

Bridging MSMEs to green finance: A content analysis of fintech-driven access in Philippine rural bankingRobert Don L. Sale*¹, Allan A. Calderon²¹ Claro M. Recto Academy of Advanced Studies, Lyceum of the Philippines University, Manila, Philippines² Department of Financial Management, Polytechnic University of the Philippines, Manila, Philippines*Corresponding Author email: don.sale@lpunetwork.edu.ph**Received:** 19 April 2026**Revised:** 21 May 2026**Accepted:** 24 May 2026**Available Online:** 25 May 2026**Volume 1 (2026), Issue 2, P-ISSN – 3116-3785; E-ISSN - 3116-3793**<https://doi.org/10.63498/ijabms4>**Abstract****Aim:** This study examines how financial technology (fintech) innovations influence access to green finance for micro, small, and medium enterprises (MSMEs) within the rural banking sector in the Philippines. Specifically, it explores fintech adoption, implementation challenges, strategic opportunities, and policy frameworks supporting sustainable financial inclusion.**Methodology:** The study employed a qualitative content analysis research design using secondary data sources, including peer-reviewed journal articles, government reports, Bangko Sentral ng Pilipinas (BSP) policies, and industry publications related to fintech, green finance, MSMEs, and rural banking.**Results:** Findings revealed significant adoption of mobile wallets, Quick Response (QR) payments, and Open Finance Application Programming Interfaces (APIs), which improved financial accessibility for MSMEs. However, most fintech systems remain weakly integrated with climate-resilient financing and Environmental, Social, and Governance (ESG)-related financial products. Green fintech models such as renewable energy financing platforms and ESG-linked credit systems remain underdeveloped. The study further identified fragmented policy implementation, limited ESG awareness, inadequate digital infrastructure, and digital skepticism as major barriers affecting MSME participation in sustainable finance initiatives.**Conclusion:** The study concludes that strengthening fintech-driven green finance in rural banking requires coordinated regulatory frameworks, ESG-integrated financial innovation, improved digital infrastructure, and active MSME participation in financial product development. The findings provide practical implications for rural banks, fintech providers, policymakers, and sustainability-oriented financial management initiatives aimed at promoting inclusive and environmentally responsible economic development.**Keywords:** *Fintech, green finance, MSMEs, rural banking, content analysis***INTRODUCTION**

The integration of financial technology (fintech) and green finance has become increasingly important in promoting sustainable economic development, enhancing business competitiveness, and improving organizational performance and strategic financial management practices (Safira et al., 2025). Fintech innovations such as mobile payments, peer-to-peer lending, blockchain, and application programming interfaces (APIs) improve financial accessibility, operational efficiency, and service delivery, particularly for underserved markets (Anifa et al., 2022). These technologies also support better decision-making and risk management, strengthening the competitiveness and resilience of financial institutions and businesses (Adewuyi et al., 2023). From a business and management perspective, fintech-driven green finance enhances organizational performance by enabling rural banks (RBs) to improve strategic decision-making, develop innovative financial products, and strengthen competitive positioning. Green finance has similarly gained prominence as governments and financial institutions allocate investments toward environmentally sustainable projects, including renewable energy and climate-resilient initiatives (Mudalige, 2023). For micro, small, and medium enterprises (MSMEs), it serves not only as an environmental initiative but also as a strategic tool for improving cost efficiency, regulatory compliance, and long-term competitiveness (Pandey, 2024; Raman et al., 2024). The convergence of fintech and green finance creates opportunities for innovation, enabling

financial institutions to develop new business models while supporting MSME sustainability.

In the Philippine context, MSMEs account for 99.63 percent of all business establishments based on the Department of Trade and Industry's 2023 Philippine MSME Statistics and play a critical role in employment generation and regional economic development. Despite their importance, MSMEs, particularly in rural and semi-urban areas, continue to face limited access to formal financial services, affecting their competitiveness and access to timely and affordable financing (Cruzado et al., 2023). RBs, as community-based financial institutions, play a key role in addressing this gap by providing credit and financial services tailored to MSMEs, agricultural sectors, and underserved populations. The Philippine financial sector has made progress in adopting sustainable finance frameworks through the Bangko Sentral ng Pilipinas (BSP), the Philippines' central bank responsible for monetary policy and financial sector regulation, Circular No. 1085 and Circular No. 1128, which emphasize the integration of environmental, social, and governance (ESG) principles in banking operations. ESG implementation is primarily driven by regulatory initiatives that encourage financial institutions to incorporate environmental and social considerations into lending, investment, and risk management practices. These are supported by the BSP Sustainable Finance Roadmap and Securities and Exchange Commission sustainability reporting requirements, which strengthen the regulatory environment for green finance. These initiatives position RBs not only as financial service providers but also as strategic actors in advancing ESG-based banking innovation and sustainable financial management. However, the translation of these policies into improved financial inclusion and organizational performance remains limited.

