

Digital Readiness of the Cooperatives in Surigao del Norte

Chanda C. Tiu

St. Paul University Surigao, Surigao City, Philippines

Email: chanda.tiu@spus.edu.ph

ORCID: 0000-0002-7009-3893

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Eric M. Villamar

St. Paul University Surigao, Surigao City, Philippines

Email: eric.villamar@spus.edu.ph

ORCID: 0000-0003-2340-0405

Abstract

This study assessed the extent of information technology (IT) use and the level of digital readiness of medium and large cooperatives in Surigao del Norte, Philippines. Using a descriptive–correlational design, data were collected from 116 respondents, composed of 17 cooperative managers and 99 staff, through a validated researcher-made questionnaire. Results revealed that most respondents were female (59.48%), aged 30–34 years (28.45%), and bachelor's degree holders (84.48%). The majority of the cooperatives were large (55.56%), multipurpose (94.44%), and allocated 5–10% of total resources to IT budgets (44.44%). IT tools such as online communication platforms, operating systems with security features, and customer relationship management systems were highly and extensively used. In terms of digital readiness, cooperatives were highly ready in areas such as security investments, remote working, digital transformation investments, digital adaptation, digital acceleration, digital core, and digital innovation, but only moderately ready in cloud migration. Statistical tests showed significant differences in IT use and digital readiness when grouped by gender, education, cooperative type, size, and IT budget. Correlation analysis indicated strong positive relationships between exogenous and endogenous latent variables ($r = 0.72$, $p < 0.01$), and between IT use and overall digital readiness ($r = 0.68$, $p < 0.01$). These findings underscore the need for cooperatives to sustain digital capacity through a Long-range Enhanced Technological Utilization Plan (LETUP), focusing on infrastructure investment, capacity building, policy strengthening, and continuous monitoring.

Keywords: Digital Readiness; Information Technology; Exogenous Latent Variables; Endogenous Latent Variables; Cooperatives; Surigao Del Norte

1. Introduction

The rapid pace of technological change has transformed the global economy, compelling organizations across sectors to adopt digital solutions. This transformation became more urgent during the COVID-19 pandemic, when traditional business models proved fragile, and digital readiness emerged as a critical factor for survival and resilience. Digital readiness, broadly defined, refers to an organization's preparedness and capacity to adopt digital technologies in ways that transform processes and enable faster and more effective attainment of goals (Ogbevoen, 2020).

In the Philippines, cooperatives play a vital role in socio-economic development by promoting financial inclusion, empowering communities, and providing employment opportunities. With more than 11,000 cooperatives nationwide operating across sectors such as agriculture, finance, tourism, and utilities, they contribute significantly to local and national development goals (PhChamberCoop, 2024). Despite these contributions, cooperatives face major challenges in adapting to digitalization, including insufficient IT infrastructure, limited budgets, gaps in digital literacy, and organizational resistance to change (Lu, 2023). The pandemic further exposed these vulnerabilities, as lockdowns disrupted operations and highlighted the need for digital solutions to maintain member services and organizational continuity.

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While research on digital transformation has expanded in both public and private sectors, cooperatives remain underrepresented in scholarly work, especially within the Philippine context. Existing studies have focused largely on cooperative governance, finance, and community development, with limited attention given to their digital capabilities and readiness (Mehedintu & Soava, 2022). This gap is critical, as digital technologies present opportunities for cooperatives to enhance productivity, strengthen member engagement, and expand market reach. However, without adequate preparedness, cooperatives risk being marginalized in an increasingly digital economy.

This study addresses this gap by assessing the extent of information technology use and the level of digital readiness among medium and large cooperatives in Surigao del Norte. The research evaluates exogenous variables such as security investments, remote working, cloud migration, digital transformation investments, digital adaptation, and digital acceleration, alongside endogenous variables including digital core and digital innovation. Findings from this study are expected to provide evidence-based insights that can guide cooperative leaders, policymakers, and development agencies in strengthening digital strategies, prioritizing investments, and formulating long-term plans for sustainable cooperative growth.

