CHALLENGES IN DIGITAL TRANSFORMATION OF MICROENTERPRISES IN NUEVA ECIJA: A BASIS FOR RISK MANAGEMENT PLAN

Abstract.

Digital transformation (DT) has attracted the attention of management and organizational scholars in the past decade. It has become an important factor for the competitiveness of businesses especially with the microenterprises. The use of technology has been the goal of many microenterprises to push forward in the competition and provide better quality products and services to its customers and improve the customer experience through IT innovation. This paper presents the challenges encountered by the microenterprises in Nueva Ecija both on the business and its employees in relation to digital transformation. A structured questionnaire was given to the 359 respondents representing microenterprises in Nueva Ecija ,which showed that majority of the respondents were females at an average age of 43 years old. The objective of the study is to determine the challenges in digital transformation of microenterprises in Nueva Ecija. The sample size of 359 respondents answered questionnaires based on the factors like the level of digital skills, degree of digital transformation acceptance, level of technological adoption, implementation of digital transformation, and the challenges encountered in the process of digital transformation. The level of digital skills especially in the management level and employees appears to be high. On the degree of digital transformation acceptance, the microenterprises showed positive or good acceptance on the digital transformation. In the level of technological adoption, the result showed that majority of the microenterprises are moderately applying digital transformation or willing to apply technology in their business. While in the factor of implementing digital transformation in the business, a very small number of microenterprises implement digital technologies in their operation. Most of the microenterprises experienced difficulties in the digital transformation due factors like financial constraints, resistance to change, skills gap and others. The study recommends that microenterprises in Nueva Ecija should conduct regular training to its management and staff for skills development and acquire the necessary technologies as part of its risk management plan. It is also recommended that owners secure funds to digitally transform its businesses to stay competitive. This paper may be of help to the microenterprises owners and future researchers on the topic of digital transformation of microenterprises.

*Keywords:*Digital Transformation; Microenterprises; Risk Management

I. INTRODUCTION

Challenges in any business organization are inevitable. It is this very nature that businesses must compete and stay relevant to be able to stay afloat in the business environment they are operating. Without challenges, business organizations become stagnant and cannot offer innovative products and services that customers highly value. It is a must for business organizations to adopt changes that will improve how they operate and offer quality and efficient products and services to their clients. In this challenging modern business environment, managers and business leaders are challenged on how to integrate digital transformation to improve its operation given the limitations imposed on them.

Digitalization is transforming economies across the world and altering the way firms develop and market goods and services. It holds many promises to spur innovation, generate efficiencies, and improve economic prospects. However, the dynamics of digitalization have not been equally spread across regions, over time, or even across firms within countries. While differences in digitalization between high- and low-income countries remain

large, spurred by the declining costs of broadband from the mid to late 2000s and the increasing ease of internet access with inexpensive mobile phones, some developing countries have expanded their digital economies exponentially over the past decade or so. Digital transformation is a driving force for innovative, inclusive, and sustainable growth. Digitalization continues to expand across the globe, understanding how managers' digital literacy affects firm outcomes, such as innovation and performance. Managers' Digital Literacy comprises more than a manager's ability to use digital devices or software. Rather, it involves a complex set of sociological, emotional, and cognitive skills that allow managers to function effectively in the digital environment. These skills broadly include the ability to use digital tools and technologies to identify and access new knowledge. Interestingly, Digital literacy has been identified as a crucial skill for individuals to help them transform their organizations and achieve superior performance. Indeed, the fourth industrial revolution (i.e., Industry 4.0) has led to increased patronage of digital technologies such as the Internet of Things (IoT), big data, artificial intelligence (AI), robotics, cloud computing, additive manufacturing, augmented and virtual reality, and many other related digital innovations. The diffusion of these digital technologies is radically transforming organizational processes and business models. Given the rapid and radical transformation brought about by digital technologies, it is critical for managers to embrace the digital revolution in order to innovate and grow [39].