Nevertheless, MSMEs continue to face persistent challenges in accessing green finance due to limited creditworthiness, low awareness of financing instruments, and structural constraints within the financial ecosystem (Mahesh et al., 2022). Additional barriers such as uneven digital banking adoption, infrastructure gaps, and limited financial literacy further restrict participation in sustainable finance initiatives. Barriers related to internet access and digital literacy exacerbate these challenges, particularly in geographically isolated regions. Although fintech improves access through digital platforms and alternative financing, its integration with sustainability-oriented financial systems remains underdeveloped in rural banking operations (Dadabada, 2025). This gap limits the ability of RBs to leverage fintech for innovation, competitiveness, and sustainable value creation, while MSMEs remain unable to fully utilize fintech-enabled tools for resilience and long-term sustainability.

Although prior studies have examined fintech and sustainable finance, these domains are often explored independently. There remains limited research on how fintech can be strategically integrated to enhance green finance accessibility for MSMEs, particularly within rural banking systems in developing economies such as the Philippines. This gap has implications for managerial decision-making, policy design, and financial innovation strategies. This study contributes to business scholarship by integrating fintech innovation and ESG-oriented financing within rural banking systems to advance sustainable financial inclusion for MSMEs. It provides a unified framework linking digital financial innovation with sustainability-oriented banking strategies and organizational performance outcomes. From a managerial perspective, it offers insights into how RBs can enhance competitive positioning, improve operational efficiency, and develop innovative financial products such as ESG-linked lending and sustainability-oriented digital services. It also provides policy-relevant insights by identifying gaps in regulatory coordination and digital financial inclusion frameworks, while offering strategies to improve MSME financial access, resilience, and competitiveness.

The study therefore examines how fintech innovations influence the ability of RBs to deliver green finance solutions to MSMEs. Through qualitative content analysis, it identifies key challenges, opportunities, and policy considerations to support the development of a more integrated, competitive, and sustainability-driven financial ecosystem in the Philippines.

Review of Related Literature and Studies

Fintech and MSME Financial Inclusion

Financial inclusion efforts for MSMEs focus on providing financial services that are accessible, affordable, and timely. Limited access to formal financing is often linked to barriers such as lack of collateral, insufficient credit history, and informal business structures (Setyawati et al., 2023). Fintech innovations address these constraints by offering alternative financing solutions such as digital lending, invoice financing, and peer-to-peer platforms (Agrawal & Jethy, 2024). Digital financial services, including mobile banking and e-wallets, enable MSMEs to manage cash flows and reduce transaction costs, thereby improving financial inclusion (Khando et al., 2023). While studies consistently show that fintech improves MSME access to financial services, its effectiveness varies across contexts. Some research highlights gains in access and efficiency (Sun & Zhang, 2024), while others identify persistent barriers such as limited infrastructure, low financial literacy, and digital skepticism (Ahmed & Sur, 2023). This suggests that

fintech's impact depends on institutional and environmental conditions. Moreover, fintech adoption tends to improve short-term access but does not always translate into long-term organizational resilience without complementary capabilities such as financial literacy and risk management (Oiku & Ayobami, 2024).

Green Finance for MSMEs

Green finance plays a critical role in funding environmentally sustainable initiatives, including renewable energy and climate-resilient projects (Khan et al., 2022). Financial instruments such as green bonds and ESG-linked investments are increasingly used to support sustainable development goals (Liu & Wu, 2023). For MSMEs, green finance enables the adoption of sustainable practices, reduces operational costs, and enhances long-term competitiveness (Pandey, 2024), while also contributing to economic resilience through environmentally responsible business practices. Despite these benefits, the literature reveals a gap between the growing availability of green finance and MSMEs' limited access. While studies agree that green finance enhances sustainability and competitiveness, barriers such as limited awareness, stringent eligibility requirements, and inadequate institutional support remain (Mahesh et al., 2022). This indicates persistent challenges in translating policy and financial innovation into practical accessibility for MSMEs. Furthermore, green finance initiatives tend to favor larger firms, leaving MSMEs underserved due to structural and informational constraints.

Rural Banking and Financial Accessibility

RBs provide essential financial services to underserved populations, including MSMEs and agricultural communities (Sunio et al., 2023). Through localized operations, they offer microloans, savings products, and livelihood financing tailored to community needs. However, they face structural challenges such as limited capital, high transaction costs, and operational inefficiencies (Ahmed & Sur, 2023). MSMEs in rural areas also encounter difficulties in securing loans due to perceived risk, lack of credit records, and geographic constraints. While the literature recognizes the critical role of RBs in promoting financial inclusion, it also highlights their operational limitations. Although RBs maintain strong community relationships, they lack the technological and institutional capacity needed to scale services effectively, creating a gap between their strategic importance and operational capabilities. Moreover, the absence of digital infrastructure and innovation capacity limits their competitiveness in increasingly digital financial environments. These issues suggest that without technological integration and capability development, RBs may struggle to sustain their role in inclusive and sustainable finance.

