

Bridging Digital Gaps: Industry-Specific Challenges and Opportunities for Guangxi's SMEs in Digital Transformation

Deng, Keting¹ & Kwong, Simon CM^{2*}

¹City University, Petaling Jaya, Selangor, Malaysia

²City University, Petaling Jaya, Selangor, Malaysia

Email Address:

1061697666@qq.com (Deng, Keting), simoncmkwong@city.edu.my (Kwong, Simon CM)

*Corresponding author: 1061697666@qq.com (Deng, Keting)

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Abstract: This paper explores the challenges and opportunities faced by small and medium-sized enterprises (SMEs) in Guangxi Province, China, in their journey toward digital transformation. As digital technologies continue to reshape business practices globally, SMEs in China are under increasing pressure to adopt these innovations to remain competitive and enhance operational efficiency. However, digital transformation remains a complex and multifaceted process, particularly for SMEs in less-developed regions such as Guangxi. The study examines industry-specific barriers, opportunities, and strategies in the context of digital transformation, with a particular focus on the manufacturing, hospitality, and retail sectors. Drawing on qualitative data from in-depth interviews with senior management and decision-makers from five SMEs across these industries, the research identifies common obstacles including financial constraints, technological limitations, and a lack of skilled personnel. It also highlights key opportunities such as improved customer engagement, operational efficiency, and the potential for new revenue streams. By situating these findings within the broader literature on digital transformation, this study contributes to a deeper understanding of the unique challenges SMEs in Guangxi face and the role of government policies in facilitating digital adoption. The paper concludes with practical recommendations for SMEs and policymakers aimed at overcoming these challenges and accelerating digital transformation in the region.

Keywords: digital transformation, SMEs, hospitality, industry-specific challenges, opportunities

1. Introduction

In today's rapidly evolving global economy, digital transformation has become a critical driver of growth, innovation, and competitiveness for businesses of all sizes. Small and medium-sized enterprises (SMEs), which make up the backbone of most economies, are no exception. Digital transformation refers to the integration of digital technologies into all aspects of business operations, resulting in fundamental changes in how businesses operate, interact with customers, and deliver value. For SMEs, this shift offers numerous benefits, including increased operational efficiency, improved customer engagement, and enhanced competitiveness in an increasing digital marketplace.

Globally, SMEs have been increasingly adopting digital technologies as they seek to streamline processes, reduce costs, and stay competitive. However, the extent to which SMEs engage with digital transformation varies significantly across regions and sectors. According to a report by the World Bank (2020), while digital adoption rates are high in certain advanced economies, SMEs in many emerging markets still face significant barriers, including limited access to technology, lack of skilled labor, and inadequate infrastructure. In China, the government has recognized the importance of digital transformation for SMEs, particularly as the country shifts toward a more innovation-driven economy. Policies aimed at improving the digital infrastructure and providing incentives for digital adoption have been introduced, but many SMEs still struggle with the practicalities of digitalization.

SMEs in China, including those in regions like Guangxi Province, play a pivotal role in the economy, contributing significantly to employment and GDP. However, digital transformation in these businesses is often uneven, with certain industries embracing new technologies more readily than others. The diversity in sectors such as

manufacturing, retail, and hospitality means that digital transformation challenges and opportunities are highly industry specific. While some SMEs in Guangxi have successfully leveraged digital tools to enhance their operations, others have yet to begin their transformation journey due to various obstacles, including financial constraints, lack of expertise, and regional disparities in digital infrastructure.

2. Literature Review

Definition and Significance of Digital Transformation

Digital transformation is a comprehensive and strategic process through which businesses integrate digital technologies into their operations, business models, and customer interactions. It goes beyond the mere adoption of new technologies; it involves rethinking business processes, organizational structures, and customer relationships to capitalize on the opportunities offered by digital innovations (Westerman, Bonnet, Ferraris, & Simons, 2011). For small and medium-sized enterprises (SMEs), digital transformation has become increasingly vital as it enables them to enhance efficiency, remain competitive in a rapidly changing market, and adapt to new customer demands (Brynjolfsson & McAfee, 2014). In the context of SMEs, digital transformation can involve various dimensions, including the automation of business processes, the use of data analytics to drive decision-making, the integration of digital marketing strategies, and the development of innovative business models (Kraus et al., 2021). While SMEs often face challenges related to limited resources and technical expertise, digital transformation offers significant opportunities to improve productivity, reduce costs, enhance customer experience, and increase market reach (Ghobakhloo, 2018). As such, digital transformation is seen as a key driver for the survival and growth of SMEs in the digital age.

