

Strathmore

UNIVERSITY

The Role of Mobile Banking on Financial Inclusion in Kenya

Daisy Kukunda
146581

**Submitted in partial fulfillment of the requirements for the Degree of
Business Science in Financial Engineering at Strathmore University**

Strathmore Institute of Mathematical Sciences

Strathmore University

Nairobi, Kenya

January, 2025

This Research Project is available for Library use on the understanding that it is copyright material and that no quotation from the Research Project may be published without proper acknowledgment.

DECLARATION

I declare that this work has not been submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

© No part of this Research Project may be reproduced without the permission of the author and Strathmore University

.....KUKUNDA DAISY..... [*Name of Candidate*]

...  [*Signature*]

.....28/01/2025..... [*Date*]

This Research Project has been submitted for examination with my approval as the Supervisor.

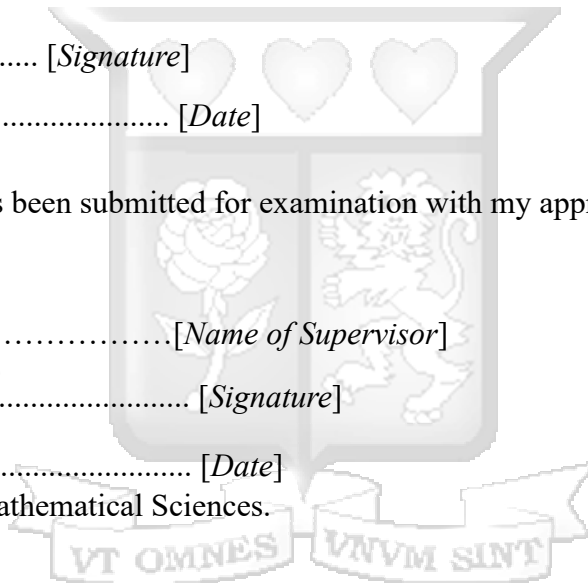
.....Wangui Kagumba..... [*Name of Supervisor*]

...  [*Signature*]

.....28/01/2025..... [*Date*]

Strathmore Institute of Mathematical Sciences.

Strathmore University.



ABSTRACT

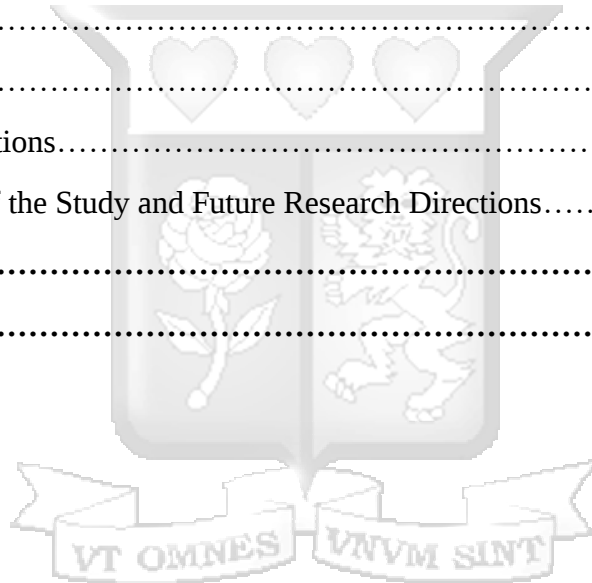
This study investigates the role of mobile banking in enhancing financial inclusion in Kenya, focusing on the effects of mobile bill payments and mobile credit facilitation. The analysis uses descriptive and panel regression techniques to assess the connections between these variables and financial inclusion, as determined by account ownership, using secondary data from 2018 to 2023 and a causal research design. The results highlight barriers like digital literacy and socioeconomic factors by showing that mobile bill payments, while positively associated with financial inclusion, have a statistically insignificant relationship. On the other hand, there is a slight negative correlation between formal account ownership and mobile credit facilitation, even though it is widely used for micro-loans and larger financial needs. These findings demonstrate that to realize mobile banking's potential to fully advance financial inclusion, focused interventions are required to address systemic barriers, improve digital infrastructure, and raise financial literacy. In order to close current gaps and accomplish sustainable financial inclusion, the study recommends a multipronged strategy for policymakers, financial institutions, and development organizations.



TABLE OF CONTENTS

DECLARATION.....	ii
ABSTRACT.....	iii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the study.....	1
1.2 Problem statement.....	2
1.3 Research Objectives.....	3
1.4 Research Questions.....	3
1.5 Scope of the study.....	3
1.6 Significance of the study.....	4
CHAPTER TWO: LITERATURE REVIEW.....	5
2.1 Theoretical Literature Review.....	5
2.1.1 Financial Intermediation Theory.....	5
2.1.2 Technology Acceptance Model.....	6
2.2 Empirical Studies and Findings.....	6
2.3 Conceptual Framework.....	10
2.4 Research Gap.....	10
CHAPTER THREE: METHODOLOGY.....	11
3.1 Introduction.....	11
3.2 Research Design.....	11
3.3 Population and Sampling.....	11
3.4 Data Collection.....	11
3.5 Data Analysis.....	12
3.6 Research Quality.....	13
3.6.1 Reliability.....	13
3.6.2 Validity.....	13
3.7 Ethical considerations.....	14