Fintech-Driven Green Finance Models

The integration of fintech with green finance has led to innovative solutions such as ESG analytics, green crowdfunding, and blockchain-based carbon credit systems (Geetha & Biju, 2024). These technologies enhance transparency, reduce transaction costs, and expand access to sustainability-oriented investments. Fintech-enabled green finance models, including sustainability-linked loans and renewable energy financing platforms, further increase opportunities for MSMEs to participate in environmentally sustainable activities (Ingels et al., 2024). However, despite this potential, there is limited empirical evidence of widespread implementation, particularly in developing economies. A key gap exists between rapid fintech advancement and the slow adoption of ESG-integrated financial products, with most applications focusing on financial inclusion and efficiency rather than sustainability integration (Roy & Vasa, 2025). Additionally, fintech and green finance systems often operate in parallel rather than in an integrated manner, limiting the development of comprehensive sustainable finance solutions.

Synthesis of the Review and Research Gap

The reviewed literature indicates that fintech improves MSME financial inclusion by expanding access to credit, payments, and risk management tools (Setyawati et al., 2023). Similarly, green finance supports sustainability through environmentally responsible investments (Khan et al., 2022), while rural banking continues to serve underserved communities. However, despite these contributions, these domains remain insufficiently integrated in both research and practice. While they are often examined independently, fintech-driven financial inclusion does not consistently translate into improved access to sustainability-oriented financing, highlighting a critical gap in ESG integration.

From a business perspective, this fragmentation limits the ability of financial institutions to leverage fintech for innovation, ESG integration, and competitive advantage. Existing studies overlook how RBs can develop innovation capabilities, align digital transformation strategies with sustainability goals, and improve organizational performance through fintech-enabled green finance solutions. MSMEs also remain constrained in accessing sustainability-linked financing due to gaps in financial product innovation, institutional support, and digital ecosystem

integration. Although fintech has improved financial accessibility, its application in supporting green finance remains underdeveloped, with structural barriers such as limited ESG awareness, inadequate infrastructure, and low financial literacy continuing to hinder implementation (Mahesh et al., 2022). These challenges are particularly evident in the Philippine rural banking context, where MSMEs dominate the economy but still face barriers in accessing sustainable financing, reflecting a persistent disconnect between digital financial innovation and sustainability objectives.

This study addresses these limitations by providing an integrated analysis of fintech, green finance, and rural banking within a developing-country context. It contributes to business scholarship by integrating fintech innovation and ESG-oriented financing to advance sustainable financial inclusion for MSMEs. The study also offers managerial insights on how RBs can strengthen strategic decision-making, enhance digital and organizational capabilities, and develop ESG-linked financial products, while informing strategies to improve MSME access, resilience, and long-term competitiveness.

Theoretical and Conceptual Frameworks

The Diffusion of Innovation (DOI) Theory and the Resource-Based View (RBV) serve as the theoretical foundation of this study in examining how fintech innovations influence green finance accessibility for MSMEs within rural banking systems. DOI explains how new technologies are adopted and diffused across users and systems, emphasizing factors such as perceived usefulness, accessibility, and compatibility (Sinha & Jha, 2024). Fintech tools, including mobile banking, e-wallets, and digital lending platforms, improve transactional efficiency and financial inclusion among MSMEs (Khando et al., 2023). However, despite widespread adoption, their integration with sustainability-oriented financial products such as ESG-linked lending and climate-resilient financing remains limited (Dadabada, 2025).

Complementing this, the RBV framework emphasizes that organizational resources and capabilities drive competitive advantage and performance. RBs must develop key capabilities, including digital infrastructure, innovation capacity, and regulatory alignment, to effectively implement fintech and green finance solutions (Cabaron, 2023). Strategic resources such as ESG-integrated financial products, alternative credit scoring systems, and fintech partnerships can enhance service delivery and expand sustainable financing options. However, these capabilities remain underdeveloped, particularly in integrating environmental sustainability into MSME-focused financial products (Raman et al., 2024). The relevance of these frameworks is reflected in the gap between fintech adoption and green finance accessibility. DOI explains how fintech innovations are adopted by MSMEs, while RBV explains how RB capabilities determine their ability to deliver sustainable financial solutions. From a strategic perspective, this indicates that fintech adoption alone is insufficient without institutional capabilities, innovation management, and ESG-oriented financial strategies. RBs must therefore combine technology adoption with capability development to translate fintech applications into sustainable financial solutions.