Digital tools bring many significant benefits to firms. Digitalization reduces transaction costs by providing better and quicker access to information, and communication between staff, suppliers, and networks. It can help microenterprises integrate into global markets, through reductions in costs associated with transport and border operations and it significantly enhances the scope to trade services. It facilitates access to resources, including finance (e.g. peer-to-peer lending), training, and recruitment channels, including government services, which are increasingly being made available online. It also supports innovation, and greater access to innovation, access to assets, as well as the potential for microenterprises to generate data and analyze their own operations in new ways, to drive improved performance. Yet despite the benefits and opportunities digital technologies bring, and the significant increase in uptake in recent years, many microenterprises continue to lag in adoption. For microenterprises, with 10- 49 employees, digital adoption gaps, compared to larger firms, have grown over the last decade. Indeed, in many countries (e.g. Greece, Hungary, Poland, Portugal, and Turkey, where the median share of employees with connected computers in small firms remains at or below 40%). The progress has stalled, while large firms in frontier countries (Denmark, Finland, Sweden at about 80% or above) have shown rapid progress over the period. Because digitalization is an important driver of productivity growth, and in turn wage growth, these gaps have contributed to increased inequalities among people, places, and firms [25].

Statement of the Problem

This study aims to determine the challenges faced by microenterprises in Nueva Ecija in terms of Digital Transformation of their businesses.

Specifically, it will answer the following questions:

1. Basic demographic profile of the respondents in terms of:
    a. Sex
    b. Age
    c. Educational attainment
    d. Asset Size

2. What is the current level of digital skills by both the management and employees of the microenterprises in Nueva Ecija when it comes to implementing digital transformation?

3. To what extent have microenterprises in Nueva Ecija embraced and accepted digital transformation as a business strategy?

4. What is the level of technological adoption of these microenterprises in the context of their business operations?

5. How can the implementation of digital transformation in the business operations of microenterprises be described, and what are the common practices and approaches used?

6. What are the specific and overarching challenges encountered by microenterprises in Nueva Ecija while attempting to implement digital transformation initiatives?

Significance of the Study

This study is beneficial to the microenterprises in Nueva Ecija in improving their business operation through digital transformation. It will provide the microenterprises in Nueva Ecija good opportunity to be competitive and provide much better products and services by way of innovation in technology.

This is also beneficial to the community as when microenterprises are innovative, the customers and the community will benefit from the effectiveness and efficiency of their operation.

It will be a basis for government bodies to provide assistance to those microenterprises which may require support from the government.

For other researchers who are interested in the topic of Digital Transformation of microenterprises, this research can be used as a reference.

II.REVIEW OF RELATED LITERATURE

Related Foreign Studies

Digital transformation refers to the comprehensive integration of digital technologies into all aspects of an organization, fundamentally changing how it operates and delivers value to its customers. It goes beyond adopting individual technologies and encompasses a strategic, organization-wide shift towards a digitally-driven culture and business model. At its core, digital transformation leverages technologies such as artificial intelligence, cloud computing, data analytics, and the Internet of Things to enhance business processes, improve decision-making, and foster innovation. The aim is to create a more agile and customer-centric organization that can adapt to rapidly changing market conditions. Digital transformation is not just a technological shift; it

involves a cultural and organizational change. Leaders need to inspire a mindset of continuous improvement, collaboration, and openness to new ideas. It requires investments in employee training and development to ensure that the workforce is equipped with the skills needed in a digital era. Several notable organizations have successfully undergone digital transformation, leading to increased efficiency and competitiveness. For example, companies like Amazon, Netflix, and Uber have disrupted traditional industries by embracing digital technologies and redefining customer experiences. Digital transformation is a crucial process that organizations undergo to leverage technology in order to improve efficiency, customer experience, and overall business operations. Through the implementation of digital tools and technologies, businesses can streamline their processes, automate routine tasks, and reduce manual errors. This leads to increased productivity, faster decision-making, and cost savings [29].

Improved customer experience is another critical benefit. Digital transformation enables businesses to better understand their customers' needs and preferences through data analytics and customer relationship management (CRM) systems. This information can be utilized to personalize products and services, provide more targeted marketing, and enhance overall customer satisfaction. For instance, the use of AI-powered chatbots can provide instant and personalized customer support, enhancing the overall experience [7].Furthermore, digital transformation facilitates better decision-making through data-driven insights. Big data analytics allows businesses to collect and analyze vast amounts of data, providing valuable information for strategic planning. Real-time data analysis enables organizations to make informed decisions promptly, adapting to market changes and staying ahead of the competition [35].

