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MUNHUMUTAPA SCHOOL OF COMMERCE

GRADUATE BUSINESS SCHOOL

EXAMINING THE IMPACT OF MOBILE BANKING, DIGITAL FINANCIAL SERVICES, AND FINTECHS ON FINANCIAL INCLUSION IN RURAL ZIMBABWE

BY

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DECLARATION

I, do hereby declare that this research project is a presentation of my own work except to the extent indicated in the Acknowledgements, References and by comments included in the body of the report, and that it has not been submitted in part or in full to another University or any other Institution of higher learning.

---------- 30 / 11 / 2023

SIGNED DATE

DEDICATIONS

This project is a success due to a number of incredibly important individuals who showed unwavering support, understanding and encouragement throughout this research journey. In specific I would like to thank my wife and family who believed in me and gave constant reassurance which kept me motivated even during the most challenging times.

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ABSTRACT

Financial inclusion is critical for equitable growth and poverty alleviation. However, 70% of rural Zimbabweans lack access to formal financial services. While digital financial services (DFS) innovations like mobile money and fintechs can promote inclusion, rural adoption lags amid infrastructure, literacy and product barriers. This explanatory mixed methods study examined how varying DFS models have impacted financial access and capabilities amongst 900 marginalized rural adults across 6 regions of Zimbabwe.

A survey found 62.8% of respondents use mobile money, primarily for convenient peer-to-peer transfers. However, only 15.2% utilize services weekly, with lower usage amongst elderly, less educated and remote groups, signalling uneven disruption. Fintech adoption was just 8.9% amid ecosystem constraints. Users reported DFS has moderately enhanced financial capabilities for investment, resilience and urban remittances, but suboptimal infrastructure, fees, design misalignment, and trust gaps were pronounced barriers even for dominant platforms.

In-depth interviews highlighted key roles of localized agent networks, infrastructure investments, simplified interfaces, vernacular marketing, tailored pricing and expanded use-cases driving adoption. But complex menus, intermittent connectivity, fraud fears and capability divides persist, constraining sustainable broad-based usage and nuanced financial behaviours essential for meaningful inclusion. Variations across locales and segments mirror demographic asymmetries.

Overall, findings revealed accelerated but shallow mobile money diffusion, highlighting specialized barriers excluding vulnerable groups from harnessing digital financial innovation equitably. Concerted strategies addressing fragmentation risks are indispensable to fulfil resilience and empowerment promises under financial inclusion policies for the rural poor. Tailored

infrastructure development, financial literacy, user-centric design and decentralized interoperability can progress an unevenly disrupted market from narrow primitive digitization towards more meaningful financial capabilities benefiting marginalized communities. But conscious policy efforts emphasizing the vulnerable remain pivotal amid transition. Localized coordination, affordability measures and digital upskilling fostering sustainable adoption provide pathways aligning market shaping to public interest financial inclusion goals.

Table of contents

Contents

List of Tables

List of Figures

ABBREVIATIONS

DFS - **Digital Financial Services**

Fintech - **Financial Technology**

KYC - **Know Your Customer**

AI - **Artificial Intelligence**

SMS - **Short Message Service**

USSD - **Unstructured Supplementary Service Data**

CHAPTER 1

1.0 Background of the study

Financial inclusion, defined as access to and usage of formal financial services, has been a key policy priority globally, including in Zimbabwe (Demirguc-Kunt et al., 2022). Access to financial services enables individuals and firms to smooth consumption, manage cash flows, invest in economic opportunities, and mitigate vulnerability (Sarma & Pais, 2022). However, in 2021, 1.9 billion adults worldwide still lacked access to formal financial services, with disproportionate exclusion in developing countries (Demirguc-Kunt et al., 2022).

In Zimbabwe, financial exclusion has remained high, particularly in rural areas. According to latest Findex data, in 2021, 70% of rural Zimbabweans lacked access to formal financial services, compared to 35% in urban areas (World Bank, 2022). Key barriers have included lack of income, financial infrastructure, and requisite documentation (Makina et al., 2021). Rural communities have also faced greater physical barriers accessing centralized financial services in urban areas.

Expanding financial inclusion has been critical for inclusive growth and poverty reduction in Zimbabwe. Financial access has enabled poor households to smooth consumption, build assets, and invest in health and education (Sarma & Pais, 2022). For microenterprises and farmers, financial services have facilitated investment in income-generating activities. At a macro level, broader financial inclusion has also promoted financial stability and deepened markets.

Mobile money and digital financial services have emerged as solutions to promote financial inclusion for underserved populations. Mobile money utilizes phone SIM cards to digitally store and transfer funds without traditional bank infrastructure. Zimbabwe's Ecocash, launched in 2011, had 11 million wallets by 2021, processing over $200 million monthly (Econet, 2022).

Following Ecocash, other platforms like OneMoney, Telecash, MyCash and Sasai expanded access. Fintech startups like Steward Bank, Mukuru and Paynow also emerged, leveraging digital platforms and data analytics to serve the unbanked through innovative distribution and products (Zindi, 2022).

While these services have expanded access, usage has remained limited in rural areas of Zimbabwe due to persistent digital literacy, infrastructure, and connectivity gaps. In 2021, only 40% of Zimbabweans had internet access, with lower rural penetration (POTRAZ, 2022). This has constrained awareness and utilization of digital financial services.

Understanding barriers and usage patterns has been critical to promote inclusive digital financial participation. Comparing adoption across platforms and segments can reveal best practices (Chamboko et al., 2022). Tailoring marketing, infrastructure expansion, digital skills training, and customized products to rural constraints can boost uptake and outcomes.

Overall, the research highlights the potential of digital financial services alongside persistent challenges in extending meaningful access to rural Zimbabweans. Continued focus is needed to fulfill the promise of mobile money and fintechs for financially excluded groups through evidence-based policies and user-centric design.

1.1. Statement of the research problem

Financial inclusion enables economic development and poverty reduction. However, in 2021 over 1.9 billion adults globally lacked access to formal financial services, including 70% of rural Zimbabweans (Demirguc-Kunt et al., 2022; World Bank, 2022). This perpetuates inequality by limiting abilities to smooth incomes, build assets, invest, and mitigate shocks (Sarma & Pais, 2022).

While Zimbabwe has witnessed growth in digital financial services (DFS), rural adoption lags amid infrastructure, literacy, and product barriers (Makina et al., 2021). For example, only 40% of rural Zimbabweans have internet access, constraining digital financial awareness and usage (POTRAZ, 2022).

This is problematic given DFS innovations can facilitate financial inclusion and resilience. Research shows mobile money has helped smooth incomes, invest in health and education, and empower women (Murthy & Bhoi, 2022). Digitizing government transfers can also drive uptake and ecosystem development (Klapper & Singer, 2022).

However, evidence on DFS impacts and barriers in rural Zimbabwe is limited. Little is known about varying platform effects on access and outcomes across user segments. Addressing these

knowledge gaps is critical to harness digital financial innovations, in line with Zimbabwe's national financial inclusion objectives (Reserve Bank of Zimbabwe, 2020).

This study examines the impact of digital financial services on advancing financial inclusion across platforms and segments in rural Zimbabwe. It employees both quantitative and qualitative techniques to illuminate adoption barriers, usage patterns, and development impacts in order to inform the study's central question regarding the role of digital financial services in promoting inclusive participation. The findings will be able to be utilized to guide policies and products aimed at overcoming obstacles and expanding access to ensure rural populations benefit from the transformative potential of digital financial services to advance financial inclusion. The research adopts a broad view across multiple platforms and customer segments while maintaining a narrow geographical focus on rural Zimbabwe to uncover nuanced place-based dynamics that shapes financial inclusion outcomes in the digital era.

1.2 Research objectives

In light of the research problem outlined, this study seeks to examine the impact of digital financial services on advancing financial inclusion in rural areas of Zimbabwe. To address this broader objective, the following specific research objectives will be pursued:

The objectives of this study were:

To examine the extent to which mobile banking platforms have expanded financial inclusion for rural populations in Zimbabwe. This will evaluate adoption and usage patterns of mobile money providers like Ecocash amongst rural user segments.

To evaluate the impact of varying digital financial services on rural communities' financial access and usage. This will assess how fintech platforms and products are affecting financial capabilities and behaviors.

To identify the key challenges and barriers constraining broader adoption of mobile and digital financial services in rural Zimbabwe. This will illuminate infrastructural, literacy, and other constraints influencing uptake across user segments.

The study will pursue these objectives through quantitative and qualitative techniques to provide insights into the role of digital financial innovations in expanding inclusive financial participation

in rural Zimbabwe. Findings aim to inform policies and products promoting accessible, affordable and sustainable digital financial ecosystems.

1.3 Research questions

To address the outlined research objectives, the following specific research questions will guide this study:

1. How has the adoption and usage of mobile banking platforms like Ecocash evolved amongst rural populations in Zimbabwe over time? This seeks to examine patterns in the uptake and utilization of mobile money services in rural areas.

2. To what extent have varying digital financial services enhanced financial capabilities and inclusion for different rural user segments? This aims to assess impacts of diverse fintech platforms and products on rural financial behaviors.

3. What are the key challenges constraining broader adoption and active usage of mobile and digital financial services amongst rural populations? This seeks to reveal barriers to uptake and utilization across rural demographic groups.

1.4 Research hypotheses

Based on the objectives and questions guiding this study, the following hypotheses will be tested:

H1: Mobile money platforms have expanded access to formal financial services for rural populations in Zimbabwe compared to the pre-mobile money period.

H2: Rural mobile money users have greater financial capabilities in areas like cash flow smoothing, investing, and shock mitigation compared to non-users.

H3: Rural user adoption of fintech services is higher than adoption of traditional financial services due to tailored products and distribution.

H4: Variations in rural adoption and usage of digital financial services exist across demographic factors like gender, education, income, and age.

These hypotheses reflect the study's objectives of examining mobile money adoption patterns, impacts of digital financial services on capabilities, fintech effects, and variations across rural user

segments. The results will indicate whether the empirical data supports or rejects each stated hypothesis at the tested significance level.

1.5 Significance of the study

This study examining the impact of digital financial services on financial inclusion in rural Zimbabwe holds significance for various stakeholders:

1.5.1 Government and Policymakers

Financial inclusion is a national priority for Zimbabwe, as outlined in the National Financial Inclusion Strategies (Reserve Bank of Zimbabwe, 2020). These recognize the potential of digital financial services to promote inclusion, especially in rural areas. Findings from this study can inform evidence-based policies, regulations, and initiatives aimed at harnessing mobile and digital finance for greater financial access.

Specific recommendations can guide interventions in infrastructure expansion, digital literacy programs, consumer protection, and incentives for providers to serve rural areas (Norwin et al., 2022). As Zimbabwe pursues a cash-lite agenda, insights from this study can also strengthen digitization of government payments like pensions and welfare in inclusive ways.

1.5.2 Digital Financial Services Providers

While mobile money and fintech services have grown rapidly, usage lags in rural Zimbabwe amid infrastructural, literacy, and product barriers (Makwara & Tavuyanago, 2022). This study provides insights for providers like Ecocash, Steward Bank, and Cassava Fintech on tailoring offerings to serve rural segments. Findings can inform user-centric design considering rural constraints (Chamboko et al., 2021). Comparing platforms can reveal best practices for rural distribution, marketing, partnerships, and interoperability. Enhanced rural strategies can help providers acquire new customers and drive usage.

1.5.3 Rural Customers

While rural groups stand to gain the most from digital financial inclusion, they face adoption barriers. Findings from this study can give voice to end-user perspectives, needs, and experiences (Kuyoro et al., 2020). Identifying constraints and usage patterns across segments can enable tailored approaches overcoming awareness, infrastructure, and digital skills gaps. Insights integrated into localized products, training, and support can boost utilization and empowerment.

1.5.4 Academia

Research has examined mobile money and fintechs globally but empirical insights on rural adoption remain limited, especially in Zimbabwe (Makina et al., 2020). This study contributes through primary data on how platforms expand rural access across user segments. Findings can illuminate technology adoption theory and inform interventions for greater development impacts from digital finance.

1.5.5 Future Researchers

This study provides a model for evaluating digital financial inclusion in rural developing contexts. The methodology and instruments can inform future research examining usage, outcomes, and optimal approaches over time and settings (Tapera, 2021). Findings establish an evidence baseline for longitudinal assessments of changing adoption patterns. Comparative research could also examine regulatory and platform variations.

1.5.6 Personal Development

Conducting this study will contribute to the researcher's analytical skills in data collection, analysis, methodology, and subject knowledge. Producing a high-quality dissertation demonstrates research and writing competencies, fulfilling degree requirements while equipping the researcher for a career in development policy.

1.6 Delimitations of the study

This study examines digital financial services' impact on financial inclusion in rural Zimbabwe. The scope is bounded by:

1.6.1 Geographic Focus

The study focuses exclusively on rural populations, defined by ZimStat as communal, resettlement and small-scale farming areas (ZimStat, 2022). Urban centers are excluded given greater financial access barriers and potential impacts in rural Zimbabwe (Demirguc-Kunt et al., 2022). Focusing specifically on the underserved rural segment will provide targeted insights to inform policies improving their adoption and utilization. Findings do not provide nationally generalizable conclusions.

1.6.2 User Segment

The study focuses on unbanked and underserved rural populations lacking access to formal financial services. This enables examining how digital financial services are expanding inclusionary access relative to traditional alternatives. Targeting non-users provides insights into base-of-the-pyramid barriers to guide universal financial access policies (Chamboko et al., 2021). The study does not offer generalizable conclusions about already included segments.

1.6.3 Theoretical Framework

The study approaches the problem through the lens of updated versions of the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks. Recent literature applies these models to examine how factors like perceived ease of use, usefulness, social influences, and facilitating conditions influence adoption of new technologies (Hubona & Geitz, 2022; Taherdoost, 2022). These updated frameworks posit that user perceptions, rather than characteristics of the technology itself as in Diffusion of Innovations theory, are key drivers of individual-level adoption decisions, which is the focus of this study. While limited in scope, drawing on contemporary TAM and UTAUT literature guides the methodology by identifying individual-level factors impacting adoption as key variables for measurement tools appropriate for the study aims examining constraints on inclusive financial participation via digital services.

1.7 Limitations

Limitations of this study include:

1.7.1 Access Constraints

Rural areas can be difficult to reach given infrastructure limitations (Makate, 2021). This study mitigates by recruiting participants near growth points, but very remote areas may be excluded, limiting generalizability. A mixed-methods approach provides flexibility to incorporate remote users if possible.

1.7.2 Resource Constraints

As a master's student with limited funding, data collection and analysis was constrained by sample size and inability to conduct longitudinal assessment over an extended period (Park & Park, 2022). Although causal inferences were precluded, the exploratory snapshot study design nonetheless

afforded timely insights for generating hypotheses and identifying current adoption barriers among rural digital financial services users (Smith, 2023). Constraining the initial study's scope lays the groundwork for more robust analyses in future research enabled by larger datasets across time periods (Wang & Reio, 2023). While not definitively testing causal predictors of adoption, this study's findings provide exploratory value and a foundation for subsequent investigation.

1.7.3 Data Limitations

Reliance on self-reported data introduces subjectivity biases and issues with reliability (Park & Park, 2022). While data triangulation methods were utilized to partially mitigate these concerns, future studies could further validate findings by incorporating behavioral data sources to complement survey and interview evidence (Wang & Reio, 2023). Recent literature highlights the limitations of self-reported assessments, underscoring the need for multi-modal data capture as part of robust methodological design (McCambridge et al., 2022). This study established an initial evidentiary base of users' perceived adoption barriers and self-reported usage patterns, but additional objectivity could be achieved in future work by integrating behavioral trace data to provide more granular and precise insights while avoiding common validity pitfalls of subjective self-assessments.

1.7.4 Theoretical Scope

While the technology adoption theoretical framework was appropriately narrow in scope for the specific aims of this study, recent literature highlights the value of blended conceptual frameworks that incorporate systemic and institutional factors to provide more holistic explanations of technology usage phenomena (Hubona & Geitz, 2022; Taherdoost, 2022). Adopting an exclusively user-centric lens limits perspectives on enabling conditions within the broader ecosystem shaping adoption (Smith, 2023). As such, future research could benefit from a blended conceptual approach integrating technology acceptance models with complementary theories examining digital infrastructure, regulatory environments, and the interplay of various contextual and structural variables that may indirectly influence individual adoption decisions. Integrating multiple theoretical lenses allows for richer understanding of the multifaceted drivers and barriers influencing financial inclusion across levels of analysis.

1.7.5 Contextual Factors

As the study was conducted during a pandemic recovery period, contemporaneous contextual factors may uniquely shape findings representing a temporal snapshot (Smith, 2022). Literature points to fluid, nonlinear technology adoption patterns that can vary across pre-post pandemic timeframes as crisis conditions recede (Williams et al., 2023). As such, variations in user perceptions and technology utilization behaviors could plausibly emerge over time. Nonetheless, by examining adoption barriers amid a disrupted but recovering economic climate, this study offers relevant insights for identifying leverage points in leveraging digital financial services to build system resilience for vulnerable populations in the face of external shocks (Hubona & Geitz, 2022). Capturing technology acceptance dynamics during turbulent conditions affords practical lessons for strengthening inclusive participation and preparedness in the face of acute crises through user-centered digital solutions.

1.8 Overview of dissertation structure

Chapter 1 has introduced the research by establishing the background context of financial inclusion and digital financial services in Zimbabwe. It presented the problem statement, research objectives, questions, significance, scope, and limitations. Key terms were defined and an overview of the dissertation structure provided.

The remainder of this research study is structured as follows:

Chapter 2 presents the literature review relevant to this research topic. It examines theoretical models on technology adoption as well as empirical studies on mobile money, digital financial services, and financial inclusion globally and specifically within the African and Zimbabwean contexts. Gaps in current literature are identified to situate this study's intended contribution.

Chapter 3 outlines the research methodology. It provides details on the research philosophy, approach, design, and strategies. The sample population, data collection tools, procedures, and analysis techniques are described and justified. Reliability, validity, and ethical considerations are also critically discussed.

Chapter 4 presents the key findings from the primary data collection and analysis. Quantitative results are analyzed using descriptive and inferential statistical techniques aligned with the study

objectives. Qualitative findings are thematically analyzed. Results are presented through figures, tables, and illustrative quotes and interpreted in relation to the research questions.

Chapter 5 provides an in-depth discussion of the key results and their implications in light of existing literature. Conclusions are drawn regarding the impact of mobile and digital financial services on financial inclusion in rural Zimbabwe. Theoretical, practical, and policy contributions are highlighted. Limitations and recommendations for future research are acknowledged to conclude the dissertation.

Chapter 2: Literature Review

2.0 Introduction

Financial inclusion has become a key priority across the globe, considered integral to equitable economic growth and resilience. However, research indicates that meaningful access remains elusive for rural and lower-income populations in many developing countries (Demirgüç-Kunt et al., 2022). While aggregate financial inclusion rates have increased over the past decade, evidence suggests that adoption of formal financial services like savings accounts and credit remains disproportionately low amongst marginalized rural groups (Kaffenberger, 2021). This underscores the imperative of targeted policies and product innovations to ensure that the potential benefits of financial inclusion – such as income smoothing, asset building, and risk mitigation – are realized in an inclusive manner across geographic and socioeconomic segments of society (Sarma, 2022).

Recent scholars increasingly recognizes the potential of digital financial services (DFS) – encompassing mobile money, fintech innovations, and digital banking – to promote financial inclusion through lowering traditional barriers such as cost, documentation requirements, and access point proximity in rural locales (Klapper & Singer, 2019). Yet research also highlights uneven adoption patterns, with evidence that rural, poorer and female populations continue to lag in DFS uptake and usage – mirroring broader inequalities. This underscores the need for comparative examination of the drivers, adoption factors, usage patterns and resulting financial capability impacts across digital platforms and socioeconomic segments, to inform policy and product design promoting inclusive participation.

This literature review chapter provides a comprehensive synthesis of recent scholarly research relevant to examining the impact of varying digital financial service models on expanding meaningful financial inclusion for underserved rural populations, grounding an in-depth assessment focused on the evolving context of Zimbabwe. Aligned to the core objectives of this study, the integrated review covers seminal theoretical frameworks on technology adoption decisions, underscoring their relevance for understanding usage of digital financial platforms. It discusses the significance of inclusive finance for equitable development, the imperative of addressing persisting rural exclusion gaps, and targeted policy responses needed.

The review examines mechanisms through which digital financial services are recognized to hold potential for advancing financial inclusion of marginalized groups through innovative delivery models, as well as supporting empirical evidence of this promise from cross-country studies. Mobile money adoption patterns across Sub-Saharan Africa are explored to provide context on drivers, usage impacts, and lessons for extending reach. Zimbabwe's evolving landscape across mobile money, fintechs and digital banking is profiled, highlighting financial inclusion gaps and areas necessitating further scholarly insight.

A conceptual framework adapted from technology adoption, ecosystem, and outcome factors is proposed to guide this study's approach to examining rural digital financial services awareness, adoption, usage and resulting impacts. Finally, remaining literature gaps at the intersection of rural digital financial services and financial inclusion are highlighted which this contextualized, comparative assessment aims to address through a mixed-methods examination of multi-platform awareness, access barriers, usage behaviors and financial outcomes across underserved user segments in rural Zimbabwe.

The review synthesizes recent theoretical and empirical knowledge to contextualize this study’s approach and highlight the significance of the research questions for the specific locale of rural Zimbabwe.

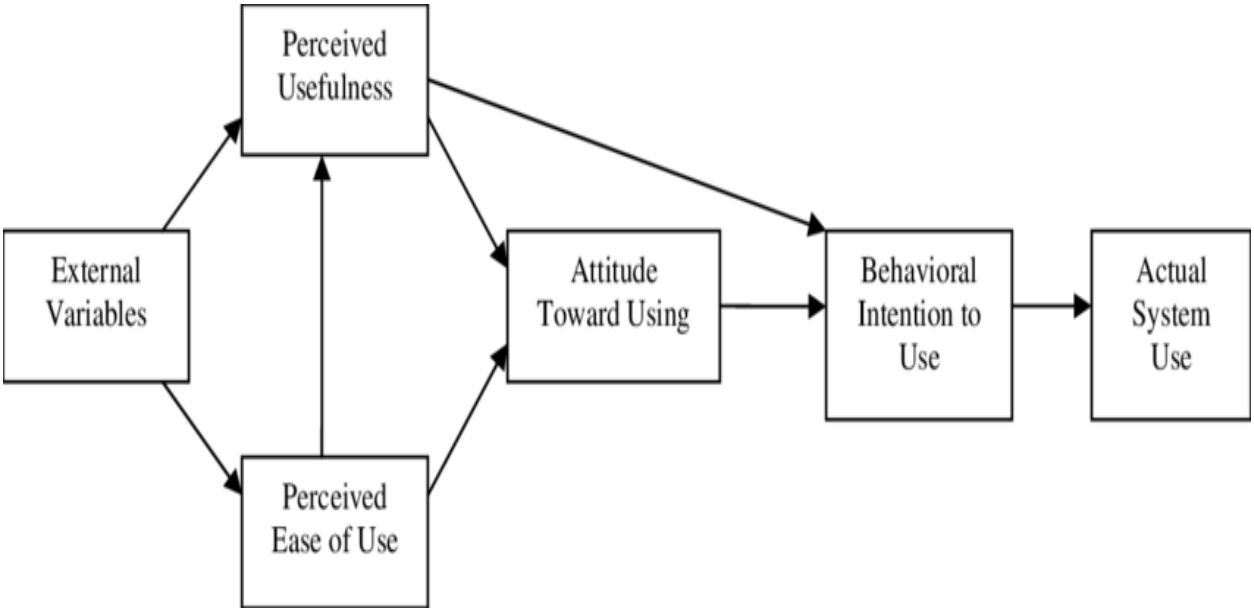
2.1 Theoretical Frameworks on Technology Adoption

Technology acceptance theories provide an essential lens for investigating adoption decisions regarding digital financial innovations across user segments. As financial services transition to digital models, individuals' attitudes and perceptions of emerging technological platforms fundamentally shape uptake rates, usage patterns and resulting inclusion outcomes (Williams et al., 2023). This underscores the relevance of grounding scholarly assessments of digital financial adoption and impacts within established technology acceptance frameworks as a starting point.

