FACTORS INFLUENCING SMEs' READINESS FOR DIGITAL TRANSFORMATION IN OUDOMXAY PROVINCE, LAO PDR

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Abstract

This study investigates the factors influencing the readiness of Small and Medium Enterprises (SMEs) in Oudomxay Province, for the digital transformation. A structured questionnaire was used as a research tool to collect data from 250 SMEs selected through quota sampling across manufacturing, trade, and service sectors. The analysis employed both descriptive statistics and inferential techniques to assess internal and external readiness factors.

The results indicate that the internal organizational factors, particularly digital capability, operational processes, and leadership, play a critical role in shaping readiness. In contrast, customer experience exhibits a significant negative impact, while business models and government supports have limited influence. These findings highlight the need to strengthen digital competencies and internal resources within SMEs to improve their ability to adopt digital technologies. The study offers actionable insights for policymakers and development agencies to design targeted support strategies that promote sustainable digital transformation in regional economies.

Keywords: Readiness of SMEs, Digital Transformation, Digital, Digital Economy of Lao PDR, Small and Medium Enterprises in Lao PDR, Oudomxay Province

Introduction

Technological advancements in the digital age have rapidly transformed the world and play a crucial role in boosting the global economy. Information and communications technology enable seamless communication at all levels, from individuals and companies to entire nations. Technology has significantly transformed various aspects of global Society, including communications, trade, manufacturing, and economic development. International cooperation supports and promotes the continuous growth of the digital economy Ministry of Technology and Communications, Lao PDR (2021)

The Lao People's Democratic Republic (Lao PDR), with a population of 7.69 million, possesses significant geographic, natural, and environmental advantages. The country has strong potential in energy, agriculture, tourism,

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and land transportation, contributing to economic growth and competitiveness. To promote economic development and service delivery, the government has implemented comprehensive policies and initiated various projects to facilitate the transition of services to digital platforms. These strategic efforts encompass the development of digital infrastructure, fostering innovation within the digital business sector, and enhancing digital competencies across commerce-related fields. Furthermore, The Lao government is strengthening cooperation with developed nations, playing a pivotal role in advancing the country's digital development agenda (Bank of Lao PDR, 2023).

Oudomxay Province, situated in the upper northern central region of Laos, covers an area of 15,370 square kilometers, representing 6.5% of the country's total land area. According to 2022 data, the province has a population of 365,713 residents. The provincial economy comprises 6,014 Small and Medium Enterprises (SMEs), distributed across manufacturing (2,016), trade (2,026), and service (1,972) sectors. The province registered a Gross Domestic Product (GDP) growth rate of 4.75%, with an average per capita income of USD 1,351. Oudomxay is recognized as an economically promising province due to its strategic location, which connects four Northern provinces of Laos and serves as a central hub linking neighboring countries including Thailand, Vietnam, Myanmar, and China. Additionally, the province benefits from the presence of a high-speed railway station. These factors collectively position Oudomxay as a province with robust economic potential in terms of both domestic and foreign trade and investment. Recently, Oudomxay was approved for a modern city development project by Thailand's Amata Corporation (Lao Statistics Bureau, 2024).

Data from the Ministry of Industry and Commerce (2023) reveal that the majority of SMEs in Oudomxay Province continue to operate as family-run businesses with informal management systems and limited digital technology integration. This situation creates significant constraints in product and service development, thereby impeding their ability to compete effectively in regional and global markets. These challenges underscore the importance of adopting digital technologies to enhance operational efficiency and market competitiveness.

However, there is limited empirical research focusing specifically on the digital transformation readiness of SMEs in Oudomxay Province, despite its strategic position and economic potential. Existing studies tend to generalize SME challenges at the national level or focus on larger urban centers, neglecting provincial contexts where infrastructure, digital literacy, and policy implementation may differ significantly. This gap highlights a critical need to explore context-specific barriers and enablers of digital adoption among SMEs in Oudomxay.

Therefore, this study aims to answer the following research questions: 1) What factors influence the digital readiness of SMEs in Oudomxay Province? and 2) How can

government and local stakeholders support SMEs in overcoming digital transformation challenges?

