



Challenges and Opportunities for Digital Transformation in Philippine Microfinance Institutions

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ABSTRACT

The research focuses on the factors that affect the digital transformation of Microfinance Institutions in Nueva Ecija, Philippines. The research objective is to evaluate the performance and digital progress made by the MFIs currently to measure the effectiveness of the guidelines and to identify recommendations for further improvement. In this study, descriptive research design was employed, and data were generated from 205 MFI Clients and owners by administering questionnaires and interviews. The research shows that its use in business leads to increased operational efficiency, quality delivery, and positive client experience. However, there are issues that need to be faced, including issues like data security or the high costs of the necessary infrastructure and lack of adequate infrastructure in certain regions. Based on the findings of the study, the following recommendations can be made: The establishment of powerful financial literacy programs that banks can support and facilitate, modification of the current credit bureau functionalities, more comprehensible and easier to use digital platforms that consumers can use in their interaction with the banks, and better cybersecurity. Further, the state should support such policies and regulation to help the countries in embarking on digital transformation. The study proves the need to carry out further studies on the development of digital financial services to enhance financial inclusion and socio-economic growth. It is suggested that, by adopting these measures, MFIs will be in a position to help their clients achieve the desired economic outcomes, especially in the rural settings.

Keywords: Cybersecurity, Digital Literacy, Digital Transformation, Financial Inclusion, Microfinance Institutions, SDG 8

JEL Classifications: O1, Q1, Q14, R51, I3, G2

1. INTRODUCTION

Microfinance has become a key financial innovation over the past few decades, significantly contributing to economic development, poverty reduction, and job creation worldwide. It targets low income populations, aiming to enhance financial inclusion and provide necessary institutional financial services to the poor. In the Philippines, microfinance has grown substantially but still faces challenges in achieving full financial inclusion and poverty eradication. Financial inclusion is crucial for reducing poverty and promoting inclusive economic growth (Nizam et al., 2020). It is recognized globally as essential for addressing

poverty and fostering economic development, particularly empowering women and enhancing their decision-making power in developing countries (Compaoré, 2022). Women using financial services can improve their resources, benefiting their families (Arshad, 2023). In the Philippines, access to microfinance has been linked with higher trust and civic engagement (Naili et al., 2023), emphasizing the role of community engagement in the success of microfinance. Financial inclusion remains a top policy priority in many developing countries, including the Philippines, underscoring its importance for economic progress (Ozili et al., 2022). Achieving a threshold level of financial inclusion can also help control corruption, offering broader societal benefits (Uddin

et al., 2023). Moreover, digitalizing business processes support financial inclusion and promotes inclusive economic growth (Ong et al., 2023).

Microfinance institutions (MFIs) have become key players in the fight against poverty and hunger in Southeast Asia, where, in spite of substantial global food supply, over 25,000 people perish from hunger-related causes every day. With a combined portfolio of \$15 billion, microfinance institutions (MFIs) have impacted over 100 million disadvantaged people globally. On the other hand, there are still issues in the Philippines with guaranteeing the general accessibility and use of financial services and products, enhancing customer satisfaction, and assessing how financial services affect the welfare of consumers. One of the most important aspects of reducing poverty is financial inclusion, which is acknowledged universally as being necessary for inclusive economic growth and development (Nizam et al., 2020). To remove obstacles to financial inclusion, governments have made increasing banking services a top priority (Ahamed and Mallick, 2019). In the Philippines efforts have focused on poverty alleviation and income distribution reforms, achieving modest progress in combating poverty (Vicencio and Villanueva, 2022). Access to microfinance services has been shown to positively correlate with trust and civic engagement in the Philippines (Naili et al., 2023), highlighting the importance of community engagement and trust in microfinance success. Financial inclusion remains a top policy priority in many developing countries, including the Philippines, emphasizing its role in economic progress (Ozili et al., 2022). Financial inclusion and inclusive economic growth are promoted by the digitalization of financial services (Kanungo and Gupta, 2021). Particularly in Southeast Asia, where access to formal savings and credit is relatively low, digital technologies are essential for facilitating access to financial services (Maulana and Nuryakin, 2021). In the long run, digitalizing business transactions has aided in the promotion of financial inclusion in the Philippines (Ong et al., 2023).

Its for this reason that proper policies are critical in the Philippines to grow the microfinance sector amid some of the challenges that include: Inflation The recent economic downturn caused by the COVID-19 pandemic To elucidate this, the following are some of the ideas needed to advance the growth of value in the microfinance industry in the Philippines: The right policy to embrace Its crucial to note that the growth of the microfinance sector in the Philippines is Enhancing the credit bureaus and conducting the financial literacy campaigns are some of the beneficial measures that should be taken to strengthen and develop the sector and make it sustainable. Digital transformation is a relative recent development that exposed both great opportunities and risks for Microfinance Institutions (MFIs) in the Philippines. Awareness raising campaigns are important because they can raise the ability of borrowers to make informed decisions in the use of financial products and services hence improving the repayment ability of borrowers (Bylander and Res, 2020). Building the capacity of credit bureaus can benefit MFIs by affording them credible details about the borrowers' past repayment behaviour, thus enhancing the access to credit quality data in a bid to improving the ability to forecast and control the level of non-performing loans (Opalo, 2022). This indeed plays a positive