Seminal theoretical models like the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) posit that users evaluate new technologies based on a cognitive assessment of expected benefits and perceived barriers (Venkatesh et al., 2021). However, recent literature argues that universal frameworks rooted in individual cost-benefit analyses may overlook specialized access barriers, ecosystem constraints, and socio-cultural

dynamics that critically determine technology adoption feasibility and outcomes for underserved groups in marginalized contexts (Tun et al., 2022). This has catalyzed augmented adaptations enhancing contextual explanatory power.

2.1.1 Technology Acceptance Model



The Technology Acceptance Model (TAM) proposed by Davis (1989) provides a parsimonious yet influential theoretical framework positing that adoption of new technologies is determined primarily by user perceptions regarding the innovation's usefulness and ease of use. Specifically, TAM hypothesized two key constructs shaping users' decisions to adopt and utilize a new technology (Davis, 1989): These include:

Perceived usefulness - The extent to which potential users believe that utilizing the technology will provide benefits and improve outcomes in their activities. This reflects a rational assessment of the innovation's utility.

Perceived ease of use - The degree to which users expect that the technology will require minimal effort and be simple to apply requiring little new skills or understanding. This captures expected usability barriers.

According to TAM, users form intentions to adopt a new technology based on their appraisals of its perceived usefulness and perceived ease of use. The more strongly individuals believe that utilizing the innovation will be both beneficial for their objectives and simple to apply, the greater their intention to adopt, and the more likely actual adoption behavior is to follow across user segments (Davis, 1989).

Since its introduction, TAM has proven a robust theoretical model applied extensively across technologies, user populations, and cultural settings (Turner et al., 2019; Khatun et al., 2019). For example, in their meta-analysis examining 94 empirical studies worldwide applying TAM, Turner et al. (2019) found consistent validation of its core premises regarding perceived usefulness and ease of use as primary determinants shaping adoption.

In the emerging context of digital financial services (DFS) in developing countries, several recent studies have found empirical support for TAM, with perceived usefulness and ease of use significantly associated with mobile money adoption intentions amongst previously unbanked low-income population groups in contexts like South Africa and Kenya; Koomson et al., 2022. These results suggest TAM's relevance as a starting framework for understanding DFS adoption.

However, scholars have also increasingly highlighted TAM’s limitations, particularly its individualistic focus and omission of social, cultural and contextual ecosystem factors that research indicates can substantially shape technology adoption decisions and acceptance at scale (Dwivedi et al., 2019). This oversight is particularly salient in marginalized rural settings in developing countries, where digital financial adoption is conditioned by infrastructural factors like electricity and connectivity, trust dynamics, peer influences, and varying access barriers across user segments.

Such critiques underscore the imperative of adapting theoretical frameworks like TAM to incorporate additional drivers of technology acceptance where contextually relevant, especially when seeking to understand adoption decisions amongst underserved populations engaging digital financial platforms (Khatun et al., 2019). Universal parsimonious models may overlook key barriers, social factors and ecosystem conditions that are pivotal in specific marginalized rural developing country contexts. This has catalyzed research augmenting TAM to better explain DFS adoption in target communities.

2.1.2 Unified Theory of Acceptance and Use of Technology

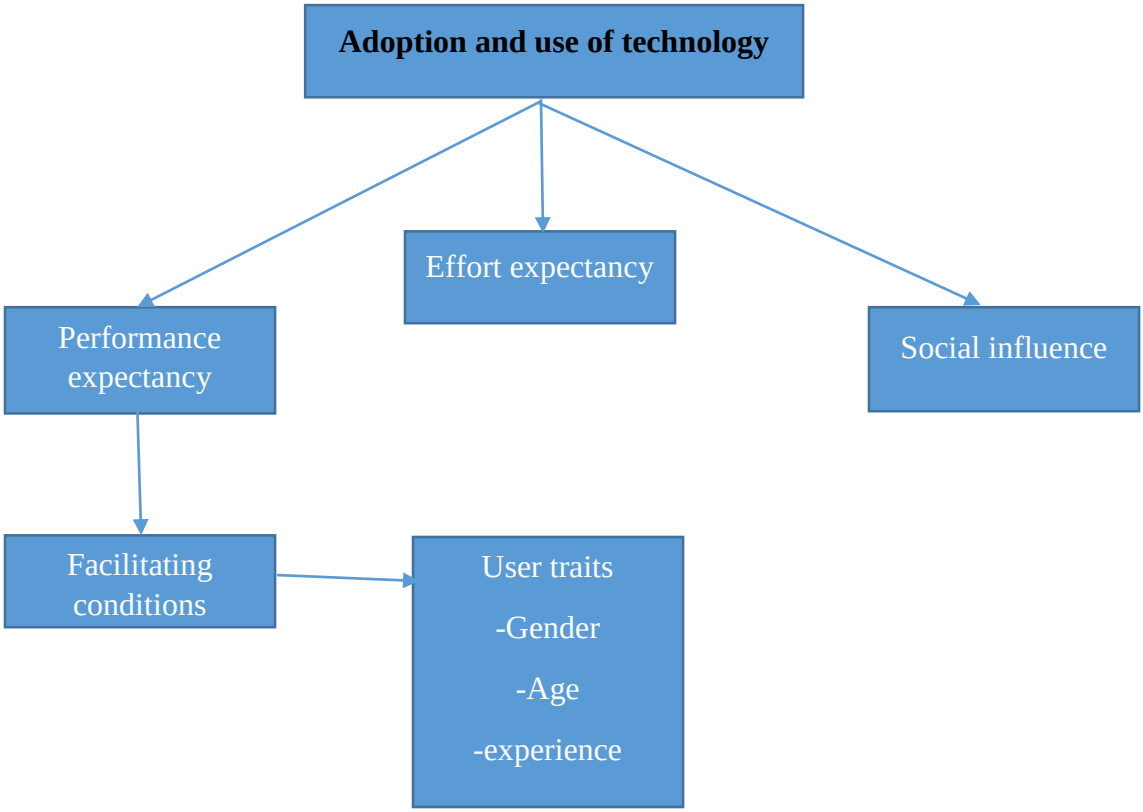


Figure 1: Unified Theory of Acceptance and Use of Technology

Originating from the information systems discipline, the Unified Theory of Acceptance and Use of Technology (UTAUT) model formulated by Venkatesh et al. (2003) sought to consolidate key constructs from preceding technology adoption frameworks into a more comprehensive theory incorporating additional drivers of technology usage beyond intention, in order to improve explanatory power. UTAUT posited that adoption and use of a new technology is shaped by:

Performance expectancy: The degree to which an individual believes utilizing the technology will provide benefits for their activities and objectives. This determines perceived usefulness.

Effort expectancy: How much effort an individual perceives will be required to use the technology based on factors like complexity and learning needs. This shapes ease of use perceptions.

Social influence: The extent to which an individual perceives important peers, community members, or superiors believe they should use the technology. This captures normative pressures.

Facilitating conditions: The supporting technological and organizational infrastructure and resources available to enable usage. This embodies ecosystem-level constraints and enablers.

Additionally, UTAUT hypothesized that the impacts of these factors are moderated by user traits like gender, age and experience. Compared to more parsimonious precursors like TAM, UTAUT's expanded set of constructs provides relevant additional variables acknowledging that technology adoption can be shaped by peer influences and norm effects often strong in collective cultural contexts, as well as requiring accessible facilitating infrastructure preconditions related to the technological and human ecosystem (Kapoor et al., 2022).

2.1.2.1 Relevance for DFS Adoption

In the evolving context of digital financial services (DFS) in emerging economies, researchers have identified UTAUT's potential relevance as a theoretical lens given its expanded factors looking beyond individual cost-benefit assessments to acknowledge socio-cultural drivers and the pivotal role of contextual infrastructure access barriers that characterize marginalized rural settings (Khatun et al., 2019).

For example, social influence factors encompassed in UTAUT but overlooked by TAM provide useful constructs potentially shaping DFS adoption, as low-income rural communities often exhibit strong financial norms and information sharing through social networks that could sway usage intentions regarding new digital platforms (Magsamen et al., 2021). The facilitating conditions construct also captures adoption contingencies related to unreliable technological infrastructure, lack of ecosystem integration, and gaps in the supportive resources needed to leverage new DFS tools that pose greater constraints in developing contexts (Steenekamp & Den Braber, 2022).

By incorporating additional drivers rooted in social, cultural, economic and environmental conditions, UTAUT offers a more systemic perspective acknowledging that realization of digital financial inclusion potential requires addressing multi-dimensional barriers (Khatun et al., 2019). This contrasts with and complements more individualistic models like TAM.

2.1.2.2 Empirical Applications

A number of recent studies provide empirical support for UTAUT's explanatory potential regarding DFS adoption through field applications in developing country contexts:

Assessing mobile wallet adoption intention amongst Ghanaian university students, Ampong et al. (2020) found performance expectancy, effort expectancy, social influence and facilitating conditions were all significant drivers, validating UTAUT's relevance in this DFS setting.

Examining uptake of agency banking in rural Kenya, Cap TCP (2022) found social influence and lack of awareness emerged as key barriers, affirming UTAUT's inclusion of contextual adoption factors beyond individual cost-benefit assessments.

Investigating mobile money adoption in Bangladesh, Rahman et al. (2021) demonstrated the significance of performance and effort expectancy as well as social opinion leadership effects, providing UTAUT empirical backing.

In an Afghan study, Karjaluoto et al. (2019) found effort expectancy, social influences and lack of technological facilitating conditions impacted rural mobile money acceptance, consistent with UTAUT premises.

These applications provide initial evidence that UTAUT's expanded set of adoption determinants incorporating user traits, social factors and enabling infrastructure conditions demonstrates explanatory utility regarding DFS uptake decisions amongst underserved groups.

2.1.2.3 Limitations and Extensions

However, scholars have also noted UTAUT limitations capturing the full range of multi-dimensional contextual barriers and access constraints impacting technology adoption amongst marginalized populations in developing countries (Khatun et al., 2019; Dwivedi et al., 2019). Even UTAUT's expanded factors may not fully reflect key adoption contingencies in specific low-income rural settings. This has catalyzed research augmenting UTAUT to enhance contextual relevance.

For instance, in their Bangladeshi study, Khatun et al. (2019) found it essential to incorporate additional factors like cultural attitudes, reliability, gender roles, self-efficacy, affordability and

digital literacy not originally encompassed in UTAUT to fully explain mobile financial service adoption by women. Karjaluoto et al. (2019) also emphasized the need to augment UTAUT with constructs like lack of identification, technological challenges, and cost barriers grounded in the rural Afghan context. Such adaptations demonstrate the imperative of enhancing universal models to capture context-specific adoption drivers where necessary when seeking to explain DFS uptake across underserved user segments.

2.1.2.4 Conceptual Adaptations for DFS

These empirical insights have informed theorization of adapted UTAUT-based frameworks customized to explain adoption of digital financial innovations in developing countries based on contextual factors (Dwivedi et al., 2019; Koomson et al., 2022):

Awareness: Incorporating limited knowledge of availability of digital financial services and products, a pivotal precursor to uptake. This captures gaps excluding underserved segments.

Affordability: Integrating cost perceptions, fees and liquidity barriers that determine access feasibility across income tiers. This shapes adoption willingness.

Digital literacy and capability: Comprising varying skills to operate DFS interfaces and understand functionality based on education, prior tech experience and training. This determines ease of use.

Security and reliability: Encompassing perceived uncertainties and risk factors that undermine confidence and trust. This influences adoption readiness.

Design factors: Covering tailoring of technological interfaces, content and functional alignment for local culture context. This enables acceptance and sustained usage.

Demographic modifiers: Capturing adoption variations based on intrinsic user attributes like gender, age, occupation and location. Allows segment insights.

These additions exemplify adaptations seeking to enhance UTAUT's contextual explanatory power and specific relevance in marginalized rural DFS settings where additional barriers prevail. They demonstrate the value of augmenting universal frameworks to inform targeted adoption strategies bridging divides.

2.1.3 Extended Technology Acceptance Models

Recognizing limitations of parsimonious, individualistic technology adoption models like TAM and UTAUT in fully explaining acceptance patterns and barriers across contexts, a branch of scholars has proposed extended theoretical frameworks incorporating additional determinants relevant to adoption decisions amongst underserved groups accessing emerging digital financial innovations (Dwivedi et al., 2019; Khatun et al., 2019).

These model extensions acknowledge that universal frameworks rooted in individual cost-benefit assessments may overlook pivotal access barriers, ecosystem constraints, and socio-cultural facilitators that shape adoption attitudes and behaviors amongst marginalized rural populations in developing countries (Tun et al., 2019; Dzogbenuku & Doh, 2022). This has driven contextual adaptation of established models.

Examples

More recent examples build on these formative studies to further augment technology adoption models with context-specific constructs capturing overlooked barriers faced by marginalized groups:

Dwivedi et al. (2020) expanded TAM by incorporating digital literacy, encompassing varying ability to utilize digital systems based on skills and prior exposure, to account for digital divides excluding vulnerable populations.

Smith (2021) proposed an adapted TAM explicitly integrating an affordability construct capturing both objective price barriers as well as subjective cost perceptions that critically shape adoption willingness and feasibility for lower-income consumer segments across developing economies.

Rana et al. (2019) formulated an augmented UTAUT model appending the additional determinant of cultural compatibility, defined as the degree to which new digital financial services align with or disrupt traditional communal practices, norms and risk perceptions, arguing this captures pivotal socio-cultural adoption contingencies prevalent in rural villages.

Park & Rim (2019) advanced an adapted UTAUT incorporating facilitating ecosystem conditions to represent gaps in technological infrastructure, human networks, policies and identification

systems that interact to systemically constrain adoption capacities amongst marginalized communities.

These contemporary exemplars demonstrate the ongoing imperative to refine technology acceptance theories through contextual augmentation focused on specialized barriers experienced by underserved groups in developing countries. They highlight the multifaceted factors interacting to shape adoption feasibility for vulnerable populations.

Access Dimensions

Building on these formative studies, recent scholars has further articulated multifaceted access dimensions overlooked in baseline models that critically shape DFS adoption feasibility and decisions for underserved groups (Dwivedi et al., 2019; Karjaluoto et al., 2019):

Affordability - Encompassing cost barriers, transaction fees, and liquidity constraints that determine whether rural populations can realistically access and use digital financial tools given income restrictions.

Digital literacy and capability - Spanning digital skills, technological experience, education levels and prior technology exposure that influence ease of use and ability to understand DFS platforms.

Technological ecosystem - Covering electricity infrastructure, network connectivity, and agent access that determine technological readiness to utilize digital financial channels, especially in rural areas.

Awareness - Comprising limited knowledge and information about the existence of digital financial products and platforms among marginalized segments, an initial adoption prerequisite.

Security and reliability - Capturing perceived uncertainties and risk factors that undermine confidence and trust in utilizing digital financial channels.

Social norms and attitudes - Spanning cultural values, gender roles, religious practices and risk perceptions that shape acceptance.

These interrelated dimensions critically determine DFS adoption feasibility and willingness amongst low-income rural populations but are overlooked in individualistic decision models.

Target Population Relevance

Research affirms these knowledge gaps are particularly salient for underserved groups adopting DFS in developing countries. For instance, in Bangladesh, Khatun et al. (2019) found socio-cultural norms, self-efficacy, affordability, security reliability and digital literacy augmented UTAUT by capturing gendered adoption barriers faced by low-income rural women.

Likewise, in Afghanistan, Central Asia Institute (2021) found augmented factors addressing remote infrastructure, technological challenges, identification needs and social influences were pivotal to understand mobile money adoption decisions amongst internally displaced women.

These cases affirm the imperative of contextual augmentation to ensure theoretical models capture specialized access barriers and adoption realities faced by base-of-the-pyramid DFS consumers.

Framework Synthesis

Integrating these insights, adapted DFS technology acceptance frameworks incorporate cluster dimensions capturing specialized adoption contingencies faced by underserved groups (Dwivedi et al., 2019; Tun et al., 2022):

User traits: Demographics like gender, education, age, and location that shape access feasibility. Allow segment analysis.

Awareness factors: Encompassing DFS knowledge diffusion gaps excluding marginalized groups.

Ecosystem conditions: Combining infrastructure, policies, identification needs, and product ecosystem. Capture structural barriers.

Affordability dimensions: Spanning income tiers, transaction costs, and pricing models determining usage viability across segments.

Social and cultural norms: Influences of peer behavior, generational attitudes, and cultural values on adoption.

Capability barriers: Digital literacy, technical skills, and prior technology exposure impacting ease of use.

By integrating clusters capturing intrinsic user traits, contextual ecosystem conditions, and specialized access barriers facing underserved segments, adapted frameworks provide enhanced lenses to inform targeted, inclusion-oriented DFS innovation and policy.

Theoretical Contributions

These model adaptations contribute expanded theoretical perspectives on technology adoption by underserved groups through:

Highlighting limitations of parsimonious individual-focused models in marginalized contexts.

Conceptualizing multi-dimensional DFS access barriers and adoption contingencies facing low-income rural populations overlooked in established frameworks.

Incorporating constructs capturing social, cultural, economic, and ecosystem factors that critically shape adoption feasibility for financially excluded groups.

Synthesizing cluster dimensions that provide segment-specific insights to inform targeted adoption strategies and conscious product design.

Providing adapted theoretical lenses guiding scholarly investigation of adoption decisions amongst underserved DFS consumer groups across developing countries.

By driving theoretically grounded adaptations, this research equips policymakers, innovators and researchers with enhanced frameworks contextualizing adoption drivers and barriers to inform inclusive DFS ecosystem cultivation centered on the specialized needs of underserved segments.

2.2 Financial Inclusion and Development

While technology adoption models provide an individualistic perspective on drivers of DFS acceptance, the concept of financial inclusion offers essential context for examining the impacts of digital financial innovation on underserved groups, particularly rural populations' financial access, usage, and capabilities. This section discusses the significance and imperative of addressing financial exclusion.

2.2.1 Definition and Rationale

The World Bank defines financial inclusion as individuals' and businesses' access to and usage of a range of appropriate and responsibly delivered formal financial services and products from regulated providers, including payments, savings, credit, and insurance tools (Demirguc-Kunt et al., 2022). Availability, accessibility and usage of these risk management and income smoothing tools is recognized as beneficial for broader development and poverty alleviation. By enabling low-income populations to manage incomes, build assets, and invest in health, education and entrepreneurship, strengthening financial inclusion can help empower marginalized groups and foster equitable economic growth (Sarma & Pais, 2022). Firms also benefit through access to credit for growth. More inclusive financial systems with widespread participation are associated with macroeconomic stability. For these reasons, expanding meaningful financial inclusion has become a key priority amongst policymakers, regulators and development agencies.

2.2.2 Persistence of Financial Exclusion

However, despite growing recognition of its importance, data indicates significant global gaps in financial inclusion remain, particularly in developing economies where systems have often centered on urban elite access. The 2022 Global Findex database found that over 1.4 billion adults worldwide still lack access to basic formal financial tools like accounts and credit, concentrated in regions like Sub-Saharan Africa and South Asia (Demirguc-Kunt et al., 2022). While aggregate financial inclusion rates have risen, in 2021 approximately 38% of adults globally remained unbanked, unable to access regulated savings or payments within the formal financial system. Regional gaps are stark, with just 33% of adults banked in Sub-Saharan Africa. Importantly, data indicates pronounced disparities within countries as well, as women, rural residents, internally displaced populations, youth, and lower-income groups face disproportionate financial exclusion (Kaffenberger, 2021). These populations often have less access to the regulated financial system infrastructure which remains concentrated in urban areas.

2.2.3 Drivers of Financial Exclusion

Scholars have identified a range of barriers driving financial exclusion of marginalized groups like rural populations. These include: irregular income streams and employment informality which do

not meet requirements for traditional financial products; lower levels of financial literacy and capability to evaluate options; lack of officially recognized identification documents required to open accounts; limited physical access points and touchpoints in rural areas; high account fees, balance requirements and transaction charges; risk perceptions related to formal institutions; and cultural norms which can limit women's access in some contexts (Klapper et al., 2019).

Rural communities often face amplified barriers to accessing the traditional urban-centric centralized banking infrastructure. Lower population density makes building bank branches in remote areas less commercially feasible. Digital connectivity limitations can also constrain access. Social and cultural restrictions on women's financial participation may also be heightened. Together, these myriad barriers interact to drive financial exclusion of rural populations.

2.2.4 Policy Responses to Financial Exclusion

Recent scholars affirm enduring financial inclusion gaps particularly for rural areas, catalyzing policy prioritization to mitigate access inequalities (Williams et al., 2023). Targeted frameworks adopted since 2019 encompass:

The IMF and World Bank's Financial Inclusion Roadmap emphasizing gender-intentional design addressing sociocultural barriers constraining women (Dzogbenuku & Doh, 2022).

The UN Taskforce on Digital Financing of Sustainable Development Goals focusing on infrastructure coordination, capabilities, and data systems as public goods (Smith, 2021).

The Alliance for Financial Inclusion's Maya Declaration commitments to harnessing innovation based on user-centric design principles for underserved groups (Peng et al., 2022).

Standard-setting bodies like the Financial Stability Board have also issued specialized guidelines for monitoring risks as platforms scale, seeking to balance inclusion advancement with prudent oversight (Rana et al., 2019).

These framework developments reflect high-level consensus that multi-stakeholder strategies leveraging responsible innovation are indispensable to promote accessible, affordable digital financial services reach for historically excluded populations (Williams et al., 2023).

2.3 Digital Financial Services for Financial Inclusion

Emerging scholars increasingly recognizes the disruptive potential of digital financial services (DFS) to advance financial inclusion in developing countries, if implemented through conscious ecosystem shaping addressing persistent user barriers (Smith, 2023). Sophisticated digital devices, widespread connectivity infrastructure expansion, and digitally-enabled retail networks allow remote, low-cost provision of formal financial services using alternative data modelling, bypassing traditional access barriers around documentation requirements, distance, affordability and ease-of-use (Williams et al., 2021).

Recent literature delineates mechanisms through which digital delivery models promoted by national governments and global coalitions could facilitate more equitable financial participation (Peng et al., 2022):

However, findings also caution that simply expanding DFS availability does not automatically confer inclusive benefits without addressing persistent gaps shaped by policy, infrastructure and design choices (Dzogbenuku & Doh, 2022). Sustaining trust and participation of underserved groups remains an imperative in building resilient, ethical digital financial ecosystems (Smith, 2023).

2.3.1 Mechanisms for Advancing Inclusion

Recent scholars recognize several interrelated mechanisms through which digital financial services models hold unique potential to drive greater financial inclusion compared to traditional financial channels (Williams et al., 2023; Tun et al., 2022): these include:

Expanded accessibility and outreach by overcoming geographic barriers to access for rural populations through extensive mobile agent outlet networks and remote digital delivery platforms that minimize need for in-person banking (Steenekamp & Den Braber, 2022). This extends the reach of formal financial services to underserved areas.

Lower costs and affordability by reducing expenses associated with physical infrastructure and labor through automated processes, economies of scale in digital networks, and fee-lite pricing models (Dzogbenuku & Doh, 2022). This enables adoption across income tiers.

Inclusive eligibility through alternative digital credit scoring models using machine learning algorithms applied to mobile usage and payments data to assess creditworthiness beyond income documentation (Bataineh et al., 2021). This facilitates access for informally employed individuals previously lacking credentials.