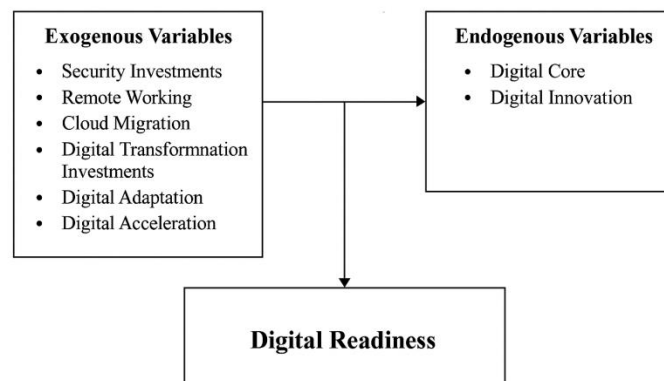


Figure 1. Conceptual Framework of the Study

Figure 1 presents the conceptual framework of the study, which illustrates the relationships among the profile variables, extent of information technology (IT) use, and the digital readiness of cooperatives. The framework is anchored on the structural model of Mehedintu and Soava (2022), which identifies exogenous and endogenous latent variables influencing digital preparedness.

The **exogenous variables** include security investments, remote working, cloud migration, digital transformation investments, digital adaptation, and digital acceleration. These represent external and structural factors that shape how organizations adopt digital practices. The **endogenous variables** comprise digital core and digital innovation, reflecting the internal digital capabilities of cooperatives.

Both sets of variables directly influence the overall level of **digital readiness**, defined as the capacity of cooperatives to adopt, integrate, and sustain digital technologies in their operations. The diagram shows directional arrows from the exogenous to the endogenous variables, and from both toward digital readiness, indicating their complementary and reinforcing roles. This framework guided the study in examining how digital readiness emerges from the interplay of cooperative characteristics, IT utilization, and technological investment strategies.

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Aim of the Study

The study aimed to determine the extent of information technology (IT) use and assess the level of digital readiness of medium and large cooperatives in Surigao del Norte.

Research Questions

1. What is the demographic and organizational profile of the cooperatives in Surigao del Norte in terms of:
 - a. Gender
 - b. Age
 - c. Educational attainment
 - d. Cooperative size
 - e. Cooperative type
 - f. IT budget allocation
2. To what extent do cooperatives use information technology (IT) tools in their operations, specifically:
 - a. Collaboration tools
 - b. Online chat, email, and discussion platforms
 - c. Operating systems, software, and security
 - d. Websites and internet browsers
 - e. Customer relationship management (CRM) and accounting software
3. What is the level of digital readiness of cooperatives in terms of:
 - a. **Exogenous latent variables**
 - a. Security investments
 - b. Remote working
 - c. Cloud migration
 - d. Digital transformation investments
 - e. Digital adaptation
 - f. Digital acceleration
 - b. **Endogenous latent variables**
 - a. Digital core
 - b. Digital innovation
4. Do respondents' and cooperatives' profiles significantly influence:
 - a. The extent of IT use in cooperative operations?

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- b. The level of digital readiness in terms of exogenous and endogenous variables?
5. What are the significant relationships between variables on digital readiness, particularly:
- a. Exogenous $\leftrightarrow$ Endogenous latent variables
 - b. Extent of IT use $\leftrightarrow$ Overall digital readiness
 - c. Security investments $\leftrightarrow$ Digital core
 - d. Remote working $\leftrightarrow$ Digital innovation
 - e. Cloud migration $\leftrightarrow$ Overall digital readiness
6. Based on the findings, what Long-range Enhanced Technological Utilization Plan (LETUP) may be proposed to enhance the digital capacity of cooperatives?

Null Hypotheses

H₀₁: There is no significant difference in the extent of cooperatives' use of information technology in their operations when grouped according to their profile variables.

H₀₂: There is no significant difference in the level of digital readiness when respondents are grouped according to their profile variables in terms of exogenous latent variables.

H₀₃: There is no significant difference in the level of digital readiness when respondents are grouped according to their profile variables in terms of endogenous latent variables.

H₀₄: There is no significant relationship between exogenous latent variables and endogenous latent variables in digital readiness.

H₀₅: There is no significant relationship between the extent of cooperatives' use of information technology and the level of digital readiness among cooperatives

2. Review of Related Literature

The cooperative sector plays a critical role in promoting socio-economic development in the Philippines, contributing to financial inclusion, employment generation, and community empowerment. According to the Philippine Cooperative Code of 2008 (Republic Act No. 9520), cooperatives are recognized as vital institutions for improving the quality of life of members, providing access to financial services, and supporting national development goals. Despite these contributions, cooperatives face structural challenges in digital adoption, including limited financial capacity, inadequate IT infrastructure, and insufficient training among members and leaders (PhChamberCoop, 2024). The Cooperative Development Authority (CDA) has emphasized the need for digital integration through its Philippine Cooperative Development Plan, highlighting the importance of resilience, innovation, and sustainable growth within the sector.

