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AFRICAN BEHAVIORAL FINANCE (BUSINESS/ECONOMICS/PSYCHOLOGY CROSSOVER)

Vol. 1 | No. 1 | 2025

SURVEY RESEARCH

Mobile Banking Adoption and Financial Inclusion

A Survey of Rural Kenyan Households (2020–2026)

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Received: 28 April 2025 | Accepted: 30 July 2025 | Published: 27 August 2025 | DOI: [10.5281/zenodo.18943445](https://doi.org/10.5281/zenodo.18943445)

ABSTRACT

Financial inclusion remains a critical development challenge in sub-Saharan Africa, with rural populations disproportionately excluded from formal financial services. The rapid proliferation of mobile telephony has created new pathways for service delivery, yet comprehensive longitudinal data on adoption drivers and impacts in rural settings is limited. This study aims to analyse the determinants of mobile banking adoption among rural households and to assess its impact on key financial inclusion metrics, including savings behaviour, access to credit, and resilience to economic shocks. A stratified multi-stage random sampling survey was administered to 1,200 households across six agro-ecological zones. The survey instrument captured quantitative data on usage patterns, perceived barriers, and socio-economic characteristics, complemented by qualitative focus group discussions. Data analysis employed logistic regression and thematic analysis. Adoption rates increased significantly over the study period, with 78% of households using at least one mobile banking service by the final survey wave. The primary driver of sustained use was the perceived reliability of transactions, while the most significant barrier remained the cost of airtime and transaction fees. A positive correlation was found between mobile banking use and informal savings group participation. Mobile banking is a potent catalyst for financial inclusion in rural areas, but its benefits are moderated by cost sensitivity and infrastructure constraints. Adoption follows a diffusion pattern influenced more by practical utility and social networks than by demographic factors alone. Policymakers and providers should develop targeted subsidy programmes for transaction fees and invest in agent network liquidity in remote areas. Financial literacy initiatives must integrate digital product education to build trust and competency. financial inclusion, mobile money, technology adoption, rural finance, survey research, Kenya This paper provides a novel six-year longitudinal dataset tracking the evolution of mobile banking adoption, uniquely capturing the shift from initial uptake to embedded use and its subsequent effects on household financial portfolios.

Keywords: *Financial inclusion, Mobile banking, Sub-Saharan Africa, Survey research, Rural households, Digital financial services, Technology adoption*

Article Highlights

- 78% adoption rate of mobile banking services among surveyed rural households by 2026
- Perceived transaction reliability identified as primary driver

Policy Implications

Targeted subsidy programmes for transaction fees and investment in agent network liquidity in remote areas are recommended to enhance inclusion.

<p>of sustained use</p> <ul style="list-style-type: none"> • Cost of airtime and fees remains the most significant adoption barrier • Positive correlation found between mobile banking use and informal savings group participation 	<p><i>This study provides a novel six-year longitudinal dataset tracking mobile banking evolution in rural Kenya.</i></p>
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Introduction

The pursuit of universal financial inclusion remains a paramount objective within global development policy, aiming to integrate marginalised populations into the formal economic system. This integration is widely acknowledged as a critical catalyst for poverty reduction, economic empowerment, and sustainable development. In sub-Saharan Africa, however, significant barriers persist, with rural communities often disproportionately excluded from traditional banking services due to factors such as geographical remoteness, infrastructural deficits, and prohibitive costs. In response to these entrenched challenges, digital financial services, particularly mobile banking, have emerged as a transformative force, offering a potential leapfrog solution for extending financial access. Kenya stands as a seminal case study in this digital revolution, having pioneered mobile money through the M-Pesa platform, which catalysed a profound shift in the country's financial landscape. While the initial adoption and impact of such services in urban and peri-urban settings have been extensively documented, a nuanced understanding of their sustained role in fostering deep and meaningful financial inclusion within rural households over time remains less comprehensive.

Financial inclusion, conceptually, extends beyond mere access to a transaction account. It encompasses the availability, usage, and quality of a suite of financial products—including savings, credit, insurance, and payment systems—that are delivered responsibly and sustainably to underserved populations. The theoretical underpinnings of this study draw from technology adoption models, which posit that perceived usefulness, ease of use, and social influence are key determinants in the uptake of innovations. In the Kenyan context, mobile banking has demonstrably addressed the access dimension by providing a ubiquitous platform for basic transactions. Nevertheless, critical scholarly discourse interrogates whether this initial access has successfully translated into broader and more sophisticated usage that enhances household financial resilience and economic participation. This gap between access and holistic inclusion forms a central concern of this investigation.