Global Trends in Digital Transformation

The adoption of digital technologies by SMEs globally has varied significantly depending on the region, industry, and the level of technological infrastructure. In developed countries, SMEs have been quick to embrace technologies like cloud computing, big data, and e-commerce to streamline operations and enhance customer interactions. According to the European Commission (2020), over 80% of SMEs in the European Union have adopted some form of digital technology, with e-commerce and cloud computing being the most common. Similarly, in the United States, small businesses are increasingly leveraging digital tools to remain competitive in the market, with a focus on cloud-based solutions, digital marketing, and data analytics (Pereira & Almeida, 2021). However, the picture is more mixed in developing economies. In these regions, many SMEs still face significant barriers to digital adoption, such as limited access to capital, lack of digital skills, and inadequate infrastructure. A report by the World Bank (2020) found that SMEs in sub-Saharan Africa are less likely to adopt digital technologies compared to their counterparts in more developed regions. Similarly, SMEs in Latin America face challenges related to high costs of digital technologies and lack of trained personnel (OECD, 2020). These trends suggest that while digital transformation offers clear benefits, the adoption process is uneven, and many SMEs, especially in less-developed regions, struggle to harness its full potential.

Benefits and Challenges of Digital Transformation for SMEs

The benefits of digital transformation for SMEs are clear. Studies have shown that digital adoption can lead to significant improvements in efficiency, customer satisfaction, and business competitiveness. For example, SMEs that integrate e-commerce platforms often experience increased sales by reaching a broader customer base and enhancing their marketing capabilities (Chong et al., 2021). Similarly, the adoption of cloud computing allows SMEs to reduce costs related to IT infrastructure while improving data storage and collaboration capabilities (Kraus et al., 2021). However, the challenges of digital transformation are equally significant. Financial constraints remain a major hurdle for many SMEs, especially in emerging economies where digital technologies can be expensive to implement. SMEs also face difficulties in acquiring the necessary digital skills, with a significant skills gap preventing them from fully utilizing digital tools (Ghobakhloo, 2018). Additionally, organizational resistance, lack of awareness, and concerns about cybersecurity are frequently cited as barriers to digital transformation (Hess et al., 2016).

Digital Transformation in China's SMEs

Current State of Digital Transformation in Chinese SMEs

In China, SMEs constitute over 99% of all enterprises and contribute to more than 60% of the country's GDP (National Bureau of Statistics of China, 2021). Over the past decade, China has seen rapid progress in digital transformation, with government initiatives playing a crucial role in promoting the adoption of digital technologies by SMEs. The Chinese government has rolled out several policies aimed at improving the digital infrastructure and providing financial support for SMEs, including initiatives like the "Made in China 2025" plan and the "Internet Plus" strategy (China State Council, 2015). These initiatives have encouraged SMEs to adopt digital technologies, particularly in areas such as e-commerce,

cloud computing, and big data analytics. However, despite these advancements, the pace of digital transformation among SMEs in China remains uneven. According to a report by the Chinese Academy of Social Sciences (2020), while large and medium-sized enterprises in major urban centers like Beijing and Shanghai have successfully embraced digitalization, many SMEs in less-developed regions, such as Guangxi Province, are lagging behind. Factors such as limited access to advanced technologies, lack of skilled labor, and financial constraints continue to hamper the digital transformation efforts of SMEs in these regions (Chen, 2020). Moreover, SMEs in China often face regulatory challenges, as the digital transformation process requires navigating a complex landscape of policies and compliance requirements (Li & Zhang, 2021).

Government Policies and Initiatives Supporting Digital Transformation

The Chinese government has been proactive in supporting the digital transformation of SMEs through policies that focus on infrastructure development, digital skills training, and financial support. For example, the "13th Five-Year Plan for Economic and Social Development" outlined a focus on promoting digitalization across various sectors, with particular attention to SMEs (China State Council, 2016). Additionally, programs such as the "SME Digitalization Pilot Program" and various tax incentives have been designed to encourage SMEs to adopt digital technologies (Wu & Zhang, 2020). Despite these efforts, the effectiveness of these policies has been mixed. While large enterprises in tier-1 cities have had access to government support, SMEs in smaller cities and rural areas, such as Guangxi, face challenges in accessing these resources. Furthermore, there is a lack of targeted support for SMEs in specific industries, meaning that the benefits of government policies are not always felt by businesses in sectors like hospitality and manufacturing, which have distinct digital transformation needs (Wang & Shi, 2019).