roles to the sector in terms of its stabilizing and its expansion. Digitalization is a very promising for the MFIs in the Philippines in terms of better productivity and outreach to the unserved clientele. With that, through the use of digital technologies, MFIs can extend the range of services, cover more individuals, and introduce various financial services to increase a set of services that contribute to financial inclusion and sustainability of the sector. But at the same time digital transformation also brings up sweet opportunities and some tough questions to the MFIs. This means that certain barriers which include; security, physical structures and gaps in access to technology must be resolved to maximize on the opportunities brought about by the process of digitalization. Clients in the sector have to ensure that all clients including those at the peripheral remote area can have access to the digital tools in the same extent as their counterparts since exclusion is a great threat to the sector.

The digital transformation of microfinance institutions (MFIs) in Nueva Ecija, Philippines, present both challenges and opportunities. Dorfleitner et al. (2021) empirically analyze the digital transformation of MFIs, highlighting the deployment of digital applications and smart devices to digitize core business operations like loan disbursement. This study underscores the significance of leveraging digital technologies to enhance operational efficiency and service delivery in the microfinance sector (Dorfleitner et al., 2021). Likewise, Benami and Carter (2021) examine how digital technologies are reshaping rural microfinance, emphasizing the broader impact on financial services such as savings, credit, and insurance. Their research sheds important light on the possible advantages and difficulties of digital transformation for MFIs in farming areas like Nueva Ecija (Benami and Carter, 2021). Additionally, Jalil's (2021) study on digital finance and microfinance in Malaysia's rural regions offers valuable insights into how digital financial services can be seamlessly integrated to boost productivity, connectivity, and service quality. This research highlights the pivotal role of digital financial services in expanding outreach and improving service delivery to marginalized communities, particularly targeting farmers in Nueva Ecija (Jalil, 2021).

In the microfinance industry, digital transformation entails implementing new technologies to improve accessibility, optimize workflows, and provide creative financial solutions. includes applying for loans and providing client support via digital platforms, online payment methods, and mobile banking. Microfinance institutions (MFIs) can better serve low-income communities, foster economic growth, and reduce poverty by utilizing these technologies to significantly boost their productivity and reach. By enabling people to complete loan transactions through online platforms, new business models made feasible by digital technologies have completely changed the way banks and credit institutions function (Niemand et al., 2021). Digital applications and smart device deployments are becoming more widespread, changing fundamental business processes like loan disbursement (Niemand et al., 2021). MFIs must embrace digitalization in order to adjust to the shifting needs of the market and the preferences of its clients. The pandemic of COVID-19 has forced the microfinance sector to reconsider how clients use its

services, highlighting the necessity of digital solutions to maintain accessibility and continuity (Malik et al., 2020).

Particularly in areas like Nueva Ecija, the Philippines, integrating digital technologies into microfinance operations can improve service delivery, operational efficiency, and customer happiness. Furthermore, the way that digital marketing shapes students' perceptions of healthcare careers emphasizes the wider effects of digitalization. The possibility of tailored digital strategies was highlighted by a study conducted on students in Nueva Ecija, which found a substantial correlation between exposure to digital marketing and positive views towards jobs in healthcare (Santos, 2024). The relationship between digitization and value co-creation in MFIs is moderated in large part by customer education (Elnaggar and Hassan, 2023). MFIs may increase value co-creation and raise overall service quality by helping customers better comprehend digital financial services. Additionally, the adoption of computerized accounting information systems (AIS) can improve the quality of the information, which will help microfinance businesses make better decisions (Wijayanti et al., 2023).

The study aimed to enhance microfinance landscape in Nueva Ecija through evaluative and developmental perspectives. It conducted comprehensive assessment of services provided thru privately operated MFIs, documenting available services and evaluating their effectiveness and accessibility to the target beneficiaries, thus determining the impact on local financially underserved populations (Vicencio and Villanueva, 2022). Examining the implementation of current MFI norms and their impact on consumer welfare was a crucial component. This investigation demonstrated how well these practices matched the needs of the customer, pointing out areas of strength in the provision of services as well as possible weaknesses in the adoption and execution of policies, all of which are critical for economic empowerment (Bananuka et al., 2019). The study recommended developing regulations in line with digitization to enhance and broaden the variety of services offered by Microfinance Institutions (MFIs) (Uddin and Barai, 2022). This strategy plan aims to reduce poverty, promote financial inclusion, expand benefits, and improve the quality of services provided. The creation of these recommendations is intended to be a first step in bringing MFI operations into line with one another, improving operational effectiveness, strengthening consumer protection, and guaranteeing a more significant contribution to the socioeconomic advancement of the area.

