Financial Inclusion Through Digital Service Innovation: Mobile Banking Solutions for Rural Communities in Vietnam

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ABSTRACT

Despite significant economic growth over the past three decades, Vietnam faces persistent challenges in extending financial services to rural communities. This qualitative study investigates how mobile banking innovations can advance financial inclusion in Vietnamese rural areas, addressing barriers that have historically excluded these populations from formal financial systems. Through in-depth interviews with 52 stakeholders including rural mobile banking users, non-users, banking executives, fintech developers, local government officials, and village leaders across five provinces, we explore the multifaceted dynamics of digital financial service adoption in resource-constrained environments. Using thematic analysis guided by the Sustainable Livelihoods Framework and Technology Acceptance Model, we identify five critical factors shaping mobile banking success in rural Vietnam: infrastructure readiness and digital literacy, trust-building through local intermediaries, service design adapted to agricultural cycles, regulatory flexibility enabling innovation, and sustainable business models balancing profitability with social impact. Our findings reveal that successful mobile banking initiatives go beyond technological deployment to encompass ecosystem development, cultural adaptation, and community engagement strategies. The study contributes to the literature on financial inclusion by providing empirical evidence from an emerging market context and offers practical insights for designing sustainable digital financial services that can meaningfully improve rural livelihoods while supporting broader sustainable development goals.

Keywords: Financial inclusion, Mobile banking, Rural development, Digital innovation, Sustainable development, Vietnam, Qualitative research.

1 Introduction

Financial inclusion, defined as access to useful and affordable financial products and services that meet the needs of individuals and businesses, represents a critical enabler of sustainable development and poverty reduction (Ozili, 2021). The United Nations has recognized financial inclusion as a facilitator for 7 of the 17 Sustainable Development Goals, highlighting its role in reducing poverty, improving health and education outcomes, and promoting economic growth. However, globally, approximately 1.7 billion adults remain unbanked, with rural populations disproportionately excluded from formal financial systems due to geographic isolation, low income levels, and limited financial infrastructure (Adelaja et al., 2024).

Vietnam presents a compelling context for examining financial inclusion challenges and opportunities. Despite remarkable economic transformation since the reforms of 1986, with GDP per capita increasing from $230 in 1985 to over $3,700 in 2023, significant disparities persist between urban and rural areas (Nguyen et al., 2023; Nguyen, 2022). According to the State Bank of Vietnam, while 70% of urban adults have bank accounts, this figure drops to approximately 40% in rural areas (Linh et al., 2019). This financial exclusion perpetuates cycles of poverty, limits economic opportunities, and constrains the country's overall development potential.

The emergence of mobile banking technology offers unprecedented opportunities to bridge this financial inclusion gap. With smart phone penetration in Vietnam exceeding 71% in 2020, higher than the Asian average of 65%. and smartphone adoption rapidly increasing even in rural areas, mobile-based financial services could potentially leapfrog traditional banking infrastructure constraints (Nguyen & Nguyen, 2020). However, the deployment of technology alone does not guarantee inclusion. Success requires understanding the complex interplay of technological, social, economic, and cultural factors that influence adoption and sustained use of digital financial services in rural contexts.

This study addresses critical gaps in our understanding of how mobile banking innovations can effectively serve rural communities in emerging markets. While existing literature has examined mobile banking adoption in developed countries and urban contexts, rural environments in developing nations present unique challenges including limited digital literacy, inadequate infrastructure, cultural barriers, and distinctive financial needs tied to agricultural cycles. Furthermore, most studies have focused on adoption factors from a user perspective, with limited attention to the broader ecosystem requirements for sustainable service delivery.

Our research is guided by three primary questions: First, what are the specific barriers and enablers for mobile banking adoption in rural Vietnamese communities? Second, how can mobile banking services be designed and delivered to meet the unique needs and constraints of rural users? Third, what ecosystem conditions are necessary to ensure the sustainability and scalability of mobile banking initiatives in rural areas? Through qualitative investigation across diverse rural contexts in Vietnam, this study aims to develop nuanced understanding of these issues and provide actionable insights for policymakers, financial service providers, and development practitioners.