Theoretical Framework

Two key theoretical frameworks commonly used to study digital transformation in SMEs are the Technology-Organization-Environment (TOE) framework and the Resource-Based View (RBV). The TOE framework highlights how technological, organizational, and environmental factors interact to influence the adoption of new technologies. This framework can be applied to SMEs in Guangxi to examine the role of technological infrastructure, organizational culture, and external factors such as government policies and market pressures in shaping digital transformation efforts (Tornatzky & Fleischer, 1990). The **Resource-Based View (RBV)**, on the other hand, focuses on the internal capabilities of a firm, such as resources and competencies, that enable it to gain a competitive advantage (Barney, 1991). In the context of digital transformation, SMEs in Guangxi need to leverage their internal resources, including skilled.

3. Research Methodology

Research Design

The research adopts a **qualitative research approach**, as it is well-suited to exploring the underlying factors, experiences, and perceptions that influence digital transformation among small and medium-sized enterprises (SMEs) in Guangxi Province. Given the complexity and depth of the topic, a qualitative approach allows for a detailed exploration of SMEs' digitalization processes, as well as the challenges and opportunities they encounter. Qualitative research provides the flexibility to understand not only the "what" and "how" of digital transformation but also the "why"—the motivations, barriers, and specific contexts in which SMEs are attempting to digitize their operations. This study employs **in-depth interviews** as the primary method of data collection, focusing on senior management or decision-makers within SMEs. These interviews are essential for understanding the perspectives of those directly involved in shaping the digital transformation strategies of their organizations. In-depth interviews are particularly valuable in this research context because they allow the researcher to gather rich, detailed information, provide flexibility to explore complex topics, and capture the nuanced challenges that SMEs in Guangxi face in their digitalization efforts. The choice of qualitative research aligns with the research goals, which include understanding the multifaceted aspects of digital transformation, exploring industry-specific challenges, and identifying opportunities for SMEs to bridge the digital gaps. As digital transformation is a dynamic process influenced by both internal factors (e.g., organizational culture, resources) and external factors (e.g., market trends, government policies), a qualitative approach offers a comprehensive view of these dimensions that cannot be fully captured through quantitative methods alone.

Sampling Method

To ensure a diverse and representative sample of SMEs from Guangxi Province, the research utilizes a **purposeful sampling** technique. Purposeful sampling is a non-random selection strategy that focuses on selecting participants who are most likely to provide rich and relevant information concerning the research questions (Patton, 2002). In this study, the focus is on SMEs in Guangxi Province that are actively engaged in digital transformation efforts.

This purposeful sampling approach is aimed at ensuring the selection of SMEs that are representative of the diverse industries and digital transformation experiences found in Guangxi. By including a range of organizations with varying levels of digital engagement, the study aims to capture a broad spectrum of insights and identify commonalities and industry-specific differences.

Data Collection Method

The primary data collection method for this research is **in-depth structured interviews** with senior management or decision-makers within the selected SMEs. The interviews are designed to explore the specific challenges, opportunities, and strategies related to digital transformation within each organization. The structured interview guide developed for this study ensures consistency across interviews, while still allowing flexibility for participants to share their insights and experiences.

Interview Process and Ethical Considerations

The interviews are conducted in person or through digital platforms, depending on the preferences of the participants. Each interview lasts between 45 minutes to one hour, providing sufficient time to explore the various aspects of digital transformation in depth. All interviews are audio-recorded, and detailed notes are taken to ensure accurate data capture.

Confidentiality and anonymity are paramount in this research. Each participant is assigned a pseudonym, and any identifying information about the SMEs is removed from the data to ensure privacy. Participants are assured that their responses will only be used for academic purposes and that the data will be stored securely. Ethical approval is obtained from the relevant academic committee before beginning the research.

Data Analysis Method

The data collected from the interviews will be analyzed using **thematic analysis**, a widely used qualitative method for identifying, analyzing, and reporting patterns (themes) within data (Braun & Clarke, 2006). Thematic analysis allows the researcher to systematically identify key themes and sub-themes that emerge from the data, providing a structured approach to understanding complex and multifaceted phenomena like digital transformation.