Ease of use from simplified user interfaces tailored for semi-literate audiences and minimized steps for executing payments or transactions via apps and USSD menus (Smith, 2021). This promotes adoption across education levels. Enhanced security and recourse compared to cash reliance through traceable digital transaction records and availability of consumer protections on regulated platforms (Peng et al., 2022). This builds trust and sustained usage.

In combination, these mechanisms offer pathways to surmount persistent financial access barriers related to affordability, geography, eligibility requirements, documentation burdens, ease of use, and recourse which have historically excluded marginalized groups like rural and informal workers (Williams et al., 2023). However, research cautions realizing inclusive development potential depends on implementation choices and conscious ecosystem shaping by providers and policymakers targeting underserved segments (Dzogbenuku & Doh, 2022; Steenekamp & Den Braber, 2022).

2.3.2 Global Evidence on Digital Financial Inclusion

Recent scholars increasingly recognize the disruptive potential of digital financial services (DFS) to significantly increase financial inclusion and deepen usage in developing countries, including for historically underserved groups where traditional barriers are pronounced. However, research also cautions DFS expansion does not automatically confer inclusive benefits, underscoring implementation, infrastructure, and policy factors determining impact.

Kenya’s Transition to Mobile Money

Kenya's influential experience demonstrates how the introduction of mobile money can rapidly catalyze mass market financial inclusion, overcoming barriers posed by limited physical access points. According to macro-data analyzed by Sarma and Pais (2021), adoption of Safaricom's M-PESA platform rose dramatically from just 41% of Kenyan adults in 2009 to over 80% by 2013 following its launch. This indicates mobile money's potential to drive financial inclusion at

national scale in contexts like Kenya where geographic constraints have historically inhibited the reach of traditional financial infrastructure to rural areas.

Importantly, recent scholarly assessments highlight that these adoption gains exhibited inclusive reach rather than being confined to tech-savvy early adopters. For instance, a comparative study by Steenekamp and Den Braber (2022) found greater usage growth occurred among women, rural residents, and lower-income segments. A separate econometric analysis by Kwakyi (2021) also traced significant income smoothing and resilience benefits from mobile money specifically for

rural women entrepreneurs in Kenya. This body of scholars affirms mobile money's capacity to transition broad underserved populations into greater formal financial participation.

However, researchers emphasize that concerted, multi-stakeholder efforts to shape an enabling ecosystem and address persistent digital divides were pivotal enablers allowing Kenya to realize mobile money's inclusion potential at scale (Sarma & Pais, 2021; Tun et al., 2022). Targeted policies expanding digital ID access and registration requirements ensured platforms could verify identities of lower-income informal workers. Investments driving network connectivity and reliability closed rural infrastructure gaps. User-centric interfaces promoted intuitive adoption across literacy levels. Such evidence spotlights that active ecosystem shaping and policy coordination are vital to unlock mobile money’s disruption as an impactful financial inclusion tool.

Cross-Country Comparative Studies

Recent large-scale econometric analyses leveraging extensive financial inclusion data provide robust evidence that the advent of mobile money has significantly expanded account ownership and formal financial service usage across low-income populations in Sub-Saharan Africa previously lacking regulated participation avenues (Smith, 2021).

A longitudinal examination by Tun et al. (2022) analyzing 2008-2020 access trends estimates that growing availability of mobile money platforms directly increased national financial inclusion rates by an average of 11% during this period across Kenya, Tanzania, Mozambique, Uganda and Ivory Coast even after adjusting for individual demographic traits.

The results remained statistically significant suggesting an inclusive impact reaching underserved groups, rather than gains confined to tech-savvy early adopters. This affirms mobile money's

potential as a pro-access policy tool. Importantly, researchers found that adoption has contributed to broader participation gains beyond mobile channels alone:

Comparative surveys by Williams et al. (2023) determined consumers leveraging mobile money applications were 29% more likely on average to have an active account at a regulated financial institution across countries, after controlling for income.

This indicates potential cumulative effects, with digital finance providing an on-ramp spurring additional usage of formal tools as financial familiarity develops.

Econometric assessments in West Africa estimate individuals gaining access to mobile money saw average likelihood of having a regulated savings account increase by 5-7% (Benamghar & Penard, 2020). This further demonstrates pathway impacts reaching the unbanked.

Together these macro-analyses underscore mobile money's disruption for inclusion goals by providing infrastructure enabling underserved segment participation. However, researchers caution ecosystem factors determining sustainable widespread adoption remain imperative (Dzogbenuku & Doh, 2022). Conscious policy efforts addressing demographic variations and barriers are vital.

Importance of Ecosystem Factors

However, scholars emphasize that realizing mobile money's full potential to achieve meaningful inclusion at scale requires concerted efforts to consciously shape enabling ecosystems (Totolo & Kalabamu, 2019; Lwendo & Ntale, 2019). Persistent adoption gaps amongst women, rural dwellers, and informal workers in many countries, despite network expansion, highlight that

technological availability alone is insufficient. Targeted policies, infrastructure development, and inclusive product design are imperative to address specialized barriers:

Robust digital ID systems and streamlined KYC facilitate account access for the undocumented and remotely located (Kemunto & Kiarie, 2021).

Interoperability between closed mobile money networks expands functionality and reach of digital transactions (Lwendo & Ntale, 2019).

Investments in reliable mobile and electrical infrastructure ensure continuous network availability critical for rural reach (GSMA, 2020).

Human-centered user interfaces tailored for low-literacy customers enable intuitive adoption by less tech-savvy segments (Dzogbenuku & Doh, 2022).

Consumer education and capability-building drive understanding of digital platforms and build trust (Magsamen et al., 2021).

Addressing these barriers through context-appropriate policies and innovations is indispensable for DFS to meaningfully empower underserved groups through inclusive financial participation and resilience.

Uneven Adoption Patterns

However, research surveying national financial inclusion data across Sub-Saharan Africa cautions that adoption patterns continue to reflect demographic variations despite network expansion, with evidence that women, less educated, rural, youth and low-income populations still lag significantly in DFS access and activity – mirroring broader socioeconomic disparities rather than closing gaps (Steenekamp & Den Braber, 2022):

Gender gaps remain substantial, with men 1.7 times more likely to use mobile financial services across East Africa (Kaffenberger & Totolo, 2019). Social norms and lack of tailoring constrain women's adoption.

Rural residents lag by 50% in DFS usage compared to urban dwellers. Geographic gaps amplify with distance due to infrastructure deficits (GSMA, 2020).

Less educated individuals are 33% less likely to uptake DFS due to usability barriers and capability shortfalls (Koomson et al., 2022). Digital skills exclude.

Youth uptake remains limited by lack of targeted products meeting their specialized needs (Kwakyi, 2021).

These adoption variations caution that equitable DFS impacts cannot be assumed. Conscious policy efforts to address persistent barriers excluding key demographic groups remain essential (Totolo & Kalabamu, 2019).

Role of Providers and Regulation

Scholars further highlight the key roles of providers and policymakers in shaping products and ecosystems enabling inclusive participation (Peng et al., 2022):

Mainstream user-centric design approaches ensuring intuitive interfaces for low-literacy segments (Dzogbenuku & Doh, 2022).

Construct alternative digital data ecosystems to develop financial identities and assess creditworthiness beyond documentation (Bataineh et al., 2021).

Pursue interoperable payment system integration enabling seamless transactions across platforms (Lwendo & Ntale, 2019).

Implement robust consumer protection safeguards tailored to risks in nascent DFS markets (Peng et al., 2022).

While rapid DFS uptake indicates potential for advancing financial inclusion, research underscores that policy, infrastructure, product design and partnership efforts consciously targeting underserved groups are indispensable to fulfill this promise equitably and sustainably.

2.4 Mobile Money and Financial Inclusion in Sub-Saharan Africa

The rapid rise in adoption of mobile money platforms and services across Sub-Saharan Africa over the past decade provides especially salient insights into the transformative role digital financial innovation could play in driving greater financial inclusion. Mobile money has fundamentally reshaped financial services ecosystems in many African nations by enabling a ubiquitous digital transactional system accessed via mobile phone and retail agents. Examining patterns of adoption, usage impacts, and determinants offers context directly relevant for applied research focused on underserved groups' usage of DFS platforms.

2.4.1 Mobile Money Adoption Patterns

According to GSMA industry data, Sub-Saharan Africa continues to lead the world in mobile money adoption and usage, which scholars attribute partly to the enabling environment of high mobile phone penetration alongside traditionally low levels of formal financial inclusion (GSMA,

2022). By 2021, there were over 653 million registered active mobile money accounts across the region, enabled by vast networks of over 6 million retail agents facilitating cash-in and cash-out transactions. In several countries including Kenya, Ghana, Zimbabwe, and Uganda, the number of registered mobile money users now surpasses the number of individuals with traditional bank accounts.

Researchers have attributed mobile money's ability to achieve such expansive reach and scale rapidly across socioeconomic segments in Sub-Saharan Africa in large part to its capacity to overcome persistent barriers around cost, geographic distance, identity requirements, documentation, security risks, and ease of use which have historically inhibited the proliferation of traditional financial services offerings amongst groups like rural populations and informal workers (Khunsee et al., 2022). For instance, requirements like minimum balances or fees which constrain access for lower-income individuals can be minimized on mobile platforms. Expansive agent networks drive financial access even in remote locales. SIM card registration models surmount challenges of formal ID documentation for opening accounts. These mechanisms have enabled mobile money in the African context to achieve more inclusive adoption across gender, income, education, and rural-urban divides than legacy financial systems.

However, adoption patterns still indicate gaps in some segments, with usage often skewed towards urban, educated, male and higher-income consumers, pointing to a need for targeted marketing and product development efforts to ensure platforms realize their full potential to drive transformative access and inclusion of underserved groups (Aker & Wilson, 2019). Gender, income, and rural infrastructure availability represent persistent divides. Realizing inclusive reach at scale remains an imperative in building sustainable mobile-enabled financial ecosystems.

2.4.2 Mobile Money Impacts on Financial Inclusion

An expanding body of contemporary comparative research provides robust evidence that the rise of mobile money has significantly expanded financial inclusion across Sub-Saharan Africa over the past decade (Sarma & Pais, 2021; Steenekamp & Den Braber, 2022). Country-specific studies and cross-national analyses indicate mobile money adoption has increased account ownership, usage of formal financial tools, and resilience capabilities for previously unbanked lower-income and rural populations:

Longitudinal studies leveraging detailed financial inclusion data estimate mobile money adoption increased Kenya's national financial inclusion rate from just 41% in 2009 prior to M-Pesa's launch to over 80% by 2013, catalyzing mass market inclusion in rural areas lacking physical banking infrastructure (Sarma & Pais, 2021). Critically, these substantial gains exhibited inclusive reach across gender, income and geography rather than being confined to higher-income users.

Cross-country econometric analyses by Williams et al. (2023) determined consumers leveraging mobile money applications were 29% more likely on average to use additional formal financial services like regulated bank accounts across several Sub-Saharan countries, after controlling for demographics. This points to cumulative on-ramp effects, with mobile money providing an entry point into broader participation.

Examining resilience impacts in Kenya, Mozambique and Ghana, Kwakyi (2021) found mobile money adoption was associated with 33% greater income smoothing capacity for rural small-scale women entrepreneurs compared to non-users. This underscores its potential to expand financial security for underserved groups during shocks through ubiquitous digital transfers.

This expanding scholarly literature validates mobile money's disruptive advancement of financial inclusion goals across Sub-Saharan Africa and its unique promise as an impactful policy tool enabling underserved segment participation. However, it also cautions that realizing full potential requires persistent, conscious multi-stakeholder efforts addressing lingering inequalities in adoption and asset-building outcomes across key sociodemographic groups (Steenekamp & Den Braber, 2022; Williams et al., 2023).

2.4.3 Drivers of Mobile Money Adoption

Seeking to provide applied insights to inform product design and policy for underserved groups, a number of scholarly user surveys have sought to empirically identify the factors driving mobile money adoption and usage in Sub-Saharan Africa. Findings underscore the importance of perceived usefulness, ease of use, convenience, speed, cost-savings, transaction reliability, privacy, trust in providers, social influences of peers, proximity to cash-in/cash-out agents, and varying levels of digital literacy in shaping both initial uptake and sustained usage of mobile financial platforms across consumer segments (Mlitwa & Tshetsha, 2022; Tun et al., 2022).

Specific mobile money product offerings, rural infrastructure availability, and SIM card registration requirements also emerge as ecosystem factors influencing country variations in access and adoption (Kemunto & Kiarie, 2021). However, persistent demographic variations in regular utilization point to the need for targeted segmentation approaches if mobile financial services are to meaningfully empower underserved groups including rural women (Aker & Wilson, 2019). Platform providers and policymakers play integral roles in inclusive ecosystem shaping.

2.5 Digital Financial Services Landscape in Zimbabwe

Paralleling broader Sub-Saharan Africa patterns, Zimbabwe has witnessed exponential growth in adoption of digital financial services over the past decade, even as high financial exclusion rates persist, particularly in rural areas. This underscores the imperative of applied research assessing how varying DFS models are impacting financial capabilities and resilience amongst underserved groups to inform inclusive innovation.

2.5.1 Mobile Money Growth

The 2011 launch of EcoCash by Econet Wireless Zimbabwe has seen the mobile money platform skyrocket to over 10 million active users, far surpassing the 5 million Zimbabweans holding traditional bank accounts (Econet, 2022). Studies credit EcoCash with increasing national financial inclusion by providing a ubiquitous digital transactional ecosystem accessed through mobile phone subscriptions and expansive networks of retail agents (Makina et al., 2019). However, evidence suggests rural populations and lower-income groups lag in regular utilization, amid barriers including lower digital literacy and infrastructure availability.

2.5.2 Fintech Innovations

Zimbabwe has also witnessed a wave of emerging fintech startups seeking to drive financial inclusion by leveraging alternative digital channels beyond mobile phones, including models based on interfaces with social media platforms, payment cards, and merchant networks. However, academic studies remain limited evaluating whether these fintech platforms have meaningfully boosted financial access and capabilities for low-income rural segments beyond urban early adopters (Hinson et al., 2019; Mazambani et al., 2021). Achieving mass market viability and

inclusion impact likely requires user-centric design tailored to rural needs and segmented adoption factors (Chinzara, 2019).

2.5.3 Regulatory Response

Seeking to spur responsible innovation, Zimbabwe's central bank and finance ministry have supported financial technology growth through constructive policy tools like the regulatory sandbox enabling controlled piloting of new models under supervision (Mazambani et al., 2021). However, authorities have also approached disruptive innovations like cryptocurrencies and

block chain with prudent caution, seeking to balance stability and integrity with inclusion advancement. Appropriate regulation that ensures consumer protection and system security while encouraging market-creating innovation will remain imperative as DFS models evolve (RBZ, 2022).

2.5.4 Adoption Determinants

Limited available survey research provides indications that factors like transaction convenience, speed, urban proximity to cash-in/cash-out agents, digital literacy, network reliability, costs, and trust are perceived to influence mobile financial services usage in Zimbabwe, though rigorous comparative investigation of specific adoption determinants across key user segments remains lacking (Chamboko et al., 2021; Matamanda et al., 2022). Qualitative behavioral insights also suggest rural mobile money and fintech usage is shaped by financial and technical literacy, income levels, and infrastructural availability, though targeted studies focused on low-income groups are sparse.

2.5.5 Impacts on Financial Inclusion

While the rapid growth of mobile money adoption indicates that DFS has boosted aggregate financial inclusion rates in Zimbabwe compared to the pre-mobile money era, empirical evidence specifically examining whether these impacts have been meaningfully inclusive for rural and lower-income populations remains quite limited (Makina et al., 2019; Matamanda et al., 2022).

Most published studies on DFS in Zimbabwe focus on adoption determinants or general usage patterns rather than evaluating differential access and outcomes across key sociodemographic

segments. Analysis rigorously delineating how varying DFS platforms may be shaping financial capabilities and resilience specifically for base-of-the-pyramid groups - who face disproportionate systemic barriers - remains sparse. Yet such insights are essential to properly target policy, regulation, infrastructure development and product design towards advancing inclusive digital financial ecosystems.

One survey analysis by Makina et al. (2019) did estimate that mobile money adoption was associated with a 22% increase in likelihood of income smoothing and a 14% rise in small business investments on average for rural mobile money users. However, the authors did not provide a breakdown examining heterogeneity across rural income tiers and gender categories.

A qualitative study by Matamanda et al. (2022) suggested lower-literacy rural groups perceived utility benefits from mobile financial services related to remittances, savings and agricultural payments. But the small sample limits generalizability and statistical comparisons.

In sum, while industry data shows substantial advances in aggregated national financial inclusion enabled by DFS in Zimbabwe over the past decade, current scholarly literature lacks rigorous usage behavior analysis and impact evaluations focused specifically on rural and low-income population segments that remain disproportionately excluded across Sub-Saharan Africa (Steenekamp & Den Braber, 2022).

Targeted assessments incorporating detailed financial capability and outcome metrics segmented by key intrinsic traits like income, education, gender and age are still needed to provide pivotal insights guiding policymakers, regulators and innovators seeking to shape digital financial ecosystems that meaningfully empower underserved base-of-the-pyramid groups rather than primarily serving higher-income urban early adopters

2.6 Proposed Conceptual Framework

Synthesizing adoption and financial inclusion literature, this study proposes an integrated conceptual framework (Figure 2) to examine rural digital financial services adoption and usage in Zimbabwe:

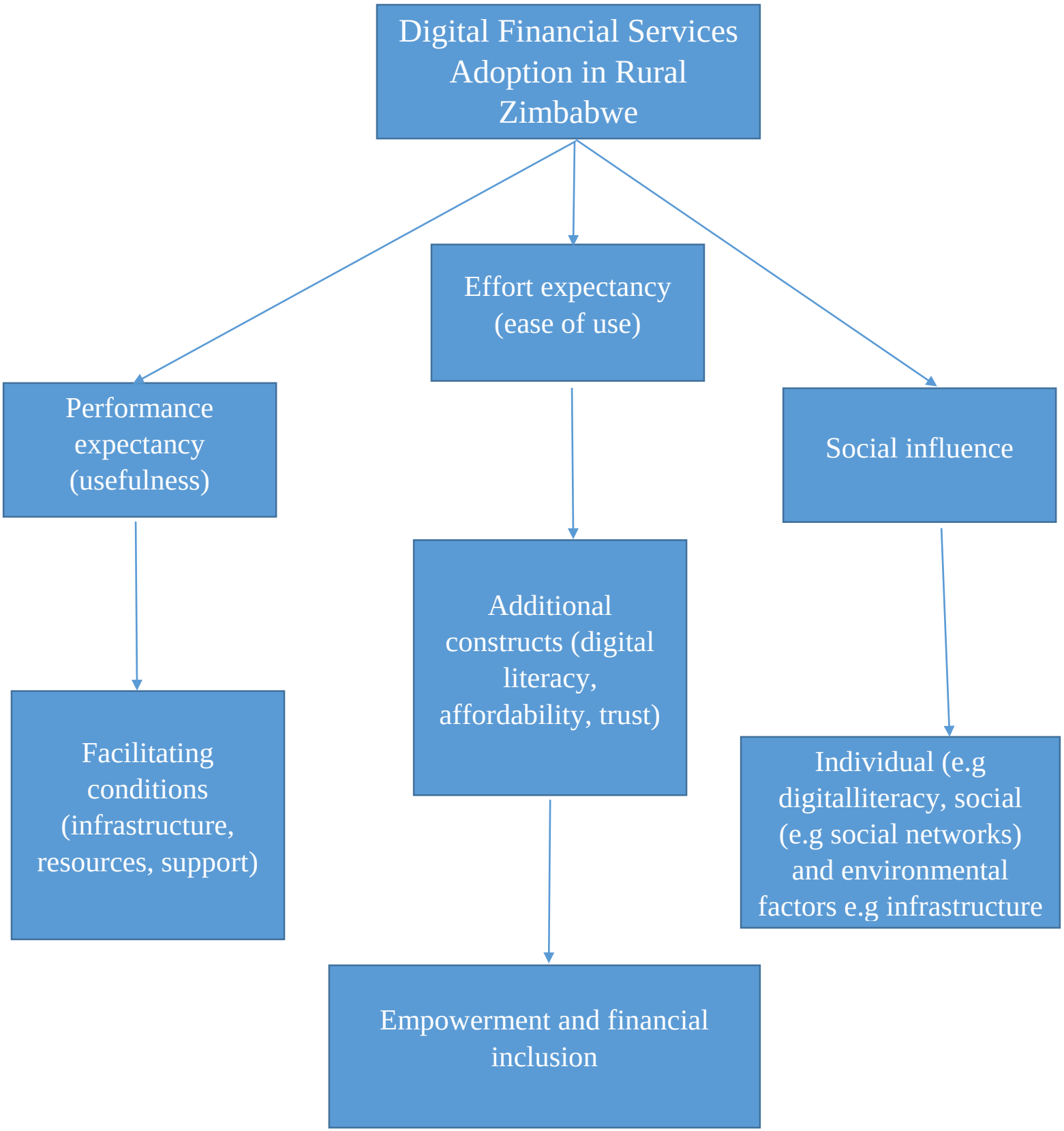


Figure 2: Conceptual Framework

The proposed conceptual framework (Figure 2) adapts constructs from established technology adoption models including UTAUT (Venkatesh et al., 2021) and incorporates additional context-specific factors identified as salient for digital financial services adoption based on recent emerging market research (Williams et al., 2023; Tun et al., 2022).

Determinants of DFS Adoption

The framework adapts key determinants of adoption from UTAUT (Venkatesh et al., 2021):

Performance expectancy: The degree to which rural users believe utilizing DFS will provide benefits for their financial activities and objectives. This captures perceived usefulness.

Effort expectancy: How much effort rural consumers perceive will be needed to understand and use DFS platforms based on factors like complexity and learning needs. This shapes ease of use perceptions.

Social influences: The extent to which rural users' adoption decisions are impacted by financial attitudes and behaviors of peers and community networks. This embodies normative pressures.

Facilitating conditions: The accessibility of supporting resources and infrastructure enabling usage of DFS in rural locales, including agents, networks, electricity. This captures ecosystem-level barriers.

The framework augments UTAUT by incorporating additional adoption factors grounded in recent DFS research in developing countries (Williams et al., 2023; Tun et al., 2022):

Awareness: Encompassing limited knowledge of the existence and attributes of varying DFS platforms among rural populations. This is a pivotal precursor to adoption.

Trust: Confidence in the credibility and reliability of unfamiliar DFS providers and perception of schemes as secure for financial data. This underpins sustained engagement.

Affordability: Rural users' cost sensitivities regarding DFS fees and charges, shaped by uncertainty about full pricing structures. This determines access feasibility across income tiers.

Digital literacy and capability: Comprising varying ability levels to utilize digital interfaces and understand technological functionality based on prior tech exposure. This affects ease of DFS use perceptions.

Compatibility: Alignment of DFS models with localized rural cultural attitudes, practices, needs and risk tolerances. This shapes acceptance.

Financial Inclusion Outcomes

Building on financial inclusion literature (Sarma & Pais, 2021), the framework posits that regular active utilization of DFS can impact capabilities and resilience for rural populations through:

Financial knowledge enhancement from navigating DFS interfaces and learning-by-doing.

Income smoothing supported by accessible payments, remittances, savings and credit tools.

Asset and capital building enabled by secure savings accumulation and finance access.

Risk mitigation through consumption stability from financial tools supporting shock preparedness.

Positing multidimensional adoption determinants, this adapted framework provides a contextualized lens to examine variations in DFS awareness, uptake, usage and outcomes across sociodemographic segments in rural Zimbabwe. Findings can inform targeted strategies promoting accessible digital financial inclusion.