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTERPRETATION	15
4.1 Introduction.....	15
4.2 Descriptive Studies.....	15
4.3 Diagnostic Tests Results.....	16
4.3.1 Test for Normality.....	16
4.3.2 Multicollinearity Test Results.....	16
4.4 Panel Regression Analysis.....	17
CHAPTER 5: SUMMARY, CONCLUSION, AND RECOMMENDATIONS.....	19
5.1 Summary.....	19
5.2 Conclusion.....	20
5.3 Recommendations.....	20
5.4 Limitations of the Study and Future Research Directions.....	21
APPENDICES.....	22
REFERENCES.....	23



CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Financial inclusion is the availability and equality of opportunities to access financial services. (Nanda & Kaur, 2016). It outlines the processes that allow individuals and institutions to access appropriate, cost-effective, and readily available financial products and services, including equity, banking, insurance and lending. (World Bank Group, 2014) Financial inclusion is widely recognized as essential in driving inclusive growth in emerging economies. It grants individuals and small businesses access a range of financial products and services that can improve their financial well-being and boost economic activity. (FSD Kenya, 2023). The advent of mobile banking has revolutionized the financial landscape globally, and Kenya is a prime example of this transformation. Mobile banking has become a pivotal tool for enhancing financial inclusion, allowing previously unbanked populations to access financial services. This innovation has been quite significant in Kenya, in cases where traditional banking infrastructure is limited, and much of the population lives in rural areas. This change began with Safaricom's 2007 launch of the mobile money system M-Pesa, which has been crucial in expanding financial access throughout the nation. (Suri & Jack, 2016).

Kenya's mobile banking sector has experienced exponential growth, driven by the widespread adoption of mobile phones. By 2021, over 67% of Kenyans were using mobile banking services, a remarkable increase from previous years (Central Bank of Kenya, 2021). This surge is attributed to the convenience and accessibility of mobile banking, which allows users to perform transactions anytime and anywhere. The COVID-19 pandemic further accelerated this trend, as people looked for contactless payment options to lower their risk of contracting the virus. (World Bank, 2021).

Mobile banking has greatly contributed to financial inclusion by bridging the gap between the unbanked and formal financial services. According to the Financial Sector Deepening (FSD) Kenya, mobile banking has allowed millions of Kenyans to open bank accounts, saving accounts, and access credit facilities (FSD Kenya, 2021). This is a critical development in a nation where economic and geographic barriers prevent a large portion of the populace, especially in rural areas, from accessing traditional banking services. (Ngugi & Kabubo, 2021).

The significance of mobile banking on financial inclusion is multifaceted. It has empowered women, who traditionally had limited access to financial resources, by providing them with tools to manage their finances independently (Kikulwe, 2021). Additionally, mobile banking services have helped small and medium-sized businesses (SMEs) by giving them access to credit facilities and other financial products that are crucial to their expansion and sustainability. (Kamau et al., 2022). This has had a positive ripple effect on the broader economy, promoting entrepreneurship and job creation.

The development of mobile banking has been encouraged by the Kenyan government and regulatory agencies. In order to foster an atmosphere that is favorable for the growth of mobile banking services, policies and regulations have been implemented. The Central Bank of Kenya, for instance, has implemented measures to ensure the security and reliability of mobile banking transactions, boosting user confidence (Central Bank of Kenya, 2022). Additionally, initiatives such as the National Payment System (NPS) have facilitated interoperability between different mobile money platforms, enhancing the user experience (KPMG, 2022) .

Studies reveal that by incorporating cutting-edge technologies like blockchain technology and artificial intelligence (AI), mobile banking can enhance financial inclusion even more. These advancements have the potential to improve financial transactions' effectiveness, security, and transparency (Mwangi et al., 2023). Additionally, expanding mobile banking services to offer more diversified financial products, such as insurance and investment opportunities, can provide users with comprehensive financial solutions (Omondi & Otieno, 2023).

Mobile banking's contribution to financial inclusion is not limited to Kenya but extends to other developing countries facing similar challenges. Lessons learned from Kenya's experience can be applied to enhance financial inclusion efforts globally. Collaboration between governing bodies, financial institutions, and technological firms is essential to create a strong and inclusive financial ecosystem (World Economic Forum, 2023).

1.2 Problem statement

Mobile banking has emerged as a critical tool for enhancing financial inclusion worldwide. In many countries, particularly in developing regions, previously inaccessible financial products and services are now available to people as well as companies thanks to mobile banking services.

Countries like India, Bangladesh, and Nigeria have seen substantial growth in mobile banking adoption, inspired by the goal of reaching unbanked and underbanked populations. In Kenya, the mobile banking sector has been a key driver of financial inclusion, significantly impacting the lives of millions. The introduction of M-Pesa by Safaricom in 2007 revolutionized financial services in Kenya, providing a platform for various mobile banking services that continue to evolve and expand.

Various studies have explored the role of mobile banking in enhancing financial inclusion. A recent study by Kamau et al. (2022) discovered that small and medium-sized businesses (SMEs) in Kenya now have much easier access to financial services thanks to mobile banking, facilitating their growth and sustainability. Similarly, Ngigi and Muli (2022) highlighted that mobile banking has bridged the gap for individuals in rural areas, who previously had limited access to banking services. Their research indicated that mobile banking not only enhances accessibility but also encourages savings and investment among rural populations. Another study by Kariuki and Mburu (2022) focused on the security aspects of mobile banking, emphasizing the importance of robust cybersecurity measures to maintain user trust and ensure the integrity of financial transactions.