2 Literature review

2.1 Financial Inclusion and Rural Development

The relationship between financial inclusion and development outcomes has been extensively documented in academic literature. Access to formal financial services enables households to smooth consumption, invest in education and health, start or expand businesses, and build resilience against economic shocks (Pomeroy et al., 2020). In rural contexts, where livelihoods often depend on agriculture with its inherent seasonality and weather-related risks, financial services play particularly crucial roles in managing income volatility and enabling productive investments.

However, traditional banking models have struggled to serve rural populations profitably. High transaction costs relative to small account balances, dispersed populations requiring extensive branch networks, and information asymmetries regarding creditworthiness create significant barriers to rural financial service provision (Adesiyan, 2025; Pham & Huynh, 2025). In Vietnam, these challenges are compounded by topographical diversity, with many communities located in mountainous or remote areas that are costly to reach (Sterling & Hurley, 2008). Historical approaches including state-directed credit programs and microfinance initiatives have achieved limited success, often suffering from sustainability challenges or failing to provide comprehensive financial services beyond credit.

The concept of financial inclusion has evolved from simply providing access to financial services to ensuring that these services are appropriate, affordable, and actively used to improve welfare outcomes (Ha et al., 2025). This broader conceptualization recognizes that dormant accounts or inappropriate products do not constitute meaningful inclusion. In rural Vietnam, where informal financial mechanisms including rotating savings groups, and moneylenders remain prevalent, formal financial services must demonstrate clear value propositions to encourage switching from familiar informal systems.

Recent scholarship has emphasized the importance of understanding financial inclusion through a capabilities approach, focusing not just on access but on individuals' ability to make informed choices and

effectively utilize financial services to achieve valued outcomes (Adelaja et al., 2024; Ediagbonya & Tioluwani, 2022). This perspective is particularly relevant in rural contexts where limited education, unfamiliarity with formal financial systems, and power imbalances may constrain individuals' ability to benefit from financial services even when technically accessible.

2.2 Mobile Banking Innovation and Digital Financial Services

The proliferation of mobile technology has transformed financial service delivery globally, with particular impact in developing countries where mobile phones have become ubiquitous even in areas lacking traditional banking infrastructure (Khoa & Huynh, 2024; Hai, 2023). Mobile banking, encompassing various services from basic SMS-based transactions to sophisticated smartphone applications, offers potential solutions to many barriers that have historically excluded rural populations from formal financial systems (Ullah et al., 2022).

The success of mobile money platforms in countries like Kenya and Bangladesh has demonstrated the transformative potential of mobile-based financial services (Rahman, 2025). These platforms have achieved rapid scale by leveraging existing mobile network infrastructure, utilizing agent networks for cash-in/cash-out services, and designing simple interfaces accessible to users with limited literacy (Laboure, 2025). However, the transferability of these models to different contexts remains contested, as success factors appear highly context-dependent.

In Vietnam, the mobile banking landscape has evolved rapidly but unevenly. While urban areas have seen widespread adoption of sophisticated mobile banking applications offered by commercial banks, rural penetration remains limited (Khoa, 2020). Several fintech companies have emerged targeting underserved segments, but regulatory constraints and limited interoperability between platforms have hindered growth. The State Bank of Vietnam's regulatory sandbox initiative launched in 2021 signals growing recognition of the need for innovation in digital financial services, but questions remain about how to balance innovation with consumer protection and financial stability concerns.

The literature identifies several factors influencing mobile banking adoption, including perceived usefulness, ease of use, trust, social influence, and facilitating conditions (Hai, 2023; Khoa, 2020). However, most studies have been conducted in urban contexts or developed countries, with limited attention to the specific dynamics of rural adoption in emerging markets. Rural users may face unique barriers including inconsistent network connectivity, limited smartphone ownership, low digital literacy, and lack of local support for troubleshooting technical issues.

2.3 Service Innovation for Sustainable Development

Service innovation in the context of sustainable development requires balancing economic viability with social and environmental objectives (Marak et al., 2025). For mobile banking services targeting rural communities, this means developing business models that can achieve financial sustainability while genuinely improving welfare outcomes for marginalized populations (Cuong et al., 2025; Khan et al., 2024). The tension between commercial viability and social mission represents a fundamental challenge in designing inclusive financial services.