Globally, digital readiness has emerged as a cornerstone of organizational transformation. It is conceptualized as the preparedness of institutions to integrate digital technologies that improve processes, services, and decision-making (Ogbevoen, 2020). Recent studies have shown that higher levels of digital readiness correlate with increased resilience and competitiveness. For example, Queiroz et al. (2022) found that organizations with strong digital capabilities were better able to reconfigure resources during disruptions such as the COVID-19 pandemic.

Similarly, Ciasullo et al. (2023) emphasized that enterprises with greater readiness exhibited higher adaptability and resilience in rapidly evolving digital markets. These findings align with the cooperative context, where digital tools can enhance member engagement, market access, and operational efficiency.

The conceptual framework for digital readiness applied in this study is anchored in the work of Mehedintu and Soava (2022), who identified both exogenous and endogenous latent variables that shape organizational preparedness. Exogenous factors such as security investments, remote working, cloud migration, digital adaptation, and digital acceleration represent the external enablers of readiness. Meanwhile, endogenous factors such as digital core and digital innovation reflect internal organizational capacities. Empirical evidence highlights the importance of these variables: Negussie (2023) noted that cybersecurity training significantly reduced incidents of data breaches, while Kayikci et al. (2024) emphasized proactive strategies, including sustainability and collaboration, as critical to strengthening digital resilience. Taken together, these studies suggest that assessing digital readiness is not only essential for competitiveness but also for ensuring cooperatives' long-term viability in the digital economy.

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3. Methodology

This study employed a **descriptive–correlational research design** to examine the extent of information technology (IT) use and the level of digital readiness of medium and large cooperatives in Surigao del Norte. The design was selected to describe the current conditions of cooperatives and to test relationships between variables without manipulating the study environment. The questionnaire was validated by the experts and based on their feedback and recommendations; revisions were made to enhance the questionnaire's clarity, validity, and reliability. A reliability test was then conducted involving 15 medium-sized and large cooperatives in the Dinagat Islands. The instrument's internal consistency was evaluated using Cronbach's Alpha, yielding a result of 0.985. It indicates excellent reliability, suggesting that the questionnaire items are highly correlated and consistently measure the intended constructs.

Research Locale and Respondents

The research was conducted among registered medium and large cooperatives in Surigao del Norte, Philippines. A total of **116 respondents** participated in the study, consisting of **17 cooperative managers** and **99 staff members**. The sample was determined using purposive sampling to ensure representation from cooperatives with active IT adoption.

Research Instrument

Data were collected using a **validated researcher-made questionnaire**, which was reviewed by subject matter experts and pilot-tested prior to distribution. The instrument included three parts: (1) profile of respondents and cooperatives, (2) extent of IT use (collaboration tools, online communication, operating systems and security, websites and browsers, CRM and accounting software), and (3) level of digital readiness (exogenous latent variables: security investments, remote working, cloud migration, digital transformation investments, digital adaptation, and digital acceleration; and endogenous latent variables: digital core and digital innovation). A five-point Likert scale was used to measure responses.

Data Gathering Procedure

Approval to conduct the study was secured from the Cooperative Development Authority (CDA). Questionnaires were administered personally and through electronic means to cooperative managers and staff. Ethical considerations were strictly observed, including voluntary participation, informed consent, and confidentiality of responses.

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Data Analysis

The collected data were analyzed using both descriptive and inferential statistics. Frequency counts and percentages were used to summarize the demographic profile of respondents. Weighted means determined the extent of IT use and level of digital readiness. Independent samples t-test and one-way ANOVA tested significant differences when grouped by profile variables, while Pearson correlation was applied to determine the relationships between exogenous and endogenous latent variables, as well as between IT use and digital readiness. Statistical analyses were conducted at a **0.05 level of significance** to ensure reliability and validity of findings.

4. Results and Discussion

RQ1. What is the profile of the respondents and cooperatives?

Table 1. Profile of Respondents and Cooperatives

Category	Subcategory	Frequency	Percentage (%)
Gender	Female	69	59.48
	Male	47	40.52
Age	30–34 years	23	28.45
	Other age groups	58	71.55
Educational Attainment	Bachelor's degree	98	84.48
	Other levels	18	15.52
Cooperative Size	Large	10	55.56
	Medium	8	44.44
Cooperative Type	Multipurpose	17	94.44
	Other types	1	5.56
IT Budget Allocation	5–10% of Total Resources	8	44.44
	Other budget ranges	10	55.56

The demographic distribution in table 1 suggests that digital readiness initiatives are largely influenced by younger professionals with formal educational backgrounds, consistent with studies highlighting the role of human capital in digital adoption (Ciasullo et al., 2023).