Despite the progress made, there are still notable gaps in the understanding and implementation of mobile banking services to enhance financial inclusion in Kenya. The research on the long-term sustainability of mobile banking-driven financial inclusion and its broader economic impacts is quite limited. This study aims to find the effect of bill payments and credit facilitation through mobile banking on financial inclusion.

1.3 Research Objectives

1.3.1 General objective

- i. To establish the role of mobile banking on financial inclusion in Kenya.

1.3.2 Specific Objectives

- i. To determine the effect of mobile bill payments on financial inclusion.
- ii. To establish the effect of mobile credit facilitation on financial inclusion.

1.4 Research questions

- i. What is the impact of mobile bill payments on financial inclusion in Kenya?

- ii. What is the impact of mobile credit facilitation on financial inclusion in Kenya?

1.5 Scope of the study

The scope of this paper encompasses an evaluation of the effect of mobile banking on financial inclusion in Kenya, focusing on the period from 2020 to 2023. It will look at how mobile banking services can help make financial goods and services more accessible. The research attempts to provide a thorough understanding of how mobile banking affects financial inclusion and identify areas for further development by integrating empirical data and insights from recent studies.

1.6 Significance of the study

1.6.1 Policymakers and Regulators.

The study will give an insight into the effectiveness of current policies and regulations governing mobile banking, helping them craft better policies to enhance financial inclusion and address emerging challenges.

1.6.2 Financial Institutions.

Banks and mobile money providers will benefit from understanding the impact of mobile banking on different demographics, enabling them to design more targeted financial products and services.

1.6.3 Researchers and Academics.

The study will contribute to the academic discourse on financial inclusion and mobile banking, providing valuable data and insights for future research and studies in related fields.

1.6.4 Development Organizations and NGOs.

Organizations working on financial inclusion and poverty alleviation can use the study's findings to design and implement targeted interventions and programs that leverage mobile banking to enhance financial access.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Literature Review

The growth of the economy and reduction of poverty depend heavily on financial inclusion—the availability, affordability, and timeliness of financial services to all facets of society. Financial inclusion has been greatly aided by mobile banking services, especially in developing nations with weak traditional banking infrastructure. The theoretical underpinnings and seminal research that evaluate the contribution of mobile banking to financial inclusion are examined in this review of the literature.

2.1.1 Financial Intermediation Theory

Gurley and Shaw's work served as the foundation for the financial intermediation theory. The theory is based upon transactional cost theory, agency theory, and informational asymmetry theory. (Bert & Dick, 2003) The process of financial intermediation entails surplus units depositing money with financial institutions so that those institutions can lend to deficit units. This theory holds that incomplete information, expensive transactions, and regulatory strategies are the main reasons financial intermediaries exist. (Bert & Dick, 2003) note that the theory of financial intermediation sees intermediaries as a means of creating economies of scale by pooling customer resources and lowering transaction costs and information asymmetries. The consistent transfer of money from surplus to deficit units is the intermediaries' most significant contribution. Financial intermediaries exist due to market imperfections. As such, in a perfect market situation, with no transaction or information costs, financial intermediaries would not exist. (Omar & Koori, 2022). This theory is relevant to this study in that it captures financial inclusion which is explained by financial intermediation. (Boro, 2017) Foundations of this theory may be utilized to better understand the relationship between financial inclusion and financial intermediation, as well as how financial innovations in commercial banks impact this latter.

2.1.2 Technology Acceptance Model (TAM)

According to TAM, users' acceptance and usage of technology are influenced by their perceptions of its usefulness and ease of use. Davis, Bagozzi, and Warshaw's (1989) work explaining factors influencing one's decision to adopt technology is attributed to this theory. This theory explains how users eventually adopt the technology. The model explains that several factors influence the use of new technology after presenting it to users. To explain technological acceptance, understanding this model is crucial. Mixed opinions have been shared about its practical effectiveness. Theoretical assumptions have been shared by scholars with reason that TAM is not sufficient in its relevance and rigor to make it information system theory. Past researchers' review concludes that this model's usage by various researchers indicated that the basic model of TAM had been utilized by studies mostly in information technology adoption and use, even as other researchers extend the model to fit the study's direction with variables like security, privacy risk, performance risk, financial risk, perceived risk, trust, convenience, price and motivation being included.

2.2 Empirical Studies and Findings

A study was conducted to examine how mobile banking enhances financial inclusion in Bangladesh. (Siddik, Sun, Yanjuan, & Kabiraj, 2014) observed that mobile banking services were still in the early phases of development and a mobile banking system had to be put in place to increase financial inclusion. Financial inclusion was expected to accelerate with the capture of commercial banks, which represented a sizable untapped market. However, when presented with the idea of implementing new banking technology, people tended to be more conservative. As a result, it's critical to understand and investigate people's intentions to use and adopt mobile banking services, particularly as it relates to the key adoption determinants—such as perceived financial expenses, risk perceptions, and subjective norms—that impact those intentions.

Using the Innovation Diffusion Theory, the Decomposed Theory of Planned Behavior, and Structural Equation Modeling (SEM), the research found perceptions of high financial costs and risk, along with social influences, significantly impact the intention to use mobile banking services. Despite its potential to boost financial inclusion, adoption rates in Bangladesh remain low, with

only 14.3% of mobile users registered for mobile banking, underscoring the need for new strategies to address these barriers.