The concept of "frugal innovation" has emerged as particularly relevant for developing market contexts, emphasizing solutions that deliver greater value at lower cost through creative resource use and simplified designs (Jayabalan & Dorasamy, 2024). In mobile banking, frugal innovation might involve leveraging existing behavioral patterns, utilizing basic technology platforms accessible on feature phones, or partnering with local institutions to reduce customer acquisition costs (Al-khatib & Alghababsheh, 2025). However, frugality must not compromise service quality or security in ways that could undermine trust or expose vulnerable users to risks.

Sustainable service innovation also requires attention to local capacity building and ecosystem development (Hongli et al., 2022). Simply deploying technology without investing in user education, agent training, and ongoing support systems often leads to low adoption and high dormancy rates. The literature on innovation ecosystems emphasizes the importance of complementary assets, institutional support, and network effects in enabling successful innovation. In rural financial services, this might include partnerships with agricultural extension services, integration with government social programs, or collaboration with local community organizations.

The sustainability lens also demands consideration of long-term impacts and unintended consequences. While mobile banking can increase financial inclusion, it may also expose users to new risks including over-indebtedness, fraud, or data privacy violations (Takyi et al., 2025; Martynas & Algita, 2024). Service innovation must therefore incorporate responsible finance principles, ensuring that products are appropriate for target users and that adequate consumer protection mechanisms are in place.

2.4 Vietnamese Rural Context and Financial Landscape

Vietnam's rural areas exhibit significant diversity in terms of economic development, ethnic composition, and geographic characteristics. The Mekong Delta's commercial agriculture differs substantially from subsistence farming in northern mountainous regions, requiring differentiated approaches to financial service provision. Ethnic minorities, comprising approximately 14% of the population but concentrated in rural and mountainous areas, face additional barriers including language differences and historical marginalization from formal institutions (Choi, 2016).

The Vietnamese government has prioritized financial inclusion through various initiatives including the National Financial Inclusion Strategy to 2025, which targets 80% adult account ownership by 2025 (Otitoju et al., 2025). State-owned banks, particularly Vietnam Bank for Social Policies and Vietnam Bank for Agriculture and Rural Development (Agribank), play dominant roles in rural financial service provision. However, these institutions often operate under directed lending mandates that may not align with commercial sustainability requirements.

The informal financial sector remains significant in rural Vietnam, with various traditional mechanisms serving communities' financial needs. Rotating savings and credit associations provide social collateral-based lending, while informal moneylenders offer quick access to credit despite high interest rates. Understanding these existing systems is crucial for designing formal financial services that can effectively compete with or complement informal mechanisms.

Recent technological infrastructure developments including expanded 4G coverage and the national digital ID program create enabling conditions for digital financial services. However, significant gaps remain in digital literacy and trust in digital systems, particularly among older rural residents who comprise a large portion of the agricultural workforce. The COVID-19 pandemic accelerated digital adoption in some areas but also highlighted the digital divide between urban and rural populations.

3 Methodology

This study employs an interpretive qualitative research design to explore the complex phenomena of mobile banking adoption and impact in rural Vietnamese communities. The interpretive paradigm is particularly appropriate for understanding how individuals make sense of new technologies within their specific social and cultural contexts. Given the exploratory nature of our research questions and the need to capture nuanced perspectives from diverse stakeholders, qualitative methods provide the depth and flexibility necessary for meaningful insights. We adopt a phenomenological approach to understand the lived experiences of rural residents engaging with or choosing not to engage with mobile banking services. This philosophical stance acknowledges that reality is socially constructed and that individuals' perceptions and interpretations of mobile banking are shaped by their cultural backgrounds, previous experiences with

financial services, and social environments. Rather than seeking universal truths about mobile banking adoption, we aim to understand the multiple realities experienced by different actors within the rural financial ecosystem. The research design incorporates principles of community-based participatory research, recognizing rural communities not as passive subjects but as active participants in knowledge creation. This approach aligns with sustainable development principles by ensuring that research processes respect local knowledge systems and contribute to community capacity building. Throughout the research process, we engaged local partners and sought feedback from community members to ensure cultural appropriateness and relevance of our findings.