In alignment with government policies and to strengthen the overall potential of SMEs in Oudomxay, it is imperative to enable these enterprises to produce goods and services efficiently. This approach will facilitate progress toward self-reliance and reduce dependence on imported goods. The adoption of digital technology in business operations is thus both vital and essential.

Recognizing these challenges, this study investigates the factors influencing SMEs readiness for the digital transformation in Oudomxay Province. The findings aim to fill the identified research gap and provide evidence-based guidance for SME operators and government authorities. The study contributes to designing more effective digital transformation strategies that enhance competitiveness and promote long-term economic sustainability in regional Lao provinces.

Objective

This study aims to identify and analyze the factors influencing the readiness of SMEs in Oudomxay Province, Lao PDR, for the digital transformation.

Literature Review

Digital Transformation

The digital transformation in organizations refers to the process of improving operations by integrating technology. As defined by Price WaterhouseCoopers International Limited [PwC] (2015) in their study "Building Your Digital DNA: Digital Transformation in Progress" digital transformation involves applying digital business models and operations within an organization to meet the increasing demands of consumers and external factors. PwC offers a framework to help organizations understand the gap between their current state and the digital needs required to enhance strategic capabilities. The framework identifies five critical aspects that guide successful digital transformation. These aspects are explained below to clarify the connection to organizational readiness.

1. Strategy and Leadership: Having a clear vision and strategy for digital transformation, supported by strong leadership and effective communication is critical.

2. Customer Engagement: Using appropriate methods to understand and communicate with customers in the digital environment ensures successful customer interaction.

3. Products and Services: Developing and managing products and services that align with market demands while improving efficiency is essential.

4. Organization and Talent: Skilled personnel with relevant expertise and knowledge are necessary to support the organization's vision and operations.

5. Digital Operations: Implementing the right processes, controls, and digital technologies enhances organizational efficiency.

These five dimensions are widely applicable to both public and private organizations

and are frequently used in SME digital transformation frameworks.

A study by the MIT Sloan Center (2011), titled "Digital Transformation: A Roadmap for Billion Dollar Organization", involved interviews with companies focusing on digital transformation. The study highlighted three critical areas for successful digital transformation: Customer experience, operational processes, and business models. Each of these areas is supported by digital capabilities such as data analytics, IT systems and leadership structures. Additionally, the study emphasized digital capability as a foundational enabler, driving the transformation of these key areas.