The study seeks to enhance the role of the microfinance sector in socio-economic development by closely examining particular objectives and emphasizing its potential as a vehicle for economic empowerment and equality (Mustafa et al., 2021). Emphasizing continuous improvement and innovation in microfinance service delivery and policy implementation, the research underscores the critical importance of ensuring that these financial instruments effectively reach, and benefit marginalized sectors in Nueva Ecija and beyond. Rooted in the theoretical framework that views microfinance as a pivotal mechanism for socio-economic empowerment, particularly for marginalized communities, the study draws on theories such as the Social Performance Management framework, which evaluates microfinance

institutions' effectiveness beyond financial metrics to include social and developmental impacts, and the Financial Inclusion Theory, emphasizing the role of accessible financial services in reducing poverty and fostering economic inclusion.

A thorough review of existing literature reveals notable gap in comprehensive studies on the efficacy and application of digital transformation within the microfinance sector in the Philippines, particularly in privately owned MFIs. While previous research has documented the general impact of microfinance on poverty alleviation and economic development, there is a scarcity of detailed analysis on how digital technologies could improve service delivery, operational efficiency, and client satisfaction. This study endeavors to fill this gap by assessing the current practices of MFIs in Nueva Ecija and proposing strategies to leverage digital transformation to enhance their effectiveness in promoting financial inclusion and empowerment.

In order to achieve a comprehensive understanding of the microfinance ecosystem and the different requirements of its beneficiaries, the research involves a wide range of stakeholders, including MFI clients, MFI managers, policymakers, and community leaders. The study intends to provide practical recommendations that meet the opportunities and difficulties that the microfinance industry faces in the real world by incorporating input from these important stakeholders. With the involvement of multiple stakeholders, the research is enhanced and its practical significance is highlighted, resulting in significant advancements in policy and operations for the microfinance sector.

2. MATERIALS AND METHODS

The study employed a descriptive research design to accurately interpret and describe the microfinance landscape in Nueva Ecija, focusing on the digital transformation and its impact on socio-economic development. It aimed to profile microfinance institution (MFI) owners, assess MFI services (loans, savings, insurance, payment systems), and analyze the extent of guideline implementation. Participants included 205 MFI clients and owners, selected via quota sampling based on residency and involvement in MFI ownership for over three years. Specifically, the study included 40 MFI owners and 165 clients who are farmers in Nueva Ecija.

The questionnaire, constructed following established principles, underwent validation and reliability testing using Cronbach's alpha. Also, the Content Validity Indices of the Instrument were calculated using the Content Validation Index (CVI) method, analyzing expert ratings on each item indicator. After revisions based on initial feedback, questionnaires were distributed. Approval was obtained via a Consent Form, and data analysis included frequency count, percentage, weighted mean calculations, and verbal description identification. Open-ended questions supplemented interviews to capture participant experiences. This methodology ensures a comprehensive understanding of the digital transformation in MFIs, focusing on the specific needs and challenges of farmers in Nueva Ecija. The study's findings will provide insights into how digital technologies can be leveraged

to improve service delivery and operational efficiency in the microfinance sector.

3. RESULTS

3.1. Demographic Profile of Respondents

The demographic information of the respondents gives a basic insight of the participants in the study. The respondents were owners of MFI and clients particularly farmers in the province of Nueva Ecija. The largest group of MFI clients was between 30 and 50 years of age, representing 60% of the total; MFI owners were older, with 50% over 50 years of age. On the gender distribution, out of the total clients 55% were women, which showed that females also played a vital role in micro finance. Educationally, most of the clients had only up to secondary school education (60%), while more MFI owners had an undergraduate degree (50%) or postgraduate degree (20%). In the same way, a considerable proportion of both the clients and the owners of the MFIs were active in microfinance for more than 4 years, which suggests that a long-term orientation is present among the players in the sector.

Demographic data helps to understand the current state and characteristics of Microfinance Institution (MFI) in Nueva Ecija, as well as to determine what aspects can be improved with the help of digital transformation initiatives. The age distribution shows that the mature client base may not be well conversant with digital technologies hence the need to invest in digital literacy programs in order to enhance proper utilization of digital financial services across the population groups Lubis (2021). Similarly, the majority of the female clients also stress on microfinance for gender equality while explaining the need for digitalization initiatives for women's financial inclusion (Pervin et al., 2023). Also, the educational difference between MFI clients and owners emphasizes the need to have specific educational programs; financial literacy campaigns that will ensure that clients receive the necessary information to enable them to engage in digital financial services (Nouri et al., 2019). This stable and long-term participation of the respondents in the MFI activities also shows that it has a strong and loyal customer base that can be effectively used to slowly and gradually introduce the digital transformation strategies where the clients and owners can gradually adapt to the new technologies and enjoy the benefits of the digital transformation over a long-term period. It is important to identify MFI respondents' demographic characteristics in Nueva Ecija in order to develop proper digital transformation plan. Therefore, by targeting these aspects of the community, MFIs can improve the delivery of services, productivity, and satisfaction of the clients, thus promoting the financial inclusion and socio-economic growth in the region.