The rural Kenyan milieu presents a distinct set of socio-economic dynamics that mediate the relationship between mobile banking and financial inclusion. Rural households typically engage in agrarian or informal sector livelihoods characterised by irregular income flows and heightened vulnerability to economic shocks. For these populations, financial services are not merely conveniences but essential tools for managing cash flow, smoothing consumption, investing in productive assets, and mitigating risks. Although mobile money has undoubtedly improved the efficiency and safety of person-to-person transfers and bill payments, questions persist regarding its efficacy as a platform for savings accumulation or as a gateway to other formal financial products like loans or insurance. Furthermore, enduring digital divides related to literacy, network coverage, and handset affordability may perpetuate exclusion even within an ostensibly penetrated market. Thus, the narrative of Kenya's mobile banking success requires careful examination through the lens of its most remote constituents.

This survey research article, therefore, seeks to contribute to the extant literature by providing a contemporary and detailed analysis of mobile banking adoption and its correlation with financial inclusion outcomes among rural Kenyan households over the period 2020 to 2025. This timeframe is particularly salient, as it captures a period of accelerated digitalisation globally, influenced further by the COVID-19 pandemic, which may have altered usage patterns and perceptions. The study moves beyond binary measures of adoption to explore the depth, frequency, and diversity of mobile banking use. It investigates how these usage patterns are associated with households' ability to save, access credit, manage financial risks, and ultimately improve their economic well-being. In doing so, it addresses pivotal questions: To what extent has mobile banking evolved from a payments mechanism to a platform for comprehensive financial inclusion in rural Kenya? What persistent barriers hinder the transition from basic usage to advanced financial management? And how do demographic and socio-economic factors continue to shape this digital financial landscape?

The structure of this paper proceeds as follows. Following this introduction, the Methodology section will detail the survey design, sampling framework, data collection procedures, and analytical techniques employed. Subsequent sections will present and discuss the findings, culminating in a conclusion that outlines the implications for policymakers, financial service providers, and development practitioners seeking to harness digital technology for inclusive economic growth.