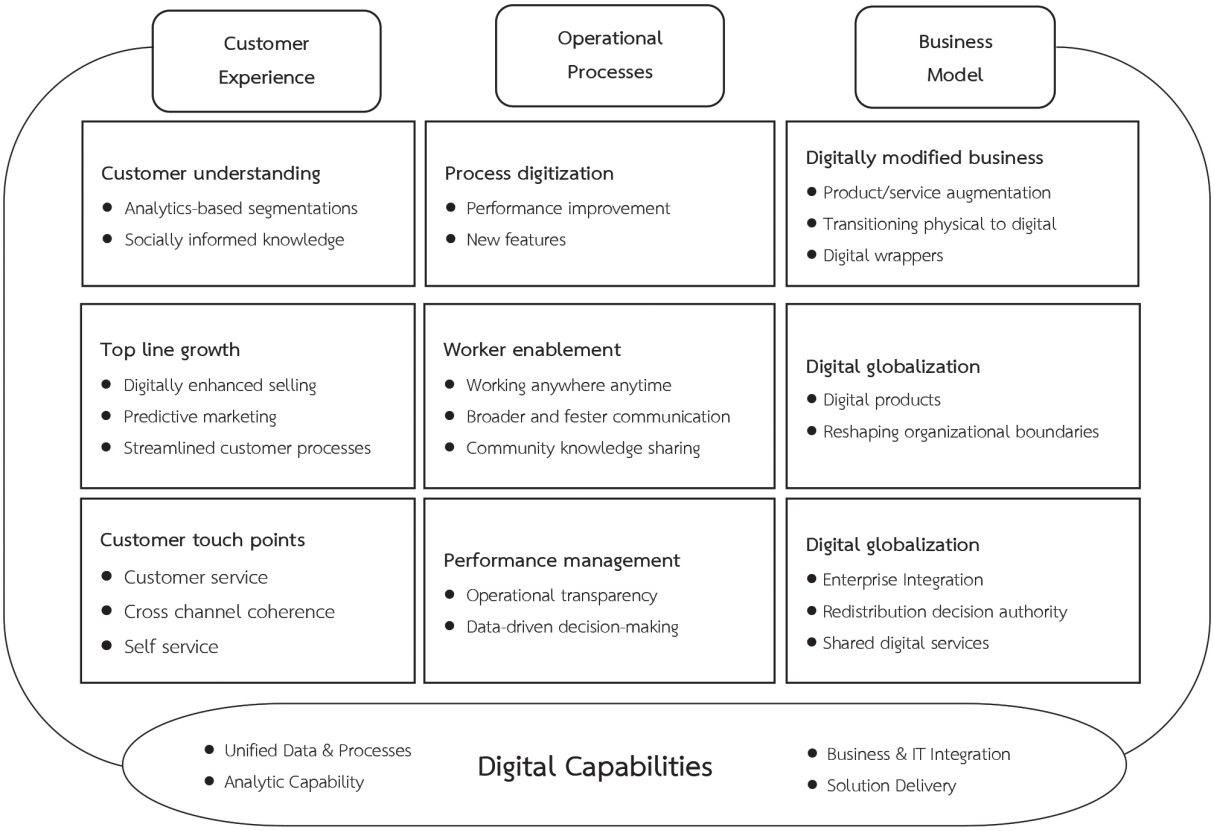

Figure 1 Building Blocks of the Digital

Source: Capgemini Consulting/MIT (2011)

Kaewchote (2022) conducted a study on the factors influencing the digital transformation of the Office of the Attorney General. The objective of the study was to examine the factors that affect the office's transition to becoming a digital organization. The Study used a mixed-method approach, integrating quantitative and qualitative research.

Data was collected through semi-structured interviews, with a quantitative sample of 45 participants and a qualitative sample of 7 participants. The study found that organizational leadership, staff, and technology factors significantly impacted the digital transformation of the Office of the Attorney General.

Pirom (2023) conducted a study on the factors influencing the readiness of SMEs in Chiang Mai Province for the digital business transformation. The objective was to investigate the factors affecting the readiness of SMEs in Chiang Mai to undergo digital transformation.

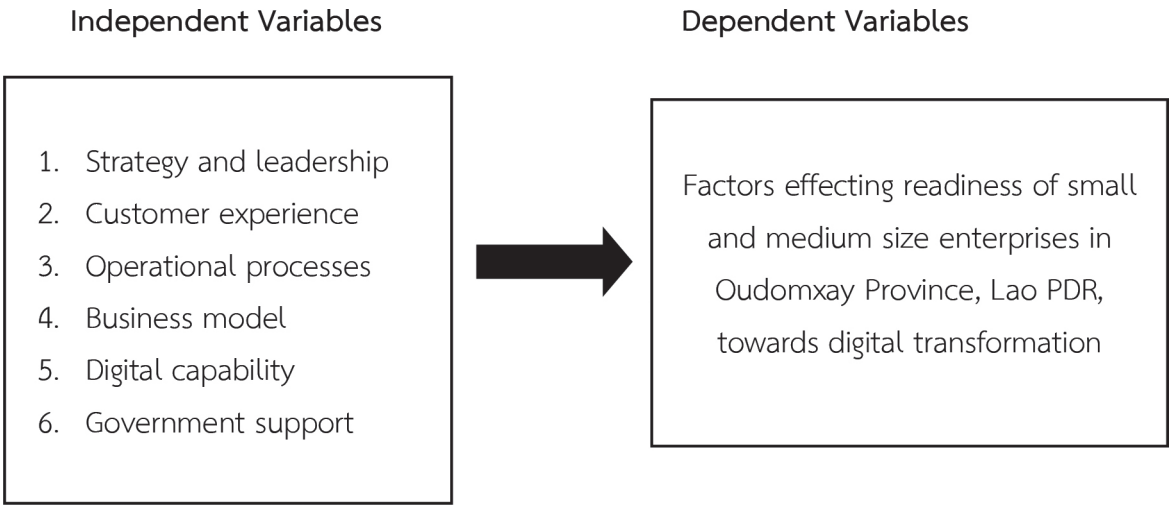

Figure 2 Conceptual Framework

Data were collected through questionnaires from a sample of 400 participants, categorized into sectors of manufacturing, trade and services. The statistical analysis methods used were descriptive and inferential statistics. The study found that strategy and leadership, business model and digital capability factors significantly influenced the readiness of SMEs for the digital transformation.

