EFFECT OF MOBILE BANKING SERVICES ON FINANCIAL PERFORMANCE OF DEPOSIT-TAKING SAVINGS AND CREDIT COOPERATIVE SOCIETIES IN NAIROBI COUNTY, KENYA

OBADIAH MULINGE

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES, UNIVERSITY OF NAIROBI

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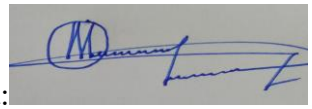
DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed:  _____Date: 17/11/2023_____

OBADIAH MULINGE

D63/40403/2021

This research project has been submitted for examination with my approval as the University Supervisors.

Signed: _____Date: __17/11/2023_____

DR. JOHNBOSCO M. KISIMBII, PhD

SENIOR LECTURER, DEPARTMENT OF FINANCE AND ACCOUNTING

FACULTY OF BUSINESS AND MANAGEMENT SCIENCES

UNIVERSITY OF NAIROBI

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DEDICATION

It is with genuine gratitude and warm regard that I dedicate this research project to my family and friends. My parents Mr. and Mrs. Muthama you have always pushed me to achieve what you two were not able and I am proud that I have achieved that. It's through your dedication and love that I have made it. My siblings Maithya, Nzembi, Ndeti, and Masila, I thank you for believing in me and for your prayers and support. God Bless you all

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ABBREVIATIONS & ACRONYMS

TAM	Technology Acceptance Model
DIT	Disruptive Innovation Theory
TFI	Theory of Financial Inclusion
VIF	Variance Inflation Factor

ABSTRACT

This study addresses the evolving landscape of the banking sector by examining the impact of mobile banking services on the financial performance of 11 commercial banks listed at the Nairobi Securities Exchange. The increasing prevalence of mobile banking services presents a transformative opportunity for the industry, but its implications on financial outcomes warrant thorough investigation. The study is motivated by the need to comprehend the dynamics of this technological shift and its influence on financial metrics, particularly Return on Assets (ROA). The main objective of this study was to determine the effect of mobile banking services on financial performance of commercial banks listed at the NSE. The control variables were; credit risk, liquidity, capital adequacy, and firm size. The study was anchored on technology acceptance model, disruptive innovation theory, and the theory of financial inclusion. The study employed a descriptive research design, utilizing secondary data extracted from annual financial reports of the sampled banks from 2018 to 2022. The target population comprises the 11 commercial banks listed at the NSE. Descriptive, correlation as well as regression analysis were undertaken, and outcomes offered in tables followed by pertinent interpretation and discussion. The research findings yielded a 0.477 R square value implying that 47.7% of changes in commercial banks listed at the NSE ROA can be described by the five variables chosen for this research. The multivariate regression analysis further revealed that individually, mobile banking services has a positive and significant effect on ROA of commercial banks listed at the NSE (β=0.114, p=0.001). Credit risk had a negative effect on ROA of commercial banks listed at the NSE as shown by (β=-0.150, p=0.000). Firm size exhibited a positive and significant ROA influence as shown by (β=0.286, p=0.000). Capital adequacy and liquidity exhibited a positive but not statistically significant influence on ROA. The study concludes that mobile banking services plays a significant role on financial performance of commercial banks listed at the NSE. The study recommends the need for policymakers to encourage and support the adoption of mobile banking services solutions within the banking sector. The study recommends fostering a conducive regulatory environment for mobile banking services and emphasizes the importance of robust credit risk management practices. Suggestions for further research include longitudinal studies, cross-country comparisons, qualitative investigations, and explorations into the evolving landscape of fintech collaborations within the banking sector.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In an era characterized by rapid technological advancements and evolving financial landscapes, the symbiotic relationship between innovation and traditional structures becomes a focal point of analysis. This study embarks on a journey to unravel the intricate dynamics between mobile money services and the traditional banking industry, using the iconic M-PESA service in Kenya as a lens through which to explore this transformative landscape. The financial realm is undergoing a seismic shift, with mobile money services carving out a space that challenges the conventional norms of banking (Deloitte, 2021). The allure of convenience, accessibility, and efficiency has beckoned consumers toward mobile money, prompting us to delve deeper into the impact of this trend on the broader financial ecosystem. As the world watches Kenya's M-PESA flourish, this study endeavors to comprehensively assess the metamorphosis underway, charting the course of this coexistence between innovation and tradition.

At the core of this research are the anchoring theories that underpin the complex interactions between mobile money services and traditional banking structures. The Technology Acceptance Model (TAM) provides a foundation for understanding the behavioral determinants of technology adoption (Scherer, Siddiq & Tondeur, 2018). In this context, TAM elucidates how individuals perceive and embrace mobile money services, ultimately influencing changes in consumer preferences and behaviors. The theory of Disruptive Innovation by Christensen offers insights into how novel services like mobile money can disrupt established industries, potentially redefining the role of traditional banks. The theory of Financial Inclusion posits that mobile money services, with their accessibility and low entry barriers, could catalyze financial inclusion, empowering previously underserved populations (Myerson, 2019). By drawing upon

these theories, this study aims to construct a comprehensive framework that elucidates the intricate relationships, synergies, and tensions between the variables under scrutiny.

Nationally, Kenya's M-PESA stands as a quintessential example of innovation transforming societies, offering unprecedented access to financial services even in the most remote corners. Previous studies have explored facets of mobile money's impact, including its role in boosting economic growth, fostering financial inclusion, and reshaping informal economies. However, the deeper intricacies of its relationship with traditional banking institutions and its potential to create collaborative or competitive dynamics have not been exhaustively examined. This study seeks to bridge these gaps by diving into the unique Kenyan context, drawing on the development and the manner in which M-PESA has revolutionized the banking sector as a whole.

