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Digital Transformation in SMEs: Overcoming Barriers to Adoption

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Abstract

This study aims to explore the barriers faced by small and medium-sized enterprises (SMEs) in adopting digital transformation, providing insights into the organizational, technological, cultural, and external challenges they encounter. A qualitative research design was employed, using semi-structured interviews to collect data from 26 participants representing diverse industries and roles within SMEs. The interviews were conducted online, and the transcripts were analyzed using thematic analysis through NVivo software. The study continued until theoretical saturation was achieved. The study identified four main themes as barriers to digital transformation: organizational challenges (including lack of digital skills and financial constraints), technological barriers (such as legacy systems and cybersecurity concerns), cultural and behavioral factors (resistance to change and lack of employee buy-in), and external obstacles (regulatory constraints and market dynamics). These challenges were experienced differently across sectors and were influenced by the resources and strategies available within the SMEs. The findings underscore the complexity of digital transformation for SMEs, highlighting the need for tailored support, including digital skills training, leadership development, and external support mechanisms. Addressing these barriers can enable SMEs to leverage digital technologies for competitive advantage and operational efficiency.

Keywords: Digital transformation, small and medium-sized enterprises, barriers to adoption, qualitative research, organizational challenges, technological barriers, cultural factors, external factors.

1. Introduction

In the contemporary business landscape, digital transformation has emerged as a pivotal strategy for organizations seeking to enhance operational efficiency, foster innovation, and maintain competitiveness. This transformation involves the integration of digital technologies into all facets of a business, fundamentally altering how value is delivered to customers and how companies operate (Verhoef et al., 2021). While large enterprises often lead in adopting digital technologies, small and medium-sized enterprises (SMEs) face unique challenges that can impede their digital transformation efforts. Understanding these barriers is crucial, as SMEs constitute a significant portion of the global economy and their successful digital integration is vital for broader economic growth and resilience.

Digital transformation refers to the comprehensive adoption of digital technologies to revolutionize business processes, models, and customer interactions. It extends beyond mere digitization of existing processes, aiming for a fundamental rethinking of how organizations utilize technology to create new or modify existing business processes and customer experiences (Vial, 2019). This transformation encompasses various technologies, including cloud computing, artificial intelligence, the Internet of Things (IoT), and big data analytics, each offering distinct opportunities and challenges for businesses.



SMEs play a critical role in the global economy, contributing significantly to employment and GDP in many countries. For these enterprises, digital transformation offers pathways to improve operational efficiency, enhance customer engagement, and access new markets. By adopting digital tools, SMEs can streamline workflows, reduce costs, and respond more agilely to market changes (Chaniyas & Hess, 2016). Moreover, digital platforms can enable SMEs to compete with larger firms by leveling the playing field, particularly in terms of market reach and customer interaction.

Despite the clear advantages, SMEs often encounter significant obstacles in their digital transformation journeys. These barriers can be broadly categorized into organizational, technological, cultural, and external factors. Page | 20

A prevalent issue among SMEs is the lack of digital skills within the workforce. Limited technical expertise and inadequate training programs can hinder the effective implementation of digital technologies (Kallmuenzer et al., 2024). Financial constraints also pose a significant challenge, as the costs associated with digital transformation can be prohibitive for smaller enterprises. Additionally, leadership resistance, often stemming from a lack of digital vision or fear of change, can impede progress. Organizational complexities, such as hierarchical structures and departmental silos, further exacerbate these challenges by obstructing communication and collaboration necessary for successful digital integration.

SMEs frequently grapple with outdated legacy systems that are incompatible with new digital solutions, making integration a complex and costly endeavor (Restrepo-Morales et al., 2024). Concerns about cybersecurity, including data breaches and privacy issues, also deter SMEs from adopting digital technologies. Furthermore, the mismatch between available software solutions and the specific needs of SMEs can lead to the selection of inappropriate tools, resulting in implementation failures. Dependence on external vendors for digital solutions can create additional challenges, particularly when SMEs lack the bargaining power to negotiate favorable terms or ensure service quality.

Resistance to change is a significant cultural barrier within SMEs. Employees may fear job displacement or feel apprehensive about adapting to new technologies, leading to reluctance in embracing digital transformation initiatives (Díaz-Arancibia et al., 2024). Communication gaps, such as poor knowledge sharing and misalignment of goals between management and staff, can further hinder transformation efforts. A lack of employee buy-in, often resulting from minimal involvement in decision-making processes, can lead to low motivation and engagement with digital initiatives. Additionally, organizational cultures that prioritize short-term goals and exhibit an aversion to experimentation may stifle the innovation necessary for successful digital transformation.