Therefore, the initial focus on leveraging existing organizational strengths in digital capability emerges as a key priority. Based on the theoretical foundations and a comprehensive review of the literature on digital transformation, this perspective informs the development of the research conceptual framework, as illustrated in Figure 2.

Building on these insights, this study examines 6 factors that are strategy and leadership, customer experience operational processes, business model, digital capability, and government support to understand their impact on the readiness of SMEs in Oudomxay Province, Lao PDR, for digital transformation.

Theoretical Frameworks (RBV and TOE) To strengthen the theoretical foundation of this study, two widely accepted frameworks are applied: The Resource-Based View (RBV) and the Technology-Organization-Environment (TOE) framework. The RBV explains how firms gain competitive advantage by developing valuable internal resources, such as digital infrastructure, skilled personnel, and leadership (Barney, 2001). The TOE framework complements this view by identifying three critical dimensions influencing technology adoption: Technological context (e.g., availability of digital tools), organizational context (e.g., leadership, strategy),

and environmental context (e.g., market pressure, government policy) (Angeles, 2012). These frameworks help explain how internal and external factors shape SME readiness for digital transformation.

Methodology

This study surveyed 250 SMEs in Oudomxay Province, Lao PDR, with the sample size based on Sudman's (1976) guideline recommending 200-500 participants for local-level research. To ensure balanced sectoral representation, the sample was drawn from the total population of 6,014 SMEs comprising 2,016 in manufacturing, 2,026 in trade, and 1,972 in services using non-probability quota sampling. Approximately 83 firms were selected from each sector. Respondents included owners, general managers, or directors responsible for strategic and operational decisions, making them appropriate informants for assessing digital transformation readiness.

Quota sampling involves dividing the population into predefined subgroups and selecting a proportional number of samples from each group. In this study, approximately 83 SMEs were selected from each sector. Respondents were chosen based on their roles as owners, general managers, or directors who are responsible for making strategic and operational decisions within their organizations.

The primary data collection instrument was a structured questionnaire developed based on a comprehensive review of the literature. The questionnaire was divided into four Section:

1. General Business Information (8 items), Type of business organization, Business sector, Length of operation, Number of employees, Monthly sales revenue, Value of fixed assets, Current customer market, and plans for international expansion.

2. Digital readiness (8 items), using a 5-point Likert scale to assess each firm's self-reported level of digital preparedness;

3. Six influencing factors, each assessed with multiple items strategy and leadership (5 items), customer experience (5 items), operational processes (5 items), business model (5 items), digital capability (5 items), and government support (5 items); and (5) Open-ended suggestions for digital development.

Example questionnaire items include: "Our business has a clearly defined digital strategy", "We interact with customers via digital platforms", and "We use digital tools to manage inventory and logistics".

Before full deployment, the questionnaire underwent a pilot test involving 30 SMEs from a neighboring province with similar characteristics. Based on the pilot feedback, minor wording adjustments were made to enhance clarity. The internal consistency of the instrument was evaluated using Cronbach's alpha, with results ranging from 0.76 to 0.89 across the six constructs, indicating acceptable to high reliability. The final survey was administered in person by trained enumerators to ensure understanding and reduce response bias, especially in cases where digital literacy may have been limited.

The study employed both descriptive and inferential statistical methods to analyze the data. Descriptive statistics, including mean and standard deviation, were calculated to summarize the data, providing an overview of SME characteristics and the ratings of factors influencing digital transformation readiness.

Inferential statistics were used to explore relationships and differences within the data. Multiple regression analysis was conducted to evaluate the relationship between the 6 independent variables strategies and leadership, customer experience, operational processes, business model, digital capability, and government support and the dependent variable, digital transformation readiness.

Independent samples t-tests were performed to compare differences across various groups, such as business sectors (manufacturing, trade, service) or enterprise size, enterprise sizes, enabling a deeper understanding of the factors affecting digital transformation readiness.