The study was conducted across five provinces representing different geographic regions and socioeconomic conditions within rural Vietnam: Son La province (Northwest mountainous region), Thai Nguyen province (Northeast), Nghe An province (North Central Coast), Dak Lak province (Central Highlands), and An Giang (Mekong Delta). These provinces were selected to capture diversity in agricultural systems, ethnic composition, infrastructure development, and exposure to financial services. Within each province, we selected two districts and four communes (two per district) using purposive sampling to ensure variation in distance from urban centers, economic development levels, and mobile network quality. This multi-level sampling approach allowed us to explore how geographic and infrastructural factors influence mobile banking service delivery and adoption. The final sample included 20 communes ranging from relatively accessible areas within 20 kilometers of provincial capitals to remote communities requiring several hours of travel from district centers. Participant recruitment employed multiple strategies to ensure diverse perspectives. We collaborated with local People's Committees to identify potential participants while being careful to avoid selection bias toward individuals favorable to government initiatives. Snowball sampling helped identify hard-to-reach populations including ethnic minorities and individuals who had discontinued mobile banking use. We also worked with local community-based organizations, farmers' associations, and women's unions to access different social networks. The final sample comprised 52 participants across six stakeholder categories: current mobile banking users (n=15), non-users (n=12), individuals who had tried but discontinued mobile banking (n=5), bank representatives and mobile banking agents (n=8), fintech company representatives and technology developers (n=5), and local government officials and village leaders (n=7). Within user categories, we ensured diversity in age (ranging from 22 to 67 years), gender (28 women, 24 men), ethnicity (including Kinh majority and ethnic minorities including Thái, Hmong, and Khmer), and primary livelihood activities.

Data collection occurred between January and September 2024, with each site visit lasting 3-5 days to allow for relationship building and deep engagement with communities. The primary data collection method was semi-structured in-depth interviews, conducted in Vietnamese or local languages with the assistance of trained interpreters when necessary. Interviews lasted between 45 and 120 minutes and were audio-recorded with participants' consent. The interview protocols were developed based on the literature review and refined through pilot interviews in each region. Questions for users and non-users explored financial behaviors and needs, experiences with formal and informal financial services, perceptions and experiences with mobile banking, barriers and facilitators to adoption, and impacts on livelihood activities. Interviews with service providers examined business models and sustainability challenges, strategies for reaching rural customers, regulatory constraints and opportunities, and perspectives on innovation needs. In addition to individual interviews, we conducted 10 focus group discussions (two per province) to explore social dynamics influencing mobile banking adoption. Focus groups were segregated by gender when culturally appropriate and included 6-8 participants each. These discussions revealed social influence mechanisms, collective concerns about digital financial services, and community-level factors affecting adoption that might not emerge in individual interviews. Participant observation provided contextual understanding of how mobile banking fits within daily life patterns. Researchers observed mobile banking transactions at agent locations, attended village meetings where mobile banking was discussed, and participated in agricultural activities to understand financial needs cycles. Field notes captured observations about

infrastructure conditions, technology use patterns, and informal financial practices. Document analysis supplemented primary data collection, including review of government policies and program documents, banks' and fintech companies' rural strategy documents, commune-level socioeconomic reports, and promotional materials for mobile banking services. These documents provided context for understanding the institutional environment and strategic approaches to rural financial inclusion.

Data analysis followed a systematic thematic analysis approach enhanced by constant comparative methods. All interviews were transcribed verbatim in the original language, with selected quotes later translated to English for reporting. The analysis process involved multiple stages of coding and interpretation, moving from descriptive to analytical insights. Initial coding was conducted inductively, allowing themes to emerge from the data rather than imposing predetermined categories. Two researchers independently coded a subset of transcripts to establish inter-rater reliability and refine the coding framework. Using NVivo 12 software, we systematically coded all transcripts, field notes, and relevant documents, generating 342 initial codes capturing diverse aspects of rural mobile banking experiences. Through iterative rounds of analysis, initial codes were consolidated into 45 focused codes and eventually organized into broader themes and sub-themes. The analysis process involved regular team discussions to challenge interpretations and ensure analytical rigor. We paid particular attention to divergent cases and contradictory evidence, using these instances to refine and nuance our understanding of the phenomena. The analytical framework was informed by the Sustainable Livelihoods Framework and Technology Acceptance Model while remaining open to emergent insights not captured by these theoretical lenses. This abductive approach allowed us to build theory from empirical observations while drawing on existing conceptual resources. Member checking with selected participants and stakeholder validation workshops in each province enhanced the credibility and relevance of findings.