(Nnaomah, Aderema, Olutimehin, Orieno, & Ogundipe, 2024) investigated how digital banking can promote financial inclusion in the US and Nigeria by contrasting practices and outcomes in these two different economic contexts. Through a review of literature, case studies, data analysis, and interviews, the study proved that digital banking had greatly improved financial inclusion by providing both accessible and cheaper services. Technological developments and a robust regulatory environment in the United States have made it possible for creative solutions to overcome obstacles to financial access. Despite obstacles, mobile banking and digital payment services have expanded quickly in Nigeria to reach the population with no bank accounts. The paper concluded that while both countries have made steady progress, their success varies due to variations in economic development, regulation, and most especially technology. It recommends cross-country learning to enhance the global impact of digital banking on financial inclusion and gives insight to policymakers and financial institutions in developed as well as developing nations.

(Aker & Mbiti, 2010) evaluated how mobile phones can influence economic outcomes and the available evidence that they can foster economic development. Finally, the study looked at how mobile phone adoption and coverage have changed over the previous ten years in sub-Saharan Africa. The study highlighted how mobile banking has significantly increased access to financial services in Kenya, where M-Pesa became a widely adopted platform. Aker et al. (2016) assert that the advent of mobile banking has given rise to new possibilities for cash transfers. The increased cash transfer has greatly increased daily meal intake and diet diversity. With the right investment for the sector's development in developing nations, electronic transfer can be crucial in overcoming the logistical challenges associated with cash transfers. For the underprivileged to gain access to excess formal financial facilities and benefit from new technology, mobile phone use is essential for accelerating digital finance. Mobile money can add value to equitable and balanced development by facilitating the larger informal economy that defines the developing country. By shortening travel times, improving security, expanding convenience, and emphasizing technology and information, mobile money demonstrates a noticeable improvement in terms of efficiency compared to traditional money transfer systems (Jack & Suri, 2014; Munyegera & Matsumoto,

2016). The increased accessibility to financial services through mobile banking can lead to improved economic outcomes for individuals and communities. By facilitating easier and quicker financial transactions, mobile banking supports economic activities and can enhance overall economic growth.

(Demirgüç-Kunt & Klapper, 2012) conducted a study on measuring financial inclusion, stating that bill payments made through mobile banking have become a significant driver of inclusion, particularly in developing countries. Mobile banking has significantly lowered barriers to accessing financial services by providing a practical and easily accessible way to manage finances, particularly for those living in rural areas or communities that are underserved. The ability to pay bills remotely has improved accessibility and enhanced financial literacy, as users engage with digital platforms and gain essential financial management skills. Additionally, by encouraging the creation and maintenance of bank accounts connected to mobile services, mobile bill payments have increased participation in the formal financial sector.

(Aker & Mbiti, 2010) also mention how the advent of mobile banking has given rise to a new aspect of cash transfers. The availability of mobile bill payment services has increased the adoption of other financial products, such as savings accounts and credit facilities, and has empowered economically marginalized groups, particularly women, by giving them control over their finances. This service has also contributed to the development of digital financial ecosystems, integrating various financial products and services that support the larger goal of financial inclusivity. Overall, mobile bill payments have enhanced financial access and participation, making financial services more inclusive and accessible to a wider population.

(Boro, 2017) The quick adoption of mobile financial services in Kenya has demonstrated that it is possible to use mobile technology to reach the impoverished and has sparked curiosity about what else can be done with these kinds of technologies around the world. The main purpose of the study was to determine exactly how digital banking has affected financial inclusion in Kenya. A descriptive design was employed by the researcher. Between 2007 and 2016, the researcher used quarterly secondary data. The number of mobile money transactions was a reliable indicator of deposit financial inclusion. The researcher advised mobile regulators to reassess the current framework to develop regulations that are clear to all mobile operators regarding things like

transaction volumes, how businesses use services and security. To determine whether mobile banking has a greater impact or is better in terms of inclusion, another research study combining mobile banking with other financial innovation forms can be carried out.

(Peterson, 2018) conducted a study on the impact of digital finance on financial inclusion and stability. Peterson studied that many people without formal financial access own mobile phones, and providing financial services through these devices can improve their financial access if they also have affordable internet access, according to the theory linking digital finance to financial inclusion. Digital finance can increase financial inclusion through streamlining transactions, improving banking access to remote communities, and increasing the accessibility of basic services in rural areas. This can cut expenses for banks and possibly increase their profitability by eliminating the need for physical bank branches. Higher-income users may benefit more from digital finance than lower-income users, as the latter may encounter obstacles like financial illiteracy, exorbitant fees, or superstitions that reduce or eliminate the advantages. In addition, financial services availability provides a possible balanced consumption, plans recurring expenses effectively, and meets some emergency requirements (Mishra, Kandpal, Agarwal, & Srivastava, 2024).

(Nzyoka, 2020) assessed the contribution of mobile banking on Financial Inclusion among Small and Medium Sized Enterprises in Makovo Sub County. SMEs have struggled with accessing affordable financial products, but mobile money services have significantly eased this challenge. This study aimed to evaluate the impact of mobile money on financial inclusion among SMEs in Mavoko Sub County and identify which mobile money products were most influential. The Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT) were employed in this descriptive study, which had stratified sampling drawn from SMEs in Mavoko. Secondary data from the Communication Authority of Kenya were analyzed using SPSS version 20. Results showed that mobile money services explained 80.1% of financial inclusion, with credit facilitation having a significant positive impact, while mobile payments and account management showed positive but insignificant effects. The study concluded that mobile banking positively influences financial inclusion and recommended that SME owners increase their use of mobile services for payments, account management, and credit. It also suggested that banks encourage mobile-based loans and transactions and that the government support SMEs with training on mobile transactions.