Results

The majority of SMEs in Oudomxay Province operate as sole proprietorships within the trading sector. Most businesses have been in a strong focus on operation for 6-10 years, employ between 6 and 50 workers, and generate monthly revenues exceeding 300,000 Baht, with fixed asset values typically ranging from 3,000,001 to 12,000,000 Baht. These enterprises primarily focus on the domestic market, with limited plans for international expansion.

Ratings for factors influencing digital transformation readiness varied across constructs, customer experience received the highest average rating ($\overline{x}$ = 3.63) indicating a strong focus on customer interaction, strategy and leadership ($\overline{x}$ = 3.22), business model ($\overline{x}$ = 3.12), operational processes ($\overline{x}$ = (3.01), and digital capability ($\overline{x}$ = 2.73) were all rated at moderate levels. Government support received the lowest rating ($\overline{x}$ = 2.06), suggesting limited external support for digital initiative. Overall readiness was rated at a moderate level ($\overline{x}$ = 2.97).

Among the factors affecting readiness digital capability emerged as the most significant predictor ($\beta = 0.459$, $p < 0.01$), followed by operational processes ($\beta = 0.319$, $p < 0.01$) and strategy and leadership ($\beta = 0.176$, $p < 0.01$). Customer experience exhibited a significant but negative impact on readiness ($\beta = -0.136$, $p < 0.01$), while the business model ($\beta = 0.109$, $p = 0.061$) and government support ($\beta = 0.002$, $p = 0.962$) did not show significant effects. The overall model demonstrated strong explanatory power, with an R^2 value of 0.724, indicating that 72.4% of the variance in digital transformation Readiness could be attributed to independent variables.

To ensure the reliability of these results, regression assumptions were tested. VIF values ranged from 1.209 to 2.939, confirming no multicollinearity. Linearity and homoscedasticity were verified through residual plots, and residuals were approximately normally distributed. These results support the validity of the regression analysis.

Discussion

The strategy and leadership factor significantly influenced the readiness for the digital transformation, this aligns with the TOE framework, which highlights organizational context such as leadership capacity and internal strategy as key enablers of technology adoption. Additionally, the Resource Based View (RBV) supports this finding by emphasizing leadership and managerial capability as internal resources that can be strategically leveraged for digital innovation (Barney, 2001).

Specifically, this finding supports PwC's (2015) assertion that having a clear digital strategy, strong leadership, and effective internal communication enhances transformation readiness.

In contrast, customer experience exhibited a significant but negative impact on readiness, while this is unexpected, it reflects the possibility that SMEs in Oudomxay rely on basic or surface level digital customer tools such as Facebook pages or messaging apps without integrated Customer Relationship Management (CRM) systems or data analytics. This may frustrate customers or fail to meet evolving expectations. This finding supports PricewaterhouseCoopers International Limited (PwC, 2015) insight that digital customer engagement requires not just presence but depth through personalized services and omnichannel platforms.

From a TOE perspective, this suggests that although the technological tools may be available, the organizational capacity or environmental pressure to adopt more advanced systems may be insufficient in this context.

Operational processes were found to positively influence readiness. This supports PricewaterhouseCoopers International Limited (PwC, 2015) emphasis on integrating digital tools into workflows to improve efficiency, reduce human error, and support real-time operations. From the TOE model, this reflects how both the "technology" (tools) and "organization" (process redesign) dimensions jointly affect readiness. SMEs that can digitize inventory control, billing, or logistics tend to be better prepared for transformation.

The business model factor did not have a statistically significant effect on readiness. This may be due to the traditional nature of many SMEs in Oudomxay, which are family-run with limited innovation and formal restructuring. Although not significant, the variable was retained in the model for theoretical completeness, as it remains a key element in digital transformation frameworks.

Digital capability was the strongest contributor to readiness. This aligns with PricewaterhouseCoopers International Limited (PwC, 2015) findings that emphasize digital literacy, infrastructure, and access to tools as the backbone of digital transformation. RBV theory strongly supports this, identifying IT knowledge and digital skills as strategic resources that give firms a sustainable competitive advantage.

Similarly, government support had no significant impact despite national-level digital policies. A likely reason is that many SMEs lack access to or awareness of these programs due to administrative and communication gaps.