In terms of competitiveness, digital transformation is a key driver. Businesses that embrace digital technologies are better positioned to adapt to market trends and changing customer expectations. This adaptability fosters innovation, allowing companies to develop new products and services, enter new markets, and gain a competitive edge [2].Moreover, digital transformation can lead to significant cost savings in the long run. While the initial investment in technology implementation may be substantial, the efficiencies gained through automation, improved processes, and reduced operational costs can result in a positive return on investment over time [28].Digital transformation also enhances cyber security. As businesses adopt advanced technologies, they become more aware of the importance of cyber security measures to protect sensitive data. This includes implementing robust encryption, regular security audits, and employee training programs to mitigate cyber threats [22].

2.1The need for Digital Transformation of Microenterprises

Digital transformation offers numerous benefits for microenterprises, playing a pivotal role in enhancing their competitiveness and sustainability in today's dynamic business environment. This comprehensive process involves the integration of digital technologies into various aspects of business operations, leading to improved efficiency, innovation, and overall growth.

One primary advantage of digital transformation for microenterprises is enhanced operational efficiency. Through the adoption of digital tools and technologies, microenterprises can streamline their processes, automate repetitive tasks, and reduce manual errors. This increased efficiency translates into cost savings and allows employees to focus on more value-added activities. For instance, implementing customer relationship management (CRM) systems can help microenterprises manage customer interactions more effectively, leading to improved customer satisfaction and loyalty [30].Moreover, digital transformation enables microenterprisesto gain valuable insights through data analytics. By collecting and analyzing data from various sources, businesses can make informed decisions, identify market trends, and understand customer preferences. This data-driven approach empowers microenterprises to tailor their products and services to meet customer demands, ultimately leading to increased sales and revenue [36].

Innovation is another key benefit of digital transformation for microenterprises. Embracing digital technologies fosters a culture of innovation within the organization, encouraging employees to explore new ideas and solutions. Cloud computing, for example, provides microenterprises with access to scalable and flexible resources, facilitating the development and deployment of innovative products and services [5].Additionally, digital transformation enhances the customer experience, a crucial factor in today's competitive business landscape. Microenterprises can leverage digital channels to engage with customers, provide personalized experiences, and offer convenient online services. Mobile apps, social media platforms, and e-commerce websites enable microenterprises to reach a broader audience and create meaningful connections with customers [16].Furthermore, digital transformation contributes to better risk management for microenterprises. With cyber security measures and data protection protocols, microenterprises can safeguard sensitive information and mitigate the risks associated with cyber threats. This not only protects the microenterprises' reputation but also builds trust among customers and partners [4].

2.2 What are the challenges encountered by Microenterprises in Digital Transformation?

Digital transformation has become imperative for businesses in today's dynamic and competitive environment. While larger enterprises often have the resources to navigate this transformation seamlessly, microenterprises encounter distinct challenges that can impede the process. This section will explore some of these challenges with a focus on their implications for microenterprises.

Limited Resources

One of the primary challenges faced by microenterprises is the constraint of limited resources, including financial and human capital. Unlike larger enterprises, microenterprises may struggle to allocate funds for comprehensive digital transformation initiatives. This limitation can hinder the adoption of advanced technologies and the hiring of skilled personnel, slowing down the overall transformation process [9].

Resistance to Change

The resistance to change is a common challenge in any organizational transformation, but it can be particularly pronounced in microenterprises. The close-knit nature of these businesses often results in employees being resistant to altering established workflows and processes. Overcoming this resistance requires effective change management strategies, emphasizing the benefits of digital transformation for both the business and its employees [33].

Lack of Digital Skills

Microenterprises may face difficulties in recruiting and retaining employees with the necessary digital skills. The rapid evolution of technology makes it challenging for microenterprises to keep pace with the skills required for successful digital transformation. Addressing this challenge involves investing in training programs for existing employees and collaborating with educational institutions to bridge the digital skills gap [24].

Cybersecurity Concerns

As microenterprises increasingly rely on digital technologies, they become more susceptible to cyber threats. However, due to resource constraints, microenterprises may struggle to implement robust cyber security measures. This exposes them to risks such as data breaches and financial losses. To address this challenge, microenterprises must prioritize cyber security and explore cost-effective solutions that align with their budget constraints [10].