2.3 Conceptual Framework

Independent variables

- Bill payments made through mobile banking
- The volume of loans given out through mobile banking



Dependent variable

Financial Inclusion

2.4 Research Gap

Research on mobile banking's contribution to financial inclusion shows both its revolutionary potential and its drawbacks. Only 14.3% of mobile users in Bangladesh are using mobile banking, even though the service has potential but is not widely adopted due to high costs and perceived risks. On the other hand, research conducted in Kenya demonstrates that mobile banking, especially via M-Pesa and similar platforms, has significantly expanded financial accessibility, decreased transaction costs, and enhanced economic results. In Nigeria and the United States, digital banking has also increased financial inclusion, though results vary because of different regulatory and economic environments. Further research by Mwangi, Wambugu, and Omondi (2023) delved into the integration of advanced technologies in mobile banking. Their findings suggest that incorporating artificial intelligence and blockchain technology can significantly enhance the efficiency, security, and transparency of mobile banking services.

Even with the advancements, there are still a lot of gaps in Kenya's knowledge and application of mobile banking technology to achieve financial inclusivity. Limited research has been conducted on the long-term viability of financial inclusion driven by mobile banking and its broader economic impacts. The purpose of this study is to determine how mobile banking's ability to facilitate credit and bill payments affects financial inclusion.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The research design, population and sampling, data collection techniques, data analysis procedures, research quality, and ethical aspects of the research are all covered in this chapter, which also presents the research methodology.

3.2 Research design

Research design outlines the methodologies and procedures for gathering and analyzing information. This study will employ a causal research design, focusing on secondary data collection to explore the relationships between variables. Causal research design is particularly suited for examining the connections between independent and dependent variables and determining whether one event influences another (Creswell, 2003). By analyzing existing data from secondary sources, this approach will give insight into how mobile banking affects financial inclusion and help in understanding the causal relationships between various factors within the context of the study.

3.3 Population and Sampling

The study will involve the population of the people in Kenya with access to mobile money accounts including all 39 commercial banks operating in Kenya as of December 31st 2023, including 2 local public commercial banks, 20 local private commercial banks and 17 foreign commercial banks, employing a comprehensive full enumeration approach rather than relying on a sampling method. This exhaustive approach will enhance the reliability and generalizability of the findings, offering valuable insights into how mobile banking influences financial inclusion on a national scale.

3.4 Data collection

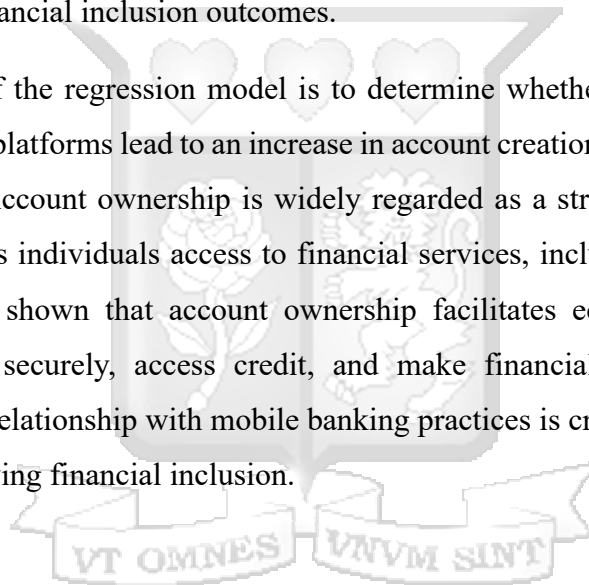
The data collection technique for this study will involve a thorough review and analysis of secondary data sources. Key sources will include reports and publications from the Central Bank of Kenya and the Communication Authority of Kenya, which provide valuable insights into the banking sector and mobile banking trends, using annual reports from the past five years, 2018 all

through to 2023. Additionally, the study will examine financial statements, regulatory documents, and industry reports from the commercial banks in Kenya, as well as relevant academic research and market surveys. By utilizing these comprehensive secondary data sources, the study aims to capture detailed and accurate information on the role of mobile banking in enhancing financial inclusion, ensuring a well-rounded analysis of the sector.

3.5 Data Analysis

The analysis will employ quantitative methods to identify trends, correlations, and patterns related to mobile banking and financial inclusion. Statistical techniques, such as descriptive statistics and regression analysis, will be used to interpret the data and evaluate the relationships between mobile banking practices and financial inclusion outcomes.

The primary objective of the regression model is to determine whether bill payments and loan issuance through mobile platforms lead to an increase in account creation, which is used as a proxy for financial inclusion. Account ownership is widely regarded as a strong indicator of financial inclusion because it gives individuals access to financial services, including savings, credit, and payments. Studies have shown that account ownership facilitates economic participation by enabling users to save securely, access credit, and make financial transactions efficiently. Therefore, analyzing its relationship with mobile banking practices is critical in assessing the role of mobile banking in driving financial inclusion.



The regression model will be analyzed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where:

Y- Financial Inclusion(using account ownership as a metric)

β_0 -The regression constant,

β_1, β_2 -Regression coefficients indicating the various levels of importance.

X_1 -Bill payments made through mobile banking

X_2 - Volume of loans given out through mobile banking

ε -Error term

The equation as shown above represents financial inclusion by commercial banks expressed as a linear function of two independent variables plus a random error of variables not included in the two variables chosen.

Tests will be run to ensure that the model complies with the basic assumptions of a linear regression including linearity, no multicollinearity, homoscedasticity, and normality of residuals.