1.1.1 Mobile Banking Services

Mobile phone penetration, often referred to as mobile phone adoption or mobile phone usage, represents the percentage of individuals within a specific area, region, or country who possess and utilize mobile phones for various purposes. This variable signifies the extent of mobile phone access and usage within a given population. In the context of Kenya, it reflects the prevalence and reach of mobile phones among its citizens, encompassing both basic mobile phones and smartphones, along with their functionalities and features.

Within the concept of mobile phone penetration in Kenya, several critical research issues emerge. These issues include disparities in access across regions, variations in digital literacy levels among mobile phone users, concerns regarding security and privacy in mobile banking services, the evolving regulatory environment's impact on adoption, the establishment of trust and confidence among users, the user experience

with mobile banking apps, and the extent of financial inclusion facilitated by mobile banking, particularly among marginalized populations.

Researchers have operationalized mobile phone penetration in various ways to assess its prevalence and impact. Common methods include subscriber counts, ownership surveys (i.e., whether individuals own a mobile phone or not), assessing usage frequency (distinguishing between occasional and frequent users), differentiation between basic mobile phones and smartphones, examining the number of active SIM cards per individual, assessing mobile internet usage, analyzing demographic correlations, investigating geographical disparities (urban vs. rural), evaluating network coverage and quality, studying market share of mobile operators, and conducting qualitative research through interviews and focus groups. These methods are selected based on research objectives, data availability, and the specific context being studied, providing insights into the societal implications of mobile phone penetration in Kenya.

1.1.2 Financial Performance

Financial performance in the context of mobile banking services in Kenya refers to the measurable outcomes and indicators that reflect the economic viability and success of these services. It encompasses various aspects, including profitability, cost efficiency, customer acquisition, revenue generation, asset quality, market share, and the ability to provide value to shareholders and customers. Financial performance is influenced by the unique dynamics of Kenya's mobile money ecosystem, where services like M-PESA by Safaricom dominate the market. It's the end result of mobile banking activities that determine the continued existence and competitiveness of service providers.

Several research issues within the concept of financial performance in the context of mobile banking services warrant further investigation. These include assessing the

impact of market dominance by M-PESA on competition and innovation, understanding the role of regulatory changes in shaping financial outcomes, examining user adoption rates and their effect on transaction volumes, evaluating the significance of agent networks in urban and rural areas, exploring the impact of innovation and product diversification on financial performance, investigating security and trust issues, analyzing the influence of economic factors, such as inflation and interest rates, on mobile banking usage, studying the expansion of services to rural areas for financial inclusion, and assessing the effects of competition on financial metrics.

Researchers have operationalized financial performance in various ways to measure its impact in the context of mobile banking services. Common methods include assessing profitability metrics such as Return on Assets (ROA) and Return on Equity (ROE) to gauge efficiency and shareholder value. Researchers also examine cost reduction, customer acquisition and retention, transaction volume and revenue, asset quality, market share, Customer Lifetime Value (CLV), cross-selling, Return on Investment (ROI), Earnings Per Share (EPS), Net Interest Margin (NIM), and customer satisfaction metrics like Net Promoter Score (NPS) to understand different dimensions of financial performance. The choice of operationalization depends on the specific research objectives and context, with the aim of providing a comprehensive evaluation of the financial impact of mobile banking services.

1.1.3 Mobile Banking Services and Financial Performance

Mobile banking services have experienced rapid growth worldwide, and their impacts on the financial performance of commercial banks have been a subject of significant interest and debate. Various theoretic relationships are expected between the adoption of mobile banking services and various financial performance metrics of commercial

banks. Furthermore, we discuss empirical evidence to validate these relationships, specifically focusing on the Kenyan context while providing a general overview of mobile banking services and their impact on financial performance in Kenya, supported by local research.

One of the theoretic expectations is cost reduction and cost Efficiency. The adoption of mobile banking is theoretically expected to reduce operating costs for banks resulting in improved cost efficiency. By reducing the need for physical branches and personnel for routine transactions, mobile banking can significantly lower operational expenses. Several studies support this theoretical expectation. A study by Muriu et al. (2021) found that Kenyan banks that embraced mobile banking experienced a notable decrease in their cost-to-income ratios, indicating improved cost efficiency. Another theoretic expectation is customer convenience and customer satisfaction. The integration of mobile banking services theoretically enhances customer convenience, which in turn is expected to lead to higher customer satisfaction. This is facilitated by unlimited access to bank accounts from anywhere within the country hence customers are less reliant on in-person visits to commercial banks. This was explored by Nyakundi and Wanjiru (2020), who concluded the existence of a strong positive correlation between the use of mobile banking and customer satisfaction in the Kenyan banking sector. The expanded customer base and customer acquisition is another theoretical expectation. Mobile banking theoretically attracts younger, tech-savvy customers leading to an increase in customer acquisition as banks tap into a broader demographic.

A study by Omondi and Kimani (2019) confirmed that Kenyan banks offering robust mobile banking services observed a significant growth in their customer base, especially among the younger population, supporting the theoretical expectation.

Another theoretical expectation is the increase in cross-selling opportunities and revenues. Through the use of mobile phone apps, banks can cross-sell other financial products thus boosting their revenues. Research by Gathoni and Mwangi (2022) indicated that Kenyan banks experienced revenue growth as a result of mobile banking-based cross-selling. Leveraging on mobile technology has enhanced competitiveness resulting in a stronger financial performance as evident in the study by Kariuki et al. (2021).