Conceptually, fintech innovation improves MSME financial inclusion by enhancing digital access, credit availability, and transactional efficiency, which in turn increases access to sustainability-linked financing. This relationship is shaped by MSME-level characteristics, institutional capabilities, and the policy environment. Accordingly, achieving sustainable finance outcomes requires not only the diffusion of digital technologies but also the development of institutional capacity and coordinated policy support. This conceptual relationship is illustrated in Figure 1, linking fintech innovation, financial inclusion, green finance accessibility, and MSME sustainability outcomes, along with key moderating factors.

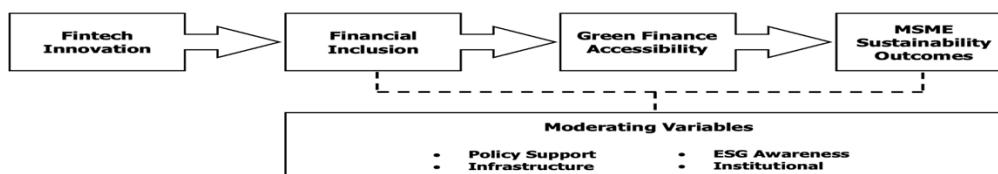


Figure 1. Conceptual Framework of Fintech Innovation and MSME Sustainability Outcomes

Statement of the Problem

The rapid growth of fintech has transformed the delivery of financial services by providing MSMEs with alternative methods of accessing credit, digital payments, and other financial resources beyond traditional banking systems. At the same time, green finance has emerged as an important strategy for promoting environmentally sustainable investments and integrating ESG principles into financial operations. Despite these developments, many MSMEs in developing countries such as the Philippines continue to experience limited access to green finance

through rural banking systems. Although fintech innovations have improved financial inclusion and digital accessibility, their integration with sustainability-oriented financial products remains insufficient. RBs and financial institutions continue to face institutional and operational challenges, including fragmented policy implementation, inadequate ESG integration, limited digital infrastructure, and low sustainability awareness among MSMEs. These limitations reduce the ability of MSMEs to access climate-resilient and sustainability-linked financing opportunities.

Existing studies have largely examined fintech, green finance, and rural banking as separate areas of inquiry. Limited research has explored how fintech innovations can be strategically integrated into rural banking systems to improve MSMEs' access to green finance within the Philippine context. This research gap highlights the need to investigate how fintech-driven financial systems may support inclusive and sustainable economic development.

The study therefore seeks to examine how fintech innovations influence green finance accessibility for MSMEs within Philippine rural banking systems. Specifically, the study aims to identify fintech solutions, assess sustainability-related financial integration, examine implementation barriers and opportunities, and evaluate policy and industry support mechanisms that contribute to sustainable financial inclusion and organizational innovation.

Research Objectives

General Objective

This study aims to examine how fintech innovations influence access to green finance for MSMEs within the rural banking sector in the Philippines.

Specific Objectives

1. To identify the common fintech solutions utilized by RBs in improving MSMEs' access to financial services.
2. To evaluate how fintech innovations enhance green finance accessibility for MSMEs.
3. To analyze the major challenges and opportunities encountered by MSMEs in adopting fintech for green financing.
4. To assess the role of policy frameworks and industry strategies in supporting the integration of fintech and green finance within rural banking systems.
5. To propose strategic recommendations for strengthening fintech-driven sustainable financial inclusion and green finance development.

Research Questions

1. What fintech solutions are utilized by RBs to improve MSMEs' access to financial services?
2. How do fintech innovations influence MSMEs' access to green finance within the rural banking sector?
3. What challenges and opportunities do MSMEs encounter in adopting fintech for green financing?
4. How do policy frameworks and industry strategies support the integration of fintech and green finance in rural banking systems?
5. What strategic recommendations may be proposed to strengthen fintech-driven green finance accessibility for MSMEs?

METHODS

Research Design

This study employed a qualitative research design using a content analysis approach to examine how fintech innovations influence green finance accessibility for MSMEs within the Philippine rural banking sector. Qualitative content analysis was appropriate as it enables the systematic examination of secondary data sources, including academic literature, government policies, and industry reports, to identify patterns and relationships shaping financial inclusion outcomes (Lim, 2024). This approach supports the analysis of complex financial and policy environments where multiple actors, institutional factors, and regulatory dynamics influence decision-making.

From a business and management perspective, the research design allows the evaluation of fintech as a strategic tool for innovation, financial inclusion, and sustainable banking practices. It enables assessment of how RBs leverage digital technologies to enhance organizational performance, develop ESG-oriented financial products, and strengthen competitive positioning. It also facilitates the analysis of policy frameworks and industry strategies, identifying gaps in regulatory coordination and opportunities to improve fintech-driven green finance initiatives.

Overall, the research design aligns with the study's objective of examining fintech-enabled financial systems within a real-world policy and business context, while providing insights into organizational innovation, strategic management, and sustainable financial development.