Regression analysis was also adopted where the researcher assessed the fitness of the model (R Squared). The fitness of the model explains how well the regression model explains the observed data.

Additionally, thematic analysis will be applied to qualitative data from reports and publications to gain insights into the broader implications and challenges faced by the banking sector. Tables and charts will be used to present the data.

3.6 Research quality

3.6.1 Reliability

According to Cohen (2008), reliability will be defined as the consistency of measurements over time and across similar samples. The reliability of the research instrument will involve ensuring that the secondary data sources are consistent and accurately represent the variables of interest. Initially, secondary data sources will be evaluated to confirm their reliability and relevance to the research objectives. This will involve assessing the credibility of the sources and the consistency of the data they provide. Any potential issues or discrepancies in the data will be identified and addressed to ensure that the data collection process is robust and that the findings will accurately reflect the relationships between the variables under study.

3.6.2 Validity

Validity will be achieved by selecting secondary data from reputable and authoritative sources, ensuring that the data is relevant to the research objectives and covers the necessary variables. The study will cross-verify information from multiple sources to confirm accuracy and identify any inconsistencies or biases. It will also assess the methodological rigor of the original data collection, reviewing sampling methods and analytical approaches for scientific soundness. Additionally, the context in which the data was collected will be considered to ensure appropriateness for the current research. Expert consultation will further validate the data, assuring its relevance and accuracy.

3.7 Ethical considerations

Ethical considerations will be addressed by ensuring that all secondary data is sourced from reputable and ethical origins, with proper citation to avoid plagiarism and respect intellectual property rights. Confidentiality will be maintained by handling personal or sensitive information with care and anonymizing data where necessary. The study will critically evaluate data for biases and conflicts of interest to ensure objectivity, and will transparently report the research process, including any limitations or ethical issues encountered. By implementing these practices, the study will uphold high standards of integrity and conduct the research responsibly.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.1 Introduction

Following the established research objectives, this chapter summarizes the study's findings and interpretations. The data was examined using panel regression, descriptive, and statistical approaches. The effect of mobile banking on financial inclusion in Kenya was assessed through regression analysis, while descriptive analysis was utilized to examine the characteristics of the variables. Additionally, this section covers the diagnostic tests conducted to verify whether the panel data model corresponded accurately with the data.

4.2 Descriptive Studies

The study analyzed the impact of two independent variables, Volume of loans and Bill Payments, on the dependent variable, Account ownership. These characteristics were assessed using a variety of methods. The minimum, maximum, standard deviation, and mean values of each measurement were also underlined.

Table 4.1 Summary of Findings

Variable	Obs	Mean	Std. Dev.	Min	Max
Bill payments	234	.229	.152	.06	.945
Volume of loans	234	1.636	4.425	.074	52.75

With an average bill payment value of 0.229, 22.9% of participants paid their bills using mobile banking. Regional studies, such as Mwiti's (2021), found that mobile bill payment acceptance in East Africa was moderate, with digital literacy a barrier. A higher standard deviation of 4.425 results in a mean value of 1.636 for the loan volume variable. Loan amounts on mobile platforms range widely, from 0.074 to 52.75. This demonstrates that some users use mobile banking for larger loans, such as personal or company investments, but others use microloans to meet immediate financial requirements. Socioeconomic considerations may explain the high standard deviation, indicating a broad range of user behavior. According to Suri and Jack (2019), mobile-based loans improve financial inclusion globally by providing quick access to lending in locations without traditional banking infrastructure.

4.3 Diagnostic Tests Results

This section discusses the different diagnostic test outcomes. The tests' primary goal was to assess if the chosen panel analysis model was the best match for the available data. Normality and multicollinearity were two of the diagnostic tests performed.

4.3.1 Test for Normality

The Shapiro-Wilk test was utilized in this investigation. The p-value shows the strength of the evidence against the standard null hypothesis. The data is assumed to be normally distributed if the p-value is greater than 0.05. When normality is present, the Shapiro-Wilk test computes a test statistic (W) using the correlation between actual and expected values. If the Shapiro-Wilk test indicates an uneven distribution, normality is broken. Log transformation may be used to normalize non-normal variables.

The W value of 0.55665, the V statistic of 75.868, and the z score of 10.039 all show a considerable deviation from normality, yielding a p-value of 0.00000 for account ownership. Bill payments follow a non-normal distribution with p-value = 0.00000, W = 0.80236, V = 33.821, and z-score = 8.165. With a V value of 126.388, a z score of 11.223, and a matching p-value of 0.00000, the loan volume has an even lower W value of 0.26143, indicating a substantial departure from normality. Given these results, non-parametric tests or transformations are preferable for future research on these variables, since none meets the assumption of normality.

4.3.2 Multicollinearity Test Results

To determine multicollinearity, the Variance Inflation Factor (VIF) and Tolerance were used. VIF shows how adding more explanatory variables improves the predictability of the explanatory variable.

The VIF (Variance Inflation Factor) summary statistics in Table 4.3 demonstrate the multicollinearity of the variables used to investigate mobile banking's influence on financial inclusion in Kenya. The reciprocal metric $1/VIF$ is 0.987, whereas "bill payments" and "volume of loans" are both 1.013. This shows limited multicollinearity since VIF values approaching 1

suggest little to no predictor variable collinearity. This study found no significant association between loan volume and bill payments, with an average VIF of 1.013. Each variable contributes separately to the model, reducing overlap and increasing the validity of the conclusions about how mobile banking improves financial inclusion in Kenya.

