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Level of Readiness of Micro, Small, and Medium Enterprises (MSMEs) in Pangasinan in Adopting Digital Transformation

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ABSTRACT

Digital transformation has become a strategic requirement for micro, small, and medium enterprises (MSMEs) that seek to remain competitive, resilient, and responsive to changing markets. This study assessed the level of readiness of MSMEs in Pangasinan in adopting digital transformation as basis for preparing an MSME Digital Toolkit. A descriptive-correlational research design was used. The respondents were 383 MSMEs from the top ten cities and municipalities in Pangasinan with the highest number of registered MSMEs, namely Urdaneta, Dagupan, San Carlos, Mangaldan, Alaminos, Calasiao, Lingayen, Malasiqui, Bayambang, and Sta. Barbara. Data were gathered through a validated researcher-made questionnaire and analyzed using frequency, percentage, weighted mean, and Pearson product-moment correlation through SPSS version 25. Findings showed that most MSMEs were sole proprietorships, service-oriented or trading/agriculture-based enterprises, micro in capitalization and workforce size, and highly dependent on smartphones, internet connection, chat applications, and social media page tools. The MSMEs were generally Strongly Ready for digital transformation, with the highest readiness in environment and strong ratings in technology, leadership, workforce, and organization. Significant relationships were found between selected profile variables and readiness indicators, particularly capitalization, number of employees, devices and gadgets, operations digital tools, digital marketing tools, advanced digital tools, and number of years in business. The overall extent of challenges was rated Challenging, with security and privacy concerns, financial constraints, and complexity/usability as the leading barriers. The study concludes that Pangasinan MSMEs possess positive readiness for digital transformation but require stronger support in infrastructure, financing, training, cybersecurity, strategic alignment, and tool selection. The proposed MSME Digital Toolkit may guide enterprises and support agencies in strengthening digital adoption and business sustainability.

Keywords: *digital transformation, digital readiness, MSME Digital Toolkit, MSMEs, Pangasinan, technology adoption*

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) are widely regarded as the lifeblood of economies because they generate employment, encourage entrepreneurship, and strengthen economic resilience. The United Nations recognizes MSMEs as contributors to the Sustainable Development Goals, particularly decent work and economic growth, poverty reduction, and women's economic participation. In the Philippines, MSMEs constitute almost all business establishments and are essential in sustaining local livelihoods, especially in provinces where commerce, agriculture, services, and small-scale production remain central to community development.

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Digital transformation has become increasingly important for MSMEs because it enables enterprises to improve communication, customer service, operational efficiency, market reach, and competitiveness. It involves the use of digital technologies to modify or improve business processes, organizational culture, and customer experiences. However, digital transformation is not merely a matter of acquiring gadgets or opening social media pages. It requires readiness in technology, organization, environment, leadership, and workforce, as well as the ability to respond to technical, financial, human resource, security, cultural, access, complexity, time, and strategic alignment challenges.

The need for digital transformation is particularly relevant in Pangasinan, a province with a strong base of MSMEs in retail trade, agriculture, food processing, tourism, manufacturing, and services. While many enterprises in the province have shown resilience, especially after the COVID-19 pandemic, they continue to face concerns related to market access, digital skills, financing, infrastructure, regulatory processes, and technology use. The Provincial Government of Pangasinan and national agencies have recognized the need to support MSMEs, but local evidence is still needed to determine how ready enterprises are to adopt digital tools and what challenges hinder adoption.

This study was conducted to assess the level of readiness of MSMEs in Pangasinan in adopting digital transformation and to identify the challenges that hinder adoption. It further examined whether the profile of MSMEs was significantly related to their readiness and used the findings as basis for developing an MSME Digital Toolkit. By focusing on MSMEs in the top ten cities and municipalities of Pangasinan with the highest number of registered enterprises, the study provides evidence that can guide business owners, government agencies, support organizations, and future researchers in strengthening digital transformation initiatives at the local level.

Literature Review

MSMEs and the Imperative of Digital Transformation

MSMEs contribute substantially to employment generation, poverty reduction, inclusive growth, and entrepreneurship. Global and regional reports cited in the study show that MSMEs account for the vast majority of businesses and a large share of employment across economies. In the Philippines, the Philippine Statistics Authority reported that MSMEs represented 99.50% of establishments in 2022, with micro enterprises accounting for the largest share. These figures show why MSME development remains a national and local priority.