4 Findings

4.1 Infrastructure Readiness and Digital Literacy Challenges

The foundational theme emerging from our analysis concerns the interplay between technological infrastructure and human capacity for engaging with digital financial services (Sharma & Díaz Andrade, 2023). While mobile network coverage has expanded significantly in rural Vietnam, substantial gaps remain in service quality and reliability, particularly in mountainous regions (Purnamasari et al., 2025). Participants in Son La province and Dak Lak province provinces reported frequent network disruptions that undermined confidence in mobile banking services.

A farmer from a mountainous commune in Son La province explained: "Sometimes the network is down for days during the rainy season. If I need to send money urgently for my child's school fees, I cannot rely on mobile banking. I must travel to the district town instead." This unreliability forces rural residents to maintain multiple financial service options, increasing their transaction costs and complexity. Bank representatives acknowledged these infrastructure limitations but noted the high costs of ensuring redundant connectivity in remote areas (Hehua et al., 2025; Aurelija et al., 2024).

Beyond basic connectivity, the transition from 2G to 3G/4G networks remains incomplete in many rural areas, limiting access to app-based services that require higher bandwidth. A fintech developer noted: "We designed a lite version of our app, but even that struggles on 2G networks. We're exploring USSD options, but that significantly limits functionality and user experience." This technological constraint forces service providers to make difficult trade-offs between accessibility and service sophistication.

Digital literacy emerges as an equally significant challenge, but with important nuances (Chibesa & Mwange, 2025). Younger rural residents often possess basic smartphone skills from social media use but lack understanding of financial concepts and security practices necessary for safe mobile banking use. Older residents, who control household financial decisions in many cases, face more fundamental challenges with digital interfaces (Khanh et al., 2025). A 58-year-old female farmer in An Giang shared: "My daughter

helped me install the banking app, but I'm afraid to use it. What if I press the wrong button and lose all my money?"

However, we observed innovative local solutions to digital literacy challenges. In several communes, younger family members serve as "digital intermediaries," conducting mobile banking transactions on behalf of older relatives (Uyen et al., 2025; Kleis Nielsen & Ganter, 2018). While this enables access, it raises concerns about financial autonomy and privacy. A village leader in Nghe An province observed: "This creates dependencies and sometimes conflicts when young people have too much control over their parents' money."

Training initiatives by banks and government agencies have achieved mixed results. Participants appreciated hands-on training sessions but noted that one-time training was insufficient given the complexity of mobile banking applications. A women's union representative suggested: "They come, do training for two hours, then leave. People need ongoing support, someone they can ask when problems arise." This highlights the need for sustained capacity-building approaches rather than one-off interventions.

4.2 Trust-Building Through Local Intermediaries

Trust emerged as a multifaceted construct influencing mobile banking adoption, encompassing trust in technology, service providers, and transaction processes (Khoa & Thanh, 2025; De et al., 2023). Rural residents expressed various concerns including fear of technical errors, skepticism about digital security, and uncertainty about recourse mechanisms when problems occur (Al-Hawamleh, 2024). These trust deficits are compounded by limited previous experience with formal financial services and stories of fraud or losses circulating within communities.

The role of local intermediaries in building trust proved crucial. Mobile banking agents recruited from within communities served as bridges between digital services and rural users (Lee & Chen, 2022). A successful agent in Thai Nguyen province explained: "People trust me because I'm from here. They know my family, my house. If something goes wrong, they know where to find me." This social embeddedness provides assurance that formal institutional mechanisms cannot easily replicate.

However, the agent model faces sustainability challenges. Agents reported that commission structures often fail to compensate adequately for time invested in educating customers and troubleshooting problems. An agent in Dak Lak province who had recently stopped operations noted: "I was earning maybe 500,000 VND per month but spending hours helping people. It's not worth it economically, though I want to help my community." This tension between social mission and economic viability threatens the agent model's sustainability.

Local government endorsement significantly influences trust in mobile banking services. In communes where local leaders actively promoted mobile banking, adoption rates were notably higher (Liu et al., 2014). A People's Committee chairman in Nghe An province described: "When I started using mobile banking for my own transactions and talked about it in village meetings, people became more interested. They think, 'If the chairman trusts it, maybe we can too.'" However, this endorsement effect varies by the legitimacy and respect commanded by local leaders.