1.1.4 Commercial Banks Listed at the Nairobi Securities Exchange

Commercial banks are financial entities that offer banking services to their consumers. They take public deposits and provide loans for investment and consumption, as well as savings accounts and the ability for consumers to move funds from one account to another. The NSE, situated in Kenya, is a vital African exchange. It gives a valuable trading institution for both local and international individuals seeking to make investment or gain exposure to the economic development of Kenya and Africa by promoting savings and investment and assisting local and international businesses in acquiring cost-effective finance (Umpiantu, 2020). The NSE lists eleven commercial banks, which are sorted by their business value.

Electronic banking has eliminated several problems in the banking industry, such as long lines and customer service delays. Customers may now obtain banking services online, eliminating the need to visit a branch, resulting in an overall improvement in the banking industry. E-banking has also given banks a competitive advantage over other businesses. Kiragu (2017) stated that the implementation of electronic banking in banks increased their financial performance significantly. Kenya's commercial banking sector is composed of various financial institutions, each playing a significant role in

the country's financial landscape. These commercial banks offer a wide array of banking and financial services to cater to the diverse needs of their customers.

The Nairobi Securities Exchange (NSE) is a pivotal financial institution in Kenya, serving as a crucial platform for both local and international investors, contributing to economic development, and promoting savings and investment in the region (Umpiantu, 2020). According to Harrison, Ndung'u, and Abayo (2021), the Nairobi Securities Exchange encompasses 11 listed banks which include the Absa Bank Kenya, Co-operative Bank of Kenya Ltd., Diamond Trust Bank Kenya Ltd., Equity Group Holdings, HF Group Ltd, I&M Holdings Ltd, KCB Group Ltd, National Bank of Kenya Ltd, NCBA Group, Standard Chartered Bank Ltd, and Stanbic Holdings.

1.2 Research Problem

When comparing mobile phone penetration with mobile banking services in Kenya, several other factors should be considered to gain a comprehensive understanding of the mobile banking landscape in the country. These factors can help identify correlations, trends, and potential areas for improvement or growth. Among many other factors, some key factors to take into consideration include internet penetration and smartphone adoption. Alongside mobile phone penetration, the availability of mobile internet is crucial for mobile banking services. A higher level of internet penetration can indicate greater access to online banking services and mobile apps. Similarly, not all mobile phones are smartphones. The percentage of smartphone users is important because mobile banking apps often require more advanced features, such as touchscreen capabilities and mobile operating systems like Android or iOS. Collecting data and conducting surveys to analyze these factors alongside mobile phone penetration will provide a more nuanced view of the mobile banking landscape in

Kenya and help in making informed decisions about expanding or optimizing mobile banking services in the country.

The study of mobile phone penetration, internet penetration, and smartphone adoption in the context of mobile banking services in Kenya differs from other studies in several ways, primarily due to the unique socioeconomic and technological landscape of Kenya. The key factors that set it apart include mobile money revolution, high mobile phone penetration, diverse mobile ecosystem, internet connectivity, regulatory environment, socioeconomic factors, fintech innovation, and cultural and behavioral factors. Kenya is often considered the birthplace of mobile money services, with the introduction of M-PESA in 2007. This revolutionary mobile banking platform has played a significant role in financial inclusion, transforming the way people in Kenya access and manage their finances. Understanding the dynamics of mobile money adoption and usage in Kenya is essential for any study in this context. Kenya has experienced a rapid increase in mobile phone penetration over the years, with a significant portion of the population having access to mobile phones. This widespread access to mobile devices creates a unique opportunity for the delivery of financial services through mobile platforms.

Kenya's mobile ecosystem is diverse, encompassing both feature phones and smartphones. While smartphone adoption is increasing, a substantial portion of the population still relies on feature phones for communication and mobile banking services. This diversity presents challenges and opportunities that may not be present in other regions where smartphone penetration is higher. Internet penetration in Kenya has been growing steadily, with a focus on improving broadband infrastructure and affordability. However, there are still variations in internet access, especially in rural

areas. Understanding the state of internet connectivity is crucial for assessing the reach of mobile banking services.

Kenya's regulatory environment has been conducive to the growth of mobile banking services, with regulatory bodies like the Central Bank of Kenya actively promoting financial inclusion. The regulatory framework and policies in place can significantly impact the development and adoption of these services. Kenya's population is diverse in terms of income levels, urbanization, and education. These socioeconomic factors influence how people access and use mobile banking services, making it essential to consider these variables in any study. Kenya has a vibrant fintech ecosystem with numerous startups and companies developing innovative mobile banking solutions. Research in this context may need to account for the competitive landscape and the impact of new technologies and services. Cultural norms and behaviors can affect the adoption and usage of mobile banking services. Understanding the cultural context of Kenya is crucial for tailoring services and communication strategies effectively.

This research is designed to comprehensively explore various dimensions of mobile banking services in Kenya, examining the interplay of factors that influence adoption, utilization, and their broader impact on the financial landscape. The conceptual and contextual arguments, discuss the status of empirical gaps, and introduces the research question. The conceptual argument for studying the factors influencing the adoption and utilization of mobile banking services in Kenya lies in the multifaceted nature of the mobile banking ecosystem. Mobile banking is not solely a technological innovation as it intersects with various socio-economic, regulatory, and user-related factors. These interconnected elements collectively shape the success and impact of mobile banking on financial inclusion and overall banking experiences.