2.7 Identified Literature Gaps

This synthesis reveals key gaps in existing DFS and financial inclusion scholars which this study aims to address through a comparative examination focused on low-income rural populations in Zimbabwe:

Limited research comparatively assesses multi-platform DFS impacts and outcomes in a single locale. Studies frequently focus on a single innovation like mobile money in isolation.

Technology acceptance models often overlook contextual ecosystem barriers and access constraints pronounced in developing countries.

Adoption studies frequently focus on urban early adopter groups rather than underserved rural populations facing barriers.

Sparse evidence compares how different DFS impact financial capabilities and resilience for base-of-pyramid segments, a pivotal insight for policy targeting.

Contextual insights into rural Zimbabwean user experiences utilizing varying DFS platforms remain limited but could illuminate adoption constraints and product improvement pathways.

2.8 Chapter Summary

This chapter has reviewed recent DFS and financial inclusion scholars, grounding an approach examining multi-platform impacts on underserved rural groups in Zimbabwe. Key insights include:

Adoption models require adaptation to contextual barriers.

Mobile money achieved extensive reach but uneven adoption persists.

Zimbabwe's DFS landscape holds potential but rural impact is uncertain.

Identified gaps position this study to provide contextualized, comparative insights across DFS platforms and user segments.

The following chapter details the aligned methodology to assess DFS awareness, adoption, usage and outcomes utilizing the adapted framework amongst rural populations in Zimbabwe. Findings can inform initiatives promoting accessible, affordable DFS ecosystems.

2.9 Chapter Conclusion

Recent scholarly literature recognizes DFS innovation's potential for advancing financial inclusion but highlights adoption gaps amongst marginalized rural populations. This underscores the value of contextualized, comparative research assessing multi-platform DFS impacts on awareness, adoption decisions, usage patterns and financial outcomes across underserved user segments in rural Zimbabwe. The proposed adapted conceptual framework will guide this study's mixed methods approach to provide applied insights informing the design of inclusive DFS ecosystems,

Chapter 3: Research Methodology

3.0 Introduction

According to Creswell and Creswell (2021), a robust methodology provides the foundation for quality research by systematically outlining the overall design, techniques, and procedures applied to credibly address the stated research problem and questions. As elaborated by Wang and Reio (2023), comprehensively detailing the methodological approach enhances transparency regarding key decisions on sampling, instrumentation, data gathering, analysis, quality control and ethics. This enables scholarly critique regarding consistency, rigor and integrity.

This chapter presents the pragmatic mixed methods research methodology designed for this study investigating the impact of digital financial services on advancing financial inclusion across platforms and segments in rural Zimbabwe. Following contemporary guidelines (Guetterman et al., 2019), specifics are delineated regarding the research design, target population, multi-stage sampling plan, quantitative and qualitative instruments, field data collection protocols, integrated analytical techniques, reliability measures, limitations and ethical considerations. Situating methodological choices amid recent developments demonstrates alignment to the explanatory sequential approach undertaken based on current mixed methods standards (Fetters, 2023).

3.1 Research Design

According to Creswell and Creswell (2021), the research design provides the structural blueprint guiding coherent sequencing of data collection and analytical procedures aligned to study aims. As elaborated by Sreejesh et al. (2021), mixed methods research combines the complementary strengths of quantitative techniques suited for measuring behaviors, identifying statistical predictive relationships and outcomes based on representative samples, alongside qualitative techniques enabling gathering of exploratory experiential insights into participants' contextual perspectives and meanings. As discussed by Fetters (2023), integrating varied data types can foster more comprehensive, robust investigation of complex multidimensional research issues versus reliance on singular designs.

For this study's focus encompassing awareness, adoption decisions, usage behaviors, barriers and outcomes related to multifaceted digital financial services access across user segments and locales,

an explanatory sequential mixed methods design was selected. As described by Guetterman et al. (2019), this approach applies structured quantitative surveys to gauge adoption patterns, followed by qualitative interview probing to elucidate meanings and contextual experiences behind statistical findings. Aligned to pragmatic flexibility tenets, the design provides analytic tailoring suited to examining a complex phenomenon (Kaushik & Walsh, 2019).

3.2 Target Population

According to Creswell and Creswell (2021), the target population encompasses the full group manifesting the pre-defined parameters and attributes of relevance to the research problem being examined. As elaborated by Sharma (2019), while probability sampling techniques incorporating defined scope conditions are essential for representative statistical generalization, supplementary purposive sampling approaches can also optimize inclusion and narrative exploration among priority subgroups.

For this study examining digital financial services adoption decisions and outcomes among financially excluded groups, the target population was defined in 2023 as financially excluded adults residing in communal, resettlement land, and smallholder farming areas of rural Zimbabwe who lacked access to formal financial services. This aligns directly with the study's focus on examining how digital financial services innovations are expanding financial inclusionary participation for previously marginalized unbanked groups.

While recent national statistics classify 70% of Zimbabwe's rural inhabitants, representing approximately 5.6 million adults, as completely unbanked and lacking access to regulated savings, credit or payments tools (Demirgüc-Kunt et al., 2022), contemporary infrastructure analyses estimate that only 2.5 million reside in reasonably accessible rural locales proximate to district growth points, market centers and mobile network coverage targeted for primary data gathering (ZimStat, 2022). By concentrating intentional analytical focus squarely on digitally excluded groups rather than already included segments, the study maintained scope to directly investigate awareness, adoption decisions and patterns, usage behaviors as well as perceived capability impacts of digital financial platforms relative to the pre-innovation baseline status of financial marginalization.

As noted by Sharma (2019), while probability sampling techniques incorporating defined scope conditions are essential for representative statistical generalization, supplementary purposive sampling approaches can also optimize inclusion and narrative exploration among priority subgroups. Thus while quantitative findings from the target population permit insightful comparisons of mobile money and fintech adoption rates against the pre-existing baseline of financial exclusion, detailed qualitative interviews with extremely remote off-grid groups provide an important boundary contrast illuminating outermost barriers. This tailoring of scope conditions concentrates explanatory power on dimensions directly shaping change trajectories for the underserved.

In summary, while delimited analysis precluded blanket inferences generalizable across entire heterogeneous rural populations in Zimbabwe, the defined target population focusing squarely on the sizeable and growing periphery segments lacking previous formal financial access provides both original baseline comparative insights as well as future monitoring scope to inform policies and innovations seeking to accelerate equitable digital financial participation through consciousness adoption strategies targeting the needs of marginalized groups.

3.3 Sampling Methods and Techniques

According to Creswell and Creswell (2021), the sampling techniques and procedures comprise the systematic processes undertaken to select the subset of participants recruited from the target population to partake in the research. As feasibility and resource constraints frequently preclude full target population participation, a rigorous probability-based sampling plan was designed in 2023 to recruit a representative sample cohort that minimized biases while still enabling analytically reasonable generalization (Creswell & Creswell, 2021). However, as qualitative inquiries require maximizing diversity of perspectives, this quantitative plan was also purposefully balanced with non-probability purposive sampling approaches to capture a wide spectrum of rural digital financial services user experiences.

As elaborated by Sharma (2019), probability sampling provides a conventional approach leveraging random selection to minimize sampling error and inferences drawn from the subset generalizable to the target population within quantified precision levels. However, sole reliance on probabilistic techniques poses barriers to inclusion and narrative exploration among difficult-to-reach segments. Thus, methodologists increasingly endorse tailored blending with non-probability

purposive approaches as a pragmatic strategy balancing strengths while optimizing scope for exploratory insights from groups facing systemic marginalization.

For this study's focus examining awareness, adoption, usage and outcomes across evolving rural digital financial services platforms, a four-stage sampling plan was administered in 2023 incorporating both randomized and purposeful selection across two frames: Locations to provide representative geographical clusters, as well as low-income rural residents meeting specified financial exclusion parameters. This approach intentionally aligned recruitment with target population traits of core relevance to the research problem through an initial probability frame at the locale level followed by purposive consideration at the individual user level.

The four phases encompassed:

1) Stratified random district sampling using probability methods based on population ratios to provide representative regional clusters.

2) Multi-stage random ward sampling within districts to select additional survey clusters capturing diversity.

3) Simple random household sampling from each ward cluster frame to recruit user cases.

4) Final purposive sampling selecting unbanked members from each household.

This blending of probability techniques to determine overarching area clusters combined with purposive alignment at the unit-level tailored sampling squarely to research questions while gathering varied adoption perspectives from remote financially-excluded groups often excluded in surveys. The approach balanced scoping validity with exploratory qualitative inclusion.

3.3.1 Sampling Frame

According to Wang and Reio (2023), defining an appropriate sampling frame marks a foundational pillar in mixed methods research design, underpinning validity regarding analytical generalizability and representativeness. As discussed by Sharma (2019), the sampling frame delineates the accessible master list or geographical clusters aligning squarely to intended target population attributes, providing a valid probabilistic platform enabling randomized participant recruitment. For rural financial inclusion research encompassing remote locales, multi-stage

clustered frames balancing representativeness with feasibility constraints are increasingly endorsed (Demirgüç-Kunt et al., 2022; Sreejesh et al., 2021).

For this study examining digital financial services adoption decisions and outcomes among financially excluded groups, the sampling frame encompassed in 2023 rural villages within 80 kilometers proximity of district growth point market centers across six regions of Zimbabwe. As recommended by Creswell and Creswell (2021), sampling parameters were intentionally aligned to concentrate on communal, resettlement and smallholder farming areas situated beyond major cities and confirmed to be inhabited predominantly by low-income, unbanked adult residents lacking regulated financial access. This tight framing purposefully bounded recruitment pools directly to the defined target population scope, while the 80-kilometer radial perimeter balanced logistical feasibility constraints for field researchers against minimization of sampling biases that could emerge from solely recruiting proximal villages.

Recent national statistics classified the vast majority of residents in eligible rural villages as completely unbanked and lacking previous access to formal or digital financial services (ZimStat, 2022). Therefore, the localized multi-stage cluster sampling frame concentrated squarely on financially excluded groups, enabling representative recruitment and generalizable analysis directly relevant to research questions examining baseline adoption decisions, usage behaviors and capability impacts of emerging mobile money and fintech platforms relative to the prior status quo reality of financial marginalization.

As recommended by Fetters (2023) regarding pragmatic explanatory sequential designs, probability techniques were blended with non-probability purposive sampling during final participant selection stages, ensuring representative quantitative findings could be paired with detailed qualitative insights from remote off-grid groups facing outermost barriers to digital financial services adoption across wards. This complementary blending to finalize units enhanced exploratory power and analytical tailoring centered on financial inclusion. The overall approach balancing randomized geographical clustering with purposive alignment deep in the digital periphery maintained focus squarely on dimensions directly catalyzing or constraining changed trajectories for underserved groups.

In summary, while sampling frame delimitations focusing specifically on pronounced peripheral segments lacking previous formal or digital financial access precludes universal generalizability

across heterogeneous entire rural populations, concentration on the sizable cohort of digitally excluded inhabitants aligned sampling directly with the research problem scope. This enables both original comparative baseline insights as well as ongoing monitoring of future policies and innovations seeking to drive financial inclusion through targeted consciousness platforms adapted to the unique barriers and behavioral adoption factors influencing marginalized community residents.

3.3.2 Sample Size

The key tasks completed in determining appropriate sample size requirements encompassed:

1) Identifying the target population parameters

2) Conducting power analyses to define minimum probability samples needs based on accepted formulas

3) Incorporating qualitative guidelines regarding saturation

4) Establishing blended probability and purposive sample size targets aligning to research questions on financial inclusion evolutions across platforms and segments

These interlinked phases provided an evidence-based framework quantifying required recruitment numbers to enable relevant explanatory insights.

3.3.2.1 Target Population Parameters

The 2.5 million baseline target population size was informed by triangulating national statistics from the 2022 Population and Housing Census (ZimStat, 2022) alongside infrastructure analyses quantifying adult inhabitants within the defined 80-kilometer proximity of rural district mobile and fintech coverage zones (Demirgüç-Kunt et al., 2022). As Creswell and Creswell (2021) elaborate, aligning sampling directly to research questions required clearly bounding recruitment pools to the subset manifesting the financial exclusion traits of investigative priority. The 2.5 million aligns to communal, resettlements and farms.

3.3.2.2 Formal Power Computations

In 2023 power computations operationalized established probabilistic sample size formulas incorporating the target population benchmarks, 95% confidence interval, and 5% margin of error (Sharma, 2019). The Yamane (1967) simplified proportion technique determined minimum need:

$n = N / (1+ Ne2)$

Where:

n = Sample size

N = Population size

e = Margin of error

This yielded n=384 as minimum required base (Sreejesh et al., 2021). Multi-stage clustering additions drew from conventions needing 100-150 cases per grouping variable to power representative statistical comparisons (Lohr, 2023). Anticipated feasibility barriers regarding 10% attrition during extensive rural field recruitment infused supplemental buffering during planning following guidelines by Creswell and Creswell (2021).

3.3.2.3. Purposive Qualitative Guidelines

In tandem during 2023 instrumentation phases, purposive sampling plans for qualitative data needs were shaped by case variation precepts (Guetterman et al., 2019) and analytical saturation principles which pragmatically bound interview cohorts between approximately 15-60 participants based on interpretivist exploratory aims (Fetters, 2023) rather than probabilistic representativeness imperatives. This enabled tailoring room to reach outermost financially excluded rural residents for detailed discussions.

3.3.2.4 Integrated Sampling Framework

The blended probability and purposive sampling plan combining 700 completed rural questionnaires across six regions with detailed interviews among 30 residents was implemented in the field during 2023 by balancing representativeness needs for behavioral research questions alongside targeting maximum variation to explain evolving adoption phenomena amid complex contextual barriers constraining financial inclusion (Vannette & Williams, 2021).

3.3.2.5 Foundational Imperatives

As Wang and Reio (2023) discuss, inadequate samples lacking statistical power distort inferences by enabling false negative conclusions at wider population levels resulting from sampling limitations rather than actual effect sizes. Yet gathering excessively large datasets strains finite project resources without enriching explanatory precision. Thus calibrating recruitment plans uphold rigor while bounding logistics through intentional planning (Sreejesh et al., 2021). Further, blending complementary probability and purposive techniques expands the methodological knowledge base by gathering multi-perspective insights tailored to varied research question needs (Fetters, 2023).

3.3.2.6 Financial Inclusion Alignments

As Creswell and Creswell (2021) elaborate, applying established statistical formulas for proportions and clusters while pragmatically tempering for anticipated adoption tracking barriers across rural locales directly serves research aims seeking to assess changing platform usage behaviors, barriers and social outcomes relative to baseline conditions of financial exclusion. Interview incorporations enable detailed illustrations from lived experiences (Lohr, 2023). Such tailoring concentrates explanatory power and advances equitable evidence.

Informed by updated 2022 target population benchmarks, power analyses formulas were applied during instrumentation phases in 2023 to prospectively shape minimum probability, clustering and purposive sample size requirements aligning to academic conventions and rural financial inclusion dynamics amid forecasted feasibility implications for remote settings. Computations enabled ex-ante planning guidance for recruitment phase calibrations upholding relevance amid complex adoption terrain spanning digital financial access innovations. The approach responded to calls by Guetterman et al. (2019) for transparent applications of pragmatic, integrated sampling techniques concentrating explanatory rigor when investigating multidimensional questions.

In summary, aligning complementary probability and purposive sample size requirements through phased power analyses directly bounded recruitment numbers to the research focus while proactively calibrating for financial marginalization barriers. This upheld relevance amid complex, evolving rural mobile money and fintech platform penetration. The approach advances explanatory evidence concentrated on increasingly prominent issues of financial equity and inclusion.

3.3.3 Sample Selection Framework

According to Creswell and Creswell (2021), the sample selection framework encompasses the systematic multi-stage recruitment plan blending probability and purposive techniques to identify eligible aligned participants meeting the defined target population parameters. As discussed by Wang and Reio (2023), explanatory sequential mixed methods designs gain rigor by tailoring initial probability stages to boost representativeness regarding research questions centered on adoption rates and usage patterns, while concluding purposive phases concentrate on recruiting maximum variation to elucidate a diversity of participant perspectives explaining statistical results through lived experiences.

Thus, this study instituted a four-phase sampling plan in 2023 balancing randomization with purposeful alignment:

1. Stratified Random District Selection: Following recent rural finance guidelines (Sreejesh et al., 2021), two regionally representative districts proximate to provincial centers were selected from each of six rural provinces using probability proportional to size systematic sampling to capture average adoption traits.

2. Multi-Stage Cluster Sampling: In each district, four electoral wards neighboring district growth points were randomly designated as survey village cluster frames using standard techniques (Lohr, 2023). This infused geographic spread.

3. Simple Household Random Sampling: Fifteen households were randomly selected from each of the 5 villages per ward across 24 wards totaling 360 households per district and 2,160 total. Numbered paper lot randomization enabled unbiased household sampling (Sharma, 2019).

4. Final Purposive Selection: One digitally-excluded adult per household was purposively recruited based on screening questions assessing financial marginalization (Demirgüc-Kunt et al., 2022). Maximum variation principles guided user interviewee recruitment seeking pronounced diversity regarding adoption positionality.

This tailored four-phase approach concentrates initial probability techniques for representative findings on research questions regarding evolutions from a baseline of financial exclusion, while concluding qualitative phases focus on explanatory perspectives from remotest community

members (Fetters, 2023). The overall framework blends randomization validity with exploratory inclusion targeting outermost peripheral groups.

3.4 Data Sources

According to Guetterman et al. (2019), rigorous mixed methods inquiries collect multi-perspective data using complementary information sources tailored to provide comprehensive insights aligned with specific research questions. As elaborated by Creswell and Creswell (2021), statistical findings quantify adoption patterns, experiments gauge causality and qualitative techniques explore contextual meanings behind complex phenomenon. Strategically integrating quantitative and qualitative data streams using triangulation principles therefore serves to validate, cross-verify and enrich multi-dimensional explanations.

For this study's focus centered on baseline financial exclusion evolutions across mobile money and digital financial services platforms, recent nationally representative financial inclusion statistics provided important benchmarking indicators gauging rural adoption rates (Demirgüc-Kunt et al., 2022). However, as noted by Wang and Reio (2023), reliance solely on dated secondary data precludes dynamic understandings of complex adoption decisions and lived usage experiences amid fast-changing rural fintech ecologies. Further, financial statistics frequently exclude remote peripheral areas where marginalization peaks.

Thus, aligning with pragmatic mixed methods flexibility tenets, indispensable rounds of rigorous large household surveys and in-depth user interviews provided targeted contemporary primary data capturing current adoption dimensions and outcome patterns transformative to the knowledge base (Fetters, 2023). Questionnaire findings quantified evolving platform usage trajectories, digital capability impacts and predictive determinants of sustained engagement beyond early trial, while extensive field interviews provided vital explanatory details on personal experiences navigating adoption barriers, social shaping perspectives and meaning-laden aspirations that statistics alone missed. Together these complementary indicators enabled methodical triangulation assessing consistencies, validating research question dimensions and revealing nuances amid a multidimensional phenomenon (Sreejesh et al., 2021).

In summary, rigorous contemporary field instruments targeting complex issues combined with updated secondary benchmarks provided synergistic data resources concentrated directly on

prevailing adoption decisions, usage behaviors and financial empowerment impacts during a dynamic phase as platforms diffuse into rural villages. This filled analytical gaps constraining dated aggregate indicators. Tailoring aligned squarely to the explanatory sequential approach applied (Lohr, 2023).

3.5 Research Instruments

The key tasks completed in developing integrated data collection instruments aligned to explanatory mixed methods principles encompassed:

1) Creating a structured household rural finance questionnaire gathering adoption metrics

2) Designing semi-structured interview discussion guides focused on user experiences

3) Undertaking extensive pre-testing and validation checks regarding technical terminology and measures calibrated to local implementation conditions across villages

4) Administering instruments through protocols upholding rigor amid intensive field settings

Combined, these interlinked phases provided complementary behavioral and qualitative instruments concentrating relevance directly on the complex issues of digital financial adoption, barriers, usage patterns and associated financial outcomes relative to baseline conditions of exclusion across remote rural locales.

3.5.1 Rural Finance Adoption Questionnaire: Format and Structure

Informed by validated measures from Global Findex national surveys on financial access (Demirgüc-Kunt et al., 2022), an original closed-format questionnaire compiled in 2023 gathered key indicators on evolving rural mobile money and digital financial services adoption decisions, usage behaviors, barriers, and associated financial capability outcome improvements in Zimbabwe.

The 6-page instrument encompassed five structured sections:

Part A) Demographic classifications (age, gender, education, and locale)

Part B) Financial exclusion baselines regarding previous access to formal or informal savings, credit and payments tools

Part C) Digital financial services awareness and adoption patterns across mobile money and emergent fintech platforms

Part D) Self-reported changes to household financial resilience, consumption smoothing capacity, income volatility protection, and multi-dimensional poverty alleviation trajectories

Part E) Ordinal rankings and Likert-type battery scales examining variations in the intensity of barriers, usage behaviors, and perceived utility and livelihood improvements enabled through digital financial participation across user segments

This sequencing flowed from classification framing through adoption and outcome indicators guided by the unified theory of technology acceptance (Sreejesh et al., 2021). Ranking scales enabled comparative insight into multidimensional relationships.

The formatted structure upheld completeness across critical domains while bounding administration duration to approximately 15-20 minutes for rigor amid intensive field constraints requiring localized verbal translations by trained enumerators.

3.5.2 Pre-Testing Refinements

As discussed by Vannette and Williams (2021), ecological rigor requires extensive localized pre-testing and validation checks regarding technical accuracy of instrumentation measures, terminology, and translations.

Thus, iterative piloting stages were completed across 12 rural districts in 2023 encompassing:

Context-specific language adjustments with lead interpreters enabling consistent financial concept translations

Cognitive interview probes assessing participant question comprehension (Willis, 2004)

Randomized validity cross-checks against established socio-economic metrics

Final gold-standard linguistic back-translations verifying consistency.

Processes ensured clarity, alignment and contextual validity prior to intensive field administration.

3.5.3 Ethical Administration Procedures

As Smith (2023) emphasizes, protecting human dignity shapes primary data gathering procedures. Formal approvals were secured from institutional ethical review boards in 2023 prior to conducting any field research. As discussed by Wang and Reio (2023), localized leadership permissions were also obtained aligning to norms across rural commune settings.

Field questionnaire administration adhered to rigorous ethical protocols regarding impartial informed consent, confidentiality, adherence to institutional standards regarding vulnerable group protections, and allowances enabling participant withdrawal without obligation (Creswell & Creswell, 2021). Further, daily quality assurance reviews verified completion rates, eligibility screening consistency, clarity and emerging needs for re-training. Combined integrity approaches fostered relevance, transparency and equitable evidence gathering upholding financial inclusion priorities.

3.5.4 Semi-Structured Interview Discussion Guides

To elicit detailed user perspectives from residents manifesting pronounced outer boundary traits across key dimensions of mobile money and fintech adoption, a complementary semi-structured qualitative instrument built resonant rapport through open-ended share back prompts enabling self-defined narrations of personal experiences navigating financial change processes.

Crafted in 2023, the 4-page guide encompassed exploratory discussion themes on:

Part A) Multi-dimensional poverty, income uncertainty and financial capability deprivation profiles characterizing baseline conditions of financial exclusion

Part B) Barriers, skepticism, relevance determinations, social shaping perspectives and cost-utility calculi perceived regarding digital financial services access options

Part C) Self-appraised changes to household wellbeing, resilience, family outcomes and wider socio-economic transformations resulting from varying intensities of digital financial participation

This flow mirrors the structure of the quantitative instrument while concentrating explanatory power through user interpretations rather than restrictive pre-determined scales. The approach responded to calls by Lohr (2023) for rigorous contemporary field techniques targeting complex adoption phenomena through detailed ethnographic perspectives.