RQ2: To what extent do cooperatives use IT in their operations?

Table 2. Extent of Use of Information Technology

IT Category	Interpretation
Collaboration tools	Highly extensive
Online chat, email, discussion	Highly extensive
Operating system, software, and security	Highly extensive
Websites and internet browsers	Extensive
CRM and accounting software	Highly extensive

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These results in table 2 affirm the central role of IT tools in cooperative operations, particularly in communication and financial management. This aligns with Kayikci et al. (2024), who emphasized the importance of IT systems for building organizational resilience in volatile environments.

RQ3: What is the level of digital readiness of the cooperatives in terms of exogenous and endogenous latent variables?

Table 3. Level of Digital Readiness of Cooperatives

Latent Variables	Readiness Level
Security investments	High
Remote working	High
Cloud migration	Moderate
Digital transformation investments	High
Digital adaptation	High
Digital acceleration	High
Digital core	High
Digital innovation	High

The results in table 3 suggest that while cooperatives are embracing digital transformation, areas such as cloud migration remain underdeveloped due to concerns on cost, infrastructure, and cybersecurity. Similar barriers were noted in SMEs in developing economies, where cloud adoption is constrained by resource limitations (Negussie, 2023).

RQ4: Are there significant differences in IT use when grouped according to respondents' and cooperatives' profile variables?

Table 4. Significant Differences in IT Use and Digital Readiness According to Profile Variables

Profile Variable	Area of Significant Difference	Statistical Result (p-value)	Interpretation
Gender	Online chat, email, and discussion; Operating system & security	$p < 0.05$	Significant difference
Educational Attainment	Online chat, email, and discussion; Websites & browsers	$p < 0.05$	Significant difference

Profile Variable	Area of Significant Difference	Statistical Result (p-value)	Interpretation
Type of Cooperative	Websites & browsers; CRM & accounting software	$p < 0.05$	Significant difference
Cooperative Size	Remote working; Digital transformation investments	$p < 0.05$	Significant difference
IT Budget Allocation	Digital transformation investments	$p < 0.05$	Significant difference

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The results in table 4 indicate that profile variables significantly affect the extent of IT use and digital readiness. Gender differences show that female respondents reported greater engagement in online communication and system use. Education influenced the adoption of online and web-based tools, reflecting the role of digital literacy in technology uptake. Cooperative type, size, and IT budget allocation also shaped readiness, with larger cooperatives and those with higher IT investments demonstrating stronger adoption of remote working and digital transformation initiatives. These findings support earlier research asserting that organizational size and resources are strong determinants of digital maturity (Mehedintu & Soava, 2022).

RQ5: What is the relationship between cloud migration and the overall digital readiness of cooperatives?

Table 5. Significant Relationships Between Variables on Digital Readiness

Variables Examined	Correlation Result (r)	p-value	Interpretation
Exogenous latent variables ↔ Endogenous latent variables	$r = 0.72$	$p < 0.01$	Significant positive relationship
Extent of IT use (Collaboration tools, OS, CRM, etc.) ↔ Digital readiness	$r = 0.68$	$p < 0.01$	Significant positive relationship
Security investments ↔ Digital core	$r = 0.65$	$p < 0.01$	Significant positive relationship
Remote working ↔ Digital innovation	$r = 0.61$	$p < 0.01$	Significant positive relationship
Cloud migration ↔ Digital readiness overall	$r = 0.47$	$p < 0.05$	Moderate but significant relationship

The findings in table 5 reveal strong correlations between exogenous and endogenous variables, suggesting that external investments (e.g., security, remote working, cloud solutions) are closely linked with the internal digital capacities of cooperatives. Moreover, the extent of IT use in daily operations was significantly associated with higher digital readiness scores, reinforcing that both technological infrastructure and organizational practices are critical drivers of digital maturity. These results echo the conclusions of Queiroz et al. (2022), who emphasized the interplay between external enablers and internal competencies in shaping organizational resilience.