Sources of Data

This study utilized a document corpus of secondary data sources for qualitative content analysis, including peer-reviewed journal articles, BSP policies, government reports, and institutional publications related to fintech, green finance, rural banking, and MSME financial inclusion.

Data were obtained from established academic and institutional databases such as Scopus, Google Scholar, ScienceDirect, and SpringerLink, as well as official government and regulatory websites. The search used keywords including "fintech," "green finance," "MSME," "rural banking," and "content analysis," and was limited to English-language publications from 2021 to 2025 to ensure relevance. These sources were selected to capture credible academic, policy, and industry perspectives. From a business standpoint, BSP policies and fintech literature were particularly important in providing insights into regulatory frameworks, digital innovation strategies, and institutional practices shaping financial inclusion and sustainable banking.

A purposive sampling strategy was applied to ensure relevance and quality. The initial search yielded 887 records, which underwent a systematic screening process. Duplicate records were removed, followed by title and abstract screening to assess relevance. Full-text review was then conducted based on inclusion criteria such as relevance to fintech, green finance, MSMEs, and rural banking, as well as focus on financial inclusion, ESG-oriented financing, and institutional or policy perspectives. Documents that were outdated, irrelevant, or lacked analytical depth were excluded. This process resulted in a final sample of 60 documents, representing a balanced set of academic literature, regulatory policies, and institutional reports. This sampling approach supports qualitative content analysis by enabling the identification of key themes, patterns, and strategic insights across diverse but relevant sources. It also strengthens the study's objective of examining fintech-driven green finance within a business and policy context by integrating academic, industry, and regulatory perspectives.

Research Instrument

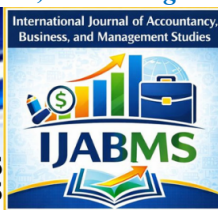
This study utilized a researcher-developed coding framework as the primary instrument for qualitative content analysis. The framework was designed to systematically categorize and analyze textual data from the selected document corpus, focusing on key themes related to fintech innovation, green finance accessibility, MSME challenges, and rural banking systems. The coding categories were deductively derived from the study's theoretical foundations, specifically the DOI Theory and the RBV. These frameworks guided the identification of core constructs, including fintech adoption mechanisms, organizational capabilities, ESG integration, financial inclusion outcomes, and policy support systems. Initial categories were developed from the literature and aligned with the research objectives. The coding framework was then refined iteratively through pilot coding of selected documents to ensure clarity, relevance, and applicability, with categories revised, merged, or expanded to capture emerging themes and reduce redundancy.

To ensure validity and reliability, several procedures were applied. The coding framework underwent expert review by individuals with expertise in fintech, sustainable finance, and qualitative research. A pilot coding process was conducted to assess consistency, followed by peer debriefing to clarify coding decisions and resolve ambiguities. These procedures enhanced the credibility and rigor of the coding process. The finalized coding framework was used to analyze the selected documents systematically and consistently. The coding scheme is presented in Table 1, outlining the categories, definitions, and key indicators used in the analysis.

Table 1

Coding Framework: Fintech, MSMEs, and green finance in Philippine rural banking

Category	Code	Description	Key Themes
Fintech Solutions	Popular_Fintech_Tools	Digital tools used in rural banking like mobile wallets and APIs	Accessibility, digital transformation, financial inclusion
	Fintech_Partnerships	Collaboration between banks and fintech providers	Modernization, service expansion, infrastructure efficiency
Green Finance Access	Green_Fintech_Models	Fintech-enabled green financial products	Sustainability, innovation, environmental impact
	Alternative_Credit_Scoring	Use of non-traditional data in credit evaluation	Inclusivity, data-driven lending, financial accessibility



Category	Code	Description	Key Themes
MSME Dynamics	MSME_Challenges	Barriers faced in accessing finance and technology	Exclusion, infrastructure gaps, trust issues
	MSME_Opportunities	Benefits derived from fintech adoption	Empowerment, resilience, innovation
Policy and Industry Support	Regulatory_Support	Government policies and frameworks	Policy alignment, financial inclusion targets, ESG frameworks
	Industry_Strategies	Initiatives by banks and fintech firms	Collaboration, product innovation, ecosystem development

Data Collection

Data were collected from secondary sources between June and July 2025 through the systematic retrieval and organization of relevant documents from selected academic databases and institutional platforms.

The retrieval process followed a structured procedure. First, searches were conducted across selected databases and official sources using keywords related to fintech innovation, green finance, MSME development, and rural banking. Retrieved documents were compiled into an initial dataset for screening. Second, materials were reviewed for completeness and relevance. Selected documents were downloaded, cataloged, and organized in a structured format, and were classified by source type, such as academic literature, policy documents, and institutional reports, to support efficient analysis.