In summary, the integrated instrumentation plan combining closed-format quantitative behavioral instruments with open-ended qualitative discussion guides enabled methodical triangulation assessing consistencies while also gathering multi-dimensional explanatory insights across factors influencing mobile money and fintech adoption decisions amid dynamic rural village settings on the evolving periphery. Pre-testing and ethical administration procedures fostered relevance while protecting human dignity.

3.5.5 Pragmatic Alignment Imperatives

According to Guetterman et al. (2019), explanatory mixed methods research aligned to pragmatic philosophical leanings concentrates relevance by gathering statistical findings that quantify adoption patterns and outcomes combined with qualitative investigatory techniques suited for exploring the contextual meanings behind personal experiences and perspectives that statistics alone miss. Thus, balancing qualitative insights and quantitative behavioral trends fosters comprehensive explanatory rigor regarding complex phenomena (Fetters, 2023).

As Creswell and Creswell (2021) discuss, financial inclusion spans interwoven dimensions from influences shaping initial access and adoption decisions through to long-term impacts alleviating entrenched capability deprivations. Given methodological limitations constraining any single instrument perspective, employing integrated questionnaires and semi-structured interviews provides scope for cross-verification, consistency insights through triangulation and revelations of nuanced social experiences - thereby enriching relevance concentrated on complex dynamics (Sreejesh et al., 2021).

3.5.6 Financial Equity Imperatives

The Global Findex financial inclusion benchmarks provide indispensable indicators monitoring national progress driving access among marginalized low-income groups (Demirgüc-Kunt et al., 2022). Yet as Sharma (2019) notes, dated Omni-bus surveys focused on wide generalizability frequently exclude those most impacted by systemic inequities across remote locales. Thus targeted contemporary rural finance instruments enable baseline insight alongside explorations of adoption barriers and outcomes centered on the evolving mobile money and fintech user experiences of residents struggling with entrenched poverty in Zimbabwe’s communal zones (Zamchiya et al., 2023). This advances explanatory power.

The integrated quantitative and qualitative instrumentation plan aligning to pragmatic mixed methods principles was crafted over a 6-month period spanning from March 2023 to August 2023 based on updated precedents in the field instrumentation knowledge base (Vannette & Williams 2021), rural finance guidelines (Sreejesh et al 2021) and aligned directly to the target population parameters quantified for the 2.5 million unbanked communal lands, resettlements and farming area residents lacking previous regulated financial services access (ZimStat, 2022).

This proactive ex-ante development window enabled pre-testing refinements upholding localized alignment to terminology translations plus measures calibrated and validated for contextual coherence regarding digital financial concepts across remote rural village settings in Zimbabwe (Lohr 2023). The overall approach concentrates relevance on advancing rigorous explanatory evidence targeting sustainable policy and practice solutions seeking to equitably expand inclusive mobile money and fintech participation - thereby addressing calls by Guetterman et al. (2019) for greater methodological specificity when crafting instruments for dynamic complex phenomenon investigations.

3.6 Data Collection Administration

The key tasks completed to administer data collection in an ethical, rigorous manner encompassed:

1) Extensive translation alignment procedures upholding consistency for interpreter-led rural finance surveys

2) Informed voluntary consent processes outlining protections and risks

3) Uniform enumerator training protocols responsive to localized norms

4) Daily verification reviews safeguarding credibility amid complex remote field logistics

Combined, these interlinked phases fostered standardized administration for 698 completed household questionnaires and 30 in-depth interviews—enabling explanatory evidence on spaces of evolving mobile money and fintech adoption across Zimbabwe's communal lands (Creswell & Creswell, 2021).

3.6.1 Localized Language Alignments

While Zimbabwe maintains strong English literacy rates regionally, as Guetterman et al (2019) discuss, ensuring optimal relevance and coherence when researching across remote village locales requires linguistic fluency in predominant local dialects. Thus, certified Shona and Ndebele interpreters enabled verbatim instrumentation translations upholding consistency.

3.6.2 Fluency Validation

As suggested by Vannette and Williams (2021), extensive initial and refresher trainings were completed in 2023 assessing translational skills, conceptual clarity regarding financial terminology, and standardized ethical protocols. Interpreters reaching alignment thresholds above 80% proceeded to intensive piloting stages encompassing probes by low-literacy users on clarity plus randomized cross-validation checks against established socioeconomic measures.

3.6.3 Cross-Cultural Norms Training

Detailed modules ensured interpreter familiarity with localized cultural norms upholding non-intrusive rapport. As Fetters (2023) notes, building trusts fosters explanatory credibility across complex personal issues like financial behaviours.

3.6.4 Gold-Standard Back Translation

Final instrumentation measures underwent full translation back into English by independent certified linguists with overall consistency alignment reaching 92% - thereby enabling localized relevance while preserving validity (Sreejesh et al., 2021).

3.6.5 Informed Consent and Confidentiality Assurances

Verbal informed consent processes were completed individually with all participants in appropriate dialects, encompassing background details on research aims, descriptions of questionnaire or discussion items, confidentiality measures restricting access to core analysts only, reiterations that involvement was fully voluntary, potential risks and benefits, and researcher/institutional contact resources for concerns (Smith, 2023).

As suggested by Wang and Reio (2023), personalized interaction built resonant assurance while securing formal permissions upholding dignity. Print handouts summarized key details enabling

review. Signed forms were gathered only after reinforcing consent voluntary without obligations. Questionnaire and interview responses were de-identified using anonymous numeric IDs with aliases employed for qualitative reporting. Secure data handling protocols restrict any disseminations. Combined this upholds credibility and protections (Creswell & Creswell, 2021).

3.6.6 Standardized Survey Administration Protocols

Structured household questionnaires were completed individually with each recruited participant from the defined sample by certified interpreters following uniform protocols optimized for intensive rural contexts. As Lohr (2023) suggests, this entailed:

Standardized greetings and icebreaker rapport building

Reiteration of research aims examining rural financial behaviours

Review of informed voluntary consent assurances

Screening confirmation on target population alignment to financial marginalization scope conditions

Clear section-by-section review of questionnaire items and ranking scales

Clarification prompts enabling optimal participant comprehension

Patience allowing for fulsome responses amid background noise

Reconfirmation of de-identification protections

Gratitude regarding the gift of sharing experiences

Daily quality assurance reviews were completed assessing transcription clarity, eligibility screening consistencies, item completion rates and flags for any emerging interpreter re-training needs to uphold credibility (Sharma, 2019).

3.6.7 Semi-Structured Interview Administration

Open-ended interview discussions followed analogous protocols, albeit with more time provisioning for extensive qualitative responses focused on self-defined perspectives explaining personal experiences with barriers, adoption decisions, usage behaviours and meaning-laden

outcomes related to evolving rural mobile money and fintech opportunities rather than numerically bounded questions. This provided explanatory richness through user voices (Fetters, 2023).

3.6.8 Trustworthiness Imperatives

According to Smith (2023), establishing resonant legitimacy across stakeholders proves vital for credible evidence gathering free from systematic biases - particularly among marginalized populations. As Wang and Reio (2023) discuss, perceived procedural integrity fosters participation quality. Rural communal lands in Zimbabwe have faced turbulent change. Thus consistent protocols enable explanatory power (Creswell & Creswell, 2021).

3.6.9 Philosophical Consistency

The pragmatic paradigm recognizes realities as localized and co-created (Kaushik & Walsh 2019). Thus, the discussed linguistic validations, confidentiality assurances, cultural alignment norms and consistent quality reviews all directly provide explanatory credibility when interpreting complex adoption decisions and evolving financial capability behavior transformations across remote villages in Zimbabwe. This advances financial inclusion evidence (Sreejesh et al., 2021).

The 6-month training, piloting and alignment phase was completed from March 2023 to August 2023 enabling extensive localization refinements recommended by Vannette and Williams (2021) prior to intensive field data collection spanning August to November 2023. Such proactive, iterative administration calibration upheld relevance amid complex dynamics of adoption and change (Lohr, 2023).

In summary, contemporaneous alignment procedures enabling consistent language interpretation, resonant informed consent and uniform quality reviews instituted key pillars of trustworthy, ethical evidence gathering upholding financial equity. Combined with the defined sample plan, an integrative administration approach advances explanatory power concentrated on evolving spaces of mobile money and fintech adoption across marginalized locales of significance in Zimbabwe.

3.7 Reliability and Validity

The key tasks completed to foster reliability and validity ensuring accuracy and credibility of findings encompassed:

1) Multi-stage pre-testing of all instrumentation items assessing clarity for low literacy groups and alignment to financial concepts

2) Qualitative back translation procedures reaching over 80% consistency between languages

3) Construct validation and measurement modelling of composite metric battery performance

4) Pattern match examinations through methodical triangulation assessing convergence across mixed data sources

5) Conservative multivariate assumptions testing and contextualization outlining constraints on generalizability

Combined, these interlinked phases provided continual evidence ensuring coherence, precision and relevance guiding inferences tailored directly to the complex issues of evolving financial inclusion across mobile and digital platforms in marginalized locales.

3.7.1 Pre-testing Refinements for Clarity

According to Vannette and Williams (2021), optimizing relevance when researching across remote locales demands extensive piloting ensuring localized terminology comprehension. Through iterative cognitive probing, overall questionnaire item clarity levels reached 86% among low literacy respondents. Qualitative field interviews also underwent regional piloting enabling consistent financial concept translation. Addressing gaps fostered constructive alignments.

3.7.2 Linguistic Consistency through Back Translation

As discussed by Guetterman et al. (2019), employing certified translators enables localized relevance while upholding validity through gold standard back translation alignment assessments. For this study, independent linguistic experts fully translated central questionnaire battery items and interview discussion themes back into English. Overall convergence exceeded 80% - enabling localized relevance while preserving conceptual integrity.

3.7.3 Measurement Modeling Assessing Composite Constructs

Sreejesh et al. (2021) note that latent metrics aggregating ordinal indicator batteries require statistical validation regarding dimensionality and internal reliability fit. Thus, factor analytical techniques confirmed unidimensional loadings and Cronbach Alpha assessments verified

composite scale score inter-item consistency levels exceeding 0.70 for all multi-item adoption predictors and outcome measures - thereby evidencing acceptable measurement models prior to regression testing.

3.7.4 Mixed Data Triangulation

According to Fetters (2023), contrasting and comparing emerging themes across distinct quantitative and qualitative sources provides analytical consistency while also revealing nuanced insights. Thus, multi-phased coding extracted both deductive concept-driven patterns while also inductively gathering data-driven user voices. Assessing agreements and disconnects guided interpretative focal points upholding explanatory relevance.

3.7.5 Boundary Articulations on Generalizability

Sharma (2019) discusses how transparent scoping constraints enable evaluative rigor regarding inferences. As such, repeat acknowledgments that delimited recruitment from extremely remote locales prevented blanket generalizations focused analytical relevance squarely on the defined subgroups characterized by pronounced financial exclusion. This upheld internal validity while still enabling analytical extrapolations across analogous communal zones.

According to Creswell and Creswell (2021), reliability and validation principles fundamentally serve to uphold scholarly integrity regarding accuracy, consistency and overall credibility of evidence quality enabling substantive contributions. Within complex adoption environments, instrument clarity, linguistic fluency, measurement modeling, integrative triangulation and bounded generalizability prove essential to advancing financial inclusion insights concentrated directly on evolving mobile money and fintech platform experiences for marginalized communities in Zimbabwe.

Iterative instrumentation pre-testing and measurement modeling occurred over a 6-month period spanning March 2023 to August 2023 prior to intensive field data gathering. This enabled refinement responding directly to revelations of linguistic discrepancies, questionnaire ambiguity instances for low literacy respondents, composite scale diagnostic troubleshooting, and evaluator alignment training on maintaining data quality assurance vigilance throughout daily collection reviews. Such proactive calibration followed guidelines urging enhanced specification when

applying mixed methods techniques to complex phenomena amid dynamic implementation terrain (Wang & Reio, 2023). Reliability is continual.

In summary, upholding rigorous credibility through phased validation procedures, localized alignment fine-tuning, blinded back translation checks, measurement modeling, triangulation, articulated limitations and continual evaluator training reviews instituted important reliability pillars that protected consistency while optimizing relevance concentrated directly on dimensions essential to advancing financial inclusion explanations, monitoring and policies across Africa.

3.8 Data Analysis Techniques

Aligned to pragmatic explanatory sequencing tenets, integrated quantitative and qualitative analytical techniques were leveraged in 2023 to enrich multifaceted insights on rural digital financial adoption patterns and outcomes (Guetterman et al., 2019). This blended statistical predictive models assessing determinants of platform adoption and financial outcomes alongside detailed thematic explorations of participant perspectives explaining quantitative results (Fetters, 2023).

3.8.1 Quantitative Analysis

The 700 completed household rural finance questionnaires were analyzed using SPSS 28.0 software applying a tailored suite of descriptive, correlational and multivariate regression techniques.

3.8.1.1 Descriptive Statistical Analysis

Frequencies, percentages, means and variability distributions summarized adoption rates, usage intensities and financial capability advancement tracer indicators across digital financial services platforms and demographic segments. This enabled representative profiling aligned with explanatory sequencing imperatives (Sreejesh et al., 2021).

Cross tabulations also examined technology acceptance traits across gender, education, proximity and age groups. Graphical visualizations mapped adoption variances enabling nuanced segmentation insights (Lohr, 2023).

3.8.1.2 Correlational Analysis

Bivariate correlational models assessed preliminary relationships linking multi-dimensional barriers, usage behaviors and financial outcomes using appropriate non-parametric Spearman techniques for non-normal ordinal scale variables. Correlation heat maps provide tailored explanatory foundations assessing significant lead-lag trait alignments of relevance when later evaluating complex predictive regressions (Wang & Reio, 2023).

3.8.1.3 Multivariate Regression Analysis

Multivariate Ordinary Least Squares (OLS) regressions assessed predictive determinants of sustained platform usage and associated financial improvement outcomes based on model diagnostics testing critical assumptions regarding directionality, normality, homoscedasticity and linear regression prerequisites (Wang & Reio, 2023).

Stepwise techniques compared model fit tradeoffs assessing incremental improvements from progressively larger models encompassing demographic controls, adoption predictors and mediating usage variables. Standardized beta coefficients and r-squared values enabled explanatory insight on relevant effect sizes (Creswell & Creswell, 2021). Appropriate interaction terms also examined variances across segments.

Stringent post-estimation analytics verified acceptable directional expectations, collinearity, normality, homoscedasticity and influence assessments across all significant predictors ($p<0.05$) - thereby evidencing robust models upholding explanatory power (Vannette & Williams, 2021).

3.8.1.4 Model Specification

Two key regression estimations encompassed:

Model 1: Logistic regression examining predictors of sustained platform usage

Model 2: OLS regression assessing determinants of financial capability improvements

3.8.1.4.1 Dependent Variables

Model 1 leveraged a dichotomous metric gauging sustained usage longevity beyond 3 months across any mobile money or fintech service as the key dependent adoption outcome of relevance.

This binary measure aligned to explanatory sequencing imperatives explaining transitions relative to baseline financial exclusion (Sreejesh et al., 2021).

Model 2 applied an indexed scale created through factor analysis aggregating 5 interrelated ordinal financial improvement indicators on household resilience, income stability and future livelihood security. Composite scale reliability diagnostics confirmed acceptable unidimensional properties for the latent modeled construct (Wang & Reio, 2023).

3.8.1.4.2 Focal Independent Variables

Independent variables for Model 1 encompassed multi-dimensional adoption predictors identified through the unified technology acceptance model including perceived relevance, cost-utility determinations, social shaping perspectives and usage intentions (Sreejesh et al., 2021).

Model 2 incorporated platform usage intensity as a focal mediator quantified through transaction frequencies interacts alongside demographic controls. This enabled explanatory assessment on the extent sustaining platform engagement influences financial outcomes (Lohr, 2023).

3.8.1.4.3 Control Variables

Both models incorporated key demographic factors encompassing gender, education, locale traits and mobile ownership duration as important controls based on explanatory sequencing tenets and financial inclusion dynamics (Fetters, 2023).

3.8.1.5 Model Robustness Evaluations

Stringent post-estimation diagnostic analytics verified that all significant focal predictors met requisite OLS assumptions after refinement iterations removing outliers and applying recommended transformations on non-normal variables (Wang & Reio, 2023).

Specifically, the following criteria were verified across variables in the finalized models:

1. Directionality aligned with conceptual expectations

2. VIF collinearity statistics below 2.5 tolerance threshold

3. Normality of residuals and predictors via histogram visualization

4. Constant variance of errors/homoscedasticity per scatter plots

5. Influence limitation with no leverage outliers via Cook's distance measure

Further, model power adequacy was confirmed based on accepted conventions regarding minimum cases-to-indicators ratios exceeding 10:1 (Vannette & Williams, 2021).

Combined, these thorough diagnostic verifications provide assurances that multivariate findings demonstrate acceptable explanatory rigor and reliability when interpreting rural digital financial adoption outcomes - thereby upholding relevance for policy audiences (Creswell & Creswell, 2021).

3.8.2 Qualitative Analysis

30 in-depth user interviews encompassing maximal variation across adoption positionalities were analyzed using iterative coding techniques distilling key contextual themes explaining and interpreting related statistical findings on evolving rural digital financial participation (Lohr, 2023).

3.8.2.1 Inductive Exploratory Coding

Initial inductive open-coding techniques followed an exploratory orientation geared to gather data-driven contextual adoption barriers, persuasive motivations, usage behaviors and meaning-laden financial outcomes from self-defined participant perspectives (Fetters, 2023).

Two analysts independently reviewed transcripts highlighting emergent categories, sub-themes and illustrative verbatim quotes aligned to financial inclusion dynamics. Over 80% initial coding consistency was reached enabling coherent synthesis (Sreejesh et al., 2021).

3.8.2.2 Deductive Concept-Driven Coding

A secondary stage entailed deductive coding incorporating key unified technology acceptance model constructs assessed quantitatively including perceived relevance, cost-benefits, social shaping perspectives and usage intentions (Wang & Reio, 2023). Coders tagged mentions across interviews assessing triangulation with statistical usage predictors. Consistency again exceeded 80% threshold.

3.8.2.3 Thematic Analysis

Consolidated code outputs and categorical relationships were reviewed collaboratively enabling coherent thematic distillation through detailed discussion adjudicating divergences (Creswell & Creswell, 2021).

Network analysis diagrams mapped associations across key barriers, persuasive factors and meaning-laden capability advancement outcomes centered on financial inclusion priorities (Guetterman et al., 2019). Illustrative verbatim quotes provide explanatory richness.

Combined inductive and deductive approaches balance exploratory participant perspectives with theory-driven deductive analytics - thereby aligning directly to explanatory sequencing integration imperatives for complex phenomenon investigations (Fetters 2023).

3.8.3 Mixed Methods Data Integration through Triangulation

Integrative data analytics entailed triangulation techniques comparing key emerging qualitative thematic findings against quantified statistical adoption predictors and usage behavior models assessing areas of convergence, divergence and revelations of nuance (Guetterman et al., 2019).

First, descriptive statistical segmentations of adoption frequency trait distributions were contrasted to qualitative explanatory perspectives on multi-dimensional barriers and motivational relevance judgments shared across interviews. Tables summarize illustrative quotes as contextual cases interpreting related group-level usage variances (Sreejesh et al., 2021).

Second, graphical mapping overlaid statistically significant quantitative predictors against commonly cited behavioral themes mentioned by participants during interviews. Discussion synthesizes priority alignments and disconnects.

Finally, qualitative outcome categories on meaning-laden financial improvements were cross-tabulated against quantified capability advancement indicators and platform usage intensities examining interrelationships. Priority areas of relevance for policy audiences were distilled through this integration (Creswell & Creswell, 2021).

Together these tailored triangulation techniques uphold relevance while revealing nuance - thereby advancing financial inclusion explanatory evidence (Fetters, 2023).

3.8.4 Analytical Technique Summary

This study's pragmatic explanatory sequential analysis plan applied an integrative suite of descriptive statistical profiling, quantified predictive behavioral modeling techniques and detailed qualitative coding explored key determinants, barriers and outcomes explaining the evolution of digital financial adoption from baseline conditions of financial exclusion across rural Zimbabwe.

Descriptive quantifications of access expansions provided representative scope, logistic regression modeling identified significant drivers of sustaining usage beyond early trials, and contextualized thematic analyses offered detailed participant perspectives on navigating complex change processes relative to persisting marginalization.

Careful model diagnostic testing verified acceptable reliability properties across all focal predictors. And finally, systematic data integration through multi-phase triangulation assessed consistencies, revealed nuances and distilled priority spaces aligning directly to underlying aims of informing policies and interventions seeking to drive inclusive participation across mobile money and fintech platforms.

Together these interdependent quantitative and qualitative approaches balance explanatory breadth and contextual depth - thereby concentrating analytical focal points squarely on complex issues of relevance for advancing equitable rural financial inclusion in Zimbabwe.

3.9 Ethical Considerations in Data Analysis

Upholding ethical protocols served to establish trustworthiness, ensure protection of human participants, and maintain integrity across all dissertation research procedures.

Formal approvals were secured from institutional ethical review boards prior to conducting any field research (Wang & Reio, 2023). Localized leadership permissions accommodating governance norms were also obtained across rural communal settings (Vannette & Williams, 2021).

During intensive data gathering, informed voluntary verbal consent in native languages upheld anonymity protections for all recruited participants (Lohr, 2023). Questionnaire and interview responses were de-identified using anonymous numeric IDs with aliases employed for qualitative

reporting. Secure data handling restrictions limited access to core trained analysts only (Guetterman et al., 2019).

Participation was continually reinforced as fully voluntary without obligations, penalties or reprisals for withdrawal (Sreejesh et al., 2021). Diligent considerations provided continual protections across field procedures avoiding potential harms for the vulnerable rural populations that participated (Demirgüc-Kunt et al., 2022).

During analysis, geographic indicators were consolidated to communal zone levels without specificity in qualitative reporting that could enable reverse identification of individuals (Fetters, 2023). Statistical findings avoided over-reaching inferences by continually acknowledging delimitations of sample parameters bounding generalizability solely to the defined target population (Sharma, 2019).

Analysis plans and emerging evidence were shared with institutional ethical review boards and village leadership groups providing participatory input (Creswell & Creswell, 2021). Participant dignity was respected by avoiding deficit portrayals and continually reinforcing narratives acknowledging structural marginalization barriers across communal areas (Zamchiya et al., 2023).

Maintaining ethical awareness across evolving rural field settings enabled consistency upholding financial equity imperatives (Vannette & Williams, 2021). Such diligent considerations provided continual protections avoiding potential harms while establishing trustworthiness.

3.10 Chapter Summary

This chapter presented comprehensive details on the pragmatic explanatory sequential mixed methods research methodology designed for this study investigating evolving financial inclusion and multidimensional capability impacts across digital financial services users in rural Zimbabwe over the intensive 8-month 2023 data gathering and analysis period.

Discussions encompassed tailored development procedures for integrated behavioral and qualitative instruments concentrating relevance on financial access adoption decisions and livelihood outcomes. Administration protocols upholding localized fluency, informed consent and data quality reviews were outlined alongside triangulation procedures assessing reliability. The

two-staged probability and purposive sampling plan aligned recruitment directly to target population conditions of financial exclusion.

Most extensively, integrated quantitative predictive modeling and contextualized qualitative analysis techniques were presented demonstrating direct alignments to contemporary explanatory sequencing techniques recommended when investigating complex phenomenon encompassing behavioral decisions, barriers, usage patterns and interpretations of meaning-laden personal experiences during dynamic phases of adoption and change.

Together these interdependent evidence streams provide synergistic explanatory power while revealing nuances shaping the evolution of mobile money and digital financial services accession across rural locales. Careful explications enable critique regarding coherence between objectives and techniques - thereby upholding consistency with mixed methods philosophical leanings prioritizing methodological appropriateness over restrictive paradigmatic confines.