By investigating the interplay between demographic variables such as age, income level, education, and urban/rural residence and mobile banking adoption, we aim to discern patterns and determinants of usage. The combination of these factors contributes to a holistic understanding of why certain groups may be more inclined to use mobile banking services, while others may not. What sets this study apart from previous research is its specific focus on the Kenyan context. While existing literature provides valuable insights, it often draws from studies conducted in developed or emerging markets, which may not fully capture the unique dynamics of mobile banking adoption in Kenya. Kenya has been at the forefront of mobile banking innovation, with services like M-PESA gaining global recognition. Thus, understanding the Kenyan landscape is vital not only for the country's financial sector but also for its potential to serve as a model for other regions. This research aims to bridge the contextual gap by providing context-specific insights into the adoption and utilization of mobile banking services in Kenya.

Empirical research on mobile banking in Kenya has made significant strides in recent years. Numerous studies have explored various facets of mobile banking adoption and utilization, shedding light on its impact on financial inclusion, user experiences, regulatory implications, and more. However, the research landscape is not without gaps. While there is a wealth of empirical evidence, there remains room for more rigorous and nuanced investigations, especially in the context of Kenya. Methodological gaps exist in terms of the scope and depth of studies, and the integration of various research variables. This study aims to address these methodological gaps by employing a comprehensive approach that combines surveys, data analysis, and contextual understanding. Notably, this research explores how do various demographic, socio-economic, regulatory, and user-related factors influence the adoption and utilization of

mobile banking services in Kenya, and how can these insights be leveraged to enhance financial inclusion and improve the overall mobile banking experience. This research question encapsulates the overarching theme of the study, which aims to dissect the intricate relationship between mobile banking services and traditional banking, with a specific emphasis on the Kenyan context. By investigating this multifaceted question, the study seeks to contribute valuable insights that can inform both academic discourse and practical decision-making in the realm of mobile banking in Kenya. The current research was based on these gaps and attempted to answer the research question; what is the effect of mobile banking services on financial performance of Commercial banks listed at the NSE?

1.3 Research Objective

The objective of this study was to determine the effect of mobile banking services on financial performance of commercial banks listed at the Nairobi Securities Exchange

1.4 Value of the Study

From a policy perspective, the study can provide valuable insights into the potential benefits and challenges of mobile banking services adoption among commercial banks listed at the NSE. These insights may be used by policymakers to develop laws and rules that encourage commercial banks listed at the NSE to implement mobile banking services responsibly and sustainably. The report also highlights the importance of mobile banking services in enhancing access to financial services for low-income and underserved groups, which can help Kenya and other emerging nations implement financial inclusion plans.

For commercial banks listed at the NSE looking to use mobile banking services technologies to enhance their financial performance, the report can offer useful advice.

The study can pinpoint the best mobile banking services options for various banks and offer insights into the most efficient ways to deploy mobile banking services. These insights may be used by commercial banks listed at the NSE to guide their strategic planning and investment choices relating to the implementation of mobile banking services, thereby improving financial performance.

The study can add to the body of knowledge on how mobile banking services affects financial performance in developing economies. The study can shed light on the distinct issues and possibilities faced by commercial banks listed at the NSE in emerging economies by concentrating on commercial banks listed at the NSE. The study may contribute to the creation of a theoretical framework for comprehending how the use of mobile banking services impacts financial performance in emerging economies by offering insights into the mechanisms via which adoption of the technology affects financial performance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter covers the theoretical framework, the determinants of financial performance, empirical literature review, a summary of research gaps and a conceptual framework.

2.2 Theoretical Framework

The theoretical review section delves into the conceptual frameworks that underpin the complex relationships between mobile money services and the traditional banking industry. This exploration encompasses three main theories, each offering unique insights into various dimensions of the research problem.

2.2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) was first introduced by Davis in 1986. The model seeks to explain how users perceive and accept new technologies based on their perceived usefulness and ease of use (Lai, 2017). According to TAM, two factors which influence the intention of an individual to adopt a technology is the perceived usefulness and perceived ease of usage. People are more likely to adopt a technology if they believe it helps them to reduce their effort while enhancing their productivity. The model also suggests that perceived ease of use directly affects perceived usefulness, as users tend to associate greater ease of use with increased utility (Holden & Ben-Tzion, 2010).

TAM has faced criticism for oversimplifying the complex process of technology adoption. Critics argue that other variables, such as social influence and individual differences, can also impact technology acceptance. Additionally, TAM does not consider external factors, organizational context, or long-term use behaviors. In the context of this study, TAM's relevance lies in its ability to predict consumers' intentions

to adopt mobile money services like M-PESA. It suggests that users are likely to embrace mobile money if they perceive it as convenient and beneficial for financial transactions. The theory anticipates a positive relationship between perceived ease of use and mobile money adoption, which in turn should correlate with shifts in consumer behaviors and preferences.

2.2.2 Disruptive Innovation Theory

The Disruptive Innovation theory by Clayton Christensen explains how innovations with lower performance initially disrupt established markets by targeting underserved segments, eventually gaining traction and displacing incumbents. The DIT suggests that disruptive technologies initially offer lower performance compared to existing solutions but provide other advantages such as affordability, simplicity, or accessibility (Gemici & Alpkan, 2015). They start by addressing the needs of overlooked or marginal markets, gradually improving their performance until they surpass established solutions.

Critics argue that the theory does not consider the complexities of market dynamics and the potential for incumbent firms to adapt and respond to disruptions. The criteria for identifying disruption can also be ambiguous. DIT is relevant to understanding the competitive dynamics between mobile money services and traditional banking institutions. It predicts that mobile money services, though initially offering different performance attributes, could gradually gain traction, challenge traditional banking, and reshape consumer preferences.