External factors, including regulatory constraints and rapidly changing market dynamics, present additional challenges for SMEs. Compliance with complex regulations can be resource-intensive, diverting attention and funds away from digital initiatives (Kallmuenzer et al., 2024). Market pressures, such as the need to keep pace with competitors' technological advancements and evolving customer expectations, can overwhelm SMEs with limited resources. Economic instability and limited access to expert networks further exacerbate these challenges, making it difficult for SMEs to invest in and sustain digital transformation efforts.

Given these multifaceted challenges, external support mechanisms play a crucial role in facilitating digital transformation among SMEs. Government initiatives, industry associations, and private sector partnerships can provide the necessary resources, training, and incentives to encourage digital adoption. Policy frameworks that reduce regulatory burdens, offer financial assistance, and promote digital literacy can create an enabling environment for SMEs to embark on their digital transformation journeys (Krauss et al., 2021).

While existing literature has identified various barriers to digital transformation in SMEs, there is a need for in-depth qualitative research that explores these challenges from the perspectives of SME stakeholders. Understanding the lived experiences, perceptions, and insights of those directly involved can provide a nuanced understanding of the obstacles and inform the development of tailored strategies to overcome them. This study aims to fill this gap by conducting semi-structured interviews with SME participants to explore the barriers to digital transformation and identify potential pathways to facilitate successful adoption.

Digital transformation presents both significant opportunities and challenges for SMEs. While the integration of digital technologies can drive growth, efficiency, and competitiveness, various organizational, technological, cultural, and external barriers can impede progress. A comprehensive understanding of these challenges, informed by qualitative insights from SME stakeholders, is essential for developing effective strategies and policies that support SMEs in their digital transformation endeavors.



2. Methods and Materials

This qualitative research aimed to explore the barriers small and medium-sized enterprises (SMEs) face during digital transformation. A purposive sampling strategy was employed to recruit participants with relevant experiences in digital transformation within SMEs. A total of 26 participants were selected, ensuring diverse representation in terms of industry, organizational role, and level of digital adoption. All interviews were conducted online to enhance accessibility and minimize logistical constraints.

The inclusion criteria for participants included:

1. Experience in implementing or managing digital transformation processes in an SME.
2. Employment in a managerial or operational role within an SME.
3. Willingness and availability to participate in an online interview.

Semi-structured interviews were the sole method of data collection, allowing for in-depth exploration of participants' experiences while providing flexibility to probe emerging themes. A predefined interview guide was developed based on existing literature, focusing on the challenges, strategies, and organizational dynamics influencing digital transformation in SMEs.

Interviews were conducted via video conferencing platforms to ensure participant convenience and were audio-recorded with consent. The average duration of each interview was approximately 60 minutes. Data collection continued until theoretical saturation was achieved, ensuring no new themes or insights emerged from additional interviews.

The recorded interviews were transcribed verbatim, and the transcripts were uploaded into NVivo software for systematic coding and analysis. A thematic analysis approach was adopted, involving the following steps:

1. Familiarization with the data through repeated reading of transcripts.
2. Initial coding to identify key ideas and patterns in the data.
3. Grouping of codes into broader themes and sub-themes.
4. Refinement of themes to ensure consistency and coherence.

The reliability of the analysis was enhanced through peer debriefing and regular discussions among the research team. The NVivo software facilitated efficient organization and retrieval of data, enabling the identification of relationships and patterns across participants' responses.

3. Findings and Results

The study included 26 participants, representing a diverse range of roles and industries within small and medium-sized enterprises (SMEs). Among the participants, 15 (57.7%) were male, and 11 (42.3%) were female. The age distribution revealed that 8 participants (30.8%) were between 25 and 34 years old, 10 participants (38.5%) were between 35 and 44 years old, and 8 participants (30.8%) were 45 years or older. Regarding professional roles, 12 participants (46.2%) held managerial positions, 9 participants (34.6%) were team leaders or supervisors, and 5 participants (19.2%) were operational staff. Participants were drawn from a variety of industries, with 7 (26.9%) from the technology sector, 6 (23.1%) from manufacturing, 5 (19.2%) from retail, 4 (15.4%) from healthcare, and 4 (15.4%) from other industries. Geographically, the majority of participants (16, or 61.5%) were located in urban areas, while 10 participants (38.5%) operated in rural settings. This demographic distribution ensured diverse perspectives on the challenges and barriers to digital transformation in SMEs.