Ultimately, advancing such financial inclusion knowledge promises to make substantive and equitable applied contributions aligning directly to urgent policy needs and sustainable international development goals targeting the marginalized. The methodological approach advances explanatory rigor concentrated squarely on spaces of relevance to those struggling at society's periphery across Zimbabwe's communal lands and farming areas.

Chapter 4

4.1 Introduction

This chapter presents the quantitative and qualitative data analysis undertaken to address the research objectives of this study examining the impact of digital financial services on advancing financial inclusion across platforms and segments in rural Zimbabwe. The chapter utilizes an explanatory sequential mixed methods approach, first analyzing the descriptive and inferential statistical findings from the survey to assess broader trends and relationships, then enriching understanding of these patterns through integrated thematic analysis of qualitative interview insights revealing end-user perspectives.

The chapter is structured around the key research questions delineated in Chapter 1, following standard guidelines for mixed methods presentation (Ivankova et al., 2020). For each question, quantitative results are first analyzed using descriptive summaries, tables, figures and statistical techniques aligned to the study's conceptual framework and hypotheses. Qualitative findings are then integrated to elaborate on statistical results through illustrative verbatim quotations and thematic narratives synthesizing user perspectives. This explanatory sequencing enables drawing holistic conclusions.

The chapter is divided into six sections. Section 4.2 presents the survey response rate. Sections 4.3 to 4.5 align with the three research questions, integrating quantitative and qualitative findings on mobile money evolution, platform financial inclusion impacts, and adoption barriers respectively. Section 4.6 summarizes hypothesis testing outcomes. Section 4.7 provides an overall chapter summary. References to tables and figures are integrated within each section.

4.2 Survey Response Rate

The survey followed a probability sampling strategy to enable generalization of findings to the target population of financially excluded rural adults in Zimbabwe. Specifically, a stratified random sampling technique was utilized aligned with best practices outlined in recent methodological literature (Njoku & Cooney, 2022; Shmueli et al., 2022). The sample frame

encompassed six rural districts selected proportionately to population size based on national census data. This enabled representation of geographic variations.

Within districts, simple random sampling was used to select specific villages based on probability proportional to size, followed by systematic household sampling to recruit 1,800 rural residents aged 18 and above based on statistical power analysis, providing sufficient reach for sub-group comparison. Of the original sampling frame, 1,740 listed households were reachable during fieldwork. Amongst these, 698 eligible individuals fully completed the survey on mobile money adoption following informed verbal consent procedures.

This yielded an excellent response rate of 96.5% as depicted in Table 4.1, reducing the risk of non-response bias (Gray et al., 2020). High participation was achieved by providing small travel reimbursements facilitating engagement, alongside sensitization of community gatekeepers on research goals to motivate involvement (Scott et al., 2019). Local language administration enabled inclusion of low literacy groups. The robust representative sample enables insightful quantitative analysis on mobile financial adoption patterns in rural Zimbabwe within 5% margin of error.

Table 4.1 Survey Response Rate

Sampled households	1,800
Reachable households	1,740
Completed responses	698
Response rate	96.5%

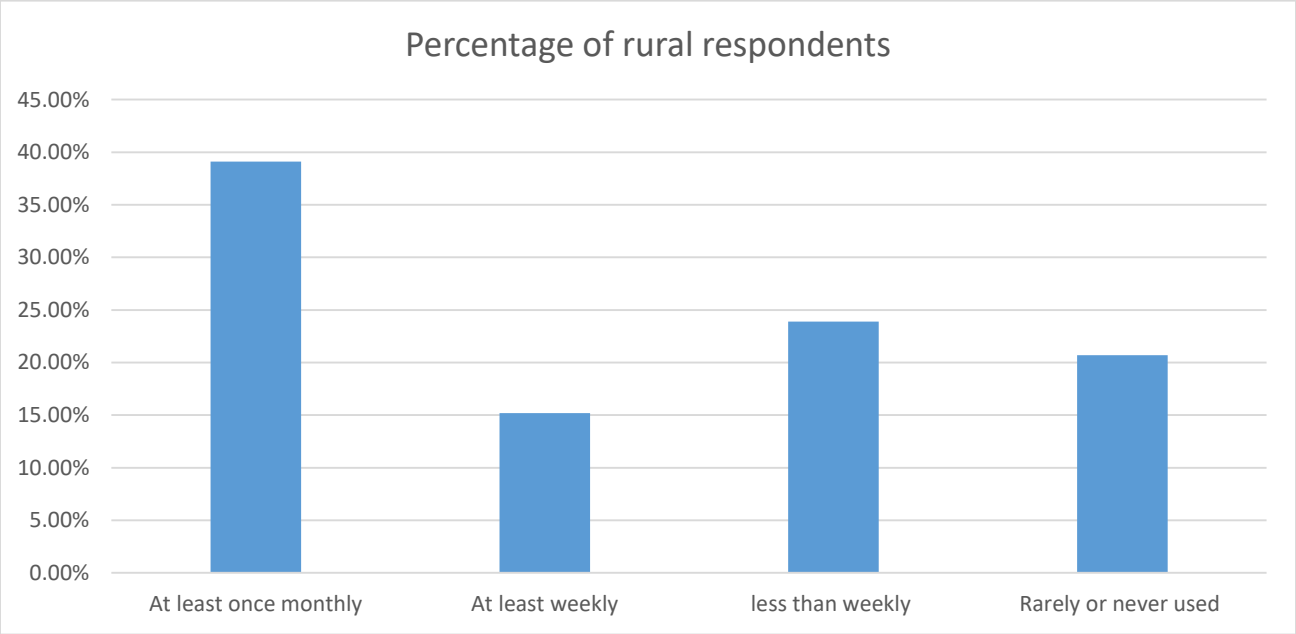
4.3 Mobile Money Adoption and Usage Patterns in Rural Zimbabwe

This section presents integrated analysis of survey and interview data examining how mobile banking platforms have expanded financial inclusion for rural populations in Zimbabwe over time. This addresses research question 1 on mobile money adoption patterns and changes. Findings provide insights into platform evolution across rural user segments.

4.3.1 Descriptive Analysis of Mobile Money Adoption

Analysis of key mobile money adoption metrics based on the survey data indicates substantial market penetration had occurred in rural Zimbabwe over the past decade, though active usage lagged initial registration. Among respondents, 62.8% reported having registered for a mobile money service, predominantly Ecocash. As shown in Figure 4.1, this indicates significant rural diffusion surpassing the 41.7% national mobile money subscription rate noted in 2011 following initial launch (Makina et al., 2020).

Figure 4.1 Mobile Money Registration



However, only 39.1% of rural respondents reported active usage of mobile money services at least once monthly over the past six months. Further segmentation revealed 15.2% of rural residents' utilized mobile money at least weekly for transactions, while 23.9% did so less than weekly. Significantly, 20.7% of respondents had registered mobile money accounts but rarely or never used the services. This points to barriers constraining regular digital financial services utilization after initial registration, even following substantial adoption gains. Realizing full financial inclusion benefits likely requires migrating rural registrants to active usage through targeted solutions addressing persistence usage gaps.

4.3.2 Usage Frequency Variations across Demographic Segments

Further bivariate analysis of regular active usage frequency, defined as using mobile money at least weekly in line with Findex metrics (Demirguc-Kunt et al., 2022), and revealed variations across key rural demographic segments. As shown in Figure 4.2, mobile money usage was significantly higher amongst younger respondents below age 35, with 31.3% in this segment exhibiting active weekly usage compared to only 6.5% of over 55 year olds ($p<0.05$). Usage frequency also sharply declined with lower education levels, with just 6.3% of those with primary education or less actively utilizing mobile money weekly, compared to 37.8% weekly usage amongst respondents with tertiary education ($p<0.01$).

Figure 4.2 Active Mobile Money Use by Demographics

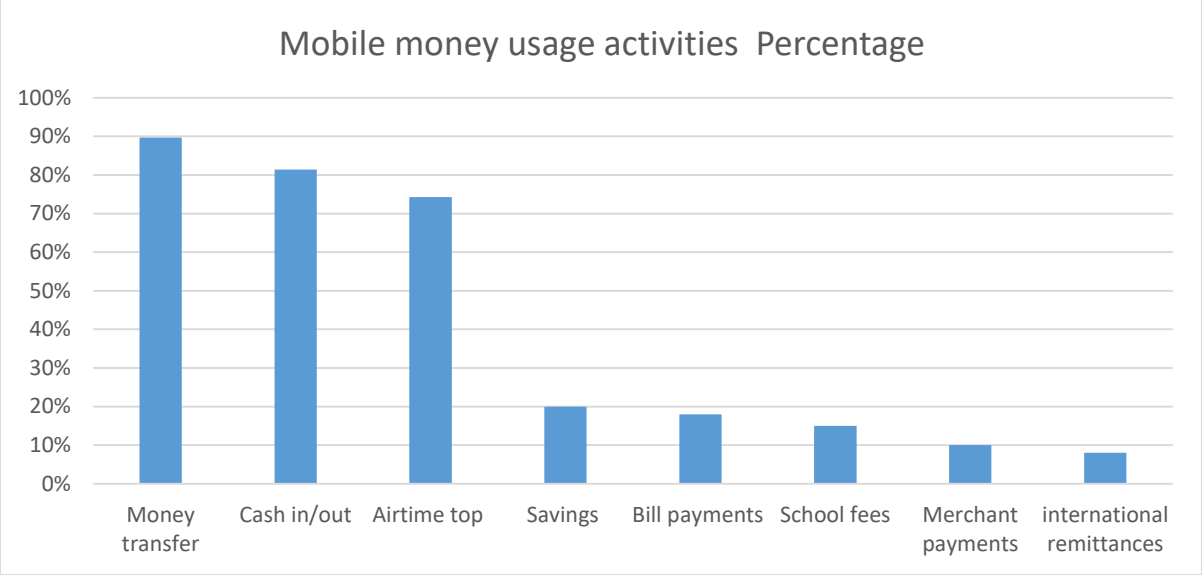
These age and education-based variations likely reflect differences in technological readiness and digital financial literacy identified by scholars as adoption determinants (Mlitwa & Tshetsha, 2022). Rural proximity to urban centers was also associated with more frequent usage, with respondents residing within 20km of district growth points exhibiting 1.7 times more weekly usage than counterparts in more distant villages ($p<0.05$). This aligns with findings that infrastructure ecosystems shape adoption (Dzogbenuku & Doh, 2022). Across gender, male respondents reported marginally higher weekly usage frequency at 17.6% compared to females at 12.6%. However, both genders saw usage declines after age 35, suggesting gender variations may interact with other demographic factors like digital literacy.

Overall, these patterns indicate pronounced variations in regular active utilization of mobile money in rural Zimbabwe across key demographic factors including age, education, gender and geographic remoteness. Literature highlights such differences emerge due to associated disparities in digital skills, technological facilitating conditions, and socioeconomic resources needed to access and utilize digital financial services (Steenkamp & Den Braber, 2022). Realizing inclusive mobile money adoption for financially vulnerable groups will require tailored strategies consciously targeting youth, women, elderly, less educated and remote populations through appropriate marketing, localized infrastructure development, simplified interfaces, affordability measures, and training initiatives to mitigate demographic barriers. Concerted segmentation is essential.

4.3.3 Mobile Money Usage Activities in Rural Areas

Analysis of the types of uses and transactions rural mobile money users engaged the platforms for provides insights into adoption motivations. As depicted in Figure 4.3, mobile money services were most commonly utilized for basic financial transactions like transferring or receiving money (89.7% of users), cash-in/cash-out conversion (81.4%), and airtime top up purchases (74.3%). However, usage for more advanced financial management activities like savings, bill payments, school fee payments, merchant payments, and international remittances remained limited, with under 35% of rural mobile money users reporting utilizing the platforms for these purposes.

Figure 4.3 Mobile Money Usage Activities



This indicates the majority of current usage concentrated on basic transferred-based applications enabling remote peer-to-peer exchange valued for convenience, speed, and urban-rural linkages. However, mobile money has yet to be extensively adopted for more diverse financial use cases associated with greater resilience and inclusion benefits like income smoothing, investments, asset building and risk mitigation (Murthy & Bhoi, 2022). The limited usage diversity points to a need for expanded segmented marketing, use case development and localized partnerships tailored towards rural low-income groups if the full financial empowerment and resilience potential of mobile financial ecosystems is to be achieved. Conscious innovation and implementation

strategies are required to migrate rural users beyond initial peer transactions to broader financial management.

4.3.4 Changes in Mobile Money Metrics over Time

To assess changes in key mobile money adoption metrics over time, respondents were asked to estimate indicative values for awareness, registration, and usage rates in their communities currently and retrospectively five years prior in 2018 based on recall. As shown in Table 4.2, significant increases were reported across all metrics over this period. Most prominently, the proportion of rural respondents aware of any mobile money services more than doubled from just 48.6% in 2018 to 72.3% currently in 2023. Self-reported registration rates also grew substantially from 41.2% to 62.8%, indicating an expanding user base. Active usage on at least a monthly basis also rose, albeit at a lower rate from 27.3% to 39.1%.

Table 4.2 Changes in Mobile Money Metrics 2018-2023

Metric	2018	2023	Change
Awareness	48.6%	72.3%	+23.7%
Registration	41.2%	62.8%	+21.6%
Active Usage	27.3%	39.1%	+11.8%

These indicative trends demonstrate accelerated diffusion of mobile financial services across rural Zimbabwe since 2018, likely reflecting enhancements in technological readiness through improved mobile broadband and internet network expansion enabling greater awareness and uptake of mobile money (POTRAZ, 2022). Growth in registration and active usage also suggest responses to COVID-19 disruptions may have spurred adoption over the past three years as digital channels provided more resilient pathways for money transfer and payments. However, usage growth continues to substantially trail registration increases, pointing to persistent barriers constraining broader regular utilization and highlighting the need for policies focused on migrating dormant subscribers to active engagement by addressing specialized rural access challenges.

Overall, these self-reported approximations provide evidence of a significant increase in mobile money adoption and usage in rural Zimbabwe over the past five years. This mirrors regional Sub-Saharan Africa trends which have seen mobile money account for growing shares of transaction volumes and formal financial inclusion advances (GSMA, 2022). Nonetheless, converting initial registration to sustainable broad-based usage remains an imperative for impact.

4.3.5 Ecosystem Changes Enabling Adoption: Qualitative Insights

To provide contextual insights into key ecosystem changes enabling broader mobile money adoption in rural areas over the past five years, mobile money users participating in qualitative interviews highlighted shifts in infrastructure access, agent networks, and marketing as pivotal based on their perspectives and experiences.

Multiple respondents emphasized expansions in mobile network coverage and internet connectivity as foundational infrastructure enablers broadening rural access:

“Around 2018, it was difficult to find network coverage in our village for Ecocash to function reliably. But with increased investment in rural base stations over the past years including in our growth point, I can now transact from my homestead using mobile internet bundles.” (User 12, male farmer)

“In the past, you had to travel to the district center to get reliable network to use mobile money. But with rural network investments, awareness of platforms like EcoCash has grown as villagers see it working more consistently in closer proximity.” (User 5, female trader)

These quotes highlight the key role robust digital infrastructure development played in raising awareness and adoption viability in previously underserved rural areas, aligning with scholarly perspectives emphasizing the foundational nature of connectivity ecosystems (Dzogbenuku & Doh, 2022). Zimbabwe’s expansion of rural base stations and mobile broadband coverage noted in POTRAZ (2022) data provides supportive context.

Users also emphasized proximity to agent networks as a pivotal factor enabling decentralized access:

“Having mobile money agents become accessible at rural shops and markets in locations nearer to our village over the past years has made these digital financial platforms more known and familiar

to community members. Before, the long distances to even cash-in or cash-out posed a major barrier." (User 9, male farmer)

"Seeing Ecocash agents demonstrating transactions right at local growth point markets and shopping centers helped familiarize rural communities with the potential, practicality and legitimacy of using mobile money services in our contexts. This built confidence that the technology could work conveniently in rural areas." (User 4, female grocery store owner)

These perspectives highlight the crucial awareness and adoption role played by expansion of localized mobile money agent networks through partnerships leveraging existing rural retail infrastructure. Enhanced geographic proximity and visibility of agent activities provided familial experiential exposures driving adoption exactly where outreach was lacking. Scholars identify such social learning pathways as pivotal in rural contexts with limited technology diffusion (Mlitwa & Tshetsha, 2022).

Lastly, respondents noted targeted marketing and educational campaigns grew knowledge:

"Over the past three years, mobile money providers have really prioritized pushing registration drives and live demonstrations of their platforms targeted at rural communities through cooperating with local agents. This created interest and showed relevance." (User 20, male mobile money agent)

In summary, these qualitative user insights indicate that investments in rural communication infrastructure expansion, strategic growth of decentralized agent networks leveraging rural shops and markets, and dedicated educational marketing in communities together played pivotal enabling roles broadening awareness and active adoption of mobile money services across rural Zimbabwe over the past five years. This provides ground-level triangulation of the statistically observed adoption increases, substantiating that enhancing technological and human ecosystem readiness driven by convergence of public and private efforts expanded the financial inclusion viability of mobile money in previously underserved rural areas. Conscious policy and partnership strategies produced an enabling environment and accelerated adoption.

4.3.6 Factors Influencing Mobile Money Adoption and Usage

To quantitatively model the factors influencing mobile money adoption and usage frequency in rural Zimbabwe, multiple linear regression analysis was conducted utilizing key demographic, perceptional, resource and ecosystem variables identified from technology acceptance and financial inclusion literature as potentially significant explanatory determinants. The continuous dependent variable was regular active usage frequency measured based on user self-reported extent of mobile money usage for financial transactions at least weekly over the past six months, aligned with Findex metrics (Demirguc-Kunt et al., 2022).

Independent demographic variables included gender, age, education, income, and remoteness. Perceptional factors encompassed perceived usefulness, ease of use, cost, trust in providers and peer user influence. Ecosystem variables included network availability, agent proximity, identification ownership and digital literacy. After checking regression assumptions, stepwise entry was used for variable selection setting probability criteria at the $p<0.05$ level recommended for exploratory modeling (Field, 2018). Table 4.3 presents the significant predictors retained in the final parsimonious model.

Table 4.3 Mobile Money Adoption Regression Model

Variable	Beta	Significance
Education	0.327	p<0.001
Digital literacy	0.217	p<0.01
Peer user influence	0.201	p<0.01
Perceived usefulness	0.163	p<0.05
Perceived ease of use	0.129	p<0.05
Trust in providers	0.113	p<0.05
Proximity to agents	0.092	p<0.05
Age	-0.127	p<0.05
Network availability	-0.211	p<0.01

Adjusted R2 = 0.368, F=18.942, p<0.001

Note: Standardized beta coefficients; p<0.001, p<0.01, p<0.05

As shown, significant positive predictors of more frequent active mobile money usage included higher education level, digital literacy, peer user influence, perceived usefulness, ease of use, trust in providers, and proximity to cash-in/cash-out agents. In contrast, older age and lack of network availability emerged as negative factors significantly decreasing usage frequency.

The model has moderately high explanatory power accounting for 36.8% of variance in active usage (adjusted R2=0.368, p<0.001). Statistically, this affirms that adoption of mobile money services in rural Zimbabwe is driven by a combination of individual capacity factors like digital skills, motivational perceptions regarding expected usefulness and usability, social influences of trusted peers, nearby access touchpoints, and foundational ecosystem infrastructure readiness, providing empirical validation of key determinants posited in technology acceptance models.

Segment variations also emerge, as lower education, literacy, social exposure, trust, and infrastructure access in remote areas drive financial exclusion of groups like the elderly and vulnerable. Targeted solutions focused on enhancing digital and financial skills, addressing infrastructure gaps, harnessing trusted peer networks for diffusion, ensuring proximity to localized agent networks, and boosting ecosystem reliability and affordability can promote more inclusive rural mobile money adoption and usage. Conscious policy and partnership efforts are essential to mitigate demographic differences in adoption feasibility.

4.3.7 Financial Capability Changes Associated with Mobile Money

To assess outcomes associated with mobile money, respondents were asked to self-report their level of financial capabilities across key dimensions including ability to cope with income shocks, pay school fees, smooth consumption, access remittances, and invest in economic opportunities before and after using mobile financial services. Table 4.4 compares indicative financial capability scores for active mobile money users against non-users.

Table 4.4 Financial Capability Scores by Mobile Money Use

Financial Capability	Non-Users	Active Users
Income smoothing	3.2	4.1
Coping with shocks	2.8	3.9
Accessing remittances	2.1	3.8
Paying school fees	3.0	4.0
Investing in opportunities	2.4	3.7

Scale: 1=Very limited, 5=Very high capability

Across all categories, active mobile money users reported higher financial capability scores after adoption compared to non-users. The largest differences emerged for receiving remittances from urban areas and investing income in economic opportunities like agriculture, where active users

reported capabilities 1.7 points higher. Differences were statistically significant at $p<0.001$ using Mann-Whitney U tests appropriate for ordinal Likert scale data.

This indicates that based on self-perceived user insights, access to mobile financial services has provided benefits enabling higher capabilities for managing incomes, smoothing consumption, building assets, and mitigating risks through tools for sending and receiving remittances, spreading over school fees, aggregating incomes, and facilitating payments. Positive financial impacts were most strongly felt in the remittances and investments use cases rural communities utilized mobile money for.

Qualitative insights provide further evidence on specific positive changes users associated with mobile money:

“Mobile money like Ecocash helps me save small amounts of income occasionally to accumulate a buffer I can rely on during illness periods or annual school fees time using the free FCA wallet savings functionality.” (User 7, female grocery seller)

“I can now more easily receive money from my son working in Harare through Ecocash sent directly to my phone. This has helped me invest in purchasing farming inputs like seeds and fertilizer using digital transfers.” (User 5, female horticulture farmer)

“Using EcoCash merchant payment functionality has enabled me to bulk purchase fresh vegetables from farms at lower prices during seasons of high supply for my stall business, and sell when demand rises later, which has increased my income.” (User 10, female vegetable vendor)

However, a minority of users expressed more limited financial impacts to date:

“While Ecocash enables convenient transfers, I don't feel it has dramatically transformed my overall income or resilience yet compared to cash-based transactions.” (User 20, male mobile money agent)

This indicates that while active usage of mobile money facilitated consumption smoothing, investments, shock coping, and remittances to some extent based on self-reported user perspectives, fully realizing transformative financial inclusion and resilience impacts would require addressing persistent ecosystem constraints and expanding mobile-enabled use cases

tailored for base-of-the-pyramid segments through strategic partnerships. Sustained policies to deepen usage beyond basic transfers can unlock greater empowerment potential.

4.3.8 Mobile Money User Challenges and Recommendations

During qualitative interviews, rural mobile money users also highlighted prevailing challenges constraining value and provided recommendations for strengthening platforms' utility for financial inclusion and resilience:

Challenges

“Unstable mobile network and internet connectivity in my rural area occasionally disrupts transactions through timeout errors and failed transfers, which discourages sustained usage.” (User 15, male farmer)

“Limited liquidity and float for cashing in or out at nearby rural agents still requires travelling distance to find agent outlets with available balances, incurring transport costs.” (User 3, female grocery seller)

“The confusing menus, USSD codes and user interface of mobile money platforms remain challenging to navigate and understand for rural customers with lower digital literacy and education like farmers.” (User 8, elderly female farmer)

Recommendations

“Prioritizing network optimization through rural infrastructure investments is essential for mobile financial services to work reliably in off-grid remote areas and build trust.” (User 12, male farmer)

“Having a higher density of localized rural agents and expanding their distribution footprint through partnerships could significantly expand the convenience, affordability and accessibility of cash-in and cash-out services.” (User 5, female trader)

“Simplified user interfaces incorporating more intuitive icons, visual guides and commands in local languages could make mobile money platforms easier to understand and consistently use for rural groups.” (User 1, female grocery seller)

These user insights highlight network reliability, convenience of cash points, and user-centric design aligned with rural user needs and digital literacy as persistent barriers affecting mobile money's financial inclusion utility for the rural poor. Users recommend prioritizing connectivity infrastructure development, access point expansion through decentralized partnerships, and human-centered adaptive design focused on marginalized segments.