Interestingly, we found that trust operates through collective rather than purely individual mechanisms (Kramer, 2010). Focus group discussions revealed that rural residents often make adoption decisions based on community consensus rather than individual evaluation. A participant in An Giang explained: "We discussed it in our savings group. When most members agreed to try it together, I felt more confident." This collective decision-making suggests that group-based adoption strategies might be more effective than individual targeting.

4.3 Service Design Adapted to Agricultural Cycles

The temporal rhythms of agricultural production create distinctive financial service needs that standard mobile banking products often fail to address. Rural households experience concentrated income during harvest periods followed by months of limited cash flow, requiring financial services that can smooth consumption and enable investment in the next production cycle (Emeana et al., 2020). Current mobile banking offerings, largely designed for urban users with regular income streams, poorly match these patterns.

Participants consistently expressed need for savings products that prevent easy withdrawal during non-emergency periods. A rice farmer in An Giang explained: "After harvest, I have money, but many temptations and requests from relatives. I need a way to lock away money for next season's inputs that I cannot easily access." While some banks offer term deposits through mobile platforms, these typically require minimum amounts beyond what smallholder farmers can afford and lack the flexibility needed for agricultural contingencies.

Credit products accessible through mobile banking remain limited and poorly adapted to agricultural needs. Existing digital credit offerings focus on small, short-term loans with high interest rates, unsuitable for agricultural investment with longer return periods (Tikku & Singh, 2023). A coffee farmer in Dak Lak province noted: "The app offers me loans, but only 5 million VND for 30 days at 1.5% monthly interest. I need 50 million for three months to invest in fertilizer and labor." This mismatch between available credit products and agricultural financing needs limits mobile banking's relevance for rural livelihoods.

Insurance products, crucial for managing agricultural risks, are virtually absent from mobile banking platforms in rural Vietnam (Linh et al., 2019). While some pilots have attempted to link crop insurance with mobile payment systems, these remain limited in scope and geographic coverage. A provincial agricultural official observed: "Farmers need integrated services – savings, credit, insurance, and payments all connected to their production cycles. Current mobile banking is too fragmented."

Successful service innovations we observed included features allowing group savings and lending within mobile banking platforms, scheduled automatic transfers aligned with harvest periods, and integration with agricultural extension services providing price information and technical advice. A fintech company executive described their approach: "We're designing 'farming wallets' that understand agricultural cycles, provide relevant information, and offer financial services timed to production needs. It's not just digitizing existing services but reimagining them for rural realities."

4.4 Regulatory Flexibility and Innovation Ecosystem

The regulatory environment significantly shapes possibilities for mobile banking innovation in rural areas. While recent reforms have created more space for digital financial services, tensions remain between innovation imperatives and regulatory concerns about consumer protection, financial stability, and anti-money laundering compliance (van Klyton et al., 2021). These tensions particularly affect services for rural populations who may lack standard documentation and operate primarily in cash economies.

Know-Your-Customer (KYC) requirements pose particular challenges in rural contexts. Standard requirements for identity verification and proof of address are difficult for rural residents who may lack formal addresses or utility bills (Ostern & Riedel, 2021). A bank compliance officer explained: "Regulations require certain documents, but rural customers often cannot provide them. We need more flexibility to use alternative verification methods appropriate for rural contexts." Some institutions have piloted video-based KYC and biometric authentication, but regulatory approval remains uncertain.

The regulatory sandbox initiative has enabled some innovations, but participants noted that the application process favors well-resourced institutions with sophisticated compliance capabilities (Fahy, 2022). A small fintech founder observed: "The sandbox is great in principle, but the application requirements and reporting

obligations are beyond what small companies targeting rural markets can manage. It's easier to operate in the informal grey areas." This suggests that regulatory innovation mechanisms may inadvertently exclude actors best positioned to serve rural markets.

Interoperability between different mobile banking platforms remains limited due to both technical and regulatory constraints. Rural users often need to maintain multiple accounts and applications to access different services or transact with different partners. A farmer in Thai Nguyen province expressed frustration: "The buyer uses one banking app, the input supplier another, and the government subsidy comes through a third. I need three different accounts and remember different passwords. Why can't they work together?"