Digital transformation is viewed as a critical means for MSMEs to sustain competitiveness and resilience. TechTarget defined digital transformation as the use of digital technologies to create or modify business processes, culture, and customer experiences. Dieffenbacher (2024) similarly described digital transformation as a staged process that includes evaluating the current state, planning a clear strategy, implementing digital tools, upskilling employees, integrating new technologies, optimizing processes, and encouraging continuing innovation. For MSMEs, these stages can improve operational efficiency, customer service, cost optimization, and market competitiveness.

Despite these benefits, digital transformation among MSMEs remains uneven. The IMD World Digital Competitiveness Ranking cited in the study placed the Philippines at a low ranking in 2023, signaling the need to strengthen digital talent, digital culture, and digital infrastructure. Local studies and policy discussions also point to persistent barriers such as limited capital, lack of digital skills, weak infrastructure, and insufficient awareness. These realities justify the need to assess readiness before promoting digital transformation interventions.

Theoretical Bases of MSME Digital Readiness

The study was anchored on three theoretical perspectives: Organizational Readiness for Change Theory, Diffusion of Innovation Theory, and Organizational Ambidexterity Theory. Organizational Readiness for Change Theory explains that successful change depends on change commitment and change efficacy. In the context of MSMEs, readiness for digital transformation depends on whether owners, managers, and employees are committed to digital change and confident that they can implement it effectively.

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Rogers' Diffusion of Innovation Theory explains why innovations are adopted at different rates. Adoption depends on perceived relative advantage, compatibility, complexity, trialability, and observability. This theory is relevant because MSMEs evaluate digital tools based on usefulness, ease of use, affordability, visibility of benefits, and fit with existing business practices. When tools appear complicated, expensive, or misaligned with daily operations, adoption may become slow or resisted.

Organizational Ambidexterity Theory complements these perspectives by explaining how enterprises must exploit existing resources while exploring new opportunities. MSMEs must continue traditional operations while experimenting with digital tools, new markets, and improved processes. The theory suggests that MSMEs that can balance current operations with innovation are more likely to benefit from digital transformation and remain competitive under changing market conditions.

Dimensions of Readiness and Adoption Challenges

The literature reviewed in the thesis emphasizes that digital readiness involves technology, organization, environment, leadership, and workforce. Technology readiness includes familiarity with digital transformation, availability of equipment and software, and technology proficiency. Organizational readiness refers to planning, risk identification, and budget allocation. Environmental readiness reflects openness to digital transformation, while leadership and workforce readiness involve strategic direction, management support, employee attitude, and training.

Studies by Jutla et al. (2002), Lalic and Marjanovic (2010), Nasution et al. (2018), Grufman et al. (2021), McDermott et al. (2023), and Anatan and Nur (2023) reinforce that readiness cannot be understood through technology alone. It requires resources, skills, strategy, leadership support, and organizational culture. In the MSME context, limited capital, small workforce size, and dependence on basic devices may affect how enterprises perceive and implement digital transformation.

The thesis also identifies common barriers to adoption, including technical problems, financial constraints, human resource limitations, security and privacy concerns, cultural and organizational issues, access and availability of digital tools, complexity and usability concerns, time constraints, and strategic alignment issues. These challenges show that digital transformation support must be multi-dimensional, combining infrastructure support, financial access, skills training, cybersecurity guidance, and strategic coaching.

Synthesis and Research Gap

The reviewed literature shows that MSMEs are vital to economic growth and that digital transformation can strengthen their resilience, market reach, and competitiveness. However, the literature also indicates that adoption depends on organizational readiness, perceived usefulness, skills, leadership, infrastructure, finances, and the ability to balance current operations with innovation. These factors are especially important for local MSMEs that operate with limited resources and small workforces.

Although national and international studies have discussed MSME digitalization, limited localized evidence has focused on the readiness of MSMEs in Pangasinan. The study addressed this gap by profiling MSMEs in selected cities and municipalities, measuring readiness across five dimensions, identifying challenges across nine areas, testing relationships between profile variables and readiness indicators, and developing a practical MSME Digital Toolkit.