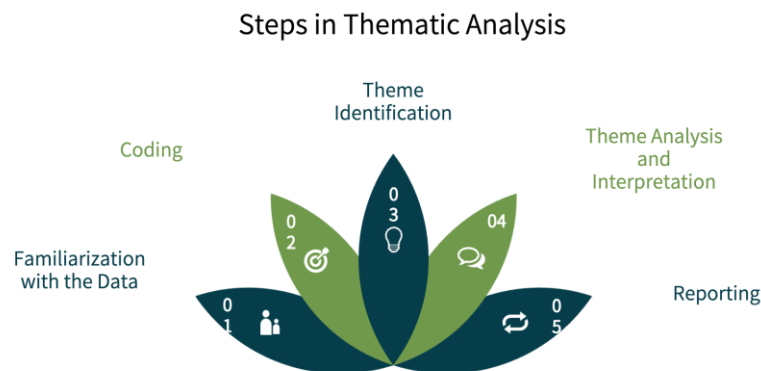


Figure 1: Steps in Thematic Analysis

Based on figure 1 above, by using thematic analysis, this study aims to provide an in-depth understanding of the digital transformation experiences of SMEs in Guangxi and to identify key factors that influence the successful adoption and integration of digital technologies in the region.

4. Findings and Discussions

The study focuses on five small and medium-sized enterprises (SMEs) based in Guangxi Province, representing a diverse range of industries. The selected SMEs provide a comprehensive view of the digital transformation efforts in the region. Each company was chosen based on its engagement with digital technologies, with varying degrees of implementation across different sectors. Guangxi Weizhou Island Yuehaiting Hotel (Hospitality Sector) This hotel is located in a prominent tourism area and serves as a key player in the hospitality sector. It is a mid-sized hotel with around 150 employees. The hotel has implemented digital technologies in areas such as customer reservations, check-in/check-out systems, and online marketing. However, its digital transformation efforts are still in the early stages, particularly in operational efficiency and customer engagement.

Guangxi Ocean City Restaurant (Catering Sector) This family-owned restaurant employs about 30 people and serves both local and international customers. It has adopted digital solutions for order management, digital payment systems, and marketing via social media platforms. However, challenges such as limited integration of digital technologies in supply chain management and inventory tracking still exist. **Guangxi Qinzhou Detian Motor Vehicle Inspection Company (Automotive Sector)** Operating in the automotive sector, this company provides motor vehicle inspection services. It has around 50 employees and has embraced digital technologies for vehicle inspection reporting and customer management systems. However, the company still faces challenges in automating backend processes and integrating new technologies into its legacy systems.

Qiangsheng Industrial Group Co., Ltd. (Manufacturing Sector) This manufacturing company is involved in the production of construction materials. It is a large SME, with approximately 300 employees. The company has undertaken substantial digitalization efforts, including the implementation of smart factory technologies, inventory management systems, and data analytics tools. However, the full integration of these technologies into all business operations is still a work in progress. **Beihai He'an Trading Co., Ltd. (Retail Sector)** A retail SME specializing in the sale of electronic products, Beihai He'an employs 80 people. The company has invested heavily in e-commerce platforms, digital marketing, and customer relationship management (CRM) systems. However, challenges related to digital payment integration and real-time stock management remain. Across these SMEs, there is a common trend of adopting digital tools, but the extent of implementation varies by industry and company size. The hospitality and catering sectors show more moderate levels of digital adoption, primarily focusing on customer-facing technologies, whereas manufacturing and retail industries show a greater emphasis on internal operations, including production and inventory management.

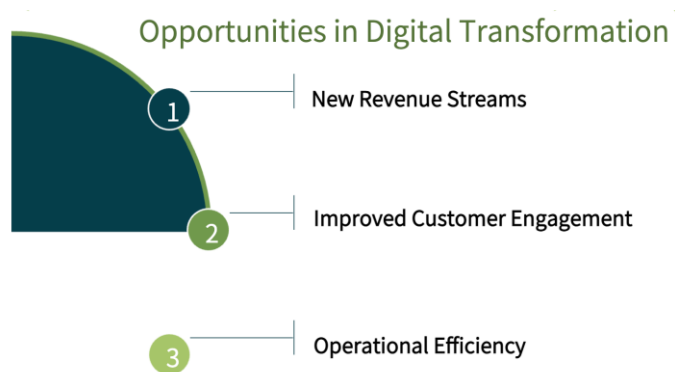


Figure 2: Opportunitise in Digital Transformation

Opportunities in Digital Transformation

Despite the barriers, the study also identified several key opportunities that SMEs in Guangxi have gained from digital transformation.