3.2. Current State of Microfinance Services

The exploration of the current landscape of microfinance services offered by MFIs in Nueva Ecija focuses on various financial products such as loans, savings, insurance, and payment systems. This section provides a quantitative descriptive analysis of the availability, utilization, and accessibility of these services, shedding light on how well they meet the needs of the target beneficiaries. The study found that microfinance services in

Nueva Ecija are widely available. Loan services are accessible to 95% of surveyed clients, with 90% having taken out at least one loan. Savings services are available to 85% of clients, with a utilization rate of 75%. Insurance products are accessible to 60% of respondents, but only 45% utilize these services. Payment systems, including digital payment options, are available to 70% of clients, with 50% utilizing these options. The availability of loan services was rated highly by MFI owners, with an overall weighted mean of 3.99, indicating that they consider the loan services offered to be of very good quality. Clients rated the services slightly lower, with an overall mean of 3.55, indicating good quality. Owners rated the practicality of the loan process and the flexibility of loan terms as very good to excellent, reflecting their belief in the accessibility and fairness of their services. However, clients expressed concerns about the complexity of loan approval processes and high-interest rates, suggesting areas for improvement in simplifying loan procedures and managing costs to enhance client satisfaction. Savings and checking account services received high ratings from both MFI owners and clients, with overall weighted means of 4.02 and 3.70, respectively. Owners rated the services as very good, particularly highlighting the availability of online services and affordable maintaining balances. Clients rated specific aspects such as PDIC insurance coverage and approachable customer service representatives as excellent, indicating satisfaction with these elements. However, clients expressed dissatisfaction with mobile and online deposit services, suggesting a need for improvement in these areas to enhance service quality and support financial inclusion goals. Microinsurance services were rated very highly by MFI owners, with an overall mean of 4.18, emphasizing the affordability and transparency of these services. Clients rated these services slightly lower, with an overall mean of 3.42, indicating good quality. The owners emphasized the advantages of accidental and death insurance, which helps members' beneficiaries by offering money when they need it. Clients did, however, voice concerns over the goods' awareness and accessibility, highlighting the need for better outreach and instruction to boost use. The aggregate weighted mean of 4.15, which indicates extremely good service, indicates how highly MFI owners valued the payment systems services. With an aggregate mean rating of 3.04, clients gave these services lower ratings, suggesting decent service but pointing out areas for improvement. Customers reported unhappiness with the range of payment instruments and technology-based means of payment, indicating a need for additional investment in infrastructure and technical innovation to improve service delivery, although they welcomed the convenience of reminders and updates on due dates.

Quantitative data on microfinance services in Nueva Ecija reveals the vital role of microfinance institutions (MFIs) in fulfilling the community's financial needs. While loan services are widespread and heavily utilized, a noticeable gap lingers in the accessibility and adoption of insurance products, highlighting the urgent need for MFIs to amplify awareness and advocate for the benefits of microinsurance (Vicencio and Villanueva, 2022). The microfinance sector is gradually embracing technological advancements, marked by a moderate shift towards digital payment systems. This evolving financial landscape unveils a wealth of untapped potential for expanding digital financial tools. To deepen

client engagement, it is essential to enhance both the accessibility and usability of these technologies. By implementing digital literacy initiatives, clients can be better equipped to master digital financial instruments, propelling financial inclusion and regional economic empowerment. The data illustrates a well-established microfinance system that effectively supports the community's financial needs, yet it also identifies opportunities for refinement, particularly in increasing the uptake of underutilized services like insurance and digital payment systems. By addressing these gaps, MFIs can better adapt to the evolving financial demands of their clients, fostering greater financial inclusion and economic empowerment in Nueva Ecija.

Agricultural studies in Nueva Ecija provide crucial insights into the region's economic tapestry. As the "Rice Granary of the Philippines," Nueva Ecija is central to the country's rice production (Mercado et al., 2023). Towns like Bongabon, famed as the onion capital of the Philippines, highlight the agricultural sector's significant contribution to the regional economy. The dominance of the onion industry emphasizes the province's pivotal role in producing a large portion of Central Luzon's yield (Santos, 2023). Understanding these dynamics is essential for crafting policies that promote sustainable practices and foster economic development.

Environmental studies on climate variables and agricultural practices in Nueva Ecija highlight the crucial role of climate-resilient techniques in safeguarding food security and sustaining crop production (Enovejas et al., 2020). The decline in ornamental and flower farming underscores the need to adapt to shifting market demands and evolving environmental conditions (Viernes et al., 2022). By factoring in climate variables, stakeholders can devise strategies that strengthen agricultural resilience and sustainability. Expanding beyond traditional crops is essential for diversifying the agricultural landscape, thereby fueling economic growth and stability. Addressing challenges in areas like hog farming can further bolster the overall sustainability and economic resilience of Nueva Ecija's agriculture.

The fusion of insights from agricultural and environmental studies with quantitative data on microfinance services furnishes a comprehensive understanding of Nueva Ecija's economic terrain. By leveraging the established microfinance infrastructure and addressing gaps in insurance and digital payments, MFIs can elevate the region's financial inclusion and empowerment. Acknowledging the strengths of the agriculture sector and addressing its challenges are essential steps in fortifying Nueva Ecija's resilience and ensuring sustained economic growth.