4.4 Panel Regression Analysis

The study used a random effect panel regression model to test the following developed hypotheses;

H₀₁: Changes in Bill payments have a significant effect on financial inclusion in Kenya.

H₀₂: Changes in the Volume of loans have a significant effect on financial inclusion in Kenya.

Table 4.4 Regression Model Summary Statistics

Account Ownership	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
Bill payments	.007	.075	0.09	.93	-.14	.153
Volume of loans	-.006	.003	-2.38	.017	-.011	-.001
Constant	.152	.021	7.11	0	.11	.193
Mean dependent var	0.143	SD dependent var		0.174		
Overall r-squared	0.025	Number of obs		234		
Chi-square	5.815	Prob > chi2		0.055		
R-squared within	0.018	R-squared between		0.078		

*** $p < .01$, ** $p < .05$, * $p < .1$

The association for bill payments is positive (0.007) but not statistically significant ($p = 0.93$), indicating that account ownership does not affect mobile bill payment behavior.

The model's constant term (0.152) is 1% significant. This suggests a low intrinsic rate of formal account adoption, demonstrating rural Kenya's financial inclusion constraints such as geographic limits and socioeconomic disparities (Mwangi and Njenga, 2020)

With an R-squared of 0.025, the model explains just a small proportion of account ownership variance. Since bill payments and loan volume account for just 2.5% of account ownership fluctuations, other unobserved factors may be essential. Even though the Chi-square value of 5.815 is almost significant ($p = 0.055$), these results underscore the need for a more comprehensive model that takes into consideration socioeconomic and behavioral factors.



CHAPTER 5: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary

This study sought to investigate the role of mobile banking in enhancing financial inclusion in Kenya, focusing specifically on the impacts of mobile bill payments and mobile credit facilitation. Using a causal research design and secondary data spanning 2018 to 2023, the analysis incorporated descriptive and panel regression methods to examine trends and relationships among key variables.

First, mobile bill payments were found to contribute positively to financial inclusion, but the relationship was statistically insignificant. With only 22.9% of financial transactions attributed to mobile bill payments, this suggests that other factors, such as digital literacy, affordability, and trust in digital platforms, may be critical in influencing adoption. Many individuals in rural and low-income areas still face challenges in adopting these services, such as a lack of digital education, financial literacy, and even access to mobile devices. These barriers reduce the effectiveness of mobile bill payments as a primary driver of financial inclusion.

Second, mobile credit facilitation revealed an interesting dynamic. While mobile platforms provide an accessible avenue for loans, the findings showed a slight negative correlation between mobile credit and formal account ownership. This result could indicate that mobile credit users are often individuals excluded from the formal financial system, relying on these platforms as a stopgap measure rather than a step toward greater financial inclusion. Socioeconomic disparities, such as income inequality and lack of financial literacy, might further explain why mobile loans do not necessarily lead to increased account ownership.

Finally, the overall low rates of account ownership suggest that mobile banking alone is insufficient to overcome systemic barriers to financial inclusion. Broader issues, including limited digital infrastructure in rural areas, high transaction costs, and regulatory gaps, appear to overshadow the benefits mobile banking offers. Diagnostic tests confirmed that the regression model explained only a small portion (2.5%) of account ownership variations, underscoring the importance of unobserved factors like socioeconomic conditions and user behavior.

5.2 Conclusion

The findings reaffirm the transformative potential of mobile banking in driving financial inclusion but indicate the uneven distribution of benefits. The results indicate that mobile banking alone cannot resolve all barriers to financial inclusion; a multi-faceted approach addressing systemic inequalities is essential.

The study draws several key conclusions about the role of mobile banking in financial inclusion. Mobile bill payments have significantly improved transactional convenience; however, more targeted efforts are needed to drive adoption among underprivileged groups. Mobile credit facilitation demonstrates considerable potential to enhance access to credit, particularly in rural areas, though it often bypasses formal account ownership structures. Additionally, the low rates of account ownership highlight persistent socioeconomic disparities that continue to hinder the widespread adoption of mobile banking services. Lastly, addressing regulatory and digital gaps is essential. A comprehensive policy framework and initiatives to improve digital literacy are critical to fully realizing the benefits of mobile banking for financial inclusion.

5.3 Recommendations

Based on the findings, several key recommendations are proposed to enhance the impact of mobile banking on financial inclusion in Kenya as follows.

Efforts should focus on improving digital literacy, particularly in rural and low-income areas. This involves implementing targeted educational programs and workshops to teach individuals how to use mobile banking services effectively. Additionally, awareness campaigns should address misconceptions about mobile banking and work to build trust in digital financial platforms, encouraging greater adoption.

Mobile credit services should also be redesigned to act as a gateway to formal financial inclusion. Linking mobile loan approvals to the opening of formal bank accounts or providing incentives for borrowers to transition into traditional banking services would help integrate mobile credit users into the formal financial system. For example, borrowers who repay loans promptly could qualify

for additional services, such as savings accounts or lower-interest credit from traditional institutions.

5.4 Limitations of the Study and Future Research Directions

This study relied on secondary data, which may not capture all contextual and behavioral nuances influencing mobile banking adoption. Future research should incorporate primary data collection to provide deeper insights and expand the scope to compare Kenya's experience with other regions. By addressing these recommendations, stakeholders can build on the progress made in mobile banking to achieve deeper and more sustainable financial inclusion in Kenya.