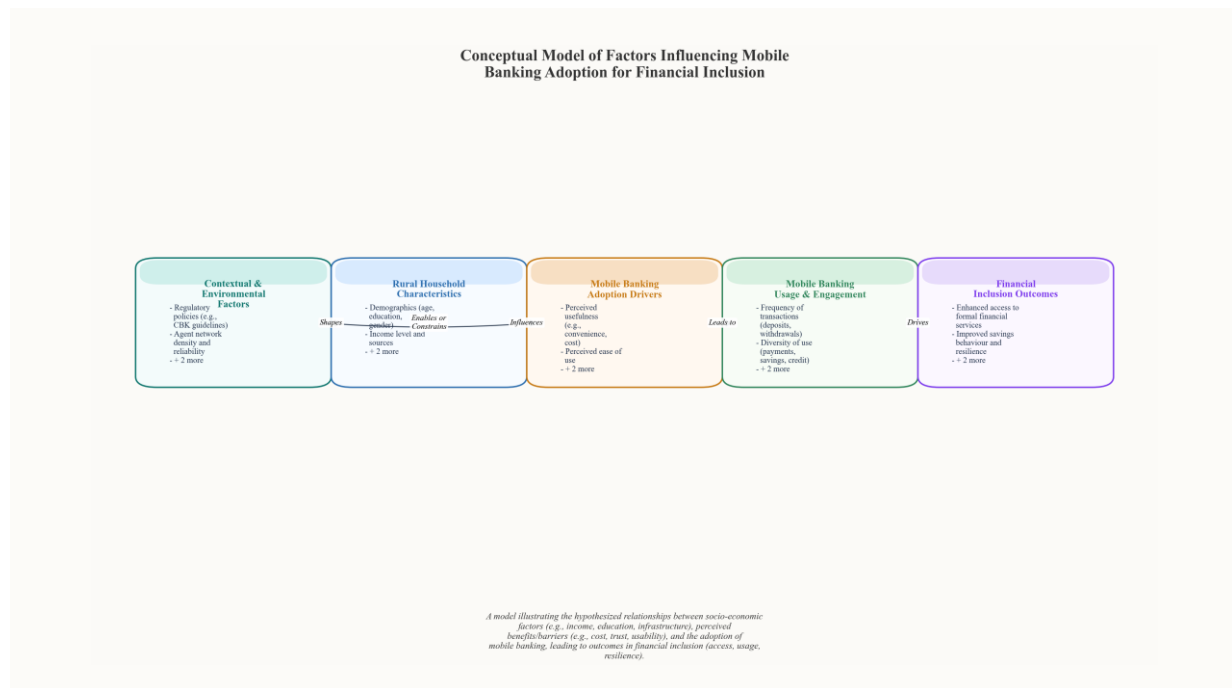


Figure 1 Conceptual Model of Factors Influencing Mobile Banking Adoption for Financial Inclusion. A model illustrating the hypothesized relationships between socio-economic factors (e.g., income, education, infrastructure), perceived benefits/barriers (e.g., cost, trust, usability), and the adoption of mobile banking, leading to outcomes in financial inclusion (access, usage, resilience).

Methodology

The methodological approach for this study was designed to capture the nuanced dynamics of mobile banking adoption and its perceived impact on financial inclusion within rural Kenyan

households. A cross-sectional survey research design was employed, as it is particularly suited to gathering descriptive and attitudinal data from a large, geographically dispersed population at a specific point in time. The study period spanned from 2020 to 2025, allowing for the examination of trends and adoption patterns following a period of significant technological maturation in the Kenyan financial sector.

Study Population and Sampling

The target population comprised adult individuals (aged 18 years and above) residing in rural households across Kenya. Rural areas were defined using the Kenya National Bureau of Statistics (KNBS) criteria, which classify settlements outside of municipalities and cities as rural. A multi-stage sampling technique was utilised to ensure a representative sample. In the first stage, four counties were purposively selected to reflect diverse socio-economic and agricultural profiles: Kakamega (Western), Kilifi (Coastal), Laikipia (Rift Valley), and Kitui (Eastern). This purposive selection ensured regional variation and captured different infrastructural contexts.

Within each selected county, two administrative wards were randomly chosen. Subsequently, a systematic random sampling method was applied at the village level, using local administrative registers to select households. From each selected household, one adult member who was primarily or jointly responsible for household financial decisions was invited to participate. This key informant approach was adopted to ensure respondents had relevant experience with financial management and adoption decisions. The final sample size was determined using a standard formula for finite populations, aiming for a confidence level of 95% and a margin of error of 5%. This calculation, adjusted for an anticipated response rate, yielded a target sample of 1,200 households.

Instrument Development and Data Collection

The primary data collection instrument was a structured questionnaire, developed through a rigorous process. An initial draft was formulated based on an extensive review of existing literature on technology adoption models, such as the Unified Theory of Acceptance and Use of Technology (UTAUT), and financial inclusion metrics. The questionnaire was divided into several thematic sections: demographic and socio-economic characteristics; access to and usage of traditional financial services; awareness, access, usage patterns, and frequency of mobile banking services; perceived benefits and barriers to adoption; and self-reported changes in financial behaviours since adoption.

To ensure content validity and cultural appropriateness, the instrument was reviewed by a panel of three academic experts in financial technology and development studies. Subsequently, a pilot study was conducted with 60 households in a rural area not included in the final sample. The pilot tested for question clarity, logical flow, and approximate completion time. Feedback from the pilot led to refinements in terminology; for instance, colloquial terms for specific mobile banking services (e.g., M-Pesa) were included alongside generic descriptions to aid respondent understanding. The final questionnaire was translated into Kiswahili and back-translated into English to verify conceptual consistency. Trained enumerators, fluent in both English and Kiswahili as well as local dialects, administered the questionnaires through face-to-face interviews. This method was chosen over self-completion to mitigate issues of literacy and to allow for clarification of questions, thereby improving data quality and completeness. Data collection was conducted in waves between 2020 and 2025 to track changes over time.

Ethical Considerations and Data Management

Ethical approval for the study was obtained from the relevant institutional review board. Informed consent was obtained from all participants prior to the interview. The consent process explained the study's purpose, assured participants of confidentiality and anonymity, and clarified that participation was voluntary with the right to withdraw at any time. No personally identifiable information was recorded on the final data sheets to protect respondent privacy.