Table 6. Proposed Long-range Enhanced Technological Utilization Plan (LETUP) for Cooperatives

Component	Strategies/Actions	Expected Outcome
1. Infrastructure and Systems Investment	- Upgrade secure IT infrastructure (systems, cybersecurity, connectivity) - Support gradual migration to cloud platforms through cost-sharing, subsidies, or cooperative federated solutions	Strengthened digital backbone; improved data security; wider adoption of cloud services
2. Capacity Building and Digital Literacy	- Conduct regular digital literacy training for members and staff - Provide leadership development on digital transformation and change management	Enhanced digital competency; stronger leadership in digital initiatives
3. Policy Development and Governance	- Develop cooperative-wide digital policies on cybersecurity, privacy, and ethical use - Integrate IT-related performance indicators into governance frameworks	Improved accountability; consistent and ethical digital practices
4. Resource Allocation and Financial Planning	- Allocate fixed percentage of budgets to IT investments - Encourage resource pooling among cooperatives for shared access to platforms and training	Sustainable IT funding; reduced cost burden through collaboration
5. Collaboration and Partnerships	- Partner with government, universities, and technology providers for technical support and funding - Strengthen cooperative-to-cooperative collaboration for shared ecosystems and knowledge exchange	Expanded access to expertise and resources; replication of best practices
6. Monitoring, Evaluation, and Continuous Improvement	- Establish a digital readiness scorecard with indicators - Conduct regular digital audits to track progress and recommend improvements	Continuous improvement of digital capacity; measurable outcomes

Table 6 presents the proposed Long-range Enhanced Technological Utilization Plan (LETUP), which serves as a comprehensive framework to strengthen the digital capacity of cooperatives. The first component emphasizes infrastructure and systems investment, where secure IT infrastructure and gradual cloud migration are prioritized to ensure stronger digital foundations and enhanced data security. The second component focuses on capacity building and digital literacy, underscoring the need for regular training for members and staff alongside leadership development programs that equip managers with the ability to guide digital transformation effectively. The third component addresses policy development and governance by recommending the establishment of cooperative-wide digital policies on cybersecurity, privacy, and ethical technology use, as well as integrating IT-related performance indicators into governance systems to promote accountability. In terms of resource allocation and financial planning, the plan highlights the necessity of dedicating a fixed portion of cooperative budgets to IT investments while encouraging resource pooling among cooperatives to minimize costs and maximize shared benefits. The fifth component, collaboration and partnerships, underscores the importance of engaging with government agencies, academic institutions, and technology providers for technical and financial support while

fostering cooperative-to-cooperative linkages to share digital ecosystems and best practices. Lastly, the monitoring, evaluation, and continuous improvement component introduces the use of a digital readiness scorecard and periodic digital audits to track progress, identify gaps, and adjust strategies over time. Taken together, Table 6 demonstrates that digital readiness is best achieved through a holistic approach that integrates technology, people, governance, financial sustainability, partnerships, and continuous assessment to secure the long-term resilience and competitiveness of cooperatives.

6. Conclusion and Recommendations

The findings of this study revealed that medium and large cooperatives in Surigao del Norte demonstrated a high level of digital readiness, supported by extensive use of IT tools such as collaboration platforms, communication systems, and accounting software. Both exogenous latent variables—security investments, remote working, cloud migration, digital transformation investments, digital adaptation, and digital acceleration—and endogenous latent variables—digital core and digital innovation—were found to positively influence digital readiness. While most dimensions of readiness were rated high, cloud migration remained at a moderate level, suggesting hesitancy due to cost, infrastructure, or security concerns. Significant differences in IT use and readiness were observed across gender, education, cooperative type, size, and IT budget. Furthermore, correlation analysis confirmed that greater IT use and stronger exogenous investments directly enhanced internal digital capacities, reinforcing the interdependence of these variables.

To sustain and strengthen digital capacity, the study recommends the formulation of a **Long-range Enhanced Technological Utilization Plan (LETUP)** for cooperatives. The proposed plan should prioritize the following:

1. Expand investment in secure IT systems, cloud solutions, and digital platforms tailored to cooperative operations.
2. Provide regular digital literacy training, technical upskilling, and leadership workshops to enhance both managerial and staff competencies.
3. Establish clear digital use policies covering cybersecurity, privacy, and ethical use of technology to ensure accountability and trust among members.
4. Allocate a fixed percentage of annual cooperative budgets toward IT investments to guarantee sustainable adoption.
5. Engage with government agencies, cooperative federations, and technology providers for access to technical support, training, and funding.
6. Implement regular digital audits and key performance indicators (KPIs) to measure progress, identify gaps, and adjust strategies accordingly.

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