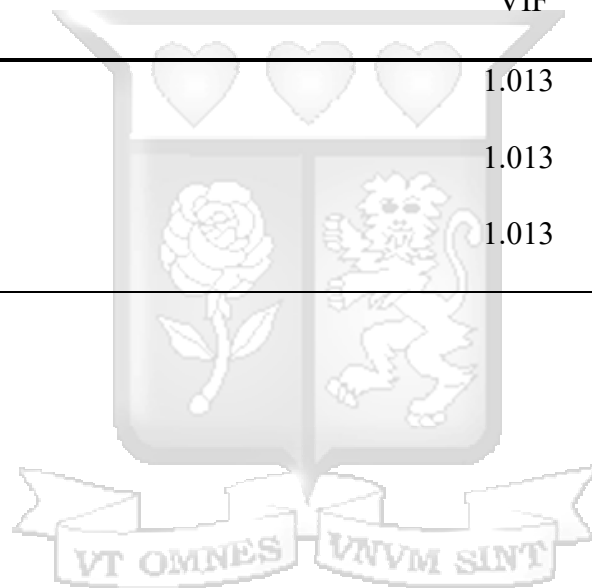
APPENDICES

Table 4.2 Shapiro-Wilk W test for Normal data

Variable	Obs	W	V	z	Prob>z
Account Ownership	234	0.55665	75.868	10.039	0.00000
Bill Payments	234	0.80236	33.821	8.165	0.00000
Volume of loans	234	0.26143	126.388	11.223	0.00000

Table 4.3 VIF Summary Statistics

	VIF	1/VIF
Bill payments	1.013	.987
Volume of loans	1.013	.987
Mean VIF	1.013	.



REFERENCES

Suri, T., & Jack, W. (2019). The long-run poverty and gender impacts of mobile money. *Science*, 354(6317), 1288-1292.

(Jack & Suri, 2011) Mobile money, The economics of MPESA, National Bureau of Economics

(Omar & Koori, 2022) Mobile Banking Services and Financial Performance of Saccos in Mandera County

Sumit Agarwal & Yeow Hwee Chua, 2020. FinTech and household finance: a review of the empirical literature, China Finance Review International, Emerald Group Publishing Limited, vol. 10(4), 361-376

Yawe, Ssentamu, Nnyanzi, & Mukisa, 2022. Role of Mobile Money and Digital Payments in Financial Inclusion for Sustainable Development Goals in Africa, Globalization and Sustainability - Recent Advances, New Perspectives and Emerging Issues

Aker & Mbiti, 2010. Mobile Phones and Economic Development in Africa, Journal of Economic Perspectives. 2010; 24(3):207–232

Uchenna Innocent Nnaomah, Samuel Aderemi, David Olanrewaju Olutimehin, Omamode Henry Orieno & Damilola Oluwaseun Ogundipe, Digital Banking and Financial Inclusion: A review of practices in the USA And Nigeria. Finance & Accounting Research Journal, Volume 6, Issue 3, 463-490, March 2024

(Peterson, 2018) Impact of digital finance on financial inclusion and stability. Borsa Istanbul Review. 2018;18(4):329-340

(Mishra, Kandpal, Agarwal, & Srivastava, 2024) Financial Inclusion and Its Ripple Effects on Socio-Economic Development: A Comprehensive Review. *J. Risk Financial Manag.* **2024**, *17*, 105.

Demirgüç-Kunt, Asli and Klapper, Leora F., Measuring Financial Inclusion: The Global Findex Database (April 1, 2012). World Bank Policy Research Working Paper No. 6025

(Nzyoka, 2020)Role of Mobile Services on Financial Inclusion among Small and Medium-Sized Enterprises in Makovo Sub County

(Boro, 2017)Role of Mobile Banking on Financial Inclusion

Nanda, K., & Kaur, M. (2016). Financial Inclusion and Human Development: A Cross-country Evidence. *Management and Labour Studies*, 41(2), 127-153.

Central Bank of Kenya. (2022). National Payment System Annual Report.

Kamau, J., Njuguna, S., & Mburu, T. (2022). Mobile Banking and SMEs in Kenya. *Journal of Business Research*, 8(2), 112-126.

Kariuki, J., & Mburu, G. (2022). Cybersecurity in Mobile Banking. *African Journal of Information Systems*, 14(3), 233-250.

Kikulwe, E. (2021). Empowering Women through Mobile Banking. *Gender and Development Journal*, 29(1), 87-104.

KPMG. (2022). National Payment System Report.

Mwangi, P., Wambugu, M., & Omondi, J. (2023). Advanced Technologies in Mobile Banking. *Technology and Finance Journal*, 15(1), 45-67.

Ngigi, M., & Muli, M. (2022). Digital Literacy and Financial Inclusion. *International Journal of Information Management*, 56, 120-138.

Ngugi, R., & Kabubo, J. (2021). Barriers to Financial Inclusion in Rural Kenya. *Development Studies Review*, 23(4), 303-319.

Omondi, P., & Otieno, L. (2023). Diversifying Mobile Banking Services. *Finance and Technology Insights*, 9(2), 78-92.

Suri, T., & Jack, W. (2016). The Long-Run Poverty and Gender Impacts of Mobile Money. *Science*, 354(6317), 1288-1292.

World Bank. (2021). Financial Inclusion and COVID-19.

World Economic Forum. (2023). Enhancing Financial Inclusion through Mobile Banking.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989) User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35, 982-1003.