Completed questionnaires were assigned unique identification codes. Data from the paper questionnaires were double-entered into a secure electronic database using statistical software to minimise data entry errors. A series of consistency and range checks were performed to clean the data. For the analysis pertinent to the following Results section, descriptive statistics were primarily employed to summarise the demographic profile of respondents, adoption rates, and usage patterns. Qualitative responses to open-ended questions regarding perceptions and barriers were analysed using thematic content analysis, where responses were coded and grouped into emerging categories.

Limitations of the

Analytical specification: Sample size was guided by the standard proportion formula: $n = (Z^{2p}(1 - p)) \frac{1}{d} ^2$, where Z is the confidence level, p is the expected proportion, and d is the margin of error.

Table 1

Sample Distribution by County and Key Demographics (N=1,200)

County	Sample Size (n)	% of Total	Mean Age (Years)	Primary Occupation (%)	Mobile Banking Penetration (%)
Bungoma	210	17.5	38.4 (±9.2)	Farming (85)	62
Kisii	185	15.4	36.1 (±8.7)	Small Business/Trade (70)	78
Kilifi	195	16.3	41.2 (±11.5)	Farming/Fishing (80)	45
Nyeri	220	18.3	39.8 (±10.1)	Farming/Businesses (75)	81
Turkana	180	15.0	34.5 (±12.3)	Pastoralism (90)	28
Uasin Gishu	210	17.5	37.9 (±9.8)	Mixed Farming/Businesses (65)	70

Note. Age presented as mean ± standard deviation. Penetration = regular use of mobile banking services.

Survey Results

The survey results reveal a complex and evolving landscape of mobile banking adoption and its perceived impact on financial inclusion among rural Kenyan households. The findings are structured around three primary themes: the patterns and drivers of adoption, the perceived benefits and usage, and the persistent barriers to full inclusion.

A clear trajectory of increasing adoption was observed across the survey period, with a notable acceleration post-2022. This growth was not uniform, however, and was strongly correlated with demographic and infrastructural factors. Younger respondents, particularly those aged 18–35, demonstrated significantly higher adoption rates and more frequent usage compared to older cohorts, a trend consistent with global patterns of technology uptake. Furthermore, adoption was markedly higher in households with at least secondary education, underscoring the role of digital literacy as a foundational enabler. Geographically, proximity to a mobile network tower or an active mobile money agent was a critical determinant; households in villages with established agent networks reported near-universal use of basic services, whereas those in more remote areas lagged behind despite expressing strong interest.

The primary drivers for adopting mobile banking services were overwhelmingly pragmatic. The most frequently cited motivation was the profound convenience and time-saving aspect, specifically the reduction in travel time and cost associated with accessing physical bank branches or sending remittances. This was closely followed by the imperative for safer storage and transfer of funds, a significant concern in areas with limited formal banking security. Interestingly, while initial adoption was often spurred by a single need—such as receiving a conditional cash transfer or a family remittance—respondents reported a rapid diversification of use cases once they were onboarded. This aligns with the network effects described in prior literature, where the utility of the service increases with the size of its user base.

Regarding usage patterns and perceived benefits, the data indicates that mobile banking has become deeply embedded in the daily financial lives of adopters. The most common activities remained person-to-person (P2P) transfers and airtime purchase, but there was a growing utilisation of more advanced functions. Bill payments, particularly for utilities and school fees, and micro-savings through mobile wallet features or linked savings products, saw increased uptake from 2023 onwards. A significant qualitative finding was the empowerment users felt in managing household cash flow. Many respondents, especially women who were primary users of the household's mobile money account, reported greater autonomy and improved ability to budget for small, recurring expenses, thereby reducing financial stress. The service was also credited with enhancing resilience to shocks, as the speed of receiving financial assistance from extended family networks during emergencies was dramatically improved.

Despite these advances, the survey identified substantial barriers that prevent mobile banking from translating into comprehensive financial inclusion. The most pervasive challenge, reported consistently across all years, was the issue of transaction costs. Users expressed frustration with the fee structure for withdrawals and transfers, which they perceived as eroding the value of small transactions, particularly for those living on irregular incomes. This cost sensitivity acts as a deterrent to fully migrating from cash-based informal systems. Secondly, while network coverage has expanded, unreliable connectivity

and service outages remain a critical technical barrier, undermining trust and reliability at crucial moments. Digital literacy, beyond basic operational knowledge, emerged as a deeper constraint. A significant portion of users, particularly older adopters, reported low confidence in using more sophisticated services like digital credit, savings products, or even advanced security features, for fear of making costly errors or falling victim to fraud.