2.2.3 Theory of Financial Inclusion

The theory of Financial Inclusion (TFI) emphasizes the importance of providing access to affordable and appropriate financial services to underserved and marginalized

populations (Tay et al., 2022). While not attributed to a single originator, this theory gained prominence with global efforts to enhance financial access. The TFI asserts that increasing financial access empowers individuals and communities, leading to improved economic well-being and reduced poverty (Tay et al., 2022). It suggests that innovative financial services, such as mobile money, can play a pivotal role in expanding financial inclusion, especially in regions with limited traditional banking infrastructure.

Critics highlight the challenges of solely relying on technology-driven financial inclusion, as issues such as digital literacy, trust, and regulatory barriers can hinder adoption. Additionally, financial inclusion's impact on economic growth is debated. The TFI aligns with this study's focus on the impact of mobile money services on marginalized populations. It anticipates that mobile money's accessibility could positively affect financial inclusion indicators, potentially leading to broader economic growth and reshaping informal economies. Incorporating these theories enriches our understanding of the conceptual underpinnings of the mobile money-banking relationship. TAM informs the anticipated shifts in consumer behaviors, DIT predicts competitive dynamics, and the theory of Financial Inclusion guides insights into inclusive economic growth. These theories collectively shape the theoretical framework that guides our investigation into the multifaceted impact of mobile money services on the banking industry.

2.3 Determinants of Financial Performance

This section covers factors that are theoretically expected to influence the financial performance of firms. The factors discussed in this section are mobile banking services, credit risk, firm liquidity, firm size and capital adequacy.

2.3.1 Mobile Banking Services

The adoption of mobile banking is theoretically expected to reduce operating costs for banks resulting in improved cost efficiency. By reducing the need for physical branches and personnel for routine transactions, mobile banking can significantly lower operational expenses. Several studies support this theoretical expectation. A study by Muriu et al. (2021) found that Kenyan banks that embraced mobile banking experienced a notable decrease in their cost-to-income ratios, indicating improved cost efficiency. Another theoretic expectation is customer convenience and customer satisfaction.

The integration of mobile banking services theoretically enhances customer convenience, which in turn is expected to lead to higher customer satisfaction. This is facilitated by unlimited access to bank accounts from anywhere within the country hence customers are less reliant on in-person visits to commercial banks. This was explored by Nyakundi and Wanjiru (2020), who concluded the existence of a strong positive correlation between the use of mobile banking and customer satisfaction in the Kenyan banking sector.

2.3.2 Credit Risk

In general, a favorable correlation between asset quality and financial success is anticipated. Higher revenues and less credit losses are anticipated from high-quality assets, such as loans that are likely to be returned on time, which will boost financial performance. On the other side, low-quality assets like non-performing loans may cause more credit losses and fewer revenues, which would result in a decline in financial performance (Chindengwike, & Mnyampanda, 2021).

Additionally, a financial institution's reputation and trustworthiness may be impacted by the quality of the assets it holds, which may have an influence on its capacity to get

finance and draw in new clients (Bae, 2020). As a result, it is frequently thought that maintaining excellent asset quality is essential to a financial institution's capacity to expand and preserve its finances over the long term. It is crucial to remember that a number of variables, including the kind of financial institution, the location in which it operates, and the regulatory environment, can have an impact on the link between credit risk and financial performance (Parvin, Hossain, Mohiuddin & Cao, 2020).

2.3.3 Firm Liquidity

The capacity of a business to fulfill its immediate financial responsibilities, such as paying invoices and debts when they become due, is referred to as liquidity. As it enables the firm to take advantage of investment opportunities and weather unforeseen financial shocks, sufficient liquidity is essential for a company's financial health and growth (Guerini, Nesta, Ragot & Schiavo, 2020). High levels of liquidity can protect against financial risks and uncertainties from the standpoint of financial performance, enabling a business to continue operations and make money. On the other hand, inadequate cash levels may result in lost opportunities, greater borrowing costs, and even insolvency (Pattiruhu & Paais, 2020).

It's crucial to remember, too, that excessive liquidity can sometimes hurt a company's financial success. Lowered returns on investment and decreased profitability might arise from holding excessive amounts of cash or other liquid assets (Sari & Sedana, 2020). Furthermore, certain financial organizations could conceal underlying financial issues with excessive liquidity, which might eventually result in lower financial performance. Therefore, although while a link between liquidity and financial performance is typically assumed to be positive, the ideal degree of liquidity might vary

depending on a number of variables, such as the sector the firm operates in, its business plan, and its risk appetite (Hacini, Boulenfad & Dahou, 2021).

2.3.4 Firm Size

Larger businesses often have more access to resources like money, people, and technology, which may help them seize growth opportunities and realize economies of scale (Kamau, 2023). These benefits may contribute to better financial performance by increasing revenue generation, reducing expenses, and increasing profitability. Additionally, larger businesses could have more negotiating leverage with suppliers and clients, which might lead to better pricing conditions and higher profit margins. Due to their increased diversification and larger networks, they may also be more robust to economic downturns and other external shocks (Yang & Wang, 2023).

However, it is crucial to keep in mind that different contextual variables, such as competition, regulation, and market saturation, can also have an impact on the link between business size and financial success (Khan, Jia, Lei, Niu, Khan, & Tong, 2023). Smaller companies may occasionally be more inventive and agile, enabling them to take advantage of unique market possibilities that bigger companies would ignore and to react more swiftly to shifting market conditions. As a result, while a correlation between company size and financial success is typically assumed to be positive, the ideal firm size can vary by sector and environment and be influenced by a number of different factors (Weinzimmer, Esken, Michel, McDowell & Mahto, 2023).