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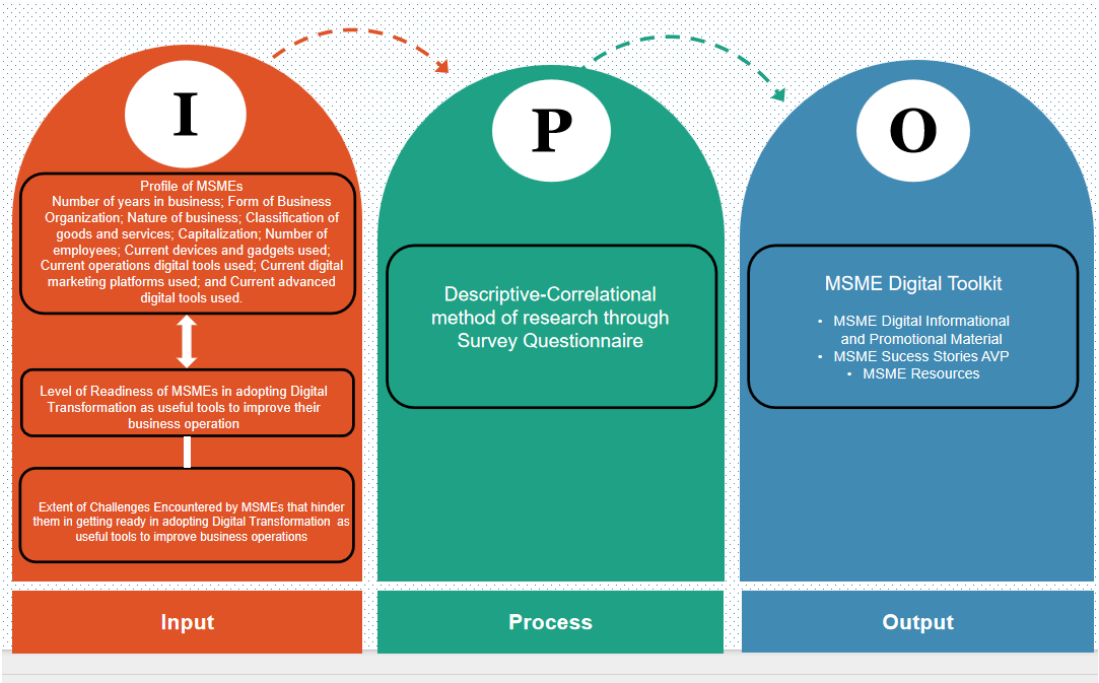
Figure 1. *Conceptual Framework of the Study*



The conceptual framework uses an input-process-output structure. The inputs include the profile of MSMEs, readiness indicators, challenges, and relevant laws and theoretical bases. The process involves descriptive-correlational analysis through survey data, while the output is the MSME Digital Toolkit designed to guide enterprises in adopting digital transformation.

METHODS

Research Design

The study employed a descriptive-correlational research design. The descriptive component was used to present the profile of MSMEs, their level of readiness in adopting digital transformation, and the extent of challenges encountered. The correlational component was used to examine the relationship between the profile of respondents and their level of readiness in adopting digital transformation. This design was appropriate because the study examined naturally occurring conditions and relationships without manipulating variables.

Research Locale

The study was conducted in Pangasinan, specifically in the cities of Urdaneta, Dagupan, San Carlos, and Alaminos and the municipalities of Mangaldan, Calasiao, Lingayen, Malasiqui, Bayambang, and Sta. Barbara. These were selected because they represented the top ten locations in the province with the highest number of registered MSMEs as of June 2024 based on data obtained from DTI Pangasinan.

Participants and Sampling Technique

The respondents were 383 MSMEs from a population of 48,828 registered MSMEs in the selected cities and municipalities. Random sampling was used, and the sample size was computed using a 95% confidence level and 5% margin of error. Assistance from DTI Negosyo Center personnel and authorized persons was obtained in distributing and collecting the survey questionnaires.

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Table 1. *Distribution of Respondents by City/Municipality*

City/Municipality	No. of MSMEs	Percentage	No. of respondents
City of Urdaneta	8,377	23.50%	90
City of Dagupan	7,993	22.72%	87
City of San Carlos	5,721	19.84%	76
Mangaldan	5,420	6.01%	23
City of Alaminos	4,448	6.79%	26
Calasiao	4,038	5.48%	21
Lingayen	3,708	5.22%	20
Malasiqui	3,075	3.92%	15
Bayambang	3,034	1.83%	7
Sta. Barbara	3,014	4.70%	18
Total	48,828	100.00%	383

Research Instrument

The study used a researcher-made survey questionnaire. Part I gathered the respondents' profile in terms of number of years in business, form of business organization, nature of business, classification of goods and services, capitalization, number of employees, and current devices/gadgets, operations digital tools, digital marketing tools, and advanced digital tools used. Part II measured the level of readiness of MSMEs in adopting digital transformation across technology, organization, environment, leadership, and workforce. Part III measured the extent of challenges encountered in adopting digital transformation. A five-point Likert scale was used for the readiness and challenge items.