New Revenue Streams

Beihai He'an Trading, for example, has successfully expanded into e-commerce, tapping into a new customer base. Similarly, Qiangsheng Industrial Group has explored new revenue opportunities by offering data-driven services to clients in the construction sector, such as predictive maintenance and supply chain optimization. Literature similarly identifies digital transformation as a powerful tool for enabling SMEs to diversify their revenue streams (Hess et al., 2016). The expansion of online sales and digital services is particularly beneficial in an environment where traditional business models may be reaching a saturation point.

Improved Customer Engagement

SMEs in the hospitality and retail sectors, such as Yuehaiting Hotel and Ocean City Restaurant, have successfully improved customer engagement through digital tools like online reservations, digital marketing, and social media. These technologies have enabled them to better understand customer preferences and tailor services accordingly. Existing research emphasizes the role of digital transformation in enhancing customer engagement and satisfaction (Chaffey, 2015). The findings in this study confirm that SMEs in Guangxi that embrace digital tools are better able to meet customer needs and foster stronger relationships.

Operational Efficiency

The implementation of digital tools has also led to improvements in operational efficiency. SMEs like Qinzhou Detian Motor Vehicle Inspection Company have automated several back-office functions, leading to faster service delivery and fewer errors. Similarly, Qiangsheng Industrial Group has achieved higher efficiency through smart manufacturing technologies. This finding aligns with previous studies, which highlight that digital transformation often results in cost savings and increased productivity for SMEs (Lichtenthaler, 2018). The successful implementation of digital tools in operational processes has led to tangible benefits in terms of time and resource savings.

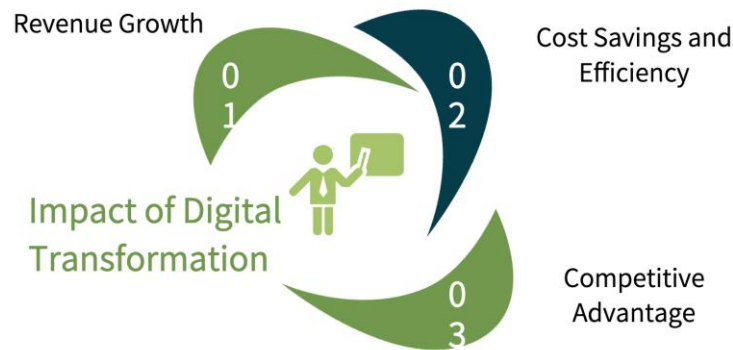


Figure 3: Impact of Digital Transformation

Impact of Digital Transformation

The impact of digital transformation on SMEs in Guangxi has been substantial in several areas, particularly revenue growth, cost savings, and competitive advantage.

Revenue Growth: Beihai He'an Trading's move into e-commerce has resulted in significant revenue growth, particularly during peak seasons. Similarly, Ocean City Restaurant's integration of digital ordering and delivery systems has contributed to increased sales, especially among younger, tech-savvy customers. These findings align with the literature that suggests digital transformation provides SMEs with access to new markets and customer segments, thereby driving revenue growth (Ghobakhloo, 2018).

Cost Savings and Efficiency: Qiangsheng Industrial Group's adoption of smart factory technologies has led to significant reductions in production costs, while Qinzhou Detian Motor Vehicle Inspection Company has seen savings from automating routine processes. These improvements in cost efficiency demonstrate the potential of digital technologies to lower operational expenses. This confirms existing literature, which shows that digitalization can drive down operational costs through process automation, data analytics, and better resource management (Westerman et al., 2011).

Competitive Advantage: SMEs that have embraced digital transformation are reporting stronger competitive positions. For instance, Beihai He'an Trading's e-commerce platform has enabled it to compete more effectively with larger retailers. Similarly, Qiangsheng Industrial Group has leveraged digital tools to offer innovative services, setting it apart from its competitors. Literature suggests that SMEs that successfully implement digital transformation are better positioned to compete in both local and global markets, gaining advantages in terms of customer experience, operational efficiency, and business agility (Bharadwaj et al., 2013).

In conclusion, the findings of this study reveal that while SMEs in Guangxi face significant challenges in digital transformation, they also stand to benefit greatly from embracing digital technologies. By overcoming barriers such as financial constraints and infrastructure limitations, SMEs can unlock new opportunities for growth, operational efficiency, and competitive advantage.