Nevertheless, the variable was included to reflect its relevance in prior studies and ensure model transparency. Addressing this gap could involve improving communication, simplifying access to incentives, and localizing support programs. (Table 1)

Table 1 The Relationship Between Factors Affecting the Readiness of Small and Medium Enterprises in Oudomxay Province, Lao PDR, for Digital Transformation Overall.

Factors Effecting Readiness Towards Digital Transformation	Overall Readiness for Digital Transformation					
	B	Beta	t	Sig.	r	r^2
1. Strategy and leadership	0.173	0.176	3.545	0.000**	0.851	0.724
2. Customer experience	-0.153	-0.136	-2.757	0.006**		
3. Operational processes	0.281	0.319	5.484	0.000**		
4. Business model	0.112	0.109	1.884	0.061		
5. Digital capability	0.459	0.457	9.037	0.000**		
6. Government support	0.002	0.002	0.048	0.962		

Remarks: Operational processes and leadership play a central role in determining readiness

Conclusions

This study investigates the factors influencing the readiness of SMEs in Oudomxay Province, Lao PDR, for the digital transformation.

The findings reveal that internal capability External support mechanisms such as government initiatives were less impactful. SMEs with foundational digital tools and skills are better positioned to respond to operational challenges and market dynamics. This reinforces the need to strengthen internal resources and digital competencies, particularly among SMEs in provincial areas. Well designed and digitized operational processes help SMEs improve efficiency, reduce human error and respond flexibly to shifting customer and market needs. This finding aligns with the TOE framework's "technology" and "organization" dimensions, where innovation in operations directly affects digital preparedness.

Similarly, strong leadership was found to be a foundational enabler of change, consistent with the Resource Based View (RBV), which recognizes managerial competence as a core strategic asset in transformation efforts. Strategy and leadership ($\beta = 0.176$) play an essential role in driving digita transformation. Leaders with a clear vision and alignment with government policies can effectively guide their organizations through this process. Strong leadership ensures that strategic goals are communicated clearly and implemented effectively across all organizational levels.

Customer experience showed a negative relationship with readiness, likely due to

SMEs' reliance on basic digital channels (e.g., social media) without full integration into CRM or analytics systems. This reveals a gap between surface level digital adoption and deep engagement strategies**.**

Meanwhile, business model and government support did not significantly influence readiness. These results challenge prior literature but reflect the localized context of Oudomxay, where traditional business practices and limited access to policy incentives persist. This suggests that simply having policies in place is insufficient without tailored, SME accessible support structures. From a theoretical standpoint, this study extends the TOE framework by demonstrating that in emerging economies like Lao PDR, the "organization" dimension especially internal leadership and capability can outweigh the influence of the "environment" (e.g., government support).

It also contributes to RBV literature by showing that SMEs' intangible resources such as IT knowledge, leadership, and digital confidence are decisive factors in transformation readiness. For SMEs owner and manager, study highlights the urgency of investing in digital training and internal capability development. Government agencies should focus less on (one-size-fits-all) digital policy and more on localized, hands-on support (e.g., training centers, funding for small upgrades). Industry groups and development partners can also play a role in bridging knowledge gaps by creating sector specific transformation roadmaps for SMEs in rural provinces.

This study focuses exclusively on the readiness of SMEs in Oudomxay Province, which may limit the generalizability of the findings to other provinces or national-level trends. The study also examines only six variables, and other important factors such as digital culture, access to finance, or sector-specific dynamics were not included.

Moreover, the use of non-probability quota sampling, while practical, may not fully capture all types of SMEs.

Future research should broaden geographic coverage and include additional variables such as cultural and financial readiness to provide a more comprehensive model of SMEs transformation.

In summary, this study emphasizes the importance of digital capability, operational processes, and strategic leadership in preparing SMEs for the digital transformation to move forward. Policymakers and business leaders must work together to create enabling building both internal SMEs capacity and external support systems.

These insights are especially urgent for developing regions where SMEs are central to local economic resilience but often under resourced in digital adoption.