Local government officials expressed desire for greater involvement in mobile banking oversight to ensure services meet community needs and protect vulnerable consumers. A district official suggested: "We know our people and their needs better than regulators in Hanoi. There should be mechanisms for local input into how services are designed and delivered." However, banks expressed concern about navigating multiple levels of regulatory oversight and potentially conflicting requirements.

4.5 Sustainable Business Models Balancing Profit and Social Impact

The fundamental challenge of achieving financial sustainability while serving low-income rural populations with small transaction volumes permeates all aspects of mobile banking service provision (Mookerjee et al., 2025; Osabutey & Jackson, 2024). Traditional banking models, dependent on net interest margins and fee income, struggle to generate adequate returns from rural markets. This economic reality has historically excluded rural populations from formal financial services and continues to constrain mobile banking expansion.

Successful models we observed employed various strategies to balance profitability with social impact. Cross-subsidization from urban to rural operations allows some banks to maintain rural presence for reputational and regulatory reasons (Bodenhorn, 2002). A bank executive explained: "We lose money on every rural transaction, but it's part of our social responsibility and helps with our State Bank performance evaluation." However, this approach depends on continued profitability in urban markets and regulatory pressure, both potentially unstable foundations.

Partnership models show promise for reducing costs and increasing reach. Collaboration between banks, mobile network operators, and local institutions like post offices or agricultural cooperatives can leverage existing infrastructure and relationships (Mehta et al., 2011). A successful partnership in An Giang between a bank and agricultural cooperative enabled cost-effective service delivery. The cooperative manager noted: "We already have relationships with farmers and physical presence. The bank provides the technology and financial services. Together, we can serve farmers profitably."

Data-driven approaches to credit assessment using alternative data sources including mobile phone usage patterns and agricultural production records could reduce information asymmetries and enable sustainable lending. However, these approaches raise concerns about data privacy and algorithmic bias. A farmer activist warned: "If they use our phone data to decide about loans, what else might they use it for? And what if the algorithm doesn't understand our context?"

Social enterprise models that explicitly balance financial and social objectives offer another pathway (Huynh et al., 2026). A social enterprise founder described their approach: "We're not trying to maximize profit but to achieve sustainability while maximizing impact. This means patient capital, reinvesting surpluses, and measuring success differently." However, such models face challenges accessing capital and achieving scale without traditional profit maximization incentives.

The role of government subsidies and development funding in supporting rural mobile banking remains contentious. While such support can enable service provision in otherwise unviable markets, it may also

distort market mechanisms and create unsustainable dependencies. A development partner representative reflected: "We've supported many mobile banking initiatives, but when funding ends, services often disappear. We need to focus more on building sustainable ecosystems rather than subsidizing individual services."

5 Discussion

5.1 Theoretical Contributions

Our findings extend existing theoretical frameworks for understanding technology adoption and financial inclusion in several important ways. First, they highlight the limitations of individual-focused adoption models like TAM in contexts where decision-making is fundamentally collective. The community-based adoption patterns we observed suggest need for new theoretical frameworks that account for social interdependencies and collective agency in technology adoption decisions. This has implications beyond mobile banking to other development interventions assuming individual rational choice.

The study reveals how trust operates through multiple mechanisms in rural financial service adoption, extending beyond institutional trust emphasized in existing literature to encompass interpersonal, community, and technology-mediated trust relationships. The crucial role of local intermediaries in trust-building suggests that theories of financial inclusion must account for the social embeddedness of financial behaviors and the importance of bridging actors who translate between formal systems and local contexts.

Our findings on the temporal dimensions of rural financial needs challenge assumptions underlying much financial inclusion literature that implicitly assumes regular income patterns. The mismatch between agricultural cycles and standard financial products highlights how financial exclusion can persist even when services are technically accessible. This suggests need for temporally-sensitive theories of financial inclusion that account for seasonal and cyclical patterns in rural livelihoods.

The tension between innovation and regulation observed in our study contributes to literature on institutional voids in emerging markets. Rather than simple absence of institutions, we find complex institutional arrangements where formal regulations, informal norms, and hybrid governance mechanisms interact in sometimes contradictory ways. This institutional complexity requires theoretical frameworks that can accommodate plurality and contestation rather than assuming coherent institutional environments.