2.3.5 Capital Adequacy

Capital adequacy refers to the amount of capital that a financial institution holds in relation to its risk-weighted assets (Suroso, 2022). A higher level of capital adequacy indicates that the institution has a stronger financial buffer against potential losses and is better positioned to weather financial downturns. From a financial performance

perspective, higher levels of capital adequacy can lead to increased investor confidence, improved credit ratings, and lower borrowing costs. This can result in higher profitability and better financial performance over the long term (Nyanyuki, Nyanga'u, & Onwonga, 2022).

On the other hand, insufficient capital adequacy can result in higher risk of insolvency and decreased financial performance. A lack of capital can limit the institution's ability to take advantage of growth opportunities, such as expanding lending activities or investing in new technologies (Gallati, 2022). Therefore, maintaining adequate levels of capital is critical for the financial stability and performance of an institution. In addition, regulatory requirements for capital adequacy have become increasingly stringent in recent years, highlighting the importance of this factor for financial institutions (Ogunode, Awoniyi & Ajibade, 2022).

2.4 Empirical Review

Local as well as global studies have determined the link between mobile banking services and financial performance, the objectives, methodology and findings of these studies are discussed.

2.4.1 Perceived Convenience and Ease of Use

Performance is a critical driver influencing the widespread embrace of mobile money services among consumers. The key to enticing consumers lies in the perceived efficiency and user-friendliness of these platforms. Mobile money services, exemplified by M-PESA, stand a much higher chance of adoption when users perceive them as straightforward, intuitive, and efficient tools for conducting financial transactions. This heightened convenience becomes particularly vital for individuals seeking expedited and more effective ways to conduct business, especially in regions where traditional banking services remain scarce. Hetrick (2019) delves into the

intricate relationship between perceived ease of use and comfort in the realm of technology adoption. These studies reveal a compelling connection that when individuals view a technology as user-friendly and trouble-free, their inclination to adopt it surges significantly.

2.4.2 Perceived Financial Benefits and Cost Efficiency

The adoption of mobile money services is significantly influenced by the perceived financial benefits and cost efficiency they offer. Consumers are increasingly drawn towards services which they perceive as promoting substantial cost savings, reduced transaction fees, and enhanced financial management capabilities. Beyond these factors, the potential to carry out transactions without the reliance on physical currency presents an appealing proposition, particularly for those seeking secure, convenient, and efficient alternatives.

In a comprehensive study conducted by Patna and Yao (2020), the adoption of mobile money services in Ethiopia was investigated. This study shed light on the pivotal role played by perceived financial benefits and cost efficiency as determinants of mobile money adoption. The findings underscored that users were more inclined to embrace mobile money when they perceived it as a platform offering distinct financial advantages compared to traditional payment methods. One of the most compelling aspects of mobile money services is the potential for cost savings. By eliminating the need for physical currency and reducing transaction fees, users can experience a noticeable improvement in their overall financial well-being. This aspect is particularly appealing in regions where access to traditional banking services is limited or costly. The convenience of conducting transactions at lower costs can be a game-changer for individuals and businesses alike, driving the rapid adoption of mobile money.

Furthermore, the enhanced financial management capabilities offered by mobile money services are instrumental in influencing adoption. These services often come with features like real-time transaction tracking, budgeting tools, and digital receipts, providing users with greater control and transparency over their financial activities. Such tools can be invaluable for individuals striving to manage their finances more effectively, making mobile money an attractive option for those seeking financial empowerment. In addition to cost savings and improved financial management, the security and efficiency of mobile money transactions contribute significantly to their adoption. With mobile money, users can make payments, transfer funds, and access financial services with minimal risk of theft or loss associated with physical currency. Moreover, the speed and convenience of mobile money transactions make them an ideal choice for both urban and rural populations, particularly in areas where traditional banking infrastructure is lacking.

In conclusion, mobile money services offer a multifaceted appeal to consumers, driven by perceived financial benefits, cost efficiency, enhanced financial management, and security. As demonstrated by Patnam and Yao (2020), these factors are pivotal in influencing individuals to adopt mobile money as a preferred financial solution. The ongoing evolution of mobile money technology and the increasing availability of such services are likely to further accelerate their adoption, transforming the way people manage their finances worldwide.

2.4.3 Trust and Security Perceptions

Trust and security perceptions play a pivotal role in shaping consumer attitudes and behaviors when it comes to embracing mobile money services. In today's rapidly evolving digital landscape, consumers are increasingly cautious about incorporating new financial technologies into their lives, primarily due to concerns surrounding the

safety of their transactions, the security of their personal information, and the integrity of their financial data. To effectively encourage the widespread adoption of mobile money services, it is imperative for service providers to address these apprehensions through robust security measures and transparent communication practices.

In a comprehensive study conducted by Akter and D'Ambra in 2010, the researchers delved into the intricate dynamics of trust and security perceptions within the realm of mobile commerce adoption. Their findings shed light on the pivotal role these factors play in influencing consumer choices and behaviors. The study revealed that consumers who perceived higher levels of trust and security were significantly more inclined to embrace mobile commerce services.