Third, the finalized set of documents was prepared for analysis by ensuring consistency in file formatting and organization. Records were grouped according to thematic relevance to align with the study's coding framework, ensuring accessibility for systematic content analysis. Throughout the process, care was taken to maintain dataset integrity, with all sources properly documented and aligned with the study's objectives.

Treatment of Data

This study employed qualitative content analysis to examine the selected document corpus and generate thematic insights on fintech innovation, green finance accessibility, MSME dynamics, and rural banking systems. A deductive coding approach was applied, guided by the DOI Theory and the RBV. Coding was conducted manually using the researcher-developed framework, as presented in Table 1, with relevant text segments systematically assigned to predefined codes. The process was iterative to ensure consistency across all documents.

Following initial coding, codes were grouped into broader themes by identifying recurring patterns and relationships. Themes were refined through cross-document comparison, with categories merged or specified to ensure clarity and conceptual distinctiveness. Thematic saturation was achieved when no new significant patterns emerged. To ensure analytical rigor, cross-validation was conducted through peer debriefing and expert consultation with individuals knowledgeable in fintech, sustainable finance, and qualitative research. This process ensured consistency in code application and validity of emerging themes, with discrepancies resolved through consensus.

The integration of DOI and RBV guided the interpretation of findings by linking fintech adoption with organizational capabilities and strategic resource use. This enabled the study to generate contextually grounded insights into financial inclusion, ESG integration, and sustainable banking practices within rural banking systems.

Ethical Considerations

This study adhered to established ethical standards in qualitative research using secondary data. It relied on publicly available sources, including peer-reviewed articles, policy papers, and institutional reports; therefore, no human participants were involved, and issues of informed consent and confidentiality were not applicable. In accordance with institutional guidelines, the study was exempt from formal ethics review as it did not involve human or animal subjects. The research nonetheless followed principles of academic integrity and responsible conduct throughout all stages.

To ensure ethical rigor, proper citation and referencing practices were strictly observed, with all sources appropriately acknowledged. Plagiarism was avoided through accurate paraphrasing, appropriate quotation, and consistent attribution. Data transparency and source verification were also upheld by selecting credible and verifiable materials from established academic databases and official institutional platforms. All sources were critically evaluated for reliability and relevance to ensure the integrity of the findings. Overall, the study was conducted with a commitment to transparency, accountability, and scholarly responsibility, consistent with ethical standards for secondary-data qualitative analysis.

RESULTS and DISCUSSION

This section presents the findings from the qualitative content analysis of selected secondary sources, focusing on the role of fintech in enhancing access to green finance for MSMEs within rural banking in the Philippines. The research results were organized according to research questions brought attention to major themes which included fintech adoption, sustainability integration, MSME involvement and policy support functions. The current relationship between fintech and green finance systems restricted MSMEs from achieving sustainable growth because the system provides access to financial services.

Fintech Adoption and Financial Accessibility

The findings demonstrated that RBs operate core financial activities through fintech-enabled systems, with 321 instances of popular fintech tools such as GCash, Maya, QR Ph, and digital onboarding platforms. These results reflect a strong shift toward digital transformation within the Philippine financial system, driven by increasing demand for accessible and efficient financial services. Existing studies support these findings, showing that mobile banking and digital payment systems significantly enhance financial access among underserved populations (Khando et al., 2023). Local evidence further confirms that RBs have adopted mobile platforms and electronic payment systems to expand customer reach and improve service delivery (Balmes, 2023).

From a business perspective, fintech adoption enables RBs to improve customer acquisition, operational efficiency, and service scalability. Digital platforms reduce transaction costs and streamline processes, thereby enhancing competitiveness within the financial sector. However, despite these benefits, infrastructure limitations and inadequate internet connectivity continue to constrain the full potential of fintech solutions. These limitations have important strategic implications, as they reduce long-term efficiency gains and limit the ability of banks to sustain digital innovation. As a result, RBs must invest not only in digital systems but also in financial education initiatives to maximize fintech benefits and support MSME development.

Fintech and Green Finance Integration

The findings revealed that fintech solutions are widely adopted across financial institutions, yet they produce only indirect effects on MSMEs' access to green finance. The Green Fintech Models category, with 132 mentions, highlights emerging practices such as ESG integration, sustainable finance frameworks, and blockchain applications. However, these remain limited within mainstream fintech systems, creating a disconnect between financial inclusion and sustainability-oriented funding. Existing literature supports this observation, indicating that ESG-linked financial products and climate-oriented financing tools remain underdeveloped due to weak integration with digital financial systems (Roy & Vasa, 2025). Similarly, fintech models continue to prioritize operational efficiency and financial inclusion over sustainability metrics in lending and investment decisions (Xia et al., 2022).