Recommendations

Suggestions from the research findings:

1. Digital Capability: This study found that SMEs in Oudomxay Province have a good foundational ability to apply digital technologies in their business operations. However, to cope with the rapidly increasing

competition in the digital era, SMEs must enhance their preparedness in several areas. They should focus on improving the digital skills of their personnel by providing training on more complex software and digital tools for data management, analysis and the use of modern communication systems within their businesses. Improving these skills will enable employees to utilize technology more effectively, enhance their work performance and help the business respond quickly to market changes. Moreover, SMEs should expand their use of digital technologies from basic tools to more advanced systems, such as automation, to reduce human errors and increase operational speed. Implementing data analytics will also enable businesses to collect and analyze data for more accurate and quicker strategic decision-making. Additionally, SMEs should collaborate with government agencies and related organizations to increase their digital development opportunities, such as participating in government-supported programs, attending digital training, or accessing low-interest funds for technology investments. These collaborations will help businesses gain knowledge and digital skills while reducing the costs of investing in new technologies.

2. Operational Processes: SMEs should develop and improve their workflows to be clearer and more efficient by integrating modern technologies and tools to assist in management and reduce complexity. For example, implementing software or automation systems such as Customer Relationship Management (CRM) or Enterprise Resource Planning (ERP) systems can enhance workflow agility, reduce operational errors and improve internal management efficiency. Additionally, utilizing automation systems for tasks like data processing, order management, and report generation can alleviate manual workloads and increase accuracy in business operations. Simultaneously, developing employees' digital knowledge, skills, and capabilities is crucial for enhancing operational efficiency. Regular performance evaluations should be conducted to analyze and review workflows, addressing and improving any identified issues to achieve greater effectiveness. By focusing on these areas, SMEs can enhance their operational processes, leading to improved productivity and competitiveness in the digital era.

3. Strategy and Leadership Executives or organizational leaders should develop a clear vision and mission that align with the government's digital economy policy. Having a well-defined vision and mission is crucial for setting the direction and goals of the organization, preparing it to adapt and grow in the digital era. The vision should serve as an inspiring, clear guide that helps everyone understand the organization's overarching goals, while the mission acts as a framework for operations, ensuring that all members follow a unified path. Aligning with the digital economy policy also enhances a business's ability to compete in the market by embracing new technologies and innovations, which play a pivotal role in this era.

Leaders should develop both short-term and long-term strategic plans, considering flexibility and responsiveness to technological changes as well as future market demands. Short-term strategies should focus on quick adaptation to current challenges, while long-term strategies should aim to build a solid foundation and ensure sustainability. It is also crucial to communicate these strategic plans and goals to all employees clearly and provide opportunities for questions and suggestions. This ensures that everyone feels involved and understands their role in executing the plan.

Leaders should set an example by supporting change and encouraging employees to share their opinions and propose new ideas. This fosters a sense of ownership among employees in the organizational change process, which in turn enhances a collaborative and unified atmosphere, driving the organization toward the successful transformation.

Furthermore, leaders should be open to learning and continuously adapting to new trends. A good leader must stay updated on technological and market changes by actively studying and following new developments that could impact the business. Leaders should seek ways to integrate new technologies and capitalize on opportunities arising from change to create innovations for the business. Embracing new ideas and committing to ongoing learning allows leaders to guide the organization forward in line with the times, while maintaining competitiveness in the market effectively.

4. Customer Experience: The study results showed a negative Beta value, indicating that as customer experience increases, the readiness for digital transformation may decrease. Therefore, SMEs should recognize the importance of providing services that effectively meet customer needs to create a positive experience and support digital transformation. For instance, implementing automatic response systems such as chatbots can help quickly answer basic questions about products, services or common issues, reducing the burden on customer service teams and enabling communication with customers 24 hours. Using chatbots also helps create a seamless experience and saves customer's time. Moreover, SMEs should develop digital after-sales services, such as real-time order tracking, technical support, or problem resolution through online platforms. This allows customers to fee continuously cared for and give them the ability to monitor the company's operations independently. High-quality digital after-sales services also help build customer trust and satisfaction. In addition, SMEs should implement an online feedback system to regularly collect customer satisfaction data and suggestions, which can be used to analyze and improve products and services to better meet customer needs. Utilizing customer analytic tools can help SMEs gain clearer insights into customer behavior and purchasing trends, allowing them to adjust marketing

strategies to better align with market demands. Listening to customer feedback demonstrates attentiveness and a willingness to continuously improve, ultimately fostering long-term trust and satisfaction.

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