3.3. Implementation of Guidelines and Their Impact

The welfare of consumers in Nueva Ecija is profoundly shaped by the enforcement of MFI guidelines. This section scrutinizes the extent of guideline implementation, revealing both strengths and gaps in service delivery and policy execution. The focus centers on how these protocols align with customer needs, providing a basis for pinpointing areas that require refinement to elevate the efficiency of microfinance services. The study uncovers a generally favorable view of microfinance standards among consumers and MFI owners alike. Owners rated the application of lending

standards with a strong 4.17 mean, signaling robust adherence, while clients mirrored this approval with a 4.11 mean. High marks for transparent regulatory frameworks, access to external finance, and clear legal authorizations underscore a firm commitment to these standards. Consumer protection guidelines also garnered positive ratings, with MFI owners assigning a 3.96 mean, reflecting significant implementation, though clients rated them slightly lower at 3.82. Strong adherence was noted in protections against abusive lending practices and transparent loan information. However, lower ratings on the disclosure of effective interest rates indicate a need for enhanced transparency and standardized interest rate calculations. Fraud and financial crime prevention guidelines were viewed positively, with owners giving a 3.91 mean and clients rating them at 4.15. The prevention of money laundering and the enforcement of laws received the highest marks, showcasing effective implementation. Yet, moderate ratings in areas like securities fraud and abusive investment arrangements highlight where further improvements are essential. Credit reference services were well-rated by both MFI owners and clients, with overall means of 3.90 and 4.21, respectively. The collection of comprehensive credit information and the use of this data to facilitate new credit access received high ratings. However, the use of statistical risk-scoring techniques received a moderate rating, suggesting the need for more advanced methods in credit risk assessment. The implementation of guidelines for secured transactions was rated as great by MFI owners, with an overall mean of 3.80, and very great by clients, with an overall mean of 4.48. Both groups appreciated the verification of documents and the use of homes and lands as collateral. However, MFI owners rated the request for movable assets and the use of legal reforms moderately, indicating areas for further development. Interest rate guidelines received high ratings from MFI owners (overall mean of 4.29) but moderate ratings from clients (overall mean of 3.76). Owners emphasized compliance with government standards and attractive interest rates, while clients expressed concerns about the transparency and fairness of the rates. This discrepancy suggests differing perspectives on the adequacy of current interest rate practices.

Microfinance institutions (MFIs) in Nueva Ecija are recognized for their strong adherence to regulatory guidelines, particularly in lending practices, consumer protection, and fraud prevention, safeguarding consumer interests (Remer and Kattilakoski, 2021). However, improvements are needed in transparency in interest rate disclosures, credit risk assessment methods, and addressing securities fraud (Inekwe, 2019).

MFIs excel in implementing clear regulatory frameworks, credit information collection, and fraud prevention, but show moderate implementation of statistical risk-scoring techniques and require better transparency in interest rate calculations (Inekwe, 2019). Developing transparency in interest rate disclosures is crucial for clients to understand loan costs, building trust and demonstrating fair practices (Abrar, 2019). Advanced credit risk assessment techniques, like statistical risk-scoring models, are vital for evaluating borrower creditworthiness and reducing loan defaults, benefiting both MFIs and clients (Remer and Kattilakoski, 2021). Effective securities fraud prevention measures are also necessary

to protect clients and maintain financial system integrity (Inekwe, 2019). Addressing weaknesses such as transparency in interest rate disclosures, implementing advanced credit risk assessment methods, and enhancing fraud prevention measures, MFIs in Nueva Ecija can significantly improve their operations and better serve their clients (Inekwe, 2019). These improvements will be promoting financial inclusion, economic empowerment, and the overall stability of the microfinance sector in the region (Remer and Kattilakoski, 2021).

Opportunities and Challenges of Digital Transformation

Opportunities

Streamlined Operations. Digital transformation enables MFIs to automate routine tasks, reducing administrative burden.

-85% of MFI owners reported a significant reduction in administrative tasks due to digital applications for loan disbursement and repayment tracking.

-75% of clients experienced quicker processing times, contributing to faster service delivery and reduced operational costs.

Enhanced Service Delivery. Adopting digital platforms improves client access to financial services.

-60% of clients embraced mobile banking and online payment systems, allowing convenient financial management without visiting branches.

-70% of clients reported positive experiences using digital platforms for financial transactions.

Reaching Underserved Groups. Digital technologies enable MFIs to reach underserved and remote populations.

-65% of new consumers in the past year were from underserved areas, thanks to advancements in internet and mobile technology.

-Digital technologies promote financial inclusion and support socioeconomic growth for underprivileged populations.

Challenges

Data Security. The adoption of digital technologies raises concerns about protecting clients' sensitive financial information from cyber threats. 55% of MFI owners identified data security as a significant concern.

-Robust cybersecurity measures are needed to prevent data breaches and ensure client trust in digital platforms.

Infrastructure Limitations. Inadequate internet connectivity and access to digital devices pose significant challenges.

-40% of clients encountered difficulties due to poor internet access, hindering successful digital project execution.

Digital Divide. Unequal access to digital technologies across different population groups can hinder digital transformation.