Integration of Legacy Systems

Many microenterprises operate with legacy systems that were not designed to accommodate the latest digital technologies. Integrating these legacy systems with modern digital solutions can be a complex and costly process. It requires careful planning to ensure a smooth transition without disrupting ongoing business operations [1].

Vendor Selection and Management

Microenterprisemay struggle with choosing the right technology vendors and managing these relationships effectively. Limited bargaining power may result in microenterprises being offered less favorable terms compared to larger enterprises. Additionally, inadequate vendor management can lead to issues such as service disruptions and unexpected costs. To mitigate these challenges, microenterprises should conduct thorough vendor assessments and establish clear communication channels [19].

Regulatory Compliance

Adhering to evolving regulatory requirements related to digital practices is a challenge for microenterprises. Navigating complex legal frameworks requires a dedicated focus on compliance, which can divert attention and resources from core business activities. Staying informed about regulatory changes and seeking legal counsel can help microenterprises navigate this challenge effectively [38].

The challenges faced by microenterprises in the implementation of digital transformation are multifaceted, encompassing resource constraints, resistance to change, skills gaps, cyber security concerns, legacy system integration, vendor management, and regulatory compliance. Overcoming these challenges requires a strategic and adaptive approach, with a focus on maximizing the benefits of digital transformation while minimizing disruptions to business operations.

Philippine Related Studies

The Philippine Government launched several strategies to cater the trend in the 21st century and aims to achieve its vision of the Philippine Government Online thru the Philippine Digital Transformation Strategy (PDTS). The goal of the PDTS is to materialize the effort of the government to establish and electronic government in the country using development and innovations in information and communications technology. These efforts include the Philippine Digital Strategy of 2011-2016, the Government Information Systems Plan, the Philippine Strategic ICT Roadmap of 2006-2010, and the eGovernment Master Plan of 2012, among others. The Philippines created the Department of Information andCommunications Technology (DICT) that will give focus on the overall goal of establishing a transparent, effective, and citizen-centric e-government. One of the objectives of PDTS is to engage the citizen genuinely through available communication channels like Facebook, Twitter, and other social media platforms on the internet. These strategies are a development plan aimed at transforming the government into a digital platform providing transparent and accountable governance, efficient operations, direct citizen engagement, and innovation. According to the report of the DICT, the E-Government Master Plan of 2012 laid the foundation for the government to pursue its goal of improving the way it provides services and how it interacts with the general public through the use of ICT[34].

According to [20]microenterprises are considered as amongthe drivers of job creation and economic growth in the Philippines. Philippines Statistics Authority (PSA) data showed that during the years 2010-2019, 99.5-99.6% of all business in the country falls under the microenterprises category. These microenterprises can have

a huge potential opportunity for considerable increased market access and tremendous growth with the ASEAN's current initiative towards regional market integration. For the Philippines to become a major player in the ASEAN market and in the regional production networks, these microenterprises must be capable of facing the challenges and opportunities the economic integration brings. Some of the challenges the Philippine microenterprises face is the limited access to finance, information gaps, lack of technology , skills, poor product quality and poor marketing that hamper the advantage of the microenterprises from the Philippines to compete internationally and to market their products abroad. To address this issue, the Philippines formulated the Microenterprises Development Plan 2017-2022 with the vision to be more globally competitive - regionally integrated, resilient, sustainable, and innovative. It emphasized on: 1.Business environment, with emphasis on improving the business regulatory requirements and procedures as well as maximizing access to finance. 2. Business capacity, focusing on human capital development, and 3. Business opportunities whose aim is broadening access to markets.

In the Philippines, the Department of Trade and Industry (DTI) has been pivotal in promoting digital transformation among microenterprises. Initiatives from the DTI have aimed to educate and support microenterprises integrating digital tools and technologies into their business models [8].

Moreover, the COVID-19 pandemic acted as a catalyst for the acceleration of digital transformation in microenterprises in the Philippines[37]. With lockdowns and restrictions impacting traditional business operations, many microenterprises swiftly pivoted towards digital solutions for remote work, e-commerce, and online marketing. This shift highlighted the significance of digital readiness for business continuity and resilience [12].