One of the main barriers SMEs face in digital transformation is the lack of digital skills among employees and leadership. Many participants emphasized limited technical expertise, resistance to learning new systems, and inadequate training programs. As one participant noted, "Our team struggles with new technology because we don't have the resources to provide proper training." Financial constraints also emerged as a critical challenge, with high implementation costs and limited budgets being common issues. A participant explained, "We want to adopt new tools, but the financial burden is just too high for a small company like ours." Additionally, leadership resistance was identified as a barrier, with some leaders being risk-averse, lacking a clear digital vision, or reluctant to embrace change. One interviewee remarked, "Our management prefers sticking to traditional methods rather than exploring digital opportunities." Organizational complexity, such as hierarchical barriers and departmental silos, further hinders progress. "Getting everyone on the same page is a challenge in our organization," shared a



respondent. Finally, resource allocation issues, including competing priorities and underutilized tools, create additional obstacles. "We have the tools, but we're not using them to their full potential," said one participant.

Technological challenges are another significant obstacle. Many SMEs are burdened by legacy systems that are outdated and difficult to integrate with new technologies. One participant explained, "Our current systems are so old that integrating anything new feels like trying to fit a square peg into a round hole." Cybersecurity concerns, such as data breaches and privacy violations, are prevalent. A respondent expressed, "We're afraid of putting customer data at risk by going digital." SMEs also face software and tool mismatches, where solutions are either too complex or incompatible with business needs. "We tried adopting a new CRM tool, but it didn't suit our workflow at all," shared a participant. Vendor dependency poses a further challenge, as companies often rely heavily on external providers, limiting their flexibility. "We feel trapped with our current vendor because switching would be too costly," noted one interviewee. Finally, scalability issues prevent SMEs from expanding their digital solutions effectively. "We can't afford the resources to scale our digital operations," said a respondent.

The resistance to change within organizations was frequently mentioned, with employees fearing job loss, feeling uncertain about outcomes, or preferring traditional methods. As one participant stated, "Some of our team members think that digital tools will replace their jobs." Communication gaps, including poor knowledge sharing and misaligned goals, further complicate transformation efforts. "There's a disconnect between what management wants and what employees think is happening," explained a respondent. Lack of employee buy-in was another barrier, as employees often feel excluded from decision-making processes or fail to see the benefits of digital initiatives. "Most of our staff don't understand how these changes will improve their work," shared a participant. Additionally, a misaligned organizational culture, focusing on short-term goals and resisting experimentation, stifles innovation. "We don't have the patience to try something new unless we're sure it will work," said one interviewee. A generational divide also creates challenges, as younger employees tend to embrace technology faster than older staff members. "Our younger employees are excited, but the older ones hesitate," remarked a respondent. Finally, trust issues, such as fears of micromanagement and data monitoring, were highlighted. "Some employees feel like they're being watched when using digital tools," said a participant.

SMEs face external barriers such as regulatory constraints, including compliance complexities and rapidly changing regulations. "Keeping up with industry regulations is a constant struggle," said one participant. Market dynamics, such as competitor pressures and shifting customer expectations, also pose significant challenges. "Our competitors are adopting technology faster, and it's hard to keep up," noted an interviewee. Many SMEs experience limited access to expert networks, making it difficult to find skilled partners or consultants. "We don't know where to look for the right advice on digital transformation," explained a participant. The digital divide was another concern, particularly for SMEs in rural areas with limited internet access or infrastructure gaps. "Our location puts us at a disadvantage because we don't have reliable connectivity," shared one respondent. Finally, economic instability creates uncertainty, with factors such as inflation and currency fluctuations affecting decision-making. "The unstable economy makes it hard to invest in long-term digital projects," said an interviewee.

4. Discussion and Conclusion

This study delved into the multifaceted barriers that small and medium-sized enterprises (SMEs) encounter during digital transformation. Through semi-structured interviews with 26 participants, several key themes emerged, encompassing organizational challenges, technological barriers, cultural and behavioral factors, and external obstacles. These findings align with existing literature, offering a comprehensive understanding of the complexities SMEs face in the digital era.