This gap has significant business implications. The absence of ESG-integrated fintech solutions limits the ability of financial institutions to achieve competitive differentiation and participate effectively in sustainability-driven financial markets. For MSMEs, limited access to green finance reduces their capacity to implement environmentally sustainable practices, thereby weakening their competitiveness in ESG-driven supply chains. For investors, this creates increased ESG-related risk and uncertainty in sustainability compliance. Additionally, fintech providers face missed opportunities for product innovation, market expansion, and long-term revenue growth due to the lack of ESG-enabled financial solutions. These findings highlight the need for stronger integration between fintech innovation and sustainability frameworks to support both financial inclusion and environmental objectives.

MSME Challenges and Opportunities

The results showed that MSMEs face persistent barriers in accessing fintech-enabled and sustainable financing solutions, with 277 mentions under MSME Challenges. These include limited financial literacy, infrastructure constraints, lack of collateral, and cybersecurity concerns, all of which restrict participation in digital financial systems. Supporting studies confirm that low awareness of ESG concepts prevents MSMEs from accessing sustainability-related financing opportunities (Rusmanah et al., 2024), while infrastructural gaps contribute to a widening digital divide (Lanciano et al., 2025). Additionally, limited MSME participation in fintech product design often results in solutions that do not fully address their needs (Teixeira et al., 2021). These barriers have significant implications for business performance and entrepreneurial resilience. Without access to adaptive financial tools, MSMEs remain vulnerable to economic shocks and are less capable of investing in innovation and sustainability initiatives. This reduces their long-term growth potential and profitability.

At the same time, the Opportunities category (306 mentions) reveals the potential of fintech to support MSME development. Digital onboarding, e-commerce integration, and financial literacy programs enhance access to financial services and improve customer experience (Aamer & Milani, 2023). However, these opportunities remain insufficiently connected to green finance initiatives. While fintech improves financial inclusion, its contribution to sustainability objectives remains limited. From a managerial perspective, integrating ESG components into MSME-focused fintech solutions is essential to enhance both economic performance and long-term sustainability outcomes.

Policy and Industry Support

The analysis demonstrated that policy and institutional support play a critical role in enabling the development of fintech-driven green finance within the Philippine financial system. The Regulatory Support category, with 354 mentions, indicates strong government involvement through BSP circulars, sustainability frameworks, and national policies. However, the results also reveal that these initiatives are often implemented in isolation, creating challenges in coordination and execution. Existing studies confirm that inadequate alignment among regulatory bodies limits the effective integration of fintech and green finance systems (Volz et al., 2025). From a strategic business perspective, fragmented policy implementation reduces the ability of financial institutions to scale ESG-integrated fintech solutions and limits opportunities for innovation and market expansion.

Similarly, the Industry Strategies category (350 mentions) highlights the importance of partnerships, innovation ecosystems, and technological investments in driving fintech adoption. Public-private collaborations and regulatory sandboxes have contributed to improvements in financial infrastructure. However, these strategies show limited ESG integration, consistent with findings that fintech and sustainability initiatives often operate separately (Roy & Vasa, 2025). This separation reduces the ability of financial institutions to develop differentiated, sustainability-oriented financial products and weakens overall industry competitiveness. To address these challenges, stronger coordination between regulatory frameworks and industry strategies is required. The integration of ESG standards into fintech policies, supported by collaborative governance mechanisms, can enhance innovation capacity, regulatory efficiency, and institutional competitiveness.

Integrated Discussion and Implications

The findings highlight a gap between fintech adoption and sustainability integration within rural banking systems. While fintech improves financial accessibility, its strategic potential for supporting sustainability remains underutilized. From a managerial perspective, RB executives should prioritize integrating ESG principles into fintech-enabled services through sustainability-linked lending, ESG-based credit assessment, and digital financial innovation. These strategies can enhance competitive advantage, improve profitability, and strengthen long-term organizational performance. For fintech managers, the results emphasize the importance of developing platforms that integrate sustainability metrics and enable ESG reporting. This can support product innovation, improve customer trust, and expand market opportunities.

For MSME owners, fintech adoption can enhance financial management, strengthen resilience, and improve access to sustainability-oriented financing. Improved digital and ESG capabilities can enable MSMEs to achieve long-term competitiveness and business sustainability. For investors, ESG-integrated fintech systems improve risk assessment and capital allocation, while policymakers must focus on strengthening regulatory coordination, expanding digital infrastructure, and promoting financial literacy. Overall, the integration of fintech and green finance represents a strategic opportunity to enhance innovation capacity, operational efficiency, financial performance, and sustainability outcomes across the financial ecosystem.

Conclusions

This study examined how fintech innovations influence the accessibility of green finance for MSMEs within the Philippine rural banking sector, highlighting the interaction between digital financial systems, sustainability integration, and institutional dynamics. The findings confirm that while fintech adoption has significantly improved financial accessibility and operational efficiency, its integration with sustainability frameworks remains limited, thereby constraining its full potential in supporting green finance initiatives.