Despite these advancements, challenges persist. Factors such as limited access to financing, inadequate digital infrastructure in certain regions, and a skill gap in adopting and utilizing digital technologies pose hurdles to widespread digital transformation among microenterprises in the Philippines.To facilitate this transformation further, government support, collaboration with tech providers, and the development of tailored programs focusing on digital upskilling are essential. Additionally, initiatives encouraging partnerships between larger enterprises and microenterprises can aid in knowledge transfer and resource sharing for a more comprehensive digital integration[26].

2.3OTHER RESEARCHERS' OPINION

On Limited Resources

According to [18], the digitalization efforts of microenterprises in urban areas found that lack of funds is not the main constraint in adopting digital technologies. Instead, factors such as culture of the organization, support of management, and digital literacy emerged as important determinants of the success of digital transformation of microenterprises. This finding challenges that traditional assumption that the lack of funds is the main barrier to digitalization of microenterprises.

This assumption was supported by [13] which conducted a comparative analysis of microenterprises with varying levels of financial resources and found that resourcefulness and innovation played a more significant role in digital transformation outcomes than financial abundance. Owner of microenterprises who showed a willingness to apply and experiment with low cost digital solutions and adapt to changing market dynamics were able to achieve significant improvements in efficiency and competitiveness, regardless of their financial constraints.

According to [31]that existing literature on digital transformation in microenterprises and identified a shift in focus from financial constraints to strategic resource allocation and entrepreneurial mindset. This shift

underscores the importance of creative problem-solving and strategic decision-making in overcoming financial barriers to digital transformation.

On Skills Gap

Recent studies conducted in the Philippine context shed light on the nuanced relationship between the skills gap and digital transformation. A survey study by [6] explored the digital skills acquisition among microenterprises owners in various regions of the Philippines. The findings revealed that while many entrepreneurs lacked advanced digital competencies, they exhibited a strong willingness to learn and adapt to technological changes. Through informal learning channels such as online tutorials, peer networks, and community workshops, microenterprises' owners demonstrated the ability to acquire essential digital skills necessary for digital transformation.

A study conducted by [27] stated that government-led initiatives have also played a crucial role in bridging the skills gap and facilitating digital adoption among microenterprises. The DigitalJobsPH program, launched by the Department of Information and Communications Technology (DICT), offers free training courses on digital literacy, e-commerce, and online marketing to micro-entrepreneurs across the country. The impact of such training programs reported a significant improvement in participants' digital skills and confidence in utilizing digital technologies within their businesses. These initiatives highlight the government's commitment to empowering microenterprises' owners with the necessary skills to thrive in the digital economy.Moreover, collaborative efforts between the private sector, academia, and civil society organizations have further contributed to addressing the skills gap in digital transformation. Partnerships between technology companies and local universities have led to the development of customized training programs tailored to the specific needs of microenterprises owners.

On Resistance to Change

The journey towards digital transformation is often impeded by resistance to change. Microenterprises owners, accustomed to traditional methods and processes, may perceive digitalization as disruptive and challenging. However, recent research suggests that while resistance to change is a prevalent concern, it is not an insurmountable obstacle to digital transformation in microenterprises.

A study conducted by [32] investigated the factors influencing digital transformation in microenterprises, with a particular focus on resistance to change. The findings revealed that while resistance was indeed present, it was often rooted in fear of the unknown and uncertainty rather than outright opposition to digital technologies. Microenterprises owners expressed concerns about the complexity of digital tools, potential disruptions to existing workflows, and perceived risks associated with technology adoption. However, with proper guidance and support, many were able to overcome their resistance and embrace digitalization as a means of enhancing business efficiency and competitiveness.

Further examination by [21] on the role of organizational culture in facilitating digital transformation in microenterprises found that businesses with a culture of innovation and openness to change were better equipped to navigate resistance and drive successful digital initiatives. By fostering a culture that values experimentation, learning, and adaptability, microenterprises owners can create an environment conducive to digital transformation, where employees feel empowered to embrace change rather than resist it.