-35% of clients struggled with digital financial services, particularly older individuals or those with lower digital literacy levels.

To fortify data security, MFIs must plunge into advanced cybersecurity technologies and practices. Implementing regular security audits, robust data encryption, and secure authentication methods are essential for safeguarding client information. Moreover, equipping staff with cybersecurity knowledge is crucial to mitigating potential risks. Collaborating with government and private partners to enhance digital infrastructure in rural areas is imperative. Investments in reliable internet connectivity and affordable digital devices are vital for the broad adoption of digital financial services. The study suggests that bolstering infrastructure could alleviate connectivity issues for 60% of clients. To bridge the digital divide, MFIs should spearhead targeted digital literacy programs tailored to different client needs, ensuring all clients, regardless of age or digital proficiency, can thrive in the digital landscape. The study indicates that these

initiatives could empower 35% of clients currently struggling with digital technologies.

The digital transformation of Microfinance Institutions (MFIs) in Nueva Ecija presents abundant opportunities to elevate service delivery, operational efficiency, and financial inclusion (Mercado et al., 2023). By harnessing digital technologies, MFIs can extend their reach, streamline processes, and offer a wider array of financial services to underserved communities. However, challenges such as data security, infrastructure limitations, and the digital divide must be confronted. Investing in cybersecurity is critical to protect sensitive client data and sustain trust in digital financial services. This involves secure data storage, encryption, and routine security audits. Enhancing digital infrastructure, particularly in rural areas, is necessary for seamless operations and effective service delivery. Promoting digital literacy among clients and staff is also essential for maximizing the benefits of digital tools and platforms, fostering greater financial inclusion (Mercado et al., 2023). The digital transformation of MFIs could profoundly impact rural communities in Nueva Ecija, where agriculture dominates, by offering farmers specialized financial products to boost productivity, manage risks, and access markets more effectively. By leveraging digital financial services, farmers can combat poverty and drive sustainable development, investing in their future and building financial resilience.

Impact of Digital Transformation on Service Delivery and Client Satisfaction

Impact of Digital Transformation on MFIs in Nueva Ecija

Improved Service Delivery

-80% of clients reported enhanced convenience and accessibility of financial services due to digital tools.

-70% of clients experienced significantly reduced transaction processing times, with loan approvals now taking <48 h.

-85% of MFI owners noted increased productivity, reduced administrative burdens, and streamlined operations through digital tools.

Increased Client Satisfaction

-75% of clients expressed high satisfaction with the digital services provided by MFIs.

-65% of clients felt that digital tools have made financial transactions more secure, boosting their trust in MFIs.

-Digital platforms have empowered clients to make better financial decisions, with access to real-time account information and financial management tools.

Higher Client Retention and Loyalty

-70% of clients who regularly use digital services are more likely to stay with their current MFI.

-Clients appreciate the seamless and efficient service offered by digital platforms, making them less likely to switch to another financial provider.

Challenges

-30% of clients reported difficulties in understanding and using digital tools, particularly older clients or those with lower digital literacy.

-35% of clients expressed concerns about data security and privacy, indicating a need for continued enhancement of cybersecurity measures and client education on protecting personal information.

Nueva Ecija's Microfinance Institutions (MFIs) have undergone a digital metamorphosis, dramatically enhancing service delivery

and client satisfaction by making financial services more accessible and impactful. This transformation has streamlined operations, expanded client reach, and introduced a broader array of financial products through digital tools (Warner and Wäger, 2019; Mavlutova et al., 2022). However, to fully unlock these benefits, MFIs must tackle challenges in digital literacy and data security. Ensuring all clients, regardless of their digital proficiency, can navigate and benefit from these services is crucial. This can be achieved by investing in digital literacy initiatives, empowering clients with the skills to adeptly use digital tools, and providing ongoing support to deepen financial inclusion in the region (Warner and Wäger, 2019). Furthermore, safeguarding data security is vital for maintaining client trust and privacy amidst growing cyber threats. Implementing robust cybersecurity measures-secure data storage, advanced encryption, and regular security audits-will protect sensitive client information and strengthen the reputation of MFIs (Warner and Wäger, 2019). Overcoming these challenges will amplify customer satisfaction and loyalty, as clients are more likely to stay committed when they feel secure using digital services and trust in the protection of their personal information (Warner and Wäger, 2019). In conclusion, while the digital evolution of MFIs in Nueva Ecija has greatly enhanced financial service accessibility and convenience, further investment in digital proficiency and client-centric solutions will empower MFIs to make an even greater impact on financial inclusion and socioeconomic growth in the region (Mavlutova et al., 2022).

Strategies for enhancing digital transformation

**Strategies for Enhancing Digital Transformation in MFIs
Financial Literacy Initiatives**

- Implement comprehensive financial literacy programs focusing on digital literacy.
- Conduct workshops on using digital financial channels, including mobile banking apps and electronic payments, and ensuring online security.
- Provide easy-to-follow guides and tutorials in local languages, available both online and in print.
- Engage local leaders and trusted community members to enhance the acceptance and use of digital products.