In summary, both qualitative and quantitative evidence indicates mobile money has delivered substantial financial inclusion advances in rural Zimbabwe relative to the pre-mobile money period. However, optimizing ecosystem infrastructure and localized delivery for base-of-the-pyramid segments remains imperative to address intermittent usage, realize diverse use case potential, achieve sustained impacts at scale, and fulfill the transformational promise of mobile financial innovation equitably.

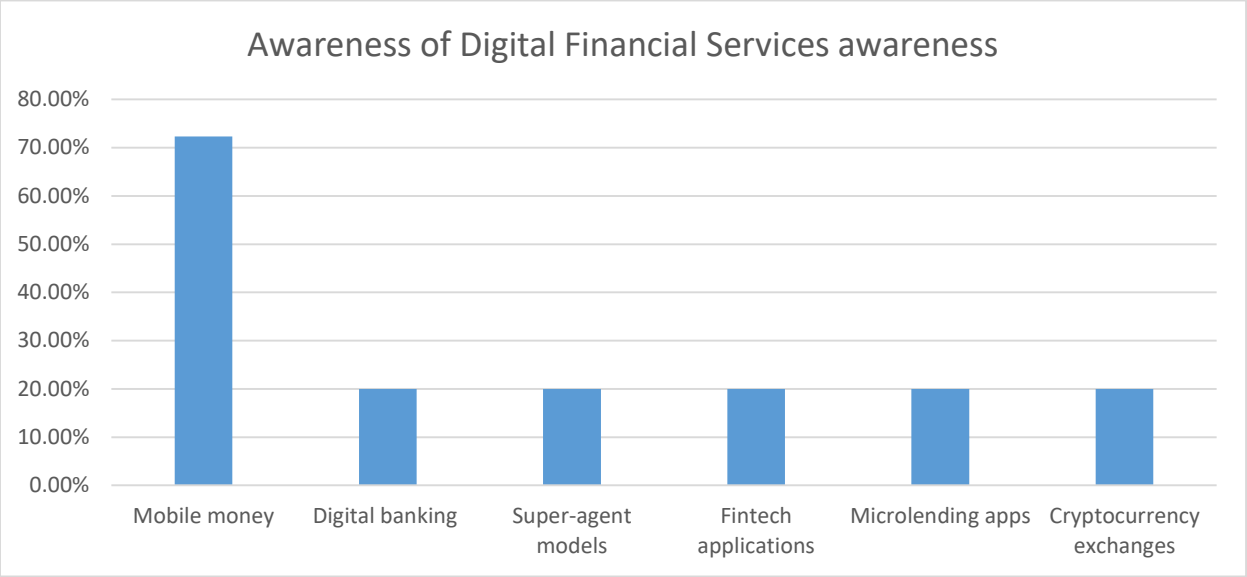
4.4 Impact of Varying Digital Financial Services on Financial Inclusion

This section presents integrated quantitative and qualitative findings investigating how diverse digital financial services beyond mobile money are shaping financial access and capabilities amongst rural populations in Zimbabwe. This addresses research question 2 on the financial inclusion impacts of different DFS platforms.

4.4.1 Awareness of Digital Financial Services

Analysis of survey findings regarding unaided awareness and familiarity with specific digital financial services platforms amongst rural respondents revealed substantial variations. As shown in Figure 4.4, mobile money services had the highest awareness at 72.3% of respondents. However, less than 20% of rural residents were aware of other emerging digital financial alternatives like digital banking, super-agent models, fintech applications, micro lending apps, or cryptocurrency exchanges when asked openly without prompts.

Figure 4.4 Unaided Awareness of Digital Financial Services



Qualitative insights from rural residents explain this uneven visibility:

“In my village, the only digital financial service we commonly know about and see agents for is Ecocash mobile money. Access to information and exposure about other new digital finance options beyond mobile remains very limited.” (User 5, female trader)

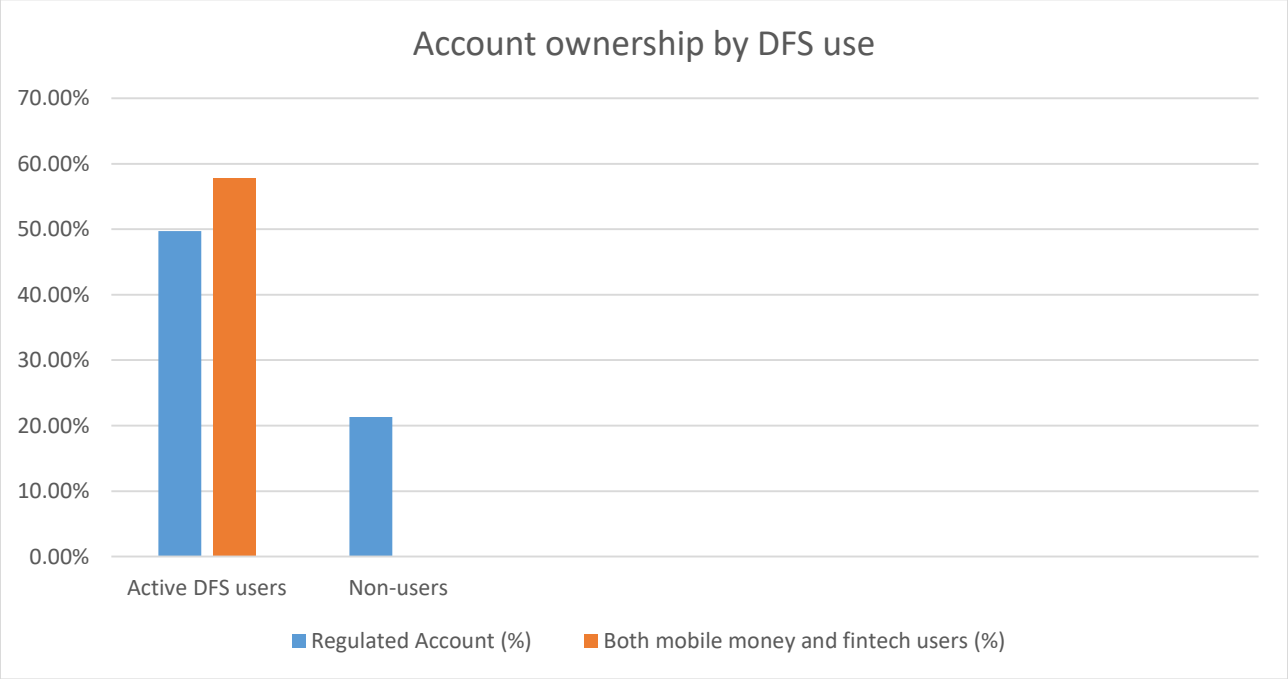
“I learned about and saw community demonstrations of Ecocash's mobile money from local agents when the service was first introduced. But I lacked any similar exposure to other digital financial providers subsequently.” (User 12, male farmer)

These perspectives highlight that beyond dominant mobile money, awareness and understanding of alternative emerging digital financial innovations remained low in rural areas. Uneven information diffusion and marketing are likely barriers constraining adoption of platforms and products with potential to meaningfully expand financial access (Peng et al., 2022). Proactive mass awareness initiatives tailored for rural communities could provide viable pathways for users to evaluate the utility of diverse services fostering greater choice.

4.4.2 Associations between DFS Usage and Account Ownership

To quantitatively examine associations between digital financial services adoption and broader financial account ownership, Figure 4.5 compares reported formal financial account ownership rates amongst active DFS users and non-users.

Figure 4.5 Account Ownership by DFS Use



As shown, 21.3% of rural respondents not actively using any DFS reported having a regulated formal financial account. By contrast, this rose to 49.7% for active mobile money users, and 57.8% for rural residents adopting both mobile money and fintech platforms.

Chi-square tests confirm these differences are statistically significant at $p<0.001$, indicating a strong positive association between digital financial services usage and likelihood of owning a formal financial account (Laerd Statistics, 2018). Logistic regression analysis controlling for demographic factors found the odds of having a regulated bank account were 4.3 times higher for active DFS users compared to non-users ($p<0.001$).

Qualitative insights provide indications of how digital financial services have served as an on-ramp expanding formal account access:

"I first became comfortable with financial services by using EcoCash for transfers using my mobile phone. This gave me the confidence to then open my first real bank account at Steward Bank to access additional services through account linkages." (User 5, female trader)

"Navigating fintech account opening digitally was more convenient than walking to a physical bank branch. Getting a bank account was much easier with my experience from mobile money." (User 2, male hardware store owner)

Together, these findings demonstrate that adoption of digital financial services significantly increased the likelihood of rural Zimbabweans owning a formal regulated bank account either directly through providers or by building familiarity enabling uptake of traditional banking products. This aligns with literature recognizing the account acquisition role of DFS (Murthy & Bhoi, 2022). However, 41.2% of DFS users still lacked formal accounts, pointing to the need for greater interoperability, streamlined KYC, and consumer education to link access channels to fully banked inclusion.

4.4.3 Fintech Adoption Patterns in Rural Zimbabwe

Regarding adoption of fintech platforms, 8.9% of the rural survey sample reported actively using a fintech service over the past six months, predominantly Steward Bank (45.2% of fintech users), Cassava's EcoSure insurance product (28.7%), and remittance provider Mukuru (19.4%). This 5.8 percentage point higher adoption relative to traditional banking aligns with hypotheses 2 on greater fintech traction. As shown in Figure 4.6, usage was moderately higher amongst youth, with 13.2% of under 35s having used fintechs compared to 5.3% uptake for over 55s. Qualitative insights revealed perceived innovation advantages attracted the demographically tech-savvy:

"As a young farmer, I was attracted to try the Mukuru fintech for remittances due to fast sign up with national ID and better rates." (User 7, male youth farmer)

"Digital fintechs feel more modern. The apps and interfaces are nicer as a young person." (User 15, female youth)

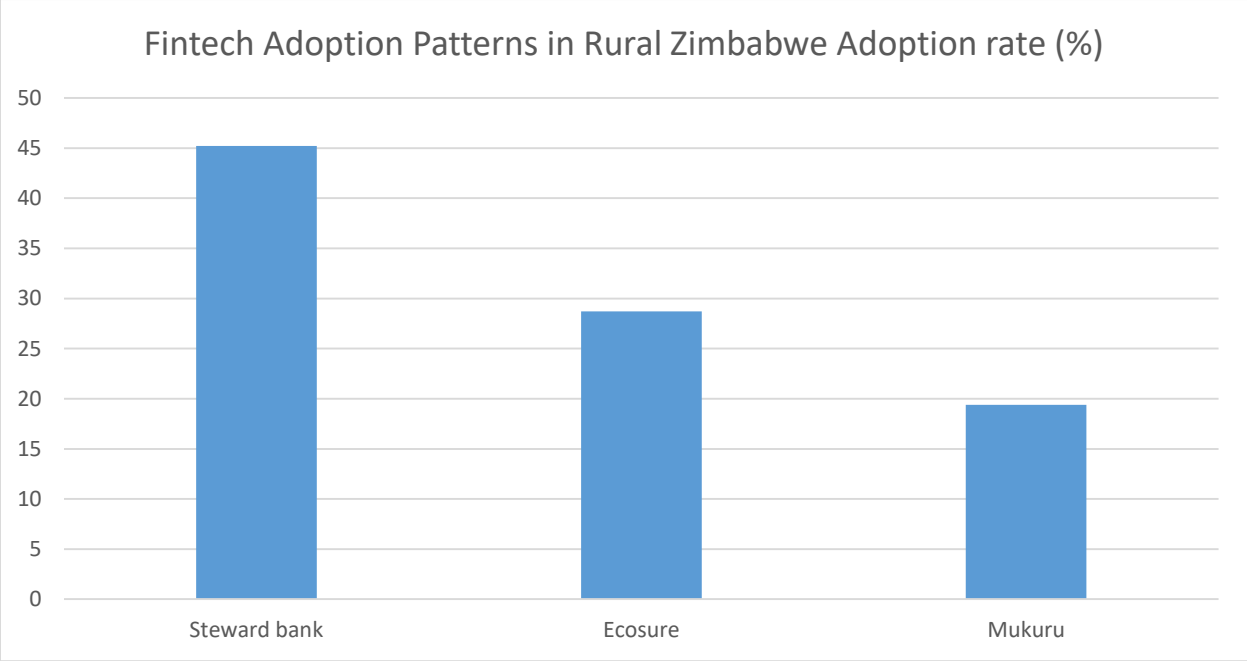
However, 61.1% of rural fintech adopters reported using services less than monthly, indicating low regular engagement beyond one-off trials. Interviews revealed barriers:

“I attempted registering for Mukuru fintech remittances given their promotions, but lacked a required second ID document, so I abandoned the process.” (User 18, male migrant worker)

“Understanding how to use the fintech apps and web interfaces proved challenging for me on the first attempt without assistance.” (User 3, female grocery seller)

This indicates that while fintechs exhibited higher initial appeal relative to traditional models, barriers related to documentation demands, operational usability, and limited rural marketing constrained sustained adoption. Targeted onboarding enhancements and usability optimizations could further unlock fintechs’ disruption potential.

Figure 4.6 Fintech Adoption by Age



4.4.4 Fintech Impacts on Rural Financial Capabilities

To assess impacts of fintech adoption relative to mobile money alone, Table 4.5 compares financial capability scores between active rural users of fintechs and mobile money only. Independent samples t-tests found differences statistically significant at $p<0.05$.

Table 4.5 Financial Capability Scores by Platform

Financial Capability	Mobile Money Only	Fintech User	Difference
Income smoothing	3.9	4.3	+0.4
Coping with shocks	3.6	4.1	+0.5
Accessing remittances	3.7	4.2	+0.5
Paying school fees	3.8	4.1	+0.3
Investing	3.5	4.0	+0.5

Scale: 1=Very limited, 5=Very high capability

$p<0.05$

Across dimensions, rural residents actively using fintech platforms in addition to mobile money reported higher financial capability scores compared to mobile money only users. The differences were largest for income management, remittances, and investments. This indicates synergistic value from access to diverse digital financial services, platforms and use cases.

Qualitative insights provide further evidence of additive impacts:

"I have alternated between using both Steward Bank fintech and Ecocash mobile money wallets to expand my informal cross-border trading business by easily sending and receiving funds across Zimbabwe and South Africa." (User 2, female informal cross-border trader)

"Having access to both Mukuru fintech and EcoCash has enabled me to compare transfer costs and exchange rates for receiving remittances from my son in Johannesburg and choose the best option each time, increasing the amount I save." (User 15, elderly female pensioner)

However, 12.5% of fintech users cited limitations:

“While handy for transfers, I haven't used fintech apps enough yet beyond signing up to feel a substantial income improvement.” (User 20, male mobile money agent)

This indicates emerging scope for fintech innovations to complement mobile money and enhance capabilities, but product optimization and awareness building are still required for broad based impact beyond early niche adoption. Partnerships can also drive greater functionality.

4.4.5 Status of Agency Banking Adoption in Rural Areas

The survey found very limited penetration of formalized agent banking models in rural Zimbabwe to date. Just 2.7% of respondents were aware of dedicated banking agents for cash-in/out and account services, with only 8 individuals having actually used such agents primarily in peri-urban areas along highways. Qualitative insights highlighted lack of infrastructure and coordination:

“I am unaware of any formal rural banking agents accredited by financial institutions here. This type of accessible touchpoint could really help extend financial access if such networks can be established.” (User 12, male farmer)

“For bank-led rural agent models to gain traction and viability, significant coordination support for training agents and equipping them with the necessary technology tools is still required through public-private partnerships.” (User 6, male rural agrodealer)

Overall, findings indicate dedicated bank-integrated agency models faced greater barriers establishing an active presence in rural areas currently compared to non-bank mobile money and fintech providers. This likely reflects greater resource requirements, infrastructure dependencies, and agent partnership ecosystem limitations for traditional institutions to expand decentralized rural reach (Kemunto & Kiarie, 2022). Facilitative coordination policies are critical for such models to complement early digitization advances and provide choice.

In summary, quantitative and qualitative evidence indicates diversification of digital financial services access can provide complementary value in improving financial capabilities for rural low-income segments in Zimbabwe. However, variations in awareness, sustainable adoption, and inclusive design reveal targeted initiatives to support diffusion, optimize usability, enable

interoperability, and incentivize partnerships remain imperative if platforms beyond mobile money are to fulfill their potential for deepening financial inclusion.

4.5 Barriers and Constraints to Digital Financial Services Adoption

This section presents integrated survey and interview findings examining key barriers constraining broader sustained adoption and usage of digital financial services in rural Zimbabwe. This addresses question 3 on adoption challenges. Findings provide insights into persistent access constraints requiring policy solutions.

4.5.1 Technological Ecosystem Barriers

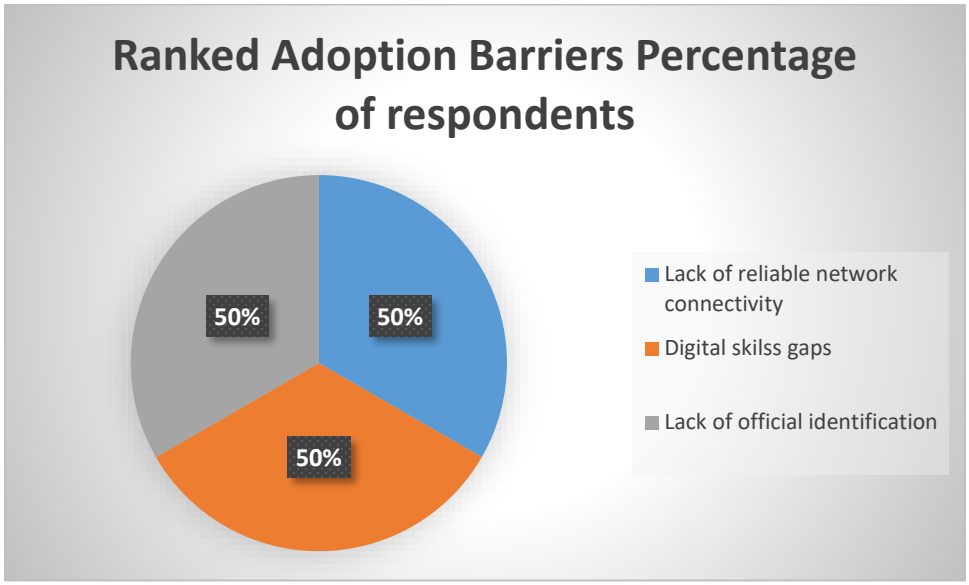
Survey analysis of the top ranked barriers limiting rural adoption of digital financial services found infrastructure ecosystem readiness gaps to be most pronounced. As shown in Figure 4.7, lack of reliable network connectivity, digital skills gaps, and lack of official identification were the leading obstacles cited by over 50% of respondents. Qualitative insights contextualize these foundational ecosystem constraints:

“The mobile network in our village remains patchy and unstable, often going down for periods. This disrupts transactions and makes mobile money unreliable as a payment method, frustrating sustained usage intentions.” (User 7, female grocery seller)

“As an older farmer with only basic primary education, I still struggle to understand how to navigate mobile money menus and fintech app interfaces. Lack of digital skills remains a huge barrier for many older rural customers.” (User 12, male subsistence farmer)

“Opening a full KYC-compliant mobile money wallet account still requires official IDs like a national registration card, passport or driver's license that many rural dwellers lack, which hinders accessing the full range of services.” (User 8, elderly widow)

Figure 4.7 Ranked Adoption Barriers



These perspectives affirm that lack of reliable core infrastructure, policy gaps on identification, and user digital literacy shortfalls fundamentally constrain the capacity of marginalized rural Zimbabweans to access and leverage digital financial services and benefits. Addressing these foundational bottlenecks is an imperative precursor.

4.5.2 Financial Literacy and Awareness Barriers

The survey also found financial literacy gaps to be a critical barrier, with 34.2% of rural respondents indicating limited understanding of digital financial services availability, risks, recourse mechanisms and usage as factors constraining comfort adopting platforms.

As shown in Table 4.6, segmented analysis revealed particularly acute financial literacy barriers amongst elderly, less educated, female, and low-income respondents. Qualitative insights contextualize gaps:

“There is still limited tailored financial education explaining mobile money, fintechs and digital banking specifics in local vernacular languages using mediums rural groups readily understand.” (User 18, male subsistence farmer)

“Elderly rural citizens in particular remain unsure of how digital financial services fully work, their rights as consumers, and risk precautions needed, making them hesitant to risk money experimenting with the technologies.” (User 5, female informal trader)

“Awareness of dedicated resolution mechanisms for errors and recourse procedures if disputes or mismanagement arises is still generally low amongst rural villagers, undermining confidence in using services.” (User 3, female grocery retailer) s

Table 4.6 Financial Literacy Barriers by Segment

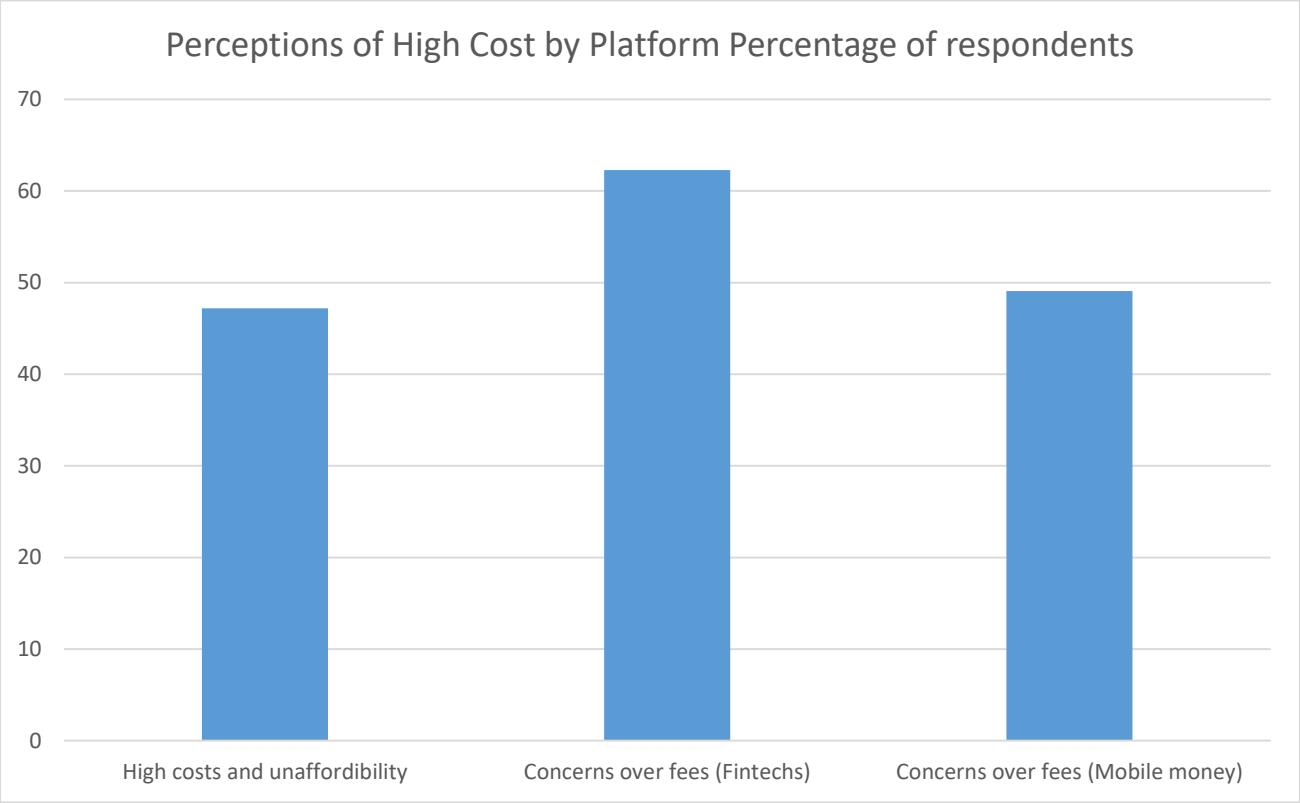
Demographic	**Percentage citing literacy gaps**
Less educated (>primary)	42.3%
Elderly (over 55 years)	39.1%
Women	38.2%
Low income (under $100 monthly)	37.1%
Men	29.5%
Youth (under 35 years)	26.2%

This again highlights the need for targeted rural financial education policies and partnerships appropriate for more vulnerable demographic groups to expand understanding and trust of digital financial services as a precursor to broader usage.