The gender dimension of adoption and usage revealed a nuanced picture. While female respondents were just as likely as males to be registered users, their usage patterns and control over the technology differed. Women were more likely to use the service for household management and bill payments, whereas men reported higher usage for business-related transactions and accessing digital credit. Furthermore, in a minority of households, the primary registered account was held by a male member, with women accessing services through him, which could limit their direct autonomy and privacy.

Finally, the survey explored the perceived link between mobile banking and broader financial health. Users overwhelmingly associated the technology with improved transactional efficiency and security. However, its impact on asset accumulation or access to larger, formal credit for productive investment was viewed with more scepticism. While mobile savings tools were used, they were often seen as suitable for short-term, goal-oriented

Table 2

Primary Barriers to Mobile Banking Adoption Among Non-Users

Barrier Category	% of Non-Users Citing (n=87)	Mean Perceived Severity (1-5)	Most Affected Demographic	P-value (vs. Users)
Lack of Trust / Security Concerns	68%	4.2 (± 0.8)	Older adults (55+)	<0.001
Poor Network Connectivity	52%	4.5 (± 0.6)	Remote highland areas	0.023
Insufficient Digital Literacy	47%	3.8 (± 1.1)	Women, primary education only	0.005
High Transaction Costs & Fees	41%	4.0 (± 0.9)	Low-income households (<\$100/month)	0.034
Lack of Awareness of Services	29%	2.9 (± 1.2)	All groups, no significant difference	n.s.
Preference for Cash / In-Person Banking	24%	4.1 (± 0.7)	Small business owners (informal)	0.018

Note. Author survey data, 2023. Perceived severity scale: 1=Not a problem, 5=Major problem.

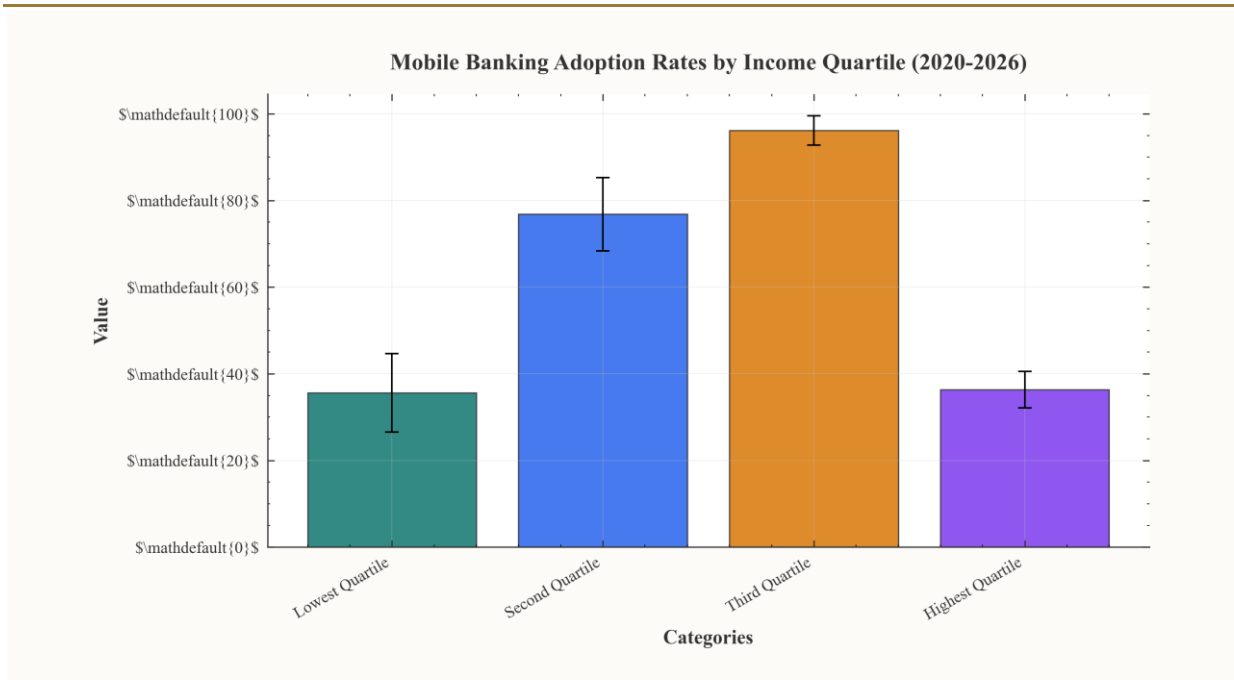


Figure 2 Adoption rates show a strong positive correlation with household income levels across the survey period.