Furthermore, collaborative partnerships between microenterprises owners and digital experts have emerged as a promising strategy for overcoming resistance to change. Through mentorship programs, training workshops, and peer networks, microenterprises owners can gain valuable insights and support from industry experts, enabling them to navigate the complexities of digital transformation with confidence. A case study by [14] highlighted the transformative impact of such partnerships, demonstrating how microenterprises owners were

able to overcome resistance and leverage digital technologies to drive growth and innovation within their organizations.

III. METHODOLOGY

Research Design

The researchers used a quantitative approach using a descriptive survey method in this study. The quantitative approach often, uses tools such as surveys or questionnaires to collect numerical data, which will be used in statistical models. This strategy is seen as more efficient than qualitative since the data collection and gathering of data is faster and the researcher tends to remain objective about the subject matter [23]. A descriptive research design can also employ a wide range of research methods to examine one or more variables [41]. These variables can then be measured, typically with tools, and the resulting numbered data such as microenterprises' socio-demographic profiles, level of digital skills, acceptance level of digital transformation, and challenges encountered in its implementation.

Research Instruments and Sampling Method

An online survey instrument with structured questions was used by the researchers. One advantage of online survey research is that it takes advantage of the ability of the Internet to provide access to groups and individuals who would be difficult, if not impossible, to reach through other channels [15]. Online surveying was identified as the most suitable method for the research proposed in this paper, on account of its benefits, as identified by [17]: due to the narrow time frame, quick delivery and easy return were required.The researchers used google forms and messenger group chats as an online instruments to conduct the responses of the respondents from the 359 microenterprises in Nueva Ecija. The questions were developed anchored on the study of [32] on the Factors Influencing digitalization of microenterprises

Data Gathering Procedures and Treatment of Data

Since this research targets microenterprises within Nueva Ecija, through a simple random sampling method the researchers asked the permission and assistance of the Department of Trade Industry (DTI) Nueva Ecija Provincial Office, being the primary agency in the promotion and development of micro, small, and medium enterprises (MSME) in the country, to reach as many microenterprises as respondents and lifts the credibility of the study. The online questionnaire was shared with Messenger Group Chats of MSME clients of DTI and the Negosyo Centers using Google Forms.

Using www.raosoft.com's sample size calculator, it was found that at least 359 respondents are necessary for the survey with a confidence level of 95% and an error margin of 5% from the total population of 5,323 microenterprises assisted by DTI in Nueva Ecija in the year 2022.

Descriptive statistical tools such as percentage and frequency distribution, tables, and graphs through Microsoft Excel Data Analysis were used to summarize, describe, process, and analyze the data gathered.

IV. RESULTS AND DISCUSSIONS

Findings from the analysis of quantitative data gathered from the current study are presented below:

Demographics of the respondents:The demographic variables included sex, age, educational attainment, and asset size, as shown in Table 1. The analysis of the data reveals a predominant representation of female respondents, constituting 93.92% of the total sample (N=362). The average age of survey participants is 43

years. In terms of educational background, a majority (56.08%) held a Bachelor's degree, 37.85% had attained some college or vocational degree, and 6.08% possessed a high school diploma.

Furthermore, the findings indicate that the majority of the respondents (87.29%) fall within the micro-enterprise category, possessing total assets of three million pesos and below. This overview of demographic characteristics provides valuable insights into the composition of the study population.

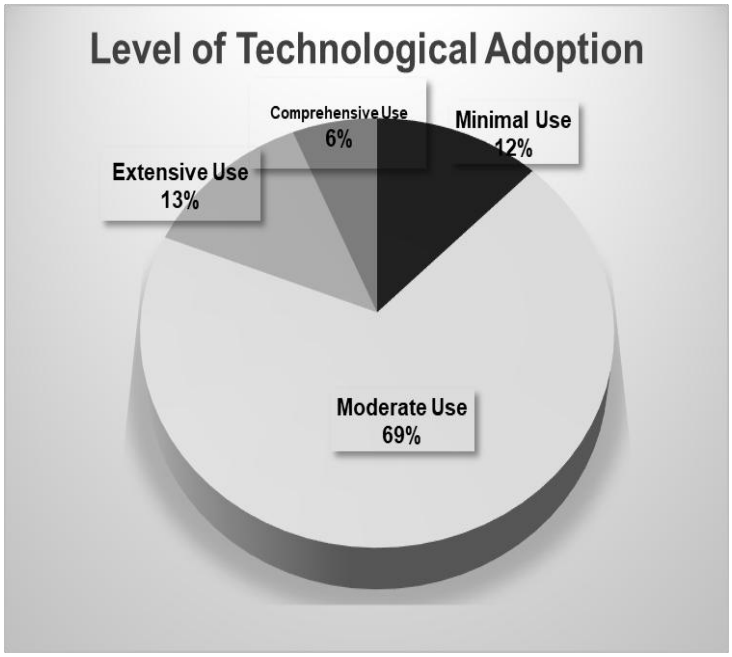
Table 1: Demographic details of Respondents