From a business strategy perspective, the study demonstrates that fintech-driven financial systems can enhance the competitiveness of rural banks by enabling more efficient service delivery, expanding customer reach, and supporting data-driven decision-making. However, the absence of ESG-integrated functionalities within fintech platforms limits the ability of financial institutions to develop sustainability-oriented financial products, reducing opportunities for market differentiation, innovation, and long-term profitability.

In terms of financial management and organizational performance, the findings show that ESG integration plays a critical role in improving sustainable financial outcomes. Financial institutions that incorporate ESG principles into their operations are better positioned to manage risks, attract sustainability-oriented investments, and achieve long-term value creation. Conversely, limited ESG integration within fintech systems weakens the alignment between innovation and sustainable finance objectives, consistent with prior findings on digital finance and ESG gaps (Roy & Vasa, 2025).

For MSMEs, the study highlights both constraints and opportunities. Limited access to green finance, combined with infrastructural and knowledge gaps, restricts the adoption of sustainable practices. However, fintech adoption provides a pathway to enhance financial inclusion, improve efficiency, and strengthen entrepreneurial resilience and long-term competitiveness, particularly when supported by digital financial ecosystems (Amer & Milani, 2023).

From a theoretical perspective, the study contributes to the DOI Theory by demonstrating how fintech adoption is shaped by infrastructural readiness, regulatory support, and user capability. At the same time, the findings extend the RBV by emphasizing the role of digital and institutional capabilities in achieving competitive advantage through sustainability-oriented financial innovation.

Overall, the study concludes that the strategic integration of fintech and green finance presents a critical opportunity to enhance organizational innovation, financial system efficiency, and sustainable economic development. Strengthening regulatory coordination, expanding digital infrastructure, and embedding ESG principles into fintech platforms are essential to achieving a more inclusive and sustainability-driven financial ecosystem.

Recommendations

Based on the findings of this study, several strategic and managerial recommendations are proposed to enhance the integration of fintech and green finance within the Philippine rural banking sector.

For MSMEs, may strengthen their financial and sustainability capabilities through targeted capacity-building initiatives, including financial literacy programs and sustainability-oriented business training. These programs may focus on ESG awareness, digital financial management, and access to green financing mechanisms, enabling MSMEs to utilize fintech platforms more effectively and improve their participation in sustainability-driven markets. In addition, MSMEs may enhance entrepreneurial resilience by adopting fintech-enabled financial tools that support cash flow management, alternative credit access, and sustainability-linked financing, thereby improving long-term competitiveness and adaptive capacity.

For RBs, financial institutions may strengthen strategic banking innovation by developing ESG-integrated financial products, including sustainability-linked lending systems, green credit evaluation frameworks, and digital platforms that embed ESG criteria into credit assessment processes. Furthermore, RBs may enhance market competitiveness by leveraging fintech to support data-driven credit scoring, customer segmentation, and product innovation, enabling the development of differentiated financial services tailored to MSMEs engaged in sustainable business activities. These initiatives may improve operational efficiency, profitability, and long-term financial sustainability.

For fintech providers, organizations may strengthen sustainability-oriented financial innovation by developing ESG-based credit assessment systems, green lending platforms, and environmentally responsive digital financial services tailored to MSMEs, consistent with emerging Open Finance architectures. Additionally, fintech firms may integrate sustainability analytics, real-time risk monitoring tools, and interoperable API-driven systems to support ESG reporting, improve transparency, and enhance customer trust. These innovations may expand market opportunities and improve competitiveness within sustainability-driven financial ecosystems.

For policymakers and regulators, government institutions may strengthen regulatory coordination by establishing inter-agency collaboration mechanisms, harmonizing ESG reporting standards, and developing fintech-specific regulatory frameworks for sustainable finance, including guidelines for ESG integration in digital lending platforms and financial services. In addition, regulators may promote the development of regulatory sandboxes focused on green fintech innovation, enabling financial institutions and fintech providers to test sustainability-oriented products in controlled environments. Policymakers may also invest in digital infrastructure expansion, particularly in rural and underserved regions, to address connectivity gaps that limit fintech adoption. These measures may enhance financial inclusion, support innovation, and enable scalable implementation of green finance initiatives.

Finally, for future researchers, further studies may expand empirical and longitudinal analysis of fintech-enabled green finance systems to assess their impact on financial performance, ESG outcomes, and customer behavior. Further studies may explore comparative models of fintech-ESG integration across different developing

economies, as well as investigate the role of digital financial ecosystems in supporting sustainable entrepreneurship and innovation. These directions may contribute to advancing both academic research and industry practice in sustainable finance.

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