especially for business owners. "How do I keep up? Which ones merit investment? A small organization needs significant resources to implement one new system. For innovation, cooperation, and value creation in cross-functional alliances and an interdependent digital transformation system, traditional organizations must adopt an agility mindset, which is difficult. Digital strategies must also adapt to changing markets and client expectations.	(Guo et al., 2023)
Cybersecurity Risks	SME cybersecurity concerns are inherent in the digital world. As SMEs adopt more technology and move operations online, their cyberattack surface grows. Small firms sometimes lack the resources to invest in security systems and protocols, so a cyberattack might damage operations, finances, and reputation. You are right that small enterprises lack resources compared to large ones. What can SMEs do to avoid these risks?	(Thamrongthanakit, 2023)

Lack of Funding for Digital Transformation	Many experienced business owners face this dilemma. New technology, systems, infrastructure, and training are expensive upfront investments that many SMEs struggle to fund alongside their daily operations. They also have smaller IT teams that wear several hats, making it hard to study, implement, and support digital transformation projects. Capital scarcity hinders digital progress.	(Soni, 2023)
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Figure 3. Digital Capabilities for Digital Transformation in SMEs.

Source: Author's Work.

SMEs Go Digital transformation program seeks to assist SMEs in adopting digital technology and developing stronger digital capabilities in order to take advantage of digital economy growth possibilities. SMEs Go Digital builds on the basis of Enhanced print by taking a more systematic and participatory approach to SMEs' adoption of digital technology.

Small and medium companies (SMEs) are the backbone of Bangladesh's economy, employing two-thirds of the workforce and accounting for roughly half of the country's GDP (GDP). As the Bangladeshi economy undergoes a digital revolution, it is critical that our SMEs take advantage of digital technologies to improve operations and earn new revenue.

Implication for Study

This study highlights how digital transformation and technological progress can enhance the performance of SMEs while also adding to our understanding of the SME landscape (Guo et al., 2023). It lays the groundwork for future research by exploring the connections between technology adoption, exports, supply chains, and finances. Recently, SMEs have been using technology transfer to tackle challenges from global expansion, creating new opportunities for sharing technology (Bhuiyan, 2023). The study suggests areas for further research, such as public-private knowledge sharing and innovation within SMEs. It also reveals how technological factors affect the sustainability of SMEs in developing countries (Hossain et al., 2024). Overall, it contributes to discussions about why organizations adopt digital technologies, filling gaps left by previous studies that often focus on only one aspect of the issue (Islam et al., 2024).

Implication for Practice

From a management perspective, the study emphasizes the important steps SMEs need to take strategically. It suggests that SMEs should collaborate actively with public organizations to benefit from available research and expertise. Overcoming challenges in building IT infrastructure that can handle new technologies is crucial (Khoo et al., 2024). Furthermore, the research expands our understanding of how different actors' roles are changing and encourages a broader look at IT and digital transformation challenges. Policymakers can use this study and its frameworks to improve support for SMEs' digital transformation, especially for smaller businesses. This could involve customized training, coaching, and other forms of assistance (Hevner & Storey, 2023). However, it requires a detailed examination of attitudes and behaviors toward IT and the development of relational capital (Bhuiyan, 2023). The study's findings

are important for policymakers aiming to create an environment that fosters SMEs' digital transformation. Policies that reinforce financial regulations can provide SMEs with stability and incentives to pursue transformative projects (Hamedani et al., 2024). Additionally, such policies can help SMEs access more support as they embark on their digital transformation journey.

Lastly, the insights gleaned from the digital transformation and the adaptive strategies of SMEs present a valuable roadmap applicable to regions across the globe (Panchal et al., 2024). Key principles such as embracing innovation, investing in digital infrastructure, promoting collaboration, and acknowledging the significance of tailored solutions for specific contexts emerge as crucial for success in the digital age.

Conclusion

The conclusion of the research underscores the critical importance of digital transformation for small and medium-sized enterprises in enhancing their performance and competitiveness by using technology (Hossain et al., 2024). Despite its numerous benefits such as productivity improvements and innovation, SMEs face various obstacles in adopting digital transformation, including budget constraints, technological literacy, and data security concerns (Rahman et al., 2024). However, given the strategic advantages it offers and its positive impact on SME performance, digital transformation is increasingly becoming a necessity rather than a choice for SMEs (Bhuiyan, 2023). The study emphasizes the significance of integrating knowledge resources and fostering technological literacy among employees to drive successful digital transformation initiatives. Additionally, it highlights the potential of open innovation and collaboration with public research institutes to facilitate SMEs' technological progress (Amin et al., 2024). The study offers useful insights into the difficulties and possibilities of digital transformation for small and medium-sized enterprises (SMEs). However, it also recognizes the importance of investigating additional competitive concerns, such as sustainability and globalization, in future research (Clemente-Almendros et al., 2024).

In summary, this study emphasizes the importance of SMEs embracing technology adoption, implementing strategic supply chain management practices, and diversifying their business strategies to achieve sustainable growth (Rahman et al., 2024). Furthermore, it highlights the role of government in facilitating the digital transformation of SMEs by providing incentives and e-commerce-related support through established government agencies (Chen et al., 2024). Success in the rapidly evolving digital landscape is increasingly dependent on individuals and SMEs staying abreast of technological advancements.

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