Indicators	Measure	Percentage
Sex	Male	93.92%
	Female	6.08%
Age	Mean	43
	Range	25-59
Educational Attainment	High School Diploma	6.08%
	Some College or Vocational Degree	37.85%
	Bachelor's Degree	56.08%
Asset Size	Micro Enterprise (3 Million and below)	87.29%
	Small Enterprise (3,000,001 to 15 Million)	12.71%

Level of Digital Skills:The data analysis involves the examination of the mean scores for the level of digital skills across different indicators, specifically in management and employees. The scale used for measurement ranges from 1 (very low) to 5 (very high). The average level of digital skills among individuals in management is moderately high, with a mean score of 3.13. This suggests a reasonable proficiency in digital skills among this group. Employees, on average, demonstrate a similar proficiency in digital skills with a mean score of 3.12. This indicates a consistent level of digital skillfulness across both management and employee categories. The data suggests a moderate level of digital skills within the studied population, both in management and among employees of the microenterprises in Nueva Ecija when it comes to implementing digital transformation.

Degree of Digital Transformation Acceptance: On the survey question, "To what extent have microenterprises in Nueva Ecija embraced and accepted digital transformation as a business strategy", a mean score of 3.5 was generated with a scale ranging from 1 (not at all) to 5 (completely).

Given the scale's nature, where 3 represents a moderate level, a mean score of 3.5 suggests that, on average, microenterprises in Nueva Ecija hold a moderately positive perception regarding their acceptance of digital transformation as a business strategy. Respondents, on average, indicate a leaning towards acceptance but may not perceive it as fully integrated or implemented.



Level of Technological Adoption. Figure 1 highlights a range of technological adoption among microenterprises in Nueva Ecija, with a significant number (69%) at a moderate level. While many businesses have embraced technology to varying extents, there are opportunities for those with minimal use (12%) to enhance their technological integration. Additionally, businesses with extensive (13%) and comprehensive (6%) use may serve as benchmarks for others looking to advance their technological capabilities.

Figure 1: Level of Technological Adoption of the Respondents

Implementation of Digital Transformation by Microenterprises: The ratings given by the respondents to the question regarding the overall progress of digital transformation in their business operations, using a scale ranging from 1 (excellent) to 4 (poor), resulted in a mean score of 2.12 which suggests that, on average, respondents rated the overall progress of digital transformation in their business operations as "good." This indicates a generally positive digital transformation effort among the surveyed businesses.

The data analysis reveals a consistent pattern among all the respondents, showcasing the predominant use of social media marketing as their primary digital tools or technologies in the context of ongoing digital transformation efforts. The data also showed a notable absence of choices such as cloud computing, the Internet of Things (IoT), and artificial intelligence (AI) as current digital tools among the respondents. Exploring the reasons behind the limited selection of these advanced tools can provide valuable insights into the current state of technology adoption and may guide strategies for broader and more diversified digital transformations within the surveyed microenterprises.

In terms of staff training and skill development relevant to digital transformation, the majority of respondents (62.71%) opt for a comprehensive training approach encompassing all staff. Conversely, 24.86% focus their training efforts on key personnel exclusively, while 12.43% report limited or no staff training initiatives.