2.4.4 Socioeconomic Factors and Accessibility

Socioeconomic factors and accessibility play pivotal roles in shaping the extent of mobile money utilization. Individuals lacking access to conventional banking services, particularly those residing in remote or underserved areas, exhibit a higher inclination toward embracing mobile money solutions for their financial requirements. Additionally, variables such as income, education, and age wield influence over the propensity and capability to adopt mobile money services. In a study conducted by Komivi et al. in 2017, an investigation into the impact of socioeconomic factors on mobile money adoption in Togo was undertaken. The research revealed that individuals with lower income levels and less education were more predisposed to adopt mobile money, underscoring the critical relevance of accessibility considerations.

Through a comprehensive exploration of the aforementioned determinants and their effects on the adoption of mobile money services, this section offers an in-depth comprehension of the factors influencing consumers' decisions to embrace innovative financial technologies. The empirical studies cited for each determinant reaffirm the

significance of these factors in real-world contexts. This is important in enhancing our understanding of the intricate interplay between consumer behavior and the adoption of mobile money services which is essential in informing various stakeholders.

2.5 Summary of the Literature Review and Research Gaps

Based on the available literature, there are several research gaps in the relationship between mobile banking services and financial performance of Commercial banks listed at the NSE. These gaps can be classified into conceptual, contextual, and methodological categories. Conceptually, there is a need for a theoretical framework that explicitly outlines the underlying mechanisms through which mobile banking services affect financial performance of commercial banks listed at the NSE. The existing literature mostly focuses on case studies and descriptive analyses, without providing a clear conceptual framework to guide the analysis.

Contextually, most of the existing literature on mobile banking services and financial performance has focused on developed economies, with limited attention given to emerging markets such as Kenya. This makes it difficult to generalize findings to the Kenyan context, which has its unique characteristics and challenges. Given the important role that commercial banks listed at the NSE play in providing financial services, there is a need for more research in this area.

Methodologically, most of the existing literature on mobile banking services and financial performance of commercial banks listed at the NSE is qualitative, descriptive, and based on case studies. There was a need for more quantitative studies that can provide robust statistical evidence on the relationship between mobile banking services and financial performance.

2.6 Conceptual Framework

Displayed in figure 2.1 is the predicted relationship between the variables. The predictor variable was mobile banking services. The control variables were credit risk, liquidity, firm size and capital adequacy. The response variable was financial performance given by ROA.

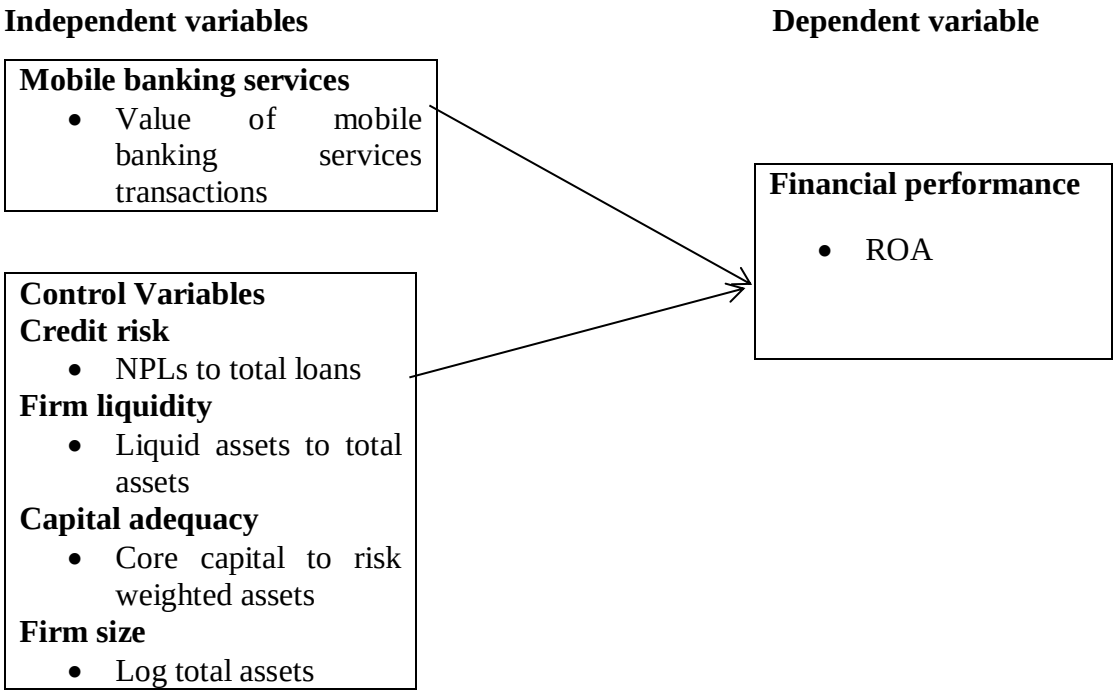

Figure 2.1: The Conceptual Model

Source: Researcher (2023)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the methodology that was adopted to answer the research objective. The chapter covers the research design, the target population, data collection and analysis procedure.

3.2 Research Design

A descriptive research design was adopted in this study. This is because the study aimed to establish the relationship between mobile banking services and financial performance of commercial banks listed at the NSE using secondary data. The use of quantitative research design enabled the researcher to analyze numerical data and test hypotheses statistically. This provided more accurate and objective results that can be replicated and generalized to a larger population. Additionally, quantitative research allowed for a larger sample size, which increased the representativeness of the findings. The data collected was analyzed using statistical software, which helped to eliminate errors and biases that may arise in manual analysis (Cooper & Schindler, 2018).

3.3 Population and Sample

A population is all observations from a collection of interest like events specified in an investigation (Burns & Burns, 2018). The study population was the 11 commercial banks listed at the NSE as at December 2022 (see appendix I). Since the population was relatively small, the study was a census.