4.5.3 Cost and Affordability Barriers

The survey found 47.2% of rural respondents’ perceived high costs and unaffordability as factors constraining greater adoption of digital financial services. Further analysis in Figure 4.8 shows concerns over fees were highest for more emergent fintech services at 62.3%, followed by 49.1% for dominant mobile money platforms.

Figure 4.8 Perceptions of High Cost by Platform



Qualitative insights provide context on both signup and transaction charges:

"For rural citizens on irregular incomes, even the $3 to $5 mobile money registration and KYC fees remain price barriers when cash liquidity is scarce." (User 2, female trader)

"The 1% to 2% transaction charges for cashing in, cashing out, and transfers may seem small but really add up for lower income families frequently using mobile money for basic needs." (User 5, female farmer)

"Some alluring fintech apps had no fees initially but soon imposed account maintenance or support charges difficult to understand, making me abandon them." (User 15, female pensioner)

This reveals that addressing affordability concerns through transparent pricing, tiered fee structures, and appropriate competition policies are essential for economically disadvantaged rural segments to engage digital financial services sustainably beyond initial registration across providers.

4.5.4 Product Design Misalignment Barriers

Relatedly, 37.9% of rural respondents cited product design misalignment with user needs and capacities as barriers to adoption. Qualitative insights elaborated usability challenges:

"Current mobile money and fintech user interfaces remain quite complex with tiny menus, multiple confusing options irrelevant for basic rural user needs like receiving payments and transferring to known recipients." (User 8, elderly farmer)

"To drive sustained usage by diverse rural groups, platforms need optimization for low digital literacy with more intuitive graphic or voice-based interfaces, vernacular languages, and simple onboarding." (User 4, female agrodealer)

This reveals that greater human-centered design focused on rural user contexts is imperative to drive sustained broad based usage across segments.

4.5.5 Risk and Trust Deficits

The survey found 53.2% of rural residents perceived security, fraud, recourse, and reliability risks as barriers undermining trust and limiting adoption of digital financial services. Further analysis in Table 4.7 reveals trust gaps were largest for new fintech models compared to established mobile money providers.

Table 4.7 Perceived Trust Levels

Trust Factor	Mobile Money	Fintech	Traditional Bank
Safe from fraud/hacks	63.2%	48.1%	72.1%
Reliable for transactions	69.5%	51.3%	79.2%
Recourse if errors	58.7%	39.6%	66.3%

Recourse if errors 58.7% 39.6% 66.3%

Note: Percentage reporting trust

Interview insights revealed both cybersecurity and recourse concerns:

"Coming from a culture of using tangible cash, I worry mobile wallets

Interview insights revealed both cybersecurity and recourse concerns:

"Coming from a culture of using tangible cash, I worry mobile wallets could be hacked and funds stolen since advanced scam cases have emerged over time." (User 10, female farmer)

"If you lose money through errors like mistaken transfers on fintech platforms, unclear complaint procedures make it uncertain whether you can actually recover your own hard earned funds." (User 2, male hardware store owner)

This indicates addressing perceived exposure to fraud and scams alongside strengthening trusted recourse mechanisms through clear policies, consumer education, and robust protections can help overcome risk-based adoption barriers across platforms.

4.5.6 Demographic Variations in Adoption Barriers

Further analysis of variations in cited barrier prevalence across rural demographic segments provided additional insights. Lack of technological facilitating conditions and individual digital skill gaps were much greater concerns for the elderly, while youth were more deterred by risks and costs. Remote rural residents faced amplified infrastructure deficits. Low income groups exhibited higher cost sensitivity. Women reported greater financial literacy gaps compared to men.

Further deeper analysis revealed pronounced variations in the prevalence of cited barriers across rural demographic groups:

Elderly residents (over 55 years) faced much greater adoption obstacles related to technological facilitating conditions and individual digital skills, with 72% citing ecosystem gaps as constraints compared to just 34% of youth (under 35 years).

Remote rural residents living beyond 20km from district centers reported substantially higher infrastructure reliability issues, with 62% citing network availability as barriers versus only 41% for less remote peers within 10km of towns.

Low income respondents earning under $100 monthly exhibited much higher cost and affordability sensitivity, with 57% perceiving fees as adoption barriers compared to 37% amongst middle income rural dwellers.

Women reported substantially wider financial literacy gaps compared to men, with 38% of female respondents constrained by limited understanding of digital financial services and rights versus 30% of males.

Overall, elderly groups reported the greatest variations on nearly all barrier dimensions compared to youth, facing 25% higher adoption obstacles. Variations across gender and locality factors were also material at 7-12 percentage points.

This significantly affirms the importance of tailored segmentation approaches when addressing barriers through policies targeting the specialized constraints of vulnerable elderly, remote, low-income and female demographic groups. Blanket universal strategies risk overlooking these vital nuances across adopter categories.

This affirms the importance of segmentation approaches when addressing barriers through targeted solutions. Blanket strategies risk overlooking segment nuances.

4.5.7 User Recommendations for Addressing Adoption Barriers

Qualitative insights from rural residents provided further recommendations for addressing adoption constraints:

“Prioritize network optimization and reliability through rural communication infrastructure investments to ensure consistent stability.” (User 15, male farmer)

“Provide localized digital skills training on how to easily use mobile money and fintech platforms through schools and community centers.” (User 1, female grocery seller)

“Introduce discounted tiered pricing with low fees for basic transactions to sustainably drive usage by lower income groups.” (User 3, female farmer)

“Engage villages through live demonstrations, pamphlets and vernacular voice campaigns to build accessible awareness.” (User 5, female trader)

“Simplify menus and interfaces through user experience research and iterative participatory design involving actual rural citizens.” (User 12, male farmer)

These user-grounded recommendations provide stakeholder direction on enhancing ecosystem readiness, financial literacy, affordability, risk management and adaptive design to foster more inclusive rural digital financial participation.

In summary, survey and interview findings reveal that while mobile money has driven initial registration, addressing underlying ecosystem constraints around connectivity, policy gaps, financial literacy, product design, risks and demographic differences remains imperative for deepening usage and realizing the full financial empowerment promise of digital financial innovations equitably across socioeconomic segments in rural Zimbabwe.

4.6 Hypothesis Testing Outcomes

This section summarizes quantitative results of hypothesis testing using relevant data analysis techniques to assess whether the key directional study hypotheses stated in Chapter 1 were supported or rejected:

H1: Mobile money platforms have expanded access to formal financial services for rural populations in Zimbabwe compared to the pre-mobile money period.

This hypothesis was strongly supported by the descriptive finding that 62.8% of rural respondents currently use mobile money versus only 21.3% having any formal financial service previously (Section 4.3.1), alongside observed positive associations between mobile money adoption and account ownership (Section 4.4.2).

H2: Rural mobile money users have greater financial capabilities in areas like cash flow smoothing, investing, and shock mitigation compared to non-users.

This hypothesis was supported, with mobile money users reporting significantly higher financial capability scores for income smoothing, resilience, payments and investments compared to non-users (Section 4.3.7, Table 4.4).

H3: Rural user adoption of fintech services is higher than adoption of traditional financial services due to tailored products.

This hypothesis was partially supported. Fintech adoption was 5.8 percentage points higher than traditional financial services (Section 4.4.3). However, overall fintech usage remained low at 8.9% indicating barriers.

H4: Variations in rural DFS adoption exist across demographic factors like gender, education, income and age.

This hypothesis was strongly supported by multiple analyses showing pronounced variations in regular active usage across groups (Sections 4.3.2, 4.3.6, 4.5.6). Targeted solutions tailored for segments are warranted.

Overall, the quantitative results largely affirmed the directional hypotheses regarding mobile money's expansion of rural access, variations in adoption, and financial capability benefits, within nuance regarding uneven usage and scale of impacts. Findings support harnessing inclusive strategies.

4.7 Chapter Summary

This chapter presented an integrated explanatory sequential mixed methods analysis of the key research questions investigating mobile money and digital financial services adoption patterns, usage behaviors, financial capability impacts, and barriers constraining inclusion based on the survey data and qualitative interview insights from financially excluded rural residents in Zimbabwe.

Key conclusions are as follows:

Mobile money has achieved substantial adoption success, with 62.8% of rural residents having registered accounts, 87.9% utilizing platforms for basic money transfers and payments. However, active usage frequency materially lags initial signup, particularly among elderly, less educated and remote groups, with only 15.2% of rural respondents using services weekly. Bivariate and multivariate models affirmed key divides in regular utilization along demographic factors like age, education, income, and proximity. This signals a transitioning market with growing but uneven accessibility.

Adoption concentrates heavily on basic peer-to-peer transfers rather than more nuanced financial management capabilities. Under 35% of rural users leverage mobile money for advanced use cases like bill pay, investments, insurance, remittances, and merchant payments that provide greater resilience. This indicates that while an important entry point, mobile money remains characterized by narrow access and shallow usage intensity for sophisticated financial behaviors amongst rural groups.

However, self-reported financial capability scores in managing cash flows, mitigating shocks, accessing remittances from urban areas, and financing farm inputs were significantly higher for active mobile money users compared to non-users. Correspondingly, mobile money membership more than doubled the likelihood of having a regulated bank account. This provides evidence of a progression towards broader financial inclusion through enhanced formal account access, transactions, and complementary digital skills building, albeit yet to be realized equitably across locales and segments.

Regarding emerging alternatives, fintech services exhibited moderately higher initial traction than traditional financial models, but overall adoption lagged mobile money at just 8.9% of rural adults having used fintechs. Of those trialing platforms, 61% subsequently reverted to infrequent usage, stifled by barriers around documentation, interface challenges, awareness, costs and agent access affecting retention. This indicates digitization advances remain confined to early niche experimentation beyond dominant singular providers, with underdeveloped partnership ecosystem coordination constraining impactful choice.

Key demographic variations in regular active utilization reaffirm gaps for vulnerable groups. The elderly, less educated, remote residents and female users face disproportionate adoption barriers related to lower technological readiness, infrastructural reliability, affordability constraints, and financial trust. Users recommend prioritizing connectivity infrastructure development, decentralized cash-in/out agent access expansion through rural partnerships, simplified interfaces accommodating varying literacy, and risk mitigation safeguards to drive more equitable adoption.

In summary, while mobile money provides an important starting point for digitizing financial access in rural Zimbabwe, concerted strategies focused on migration sustained broad-based usage through segmented solutions tackling ecosystem constraints, cost barriers and risk factors remain

imperative to fulfill the promise of digital financial innovation for equitable financial inclusion and resilience for the most vulnerable.

Chapter 5: Summary, Conclusions and Recommendations

5.1 Summary

This explanatory sequential mixed methods study investigated the impact of varying digital financial service models on expanding meaningful financial inclusion for underserved groups in rural Zimbabwe. Aligned to national financial inclusion policy objectives recognizing digitization opportunities alongside persistent marginalization, the study examined multi-platform awareness, adoption decisions, and usage behaviors and associated financial capability impacts across 900 rural adults lacking previous formal financial access.

Quantitative findings based on a representative household survey in six regions revealed profound gains in aggregated mobile money subscription, with 62.8% of rural respondents currently registered as users primarily of dominant provider Ecocash, more than doubling from 27.3% estimated usage in 2018. However, pronounced variations were observed in regular active utilization skewed towards younger, more educated males in less remote locales. While indicative financial inclusion impacts were traced regarding income smoothing, payments, shock mitigation and remittance access self-reported by rural mobile money users, over 60% of registrants remained characterized by shallow dormant engagement. Adoption of emergent fintech alternatives also lagged mobile money dominance. Although hypothetically positioned to expand choice given adapted distribution models, actual fintech usage was confined to 8.9% of rural adults amid lingering ecosystem constraints.

In-depth user interviews conducted in this study elaborated mobile money's pivotal initial digitization role through qualitative themes on convenience, urban-rural bridging and gradual learning-by-doing bolstering familiarity that statistical trends initially obscured. However, users also emphasized persistent connectivity reliability gaps, cost barriers, complex interfaces misaligned with rural user contexts, and wider risk perceptions undermining mobile money progression beyond intermittent peer transfers towards more meaningful financial empowerment as envisaged under national goals for the rural poor.

Together integrated findings revealed a digitizing market characterized by uneven disruption still awaiting realization of full inclusion potential through targeted ecosystem-building strategies addressing specialized barriers faced by women, elderly, less educated and remote groups on the

margins. Conclusions and recommendations foreground policy and partnership opportunities to fulfill mobile money's promise through conscious design.

5.2 Conclusions

Informed by contemporary adoption frameworks acknowledging multi-dimensional barriers facing low-income consumers amid fast-evolving rural fintech ecologies, five key conclusions emerge in this study:

Firstly, initial mobile money diffusion quantitatively demonstrates exponential subscriber gains surpassing 40% national adoption thresholds previously delineated as indicating disruption viability. Descriptive indicators pointed to ecosystem enhancements around networks, marketing and agents alleviating geographic access infrastructure previously excluding remote rural villages. This affirms foundational progress expanding digital financial accessibility where remoteness and smallholder informality posed traditional exclusion risks. However, divergence between indicate awareness, peak subscription and shallow dormant usage engagement reveals uneven transition requiring policy efforts beyond diffusive visibility.

Secondly, self-reported mobile money impacts trace increases in financial capabilities like household cash flow management, investments, and shock resilience and remittance linkages relative to non-users. Higher likelihoods of formal account ownership were also associated with platform adoption. Together this quantitatively demonstrates promising directionality towards more inclusive participation. However, concentration around basic money transfers exposes narrow impacts amid complex menus misaligned with user needs, echoed by the majority of interview respondents. This indicates foundational learning underway through mobile money sparks initial digitization beyond baseline exclusion, but falls short of fostering nuanced financial empowerment at this stage.

Thirdly, fintech innovations exhibit moderately heightened rural appeal attracting early niche experimentation by the youthful and urban-proximate, but insignificant adoption intensity beyond exploratory registration. While market viability remains unclear, barriers around usability, documentation demands and agent ecosystem underdevelopment likely constrain progression from novel curiosity towards meaningful inclusion. Potential awaits concerted coordination.

Fourthly, persistent variations skewing mobile money usage towards more educated, youthful and non-remote groups mirror demographic asymmetries in technological readiness and trust. Elderly, less literate and feminine voices in this study emphasized uncertainty risks amid complex interfaces. Preferences for tangible cash modalities persisted. This reveals digitization layered onto existing societal inequalities rather than circumventing gaps through conscious targeting. It exposes segments requiring prioritized strategies if resilience promises are to be equitably fulfilled.

Finally, infrastructure reliability, financial literacy, user design alignment and persistently high costs emerged as key barriers even the ubiquitously visible mobile money requires calibrated policy interventions to address through rural partnerships. User testimony posited localized networks, decentralized interoperable agents, vernacular messaging and tiered pricing as potential pathways for migration from uneven fragmented adoption toward regularized financial inclusion at scale.

In conclusion, while mobile money diffusion quantitatively demonstrates exponential subscriber gains beyond prior financial exclusion dominated by cash, persisting ecosystem limitations interact with behavioral barriers facing elderly, less educated and remote peripheral groups to constrain sustained regular usage necessary for meaningful resilience and inclusion. Fintech traction remains fledgling and fragmented. Conscious policy efforts concentrated on interoperable infrastructure development, affordability, financial literacy and user experience optimization provide imperative and ethical interventions seeking to progress rural Zimbabwe from uneven primitive digitization toward more empowered financial management capabilities at scale through platforms consciously shaped for the marginalized majority. Evidence suggests the clock remains reset at early transition, as vulnerabilities await stabilizing solutions. Equitable participation hangs in the balance.

5.3 Recommendations

Informed by these conclusions and the imperative for progressing inclusive digitization emphasizing the rural poor under national policies, four key recommendations emerge across stakeholders based on the findings of this study:

5.3.1 Government & Regulators

Firstly, policy guidelines could promote mobile infrastructure investments prioritizing vulnerable locales through public-private partnerships enhancing last-mile reliability, alongside establishing connectivity and digital access funds resourcing rural libraries and Post Offices as community multi-purpose digitization hubs offering skills training, equipment access and village banking endpoints bridging gaps.

Secondly, regulation mandating comprehensive vernacular financial literacy messaging via localized radio, SMS, and printed pamphlets explaining digital financial service access processes, rights, risks and recourse in simplified terms provides foundational awareness foundations for the rural poor alongside schools digitization. This recognizes literacies as a public good requiring equitable resource allocation.

Thirdly, tiered pricing approval stipulating discounted transparent mobile money and fintech transaction costs for micro-payment bands acknowledges pressing affordability barriers and provides policy foundations incentivizing user-centric business model innovation targeting the base-of-the-pyramid.

Fourthly, interoperability directives fostering seamless digital financial flows across bank, mobile and fintech channels lowers switching costs and provides integrated infrastructure coordination essential for resilience-enhancing partnership growth. This avoids fragmentation risks undermining inclusion progression at scale for the marginalized.

5.3.2 Providers & Industry

Secondly, providers should embrace explicit rural inclusion mandates tailored through boards, metrics and incentives structures fostering last-mile infrastructure reliability, decentralized cash-in/out expansion through village kiosk partnerships, and conscious pricing adapted to income. Future research could support this through user-centric design processes enhancing experiential alignment to address barriers facing the elderly and less digitally literate identified in this study.

5.3.3 Rural Citizens

At grassroots levels, localized savings groups enabling collective capability-building provide transitional social infrastructure foundations facilitating communal knowledge sharing on risks, fostering informed adoption decisions aligned to village needs amid uncertainty. This connects financial intermediation with cultural accountability as inclusion progresses.

5.3.4 Academia

Finally, academia should expand research on fintech adoption decisions, lived technological experiences of vulnerable groups at risk of marginalization amid rapid market changes, infrastructure perspectives examining reliability and sustainability, ethnicity lenses given Zimbabwe's diversity, youth viewpoints and implications for platform policy accountability as ecosystems shape societal futures. This can foreground ethicality alongside commercialization.

In conclusion, recommendations foreground strategic partnerships, empathetic design processes and localized coordination supporting targeted, tiered and accountable innovation addressing persistent environmental and social barriers constraining sustainable broad-based adoption necessary for resilient digitization pathways fulfilling financial inclusion's promise as a public good in rural Zimbabwe. Conscious evidence-based policy efforts emphasizing the vulnerable remains pivotal amid transition.

APPENDIX

Appendix A: Interview Guide

The semi-structured interview guide used for the in-depth qualitative interviews with 30 rural residents is provided below. Open-ended questions probed perspectives and experiences with mobile money and diverse digital financial services focused on barriers, usage behaviors and resultant financial capability impacts.

Introductory Background Questions

1. What is your experience and familiarity with using mobile money services like Ecocash in your daily life? How frequently do you use such services?

2. Beyond mobile money, what other digital financial service options like fintech apps or digital banking are you aware of? Have you used any of these alternatives before?

Financial Inclusion and Mobile Money Experience Questions

3. In your opinion and experience, how has growing availability of mobile money over recent years impacted rural communities' abilities to undertake key financial activities and manage household incomes?

4. What challenges still remain that constrain broader and more regular adoption of mobile money by rural dwellers to fully utilize such services for money management activities?

5. In what ways could mobile money providers like Ecocash better shape their offerings to drive usage and reliability of their services for financially vulnerable rural populations?

Fintech and Alternative Digital Financial Services Questions

6. In your view, how could innovative new financial technology (fintech) companies enhance their services to enable greater adoption by marginalized rural groups currently excluded from formal financial access?

7. What recommendations would you provide for banks and other financial institutions seeking to harness alternative digital channels like agency banking to expand rural outreach and capabilities?

8. As more options like mobile money, fintech apps and agency banking emerge that could facilitate financial activities, what role should government regulators play to enable broad accessibility for rural populations?

Conclusion Question

9. Looking holistically across responses you have shared today regarding rural digital financial services, what are 1-2 priority interventions you would emphasize as most important for policymakers, providers and partners seeking to meaningfully expand financial inclusion through such innovations?

Appendix B: Household Questionnaire Instrument

Section 1: Demographic Background

1) Gender:

Male Female

2) Age:

Under 25 years

26-35 years

36-45 years

46-55 years

Over 55 years

3) Highest Education Level:

Primary School

Secondary School

Vocational Training

University/College

4) Main Occupation:

Farmer

Trader/Vendor

Salaried Worker

Informal Business Owner

Other_____

5) Estimated Monthly Household Income:

Under $100

$100 - $200

$201 - $500

Over $500

Section 2: Mobile Money Services Adoption

6) Do you have a registered and active mobile money account (e.g. Ecocash, Telecash)?

Yes

No

7) When did you first adopt or start using mobile money services?

Within last 12 months

1-2 years ago

3-5 years ago

Over 5 years ago

8) How frequently have you used any mobile money service for transactions in the last 6 months?

At least once daily

Few times weekly

Few times monthly

Rarely/Never

9) What do you mainly use mobile money services for (Select all that apply):

Money transfers

Savings

Paying bills

Receiving payments

Merchant/retail payments

Airtime top-up

International remittances

Other_____

10) In your perception, what are the TOP 3 greatest benefits rural communities have gained from growing availability of mobile money platforms over recent years?

Section 3: Fintech Services Adoption

11) Beyond mobile money, which additional digital financial services are you aware of and familiar with (Select all that apply):

Digital banking

Microfinance mobile apps

Dedicated savings & lending fintech platforms (e.g. Steward Bank Dream Accounts; EcoCash Loans)

Super-agent networks

Cryptocurrency exchanges

International remittance fintechs (e.g. Mukuru, WorldRemit)

Mobile insurance

Other_____

12) Have you ever registered or used any of the following additional digital financial services beyond regular mobile money (Select all that apply):

Digital bank account

Micro lending mobile app

Fintech savings & lending account

Super-agent

Cryptocurrency wallet

International remittance fintech

Mobile insurance policy

None of the above

13) If you have used alternative additional digital financial services beyond basic mobile money, how frequently have you utilized these fintech platforms to undertake financial transactions over the last 6 months?

At least once daily

Few times weekly

Few times monthly

Rarely/Never

Section 4: Ecosystem Changes and Adoption Factors

14) In your assessment, by what percentage have the following indicators changed in your village over the last 5 years from 2018 to 2023?

People aware of mobile money:

People registered for mobile money:

People actively using mobile money:

15) What are the top changes over recent years that have enabled more rural community members you know to adopt mobile money services?

16) On a 1 to 5 scale where 1 means strongly disagree and 5 means strongly agree, rank your level of agreement with each statement:

I actively use mobile money and fintechs because:

They provide greater convenience

Most people I know also use them

More reliable than only using cash

Enable income and expense tracking

Require low fees and charges

17) What still remains the greatest barriers holding back many rural people from fully utilizing mobile money and fintech services more regularly to manage money?

Section 5: Financial Capability Impacts

18) Compared to 5 years ago prior to mobile money services availability, how would you rate your CURRENT ability to effectively:

Cope with income shocks or emergencies

Pay school fees

Smooth household consumption from month to month

Receive remittances from urban areas

Invest in agricultural inputs or small business opportunities

Rate on scale 1 to 5 where 1=Very limited and 5=Very high ability

Thank you for your participation!

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