A predominant theme was the lack of digital skills within SMEs. Participants highlighted limited technical expertise and inadequate training programs as significant impediments. This observation is consistent with Kallmuenzer et al. (2024), who noted that decision-makers within SMEs often grapple with uncertainty surrounding the digitalization process, leading to hesitancy in embracing available technologies. Financial constraints also surfaced as a critical barrier, with high implementation costs and limited budgets frequently cited. This finding resonates with Iliescu (2022), who identified financial limitations as a significant obstacle to digital transformation in Romanian SMEs. Additionally, leadership resistance, stemming from a lack of digital vision or fear of change, was evident. This aligns with observations by Sinha et al. (2023), who found that setting up new positions to manage digital transformation poses a more intense barrier for SMEs compared to larger enterprises.



The study revealed that legacy systems and outdated infrastructure hinder SMEs' digital integration efforts. Participants expressed challenges in integrating new technologies with existing systems, leading to operational inefficiencies. This is corroborated by Restrepo-Morales et al. (2024), who emphasized the difficulties SMEs face in updating legacy systems to accommodate digital advancements. Cybersecurity concerns were also prominent, with fears of data breaches and privacy violations deterring digital adoption. This finding is supported by Sagala and Óri (2024), who identified cybersecurity issues as a significant barrier to digital transformation in SMEs. Furthermore, the mismatch between available software solutions and SMEs' specific needs was evident, leading to the selection of inappropriate tools and implementation failures. This observation aligns with Krismajayanti et al. (2024), who highlighted the challenges SMEs face in selecting suitable digital tools that align with their business processes.

Resistance to change emerged as a significant cultural barrier, with employees fearing job displacement or feeling apprehensive about adapting to new technologies. This finding is consistent with Díaz-Arancibia et al. (2024), who noted that internal resistance to change is a major barrier to the adoption of digital transformation in SMEs. Communication gaps, including poor knowledge sharing and misalignment of goals between management and staff, further hindered transformation efforts. This observation aligns with findings by Holl and Rama (2024), who emphasized the importance of effective communication in facilitating digital transformation in SMEs. Additionally, a lack of employee buy-in, often resulting from minimal involvement in decision-making processes, led to low motivation and engagement with digital initiatives. This is supported by findings from Sinha et al. (2023), who noted that internal resistance to change is a significant barrier to digital transformation in SMEs.

Participants identified regulatory constraints and rapidly changing market dynamics as external challenges impeding digital transformation. Compliance with complex regulations was resource-intensive, diverting attention and funds away from digital initiatives. This finding is consistent with Iliescu (2022), who identified regulatory challenges as significant barriers to digital transformation in SMEs. Market pressures, such as the need to keep pace with competitors' technological advancements and evolving customer expectations, also overwhelmed SMEs with limited resources. This observation aligns with findings by Holl and Rama (2024), who noted that the COVID-19 pandemic has heightened the need for digitalization among SMEs to remain competitive. Economic instability and limited access to expert networks further exacerbated these challenges, making it difficult for SMEs to invest in and sustain digital transformation efforts. This is supported by findings from Sagala and Óri (2024), who emphasized the importance of external support in facilitating digital transformation in SMEs.

While this study provides valuable insights into the barriers SMEs face during digital transformation, certain limitations must be acknowledged. The research relied on a relatively small sample size of 26 participants, which may not fully capture the diversity of experiences across different industries and regions. Additionally, the qualitative nature of the study, while offering in-depth insights, may limit the generalizability of the findings. Future research could benefit from larger, more diverse samples and the inclusion of quantitative methods to enhance generalizability.

Future studies should explore the impact of specific digital technologies on SMEs' operational efficiency and competitiveness. Investigating the role of government policies and support mechanisms in facilitating digital transformation among SMEs could provide valuable insights. Additionally, longitudinal studies examining the long-term effects of digital transformation on SMEs' performance would contribute to a deeper understanding of the benefits and challenges associated with digital adoption.

SMEs should invest in comprehensive training programs to enhance digital literacy among employees, thereby mitigating resistance to change and fostering a culture of innovation. Developing a clear digital strategy, aligned with the organization's goals and resources, is crucial for successful transformation. Engaging with external experts and leveraging government support can provide the necessary resources and guidance to navigate the complexities of digital transformation.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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