Enhancing Credit Bureau Features

- Integrate data from various sources (utility payments, mobile money transactions) to create comprehensive credit profiles for clients.
- Ensure real-time updates of credit data for accurate risk assessment and creditworthiness analysis.
- Provide digital platforms for clients to access their credit reports and scores, and educate them on how financial activities impact credit ratings.

User-Friendly Digital Tools

- Develop digital platforms with intuitive navigation, clear instructions, and multilingual support.
- Optimize tools for mobile use to cater to clients accessing services via smartphones.
- Offer robust customer support, including a helpdesk, chat support, and in-app assistance.

Data Security Measures

- Implement strong encryption, multi-factor authentication, and regular security audits to protect client data.
- Train staff on cybersecurity best practices and educate clients on safe online behaviors.
- Establish a comprehensive incident response plan to quickly address security breaches and maintain client trust.

Enhancing Digital Infrastructure

- Partner with government and private entities to improve digital infrastructure in rural areas.
- Collaborate with telecom providers to expand network coverage in underserved regions.
- Work with tech companies to offer affordable or subsidized digital devices, such as smartphones or tablets, to clients in need.

The digital transformation of microfinance institutions (MFIs) in Nueva Ecija can be significantly advanced by focusing on key strategies like improving financial literacy, credit bureau functionalities, digital tool accessibility, cybersecurity, and infrastructure. Financial literacy is essential for fostering financial inclusion, as it equips individuals to make informed financial decisions and access a broader range of services (Bongomin et al., 2020). Investing in financial literacy programs empowers clients to effectively manage their finances and utilize digital tools and services. Moreover, financial literacy has a direct impact on the performance of Village Credit Institutions, highlighting its role in digital transformation (Agboklou and Özkan, 2023). Enhancing financial literacy among clients and staff boosts operational efficiency, service delivery, and overall MFI performance, contributing to long-term sustainability (Ghising, 2022). Adequate funding is also critical, as diversified sources of microfinance capital improve access to credit and support inclusive financial services (Anane et al., 2021). MFIs can play a transformative role in promoting financial literacy and empowering individuals, as seen in regions like Nigeria’s North Central Geo-Political Zone (Ajibola et al., 2021). Integrating these strategies into their digital transformation efforts, MFIs can enhance service delivery, client satisfaction, and operational efficiency, ultimately promoting financial inclusion and driving socioeconomic growth in Nueva Ecija.

Policy implications and future directions

Policy Implications and Future Directions for Digital Transformation in Microfinance

Policy Implications	Future Directions
Regulatory Structures	Impact on Financial Inclusion and Empowerment
Establish frameworks that balance innovation and safety, focusing on data security, privacy, and clear guidelines.	Research how digital financial services reach underprivileged groups, reduce poverty, and promote growth.
Funding Opportunities	Evaluation of Digital Tools and Platforms
Promote public and private initiatives for financial support, including grants, loans, and affordable digital tools.	Identify best practices and technologies that improve service delivery and client satisfaction.
Capacity-Building Programs	Obstacles and Risks
Develop training to enhance digital literacy for MFI staff and clients, ensuring effective use of digital platforms.	Investigate barriers and risks, such as the digital divide and infrastructure limitations, to ensure smooth digital adoption.

To ignite digital transformation in Nueva Ecija’s microfinance sector, it’s vital to prioritize policies, funding, regulatory frameworks, and capacity-building initiatives. Warner and Wäger (2019) emphasize that these elements are crucial for the success of digital projects within microfinance institutions (MFIs).

Progressive laws and regulations create an environment that encourages MFIs to innovate, embrace digital technologies, and extend their reach to marginalized communities (Agrawal et al., 2019). Aligning policies with the goals of financial inclusion and socio-economic development ensures MFIs have the resources to effectively leverage digital tools. Funding opportunities are pivotal for MFIs to modernize their technology infrastructure, drive digital projects, and adapt to the evolving financial landscape in Nueva Ecija (Ellström et al., 2021; Fersi, 2023). Capacity-building initiatives are equally critical, equipping MFI staff with the skills needed to adopt and optimize new digital technologies for operations and client services (Dang-Pham et al., 2022). Training and skill development programs ensure MFIs are prepared to execute successful digital transformation strategies. Future research is essential for stakeholders in Nueva Ecija to stay ahead of trends, align with new guidelines, and adopt innovative approaches in digital microfinance (Gama et al., 2023; Bentaher, 2023). Further studies can identify knowledge gaps, highlight areas for improvement, and explore collaboration opportunities to enhance financial access and socio-economic development in the region (Becker and Schmid, 2020). Recognizing the importance of policy frameworks, regulatory mandates, funding, and capacity-building paves the way for a digital revolution in Nueva Ecija's microfinance sector. An "end-to-end" approach allows MFIs to effectively leverage technology to improve service quality, expand their client base, and contribute to the global goal of economic inclusion for marginalized communities. Supportive policies and continuous research efforts will ensure digital microfinance plays a pivotal role in the region's financial and socio-economic growth.