Validity of the Instrument

The draft questionnaire was reviewed by the researcher's adviser and validated by five professionals with expertise related to the study, including representatives from DTI, DOST, academe, MSME organizations, and industry. The instrument obtained an average validity score of 4.88, indicating that it was highly valid and suitable for dissemination to respondents.

Data Gathering Procedure

Data gathering was conducted in August and September 2024. The researcher coordinated with DTI Negosyo Center heads and authorized persons in the selected cities and municipalities to assist in distributing and retrieving the questionnaires. The completed questionnaires were collected, checked, tallied, and encoded for statistical treatment.

Data Analysis

Frequency and percentage were used to describe the demographic profile of respondents. Weighted mean was used to determine the level of readiness and extent of challenges. Pearson product-moment correlation was used to test the relationship between respondent profile variables and level of readiness in adopting digital transformation. All statistical analyses were conducted using SPSS version 25, with statistical decisions based on the .05 level of significance.

Ethical Consideration

The study observed non-maleficence, respect for respondents' dignity, full consent, confidentiality, privacy, anonymity, honesty, no conflict of interest, and transparency. Respondents participated voluntarily, and their identities and business information were treated confidentially. The data were used only for the stated research purpose and were reported in aggregate form.

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RESULTS AND DISCUSSION

Profile of MSME Respondents

The respondents were mostly MSMEs that had operated for four to nine years (45%), while 42% had operated for three years and below and 13% had operated for ten years or more. Most were sole proprietorships (68%), followed by partnerships (17%), corporations (10%), and cooperatives (5%). In terms of nature of business, services dominated at 54%, followed by trading/merchandising at 32% and manufacturing at 14%.

The leading classifications of goods and services were wholesale and retail trade (21%) and agriculture, forestry, and fishing (21%), followed by accommodation and food service activities (16%) and manufacturing (12%). Most MSMEs had capitalization of not more than Php3,000,000 (72%) and fewer than nine employees (90%), confirming that the majority were micro-scale enterprises. Smartphones (31%) and internet access (19%) were the most used devices and gadgets. For operations, internet connection (25%), business email (17%), chat applications (15%), and digital payment machines (15%) were the most common digital tools. For marketing, social media page tools dominated at 40%, while social media management accounted for 56% of advanced digital tools used.

Table 2. *Summary Profile of MSME Respondents*

Profile area	Dominant category	Frequency/Percentage	Interpretation
Years in business	4–9 years	171 / 45%	Many enterprises had some operational stability.
Business organization	Sole proprietorship	260 / 68%	Most were individually owned and managed.
Nature of business	Services	207 / 54%	Service-oriented enterprises dominated the sample.
Classification	Wholesale and retail trade; agriculture, forestry, and fishing	80 each / 21% each	Trade and primary-sector activities were leading sectors.
Capitalization	Not more than Php3,000,000	277 / 72%	Most were micro-scale in financial capacity.
Number of employees	Less than 9	343 / 90%	Most were micro-enterprises with small workforces.
Main device/gadget	Smartphone	341 / 31%	Mobile technology was central to business operations.
Main operations tool	Internet connection	282 / 25%	Connectivity was the most essential operational tool.
Main marketing platform	Social media page tools	255 / 40%	Social media was the leading digital marketing channel.
Main advanced digital tool	Social media management	267 / 56%	Advanced tool use was concentrated in social media-related functions.

Level of Readiness of MSMEs in Adopting Digital Transformation

The MSMEs were generally Strongly Ready to adopt digital transformation, with an overall average weighted mean of 3.62. Environment obtained the highest mean (3.70), indicating that respondents welcomed digital transformation in improving business operations. Technology and workforce both obtained means of 3.66, showing that respondents perceived familiarity with digital transformation, availability of equipment, employee attitude, and basic training as relatively strong. Leadership obtained a mean of 3.63, while organization obtained the lowest mean of 3.52, suggesting that budgeting, risk identification, and strategy formulation still required improvement.