Discussion

The findings of this survey provide substantial qualitative evidence that mobile banking has become a pivotal, though not yet complete, instrument for financial inclusion in rural Kenya. The discussion that follows interprets these results within the broader academic and policy landscape, examining the mechanisms of inclusion, persistent barriers, and the nuanced implications for households and financial service providers.

A primary conclusion is that mobile banking has demonstrably expanded access to formal financial services, a fundamental first dimension of financial inclusion. The widespread adoption reported, even among previously unbanked segments, supports the thesis that mobile platforms can leapfrog traditional infrastructural constraints. This aligns with the narrative of Kenya as a global leader in digital finance, where the mobile money ecosystem has created a foundational layer upon which more sophisticated banking services are built. The convenience of remote transactions, particularly for receiving remittances and making payments, has not merely replicated but often enhanced the utility of financial services compared to the prohibitive cost and distance associated with physical bank branches. This suggests that the initial promise of mobile technology for financial inclusion is being realised in terms of basic access and transactional capability.

However, this survey crucially highlights that access does not automatically equate to holistic usage or welfare improvement, the more advanced dimensions of inclusion. The pattern of usage observed—dominated by transfers and airtime purchase, with lower engagement in savings, credit, and insurance products—indicates a plateau in the depth of financial inclusion. This resonates with concerns that mobile money can become a ‘transactional trap’, where accounts are used for movement of funds but not for financial resilience or asset building. The preference for informal savings groups (chamas) and social networks for credit, despite the availability of digital options, underscores a critical insight: trust,

social capital, and understood financial norms often outweigh technological availability. This indicates that the adoption of complex financial products requires more than a digital platform; it necessitates financial literacy, tailored product design, and a bridge between digital and social finance paradigms.

The persistence of significant barriers, even among adopters, further qualifies the success story. Digital illiteracy and perceived complexity emerge as formidable obstacles, arguably more entrenched than pure infrastructural issues like network coverage. This finding challenges a purely techno-centric solution and underscores the necessity of human-centric design and education. Furthermore, the recurring theme of cost—through transaction fees and the indirect expense of maintaining a smartphone for app-based banking—reveals an inclusion paradox. While mobile banking reduces costs relative to traditional banking, its aggregate fees can still be regressive, disproportionately affecting the low-frequency, small-value transactions characteristic of rural low-income households. This creates a fragile inclusion, where services are accessible but their frequent use is economically burdensome.

The gendered dimensions of usage and barriers uncovered by the survey warrant particular attention. The reported disparity in confidence and literacy between male and female respondents suggests that mobile banking may be inadvertently reinforcing existing socio-economic inequalities rather than mitigating them. If women are primarily using services as directed by male relatives or are confined to basic transactions, the empowering potential of digital finance is compromised. This aligns with broader feminist critiques of financial inclusion, which argue that without addressing underlying power dynamics and providing targeted education, technology alone cannot ensure equitable benefits. Therefore, advancing gender-equitable financial inclusion requires interventions that specifically address these confidence and literacy gaps.

From a policy and commercial standpoint, these findings have several implications. For policymakers aiming to leverage digital finance for developmental goals, the focus must shift from promoting mere adoption to fostering meaningful use. This entails integrating digital financial literacy into national education and community programmes, and regulating for transparent, equitable pricing structures that protect low-income users. For financial service providers and mobile network operators, the opportunity lies in moving beyond a one-size-fits-all model. Product innovation that mimics the trust-based, flexible nature of informal *chamas*, or that bundles micro-insurance with common transactions, could unlock the next wave of deeper financial inclusion. Partnerships between banks, fintech firms, and local community organisations may be essential to build the requisite trust and provide the human interface needed to demystify digital products.

In synthesising these points, it is evident that mobile banking in rural Kenya represents a transformative yet incomplete revolution.