5. Conclusion

In conclusion, this study has shed light on the challenges and opportunities associated with digital transformation for SMEs in Guangxi Province. While digitalization holds significant potential for improving competitiveness and operational efficiency, SMEs in the region face unique barriers such as financial constraints, lack of expertise, and

infrastructure limitations. Nonetheless, digital transformation presents numerous opportunities, particularly in terms of new revenue streams, enhanced customer engagement, and improved operational efficiency.

The findings contribute to the broader body of knowledge on digital transformation by providing an industry-specific analysis of SMEs in a less-developed region of China, offering insights that can inform both SME practices and policy decisions. Despite its limitations, the study lays the foundation for future research on digital transformation in SMEs and calls for more in-depth studies that examine specific technologies, industry differences, and long-term impacts. By addressing these areas, future research can help accelerate the digital transformation process for SMEs in Guangxi and similar regions, ultimately contributing to economic growth and competitiveness in the broader Chinese economy. This study makes several significant contributions to the existing body of knowledge on digital transformation, particularly in the context of SMEs in less-developed regions like Guangxi. First, it provides a detailed, industry-specific analysis of the digital transformation process within a diverse group of SMEs in Guangxi, offering insights that are often overlooked in broader studies that focus on more developed regions of China or other countries.

Second, the research adds to the growing literature on the barriers and opportunities that SMEs face during their digitalization efforts. By examining the unique challenges encountered by SMEs in Guangxi, the study highlights the role of local contexts such as infrastructure limitations and government support—in shaping digital transformation strategies. This context-specific approach fills a gap in the literature by addressing the particular needs of SMEs in underdeveloped areas, which are often left out of national-level studies. Third, the study contributes to the understanding of the practical implications of digital transformation for SMEs. It offers actionable insights for SME owners, managers, and policymakers, emphasizing the importance of government support, infrastructure improvement, and digital skills development in facilitating successful digitalization.

6. Limitations

Despite the valuable insights provided by this research, there are several limitations that should be acknowledged. First, the study was based on a small sample size, focusing on only five SMEs across three industries in Guangxi Province. While this sample provided rich qualitative data, the findings cannot be generalized to all SMEs in the region or to SMEs in other provinces in China. Future studies should include a larger sample size to improve the generalizability of the results.

Second, the study focused on three specific industries—hospitality, retail, and manufacturing. While these industries represent a significant portion of SMEs in Guangxi, other sectors, such as agriculture or construction, were not included in the research. A more diverse set of industries could provide a more comprehensive understanding of the challenges and opportunities faced by SMEs in Guangxi and other similar regions.

Finally, this study relied on qualitative data collected through in-depth interviews, which, while providing rich insights, are subject to biases such as participant self-reporting and subjective interpretations. Future research could benefit from incorporating quantitative methods to supplement the qualitative findings and provide more objective data on the impact of digital transformation on SMEs.

7. Suggestions for Future Research

Quantitative Studies: Future research could incorporate quantitative methods, such as surveys, to measure the extent of digital transformation across a larger sample of SMEs in Guangxi or other regions. This would allow for statistical analysis of the factors influencing digital adoption and the relationship between digitalization and business performance metrics such as revenue growth, cost savings, and customer satisfaction.

Longitudinal Studies: Longitudinal studies that track SMEs over time would provide insights into the long-term effects of digital transformation on business performance. Such studies could help identify trends in the adoption of new technologies, as well as the evolving barriers and opportunities that SMEs face as they move through different stages of digitalization.

Industry-Specific Research: While this study focused on three industries, more research is needed in other sectors, such as agriculture, education, and logistics, to understand how digital transformation varies across industries. Each sector may face unique challenges and opportunities related to digitalization, and understanding these differences could lead to more tailored strategies for SMEs.

Technological Innovations and Adoption: Future research could also focus on specific technologies that are critical to digital transformation in SMEs, such as artificial intelligence (AI), big data analytics, and Internet of Things (IoT) solutions. Studies could investigate the adoption rates, challenges, and benefits of these technologies, particularly for SMEs in underdeveloped regions like Guangxi.

Policy Implications: Further studies could examine the effectiveness of government policies and initiatives designed to support SME digital transformation. This could include an analysis of how well government programs are being implemented at the local level and whether they are meeting the needs of SMEs in underdeveloped areas. Additionally, research could explore how public-private partnerships can facilitate the digitalization process and provide SMEs with the necessary resources and expertise.

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