4. CONCLUSION AND RECOMMENDATIONS

This research has provided a clear light on the various opportunities and risks that are likely to be faced by Microfinance Institutions (MFIs) in the process of digital transformation in Nueva Ecija, Philippines. The research findings show that digital technologies have the potential of significantly improving operational effectiveness and service delivery and customer satisfaction. For example, 85% of MFI owners said that they have experienced less of administrative burden as a result of digital applications while 75% of clients said that they had faster processing time. Also, 75% of the clients reported high satisfaction with the digital services offered by MFIs, particularly enhanced financial inclusion and convenience. However, there are a number of critical issues that are yet to be resolved including data security issues, infrastructural restraints and the issue of the digital divide. The survey established that 55% of MFI owners complained of data security, and 40% of clients complained of poor internet connection. The digital divide is present in 35% of the clients especially those with lower levels of digital literacy hence the need for extensive digital literacy programs. The study also reveals that MFIs are also very compliant with the set regulations on issues to do with lending, consumer protection and fraud. However, they identified some areas of potential development, including the matters of improving the interest rate disclosure and the matters of applying more sophisticated credit risk assessment techniques.

Such enhancements are essential for the MFIs to be in a position to address the needs of the clients and support the financial and social-economic growth.

To optimise the use of digital transformation and to attend to the challenges that have been pointed out, the following strategies are suggested. The most important area that requires enhancement is the financial literacy campaigns. It is recommended to establish a set of financial literacy trainings for MFIs, including the usage of digital financial platforms for transactions, and creating simple manuals and instructions in the local language in both, online and printed versions. Involving local leaders can significantly boost the adoption of digital solutions and enhance financial literacy within communities. Strengthening credit bureau functionalities is equally vital. By integrating information from various sources to build comprehensive credit histories and providing up-to-date credit scores, MFIs can make more informed credit portfolio decisions. Offering clients access to their credit reports and scores through online portals, along with guidance on improving their credit, can foster positive financial habits. Ensuring that technology is user-friendly and accessible to everyone is crucial. Designing digital platforms with intuitive interfaces, multilingual options, and mobile compatibility, along with robust customer support, can enhance clients' experiences and perceptions of digital services. Additionally, securing data is paramount in building trust in digital financial services, making it a key focus for sustainable digital transformation. Purchasing state-of-the-art security systems, security assessment, and safe data encryption and secure user authentication mechanisms can safeguard client data. Other measures that can be taken include training the staff on cybersecurity and educating the clients on the right measures to take. It is therefore important to enhance the physical facilities in the rural areas through coordination with the government and private sectors. Internet connectivity and the availability of cheap digital devices are the other important aspects that need to be invested in to ensure that digital financial services are widely embraced. One of the strategies is giving out cheap or even free gadgets to clients through the support of technology companies. To achieve the digital transformation agenda in the microfinance sector, it is crucial to have the right policies and regulatory environment in place. There should be policy support for the promotion of digital technologies but with adequate measures that protect the consumer on issues to do with data protection. Grants, low-interest loans, and subsidies are essential to finance the enhancement of MFI systems because they are the primary source of funding. Programs aimed at capacity building should focus on the development of digital skills of the employees of MFIs and their clients.

Future research should continue to explore the impact of digital transformation on financial inclusion and economic empowerment. Assessing different digital tools and platforms, and assessing the long-term sustainability of digital initiatives, can identify best practices and effective technologies for improving service delivery and client satisfaction. Understanding the barriers to digital adoption, such as data security concerns and the digital divide, will help develop strategies to ensure successful implementation of digital financial services. Addressing these policy implications

and continuing to explore future research directions, stakeholders can ensure that digital microfinance effectively promotes financial inclusion and socio-economic development in Nueva Ecija. This comprehensive approach helps MFIs leverage digital technologies to enhance their services, reach more clients, and contribute to the broader goal of economic empowerment for marginalized communities.

This research has some limitations which are important to note in order to give a comprehensive insight into the digital transformation in MFIs in Nueva Ecija. First, the number of respondents was moderate and reached 205 MFI clients and owners only; thus, the results may not reflect the experiences of all the participants in the microfinance sector in the region. Moreover, the research design was mainly descriptive, which limits the possibility to prove cause-and-effect relations between digital transformation and its effects on business performance, service provision, and customer satisfaction. Another constraint is the use of questionnaires and interviews to gather information from the participants, which increases the chance of social desirability or recall bias. Also, the study is confined to Nueva Ecija this implies that the findings cannot be applied to other regions that have different socio-economic and technological characteristics. Future studies should attempt to use a longitudinal design to assess changes over time and a larger and more heterogeneous sample to confirm and extend these results. Lastly, the study pointed out some research objectives including data security and infrastructures limitations, but the research did not give detailed explanation of the technological solutions or interventions for the challenges highlighted, the study could expand on these in the next researches in order to give policy makers and practitioners more practical information.

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6. ETHICAL APPROVAL

The study followed strict ethical guidelines to protect participants' rights and well-being. Informed consent was obtained after explaining the study's purpose, methods, risks, and benefits. Anonymity and confidentiality were assured, with data securely stored and accessible only to the research team. Participants were informed of their right to withdraw at any time without consequence, ensuring their protection throughout the research process.

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