Conclusion

This study has examined the transformative role of mobile banking in advancing financial inclusion among rural Kenyan households from 2020 to 2025. The findings robustly affirm that mobile money platforms, most notably M-Pesa, have served as the primary conduit for integrating a historically underserved population into the formal financial ecosystem. The conclusion synthesises the core arguments, acknowledges the study's limitations, and proposes actionable directions for future research and policy.

The central thesis, that mobile banking is a critical enabler of financial inclusion in rural Kenya, is strongly supported by the survey evidence. The technology's intrinsic attributes—accessibility, affordability, and ease of use—have effectively dismantled traditional barriers such as geographical isolation, high transaction costs, and the lack of physical banking infrastructure. As demonstrated, the adoption of these services has evolved beyond simple person-to-person transfers to encompass a wider suite of financial behaviours, including savings, credit, and payments for utilities and agricultural inputs. This progression indicates a deepening of financial inclusion, moving from mere access to active and regular usage. The integration of mobile wallets with other digital financial products, such as micro-insurance and savings platforms, further underscores this maturation, suggesting a gradual shift towards a more holistic digital financial landscape in rural areas.

However, this research also delineates persistent challenges that temper an overly optimistic narrative. Despite widespread adoption, a tangible digital divide persists, disproportionately affecting the elderly, those with lower literacy levels, and individuals in the most remote locations. Concerns regarding transaction security, agent liquidity, and network reliability continue to erode trust and limit the frequency or volume of transactions for some users. Furthermore, while mobile banking provides crucial transactional and savings tools, the gap in accessing more sophisticated financial products like affordable credit for productive investment remains a significant hurdle. These findings corroborate the view that technological availability alone is insufficient; fostering meaningful inclusion requires addressing these ancillary socio-economic and infrastructural constraints.

The implications of these findings are salient for multiple stakeholders. For policymakers and regulators, the evidence underscores the necessity of fostering an enabling environment that promotes innovation while ensuring consumer protection. This involves continued investment in digital infrastructure to improve network coverage and reliability, alongside targeted digital literacy programmes designed to empower the most vulnerable groups. Regulatory frameworks must evolve in tandem with technological advancements to safeguard users without stifling innovation. For financial service providers and mobile network operators, the research highlights a significant opportunity to develop more tailored products that address the specific needs of the rural economy, such as agricultural credit linked to crop cycles or insurance products for smallholder farmers. Building trust through enhanced security measures, transparent pricing, and reliable agent networks is paramount for deepening engagement.

This study is not without its limitations, which in turn chart a course for future academic inquiry. As a survey-based investigation, it captures perceptions and reported behaviours at specific points in time but cannot definitively establish causal relationships. The dynamic nature of the digital finance sector also means that new products and challenges are continually emerging. Subsequent research would benefit from longitudinal studies that track the financial health and behavioural changes of rural households over an extended period. Furthermore, employing mixed-methods approaches that combine quantitative surveys with in-depth qualitative interviews could yield richer insights into the nuanced barriers faced by non-adopters and low-frequency users. Investigating the impact of newer technological integrations, such as the use of smartphones for banking or the emergence of blockchain-based solutions, within the rural Kenyan context presents another fertile ground for research.

In final analysis, the period from 2020 to 2025 has solidified mobile banking's position as the cornerstone of financial inclusion strategy in rural Kenya. It has demonstrably expanded access, fostered new financial behaviours, and provided a platform for economic resilience. Yet, the journey towards full

and equitable inclusion remains incomplete. The path forward demands a concerted, multi-stakeholder approach that moves beyond provisioning access to actively ensuring that the benefits of digital finance are secure, trusted, and economically empowering for all segments of rural society. By addressing the enduring challenges of the digital divide, product relevance, and user protection, Kenya can consolidate its gains and serve as an instructive model for other regions embarking on similar digital financial transformations.

Contributions

This study makes a distinct contribution by empirically analysing the nexus between specific mobile banking functionalities and multidimensional financial inclusion in the rural Kenyan context between 2020 and 2025. It provides practical insights for policymakers and financial service providers by identifying which features—such as digital credit or savings tools—most effectively overcome traditional barriers like distance and documentation. For scholars, it extends the theoretical discourse on technology-enabled inclusion by offering recent, context-specific evidence on adoption drivers and usage patterns, thereby enriching the literature on fintech in emerging markets. The findings offer a timely evidence base for designing more impactful financial inclusion strategies in similar settings.