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Table 3. *Summary of Readiness Dimensions*

Readiness dimension	Weighted mean	Descriptive equivalent	Key interpretation
Technology	3.66	Strongly Ready	MSMEs had basic familiarity, training exposure, and some equipment/software for digital transformation.
Organization	3.52	Strongly Ready	Plans, risks, and budgets existed but remained the weakest readiness area.
Environment	3.70	Strongly Ready	MSMEs generally welcomed digital transformation to improve operations.
Leadership	3.63	Strongly Ready	Management direction and requirement for adoption were perceived positively.
Workforce	3.66	Strongly Ready	Employees had positive attitudes and some training in digital tool use.
Overall	3.62	Strongly Ready	Pangasinan MSMEs were generally ready but needed support in weaker organizational and technical areas.

Relationship Between Respondent Profile and Readiness

The correlation analysis showed that selected profile variables were significantly associated with specific readiness indicators. In technology, familiarity with digital transformation was significantly correlated with capitalization (r = -.105), training for technology proficiency was significantly correlated with advanced digital tools used (r = -.108), and availability of equipment and software systems was significantly correlated with number of employees (r = -.108) and operations digital tools used (r = -.102). In organization, only budget allocation for digital transformation was significantly correlated with capitalization (r = -.104).

In the environment dimension, organizational openness to digital transformation was significantly correlated with digital marketing tools used (r = -.109). Leadership indicators were not significantly correlated with profile variables, suggesting that leadership readiness was not strongly differentiated by the measured business profile characteristics. In workforce, employee positive attitude was significantly correlated with number of years in business (r = .102) and advanced digital tools used (r = -.115), while employee training in digital tools was significantly correlated with number of years (r = .110), classification of goods and services (r = .116), digital marketing tools used (r = -.117), and advanced digital tools used (r = -.121). These results indicate that digital tool exposure, capitalization, workforce size, and business maturity shaped specific aspects of readiness.

Table 4. *Summary of Significant Correlations Between Profile and Readiness Indicators*

1	Significant profile variable/s	Correlation value/s	Interpretation
Technology: familiarity with DX	Capitalization	r = -.105*	Capitalization was associated with familiarity with digital transformation.
Technology: technology proficiency training	Advanced digital tools used	r = -.108*	Advanced tool use was associated with training exposure.
Technology: equipment/software availability	Number of employees; operations digital tools used	r = -.108*; r = -.102*	Workforce size and operational tools related to availability of technology systems.
Organization: budget allocation	Capitalization	r = -.104*	Capitalization influenced budget readiness for digital transformation.
Environment: welcoming DX adoption	Digital marketing tools used	r = -.109*	Marketing tool use related to openness toward digital transformation.
Workforce: positive attitude	Years in business; advanced digital tools used	r = .102*; r = -.115*	Business maturity and advanced tool use related to employee attitude.

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Workforce: trained employees	Years in business; classification; digital marketing tools; advanced tools	r = .110*; r = .116*; r = -.117*; r = -.121*	Several profile factors were associated with employee training in digital tools.

Note. * Correlation is significant at the .05 level.

Extent of Challenges Encountered in Adopting Digital Transformation

The challenges encountered by MSMEs were consistently rated as Challenging across all dimensions, with an overall average weighted mean of 3.21. Security and privacy concerns obtained the highest mean (3.31), indicating that data security, compliance with privacy laws, and trust in cloud or third-party data handling were the most pressing issues. Financial constraints followed with a mean of 3.27, particularly maintenance costs, subscription fees, software licenses, hardware, return on investment, and worker training costs. Complexity and usability ranked third with a mean of 3.26, showing that MSMEs found some digital tools difficult to use or overwhelming to choose from.

Other challenges were also important. Time constraints obtained a mean of 3.21, while cultural and organizational challenges, access and availability of digital divide, and strategic alignment each obtained a mean of 3.20. Human resources challenges obtained a mean of 3.18, mainly due to the need for adequate training and digital literacy. Technical challenges obtained the lowest mean of 3.02 but were still rated Challenging, especially insufficient or unreliable internet connectivity and lack of necessary software. These findings show that readiness must be supported by cybersecurity guidance, financing, training, infrastructure, and strategic planning.