Challenges encountered in the process of digital transformation: During the process of digital transformation, microenterprises in Nueva Ecija encounter a range of challenges, as indicated by research findings. A notable 56.3% of respondents identify insufficient financial resources as a prevalent challenge. Most owners of the microenterprise in Nueva Ecija believed that the lack of enough financial resources is an important challenge they encounter in digitalization which aligned with the study of [9].Additionally, 12.5% acknowledge resistance to change, emphasizing the importance of addressing organizational dynamics. The attitude of respondents leaned towards resisting the adoption of digital transformation for fear of uncertainty in the future of digitalization and how it affects their operation as stated in the study of [33]. A significant 37.5% of participants recognize a lack of digital skills as a substantial challenge, underscoring the urgency for workforce development which was found in the study of [24] indicating the difficulty of hiring staff with enough digital skills as most workers lack digital skills which is crucial in the digitalization of microenterprises. Integration issues with existing systems are reported by 6.3% of respondents, and 18.8% express concerns about data privacy and security, highlighting the critical necessity for robust cyber security measures. Collectively, these research outcomes underscore the varied obstacles that microenterprises in Nueva Ecija encounter while implementing digital transformation.

Summary of Major Findings:

The study presented the challenges encountered by the microenterprises in Nueva Ecija. One significant finding is the lack of sufficient funds that would allow digitalization of microenterprises in Nueva Ecija. Without the needed funds, the microenterprises are unable to acquire much needed technology that will help the microenterprises to become more competitive in their business through the use of technology in handling operations and customers demands. The adoption of digital technologies became more of a challenge due to the attitude of the respondents which is resistant to the change which is crucial in the digital transformation. The attitude of the respondents in embracing digital change is vital for the success of the implementation of digital transformation among the microenterprises though other factors like level of digital skills, degree of digital transformation acceptance and the implementation of digital transformation showed positive response which could be a good starting point for the owners of the microenterprises in Nueva Ecija.

V. CONCULSION AND RECOMMENDATIONS

The analysis of the current study highlights valuable information on the digital transformation journey of microenterprises in Nueva Ecija. Key challenges, including financial constraints, resistance to change, and skill

gaps, pose significant risks to the successful implementation of digital initiatives. Additionally, concerns regarding data privacy and security underscore the importance of robust risk management strategies. These constraints pose potential risk for the microenterprises especially if they want to stay in the competition. These challenges must be addressed and the management of these microenterprises must include in their risk management plan how to digitally transform its businesses to make sure they are not lagging behind in any technological development. Failure to make these changes means losing competitiveness and the ability to improve the business process which brings savings to the business. Many customers also value businesses which continue to innovate in the delivery of their products and services.

Recommendations:

1. Conduct regular and updated training for the management and staff on digital skills to keep them abreast on new developments in the use of technology in business.
2. Create a program that will include training management and staff to understand the importance of digital technologies in business so their perception and acceptance to change will improve.
3. Address the issue of cyber security by using application and mechanism that will secure the data like firewalls and anti-virus software, networks security, password management and the training of employees on how to detect data security breach.
4. Include in the annual plan on how to secure funds to acquire the necessary technologies for the transformation. This may be done by additional capital, savings or bank loans by the owners of the microenterprises.

Specific Action Plan:

1.The microenterprises in Nueva Ecija should acquire technology to digitally transform their business into a more competitive set up. This entails acquisition of new computers and software that will help significantly its business operations.

2.The management of these microenterprises must acquire the services of experts in digitalization of microenterprises to assess the level of digital transformation of the microenterprises in Nueva Ecija. This include regular assessments on the need to train management and staff on their skills in the application of digital transformation which also includes assessment on the attitude towards acceptance to digital change. The assessment and training must be conducted on a regular basis like monthly or prepare the necessary training when the need arises, or if there are new technologies available that would be vital for the successful operation of microenterprises.

3.The management of the microenterprises in Nueva Ecija should include in their annual budget how to secure funds for the digital transformation which has been one of the major challenges. The most viable way to secure funds is from its own savings or borrowing from the different banks. The management of microenterprises can also contribute funds as additional capital to purchase the new technologies needed to digitally transform their microenterprises.

Ethical Approval and Consent

The ethical considerations in this research were maintained including the approval of a request letter by the researchers from DTI and the respondents before administering the questionnaire.Participation is entirely voluntary. Respondents have the freedom to withdraw from the analysis at any time if they so choose. Throughout the analysis, the researchers retain the highest degree of objectivity and confidentiality in discussions and evaluations. The contributions and engagement of respondents are extremely important and valued.

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