5.2 Implications for Sustainable Development

The relationship between mobile banking and sustainable development emerges as more complex than simple narratives of technology-enabled inclusion suggest. While mobile banking can contribute to several SDGs including poverty reduction (SDG 1), gender equality (SDG 5), and reduced inequalities (SDG 10), achieving these contributions requires careful attention to service design, delivery mechanisms, and ecosystem conditions.

Our findings highlight the risk of digital financial services exacerbating rather than reducing inequalities if not carefully implemented. The digital literacy requirements, infrastructure dependencies, and documentation needs of current mobile banking models may systematically exclude the most marginalized populations. This suggests that achieving inclusive finance requires proactive measures to address multiple dimensions of exclusion rather than assuming technology will automatically democratize access.

The sustainability of mobile banking initiatives depends on aligning economic incentives with social objectives. Pure market-based approaches appear insufficient for serving the most marginalized rural populations, while purely subsidized models lack sustainability. Hybrid models that blend commercial and social logics offer promise but require supportive ecosystems including patient capital, appropriate regulation, and performance metrics that value social alongside financial returns.

The environmental implications of mobile banking in rural areas deserve greater attention. While digital services can reduce travel-related emissions and paper use, they also require energy-intensive infrastructure and generate electronic waste. As mobile banking scales in rural areas, attention to environmental sustainability becomes increasingly important, particularly given rural communities' vulnerability to climate change impacts.

5.3 Practical Recommendations

Based on our findings, we offer several recommendations for different stakeholders involved in rural mobile banking:

Financial Service Providers must start from deep understanding of rural livelihood patterns rather than adapting urban products. This includes developing savings products with commitment features aligned to agricultural cycles, credit products with appropriate terms and pricing for agricultural investment, and insurance products integrated with other financial services. Investment in local agent networks and ongoing capacity building is essential for sustainable service delivery, requiring revision of agent compensation models to adequately reward education and support activities.

Regulatory frameworks need greater flexibility to accommodate rural realities while maintaining appropriate consumer protection. This might include tiered KYC requirements that accept alternative documentation, regulatory sandboxes specifically designed for rural innovations with simplified application and reporting requirements, and mechanisms for local input into regulatory processes. Support for infrastructure development remains crucial, particularly ensuring reliable connectivity and power supply in remote areas.

Rather than funding individual mobile banking initiatives, development support should focus on ecosystem development including digital literacy programs, entrepreneurship support for local agents and service providers, and research on sustainable business models. Patient capital that accepts below-market returns during market development phases could enable sustainable services that pure commercial capital cannot support. Support for rigorous impact evaluation and learning across initiatives would accelerate identification and scaling of successful approaches.

Active engagement in promoting and monitoring mobile banking services can significantly influence adoption and impact. This includes endorsement and role modeling by trusted local leaders, integration of mobile banking with other development programs, and establishment of feedback mechanisms for service improvement. Communities should also organize collective learning and support systems that enable members to navigate digital financial services together rather than individually.

5.4 Limitations and Future Research Directions

Several limitations of this study should be acknowledged. The qualitative methodology, while providing rich insights into experiences and perspectives, cannot establish causal relationships or quantify the magnitude of effects. Future quantitative research could test specific hypotheses derived from our findings, such as the relationship between collective decision-making and adoption rates, or the impact of agricultural-aligned product features on usage patterns.

Our study focused on five provinces, and while selected for diversity, findings may not represent all rural contexts in Vietnam. Particular gaps include coastal fishing communities, ethnic minorities in the Central Highlands, and peri-urban areas transitioning from rural to urban characteristics. Future research should explore mobile banking dynamics in these specific contexts to develop more comprehensive understanding.

The cross-sectional nature of our data provides snapshot insights but cannot capture dynamic processes of adoption and impact over time. Longitudinal research tracking households and communities through different stages of mobile banking adoption would provide valuable insights into sustainability and long-term impacts. Such research could identify critical junctures in the adoption process and factors determining sustained versus discontinued use.

We focused primarily on basic financial services (savings, payments, credit), but mobile platforms increasingly offer broader services including insurance, investments, and government transfers. Future research should examine how service bundling and ecosystem development affect rural financial inclusion outcomes. The intersection of mobile banking with other digital services like e-commerce and digital agriculture also deserves investigation.

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