Table 5. *Summary of Challenges Encountered by MSMEs in Digital Transformation*

Challenge dimension	Weighted mean	Descriptive equivalent	Rank
Security and privacy concerns	3.31	Challenging	1
Financial constraints	3.27	Challenging	2
Complexity and usability	3.26	Challenging	3
Time constraints	3.21	Challenging	4
Cultural and organizational challenges	3.20	Challenging	5.5
Access and availability of digital divide	3.20	Challenging	5.5
Strategic alignment	3.20	Challenging	5.5
Human resources challenges	3.18	Challenging	8
Technical challenges	3.02	Challenging	9
Overall	3.21	Challenging	

MSME Digital Toolkit

Based on the findings, the study developed an MSME Digital Toolkit as its output. The toolkit was intended to assist MSMEs in Pangasinan in understanding their digital readiness, recognizing the benefits and challenges of digital transformation, and accessing practical resources for adoption. It included an audio-visual presentation on MSME profile, readiness, challenges, and benefits of digital transformation; success stories of MSMEs that adopted digital transformation; and MSME resources such as videos, forms, and guidelines available through an online link.

Table 6. *Proposed MSME Digital Toolkit Based on Study Findings*

Toolkit component	Basis from findings	Purpose
AVP on MSME profile, readiness, challenges, and DX benefits	MSMEs were strongly ready but faced challenging barriers.	To increase awareness of readiness status and practical benefits of digital transformation.
Success stories of digitally transformed MSMEs	Social media, websites, internet, and communication tools were already used by many MSMEs.	To show relatable examples and encourage adoption through observability and peer learning.
Online MSME resource link	MSMEs needed support in training, strategic planning, and tool selection.	To provide accessible videos, forms, and guidelines for digital adoption.

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Cybersecurity and privacy guidance	Security and privacy concerns were the highest challenge.	To help MSMEs manage data protection, trust, and privacy compliance issues.
Training and upskilling module	Workforce training and digital literacy were important readiness and challenge areas.	To strengthen owner and employee capacity to use digital tools effectively.
Financing and support referral guide	Financial constraints were the second major challenge.	To connect MSMEs with affordable credit, government programs, and support agencies.

CONCLUSION

The study concludes that MSMEs in Pangasinan are generally Strongly Ready to adopt digital transformation. Most respondents were micro-scale enterprises, usually sole proprietorships, with limited capitalization and small workforces. Their current digital practices were mainly basic and accessible, particularly smartphones, internet connection, chat applications, business email, digital payment tools, and social media page tools. Advanced tools such as cloud services, video conferencing, customer relationship management platforms, and cybersecurity tools were less commonly used, indicating room for further growth.

The readiness of MSMEs was strongest in environmental support, workforce attitude, technology, and leadership, but organizational readiness, particularly budget allocation, risk identification, and implementation planning, remained an area needing improvement. Selected profile variables were significantly related to specific readiness indicators, especially capitalization, number of employees, devices and gadgets, operations digital tools, digital marketing tools, advanced digital tools, and years in business. These findings suggest that digital readiness is shaped by both business capacity and actual exposure to digital tools.

Although the respondents were strongly ready, digital transformation remained challenging across all barrier dimensions. Security and privacy concerns were the most significant barrier, followed by financial constraints and complexity/usability. The results imply that readiness alone is insufficient without practical support in cybersecurity, financing, training, tool selection, infrastructure, and strategic alignment. The MSME Digital Toolkit therefore offers a research-based output that can help promote digital awareness, guide adoption, and strengthen the sustainability and competitiveness of MSMEs in Pangasinan.

Recommendation

MSME owners and managers in Pangasinan should be encouraged to adopt digital transformation gradually but strategically. They may begin with accessible tools such as smartphones, internet-based communication, social media marketing, digital payment platforms, and basic business software, then progress toward more advanced tools such as cloud storage, online accounting, customer relationship management platforms, cybersecurity tools, and automation systems when resources allow.

The MSME Digital Toolkit developed from the study should be presented to DTI, DOST, the Provincial Government of Pangasinan, Negosyo Centers, MSME associations, and other support agencies for review, refinement, and possible utilization. It may be used as an awareness, training, and promotional material to help MSMEs understand readiness, adoption challenges, success stories, available resources, and step-by-step pathways for digital transformation.

Government agencies and local support institutions should address the leading challenges identified in the study by providing cybersecurity and data privacy orientation, affordable financing options, tool-selection guidance, infrastructure support, and training on digital literacy. Programs should particularly target micro enterprises with limited capitalization and small workforces because these enterprises may need the most assistance in managing the cost, complexity, and risks of digital transformation.

MSME owners and staff should regularly participate in training and upskilling activities on digital marketing, e-commerce, digital payments, online customer service, data security, cloud-based records management, and emerging technologies. Future researchers may conduct similar studies that include the adoption of artificial intelligence, cloud computing, machine learning, augmented reality, automation, and other advanced technologies among MSMEs in Pangasinan and other provinces.

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