3.4 Data Collection

Secondary data was relied on in this investigation which was extracted from annual published financials of the commercial banks listed at the NSE from 2018 to 2022 and captured in data collection forms. The reports were extracted from the NSE financial

publications of the specific commercial banks listed at the NSE annual reports. The specific data collected included net income, total assets, value of mobile banking services transactions, total loans, total assets, liquid assets, core capital, risk weighted assets.

3.5 Data Analysis

SPSS software version 27 was used to analyze the data. Descriptive analysis involved calculating measures such as mean, median, mode, standard deviation, and range to describe the distribution of variables such as mobile banking services adoption, financial performance, credit risk, liquidity, firm size, and capital adequacy among commercial banks listed at the NSE. Correlation analysis involved examining the strength and direction of the relationship between mobile banking services adoption and financial performance, as well as the relationship between financial performance and other variables such as credit risk, liquidity, firm size, and capital adequacy. Multiple regression analysis was used to estimate the effect of mobile banking services adoption on financial performance while controlling for other factors that may influence the relationship.

3.5.1 Analytical Model

The following equation was applicable:

$$Y_{it} = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \varepsilon_t$$

Where: Y = Financial performance given by net income to total assets

β_0 =y intercept of the regression equation.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ =are the regression coefficients

X_1 = Value of mobile banking services transactions given by log total value of mobile banking services transactions

X_2 = Credit risk as measured by the ratio of NPLs to total loans on an annual

basis

X_3 = Liquidity as measured by the ratio of liquid assets to total assets

X_4 = Capital adequacy as given by the ratio of total core capital to risk weighted assets

X_5 = Firm size as measured by the natural logarithm of total assets

ε =error term

3.5.2 Diagnostic Tests

The researcher conducted diagnostic tests to ensure that the assumptions of the statistical tests used in the analysis are met. Diagnostic tests helped to identify potential problems such as outliers, multicollinearity, heteroscedasticity, and normality of residuals, which may affect the validity and reliability of the results. Table 3.1 shows the tests that were conducted.

Table 3.1: Diagnostic Tests

Assumption	Description	Type of Tests	Interpretations	Treatment
Normality Test	Normally distributed data assumes a bell-shaped curve. It implies that errors should be distributed normally.	Shapiro-Wilk test.	$p > 0.05$ suggest that variables are distributed normally.	Data can be transformed using logs and square roots.
Autocorrelation Test	This quantifies the similarity between a sequence of observations at different time points.	Durbin-Watson test	Autocorrelation exists if the statistic is greater than 2.5 or less than 1.5	Data can be transformed using logs and reciprocal techniques.
Homoscedasticity	Homogeneity of variance is a presumption that outcome variable exhibits similar magnitude of variation across entire values of explanatory variables.	Breusch Pagan Test	$P > 0.05$ implies homoscedasticity	Data can be transformed using logs and reciprocal techniques.
Multicollinearity test	Multicollinearity is a situation where the explanatory variables are highly correlated.	Variance Inflation Factor	VIF factor >10 infers presence of multicollinearity.	Obtaining additional data and omitting collinear variables.

3.5.3 Tests of Significance

The t-test and F-test was used to test the significance of individual coefficients and overall model fit, respectively. The F-test was used to test the overall significance of the regression model. It compared the variance explained by the model to the variance that cannot be explained by the model. The t-test was used to test the significance of individual coefficients in a regression model.

CHAPTER FOUR: DATA ANALYSIS RESULTS AND FINDINGS

4.1 Introduction

The focus of this chapter was to analyze the collected date in order to ascertain the effect of mobile banking services on financial performance of commercial banks listed at the Nairobi Securities Exchange. Using descriptive statistics, correlation and regression analyses, findings were illustrated on tables as illustrated in the subsequent sections.

4.2 Descriptive Statistics

This section presents the descriptive findings from the collected data. The descriptive results include mean and standard deviation for each of the study variables. The analyzed data was obtained from individual commercial banks listed at the NSE annual reports for a period of 5 years (2018 to 2022). The number of observations was 55 (11*5) as 11 commercial banks listed at the NSE provided complete data for the 5-year period. The results are as shown in Table 4.1

Table 4.1: Descriptive Results

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	55	.0035	.3650	.122178	.0964466
Mobile banking services	55	.7826	11.3884	4.038177	2.3649063
Credit risk	55	.0000	.2500	.077636	.0626266
Liquidity	55	1.0320	4.4016	1.835580	.8806601
Capital adequacy	55	.0370	.5708	.237095	.1057016
Firm size	55	6.0724	8.6261	7.713710	.6283005
Valid N (listwise)	55				

Source: Field Data (2023)

The response variable, ROA, which indicates financial performance, exhibits variability with a minimum value of 0.0035, a maximum of 0.3650, a mean of

0.122178, and a standard deviation of 0.0964466. This suggests diversity in financial performance among the sampled banks during the study period. The predictor variable, mobile banking services, demonstrates a wide range of values, with a minimum of 0.7826, a maximum of 11.3884, a mean of 4.038177, and a standard deviation of 2.3649063. These statistics provide an overview of the diversity in the adoption and usage of mobile banking services by the commercial banks under investigation.

Credit risk, represented by the ratio of NPLs to total loans, has a mean of 0.077636 and a standard deviation of 0.0626266. The variation in credit risk levels among the banks is evident, with the minimum value at 0.0000 and the maximum at 0.2500. Liquidity, measured by the ratio of liquid assets to total assets, has a mean of 1.835580 and a standard deviation of 0.8806601. The minimum value of 1.0320 and the maximum of 4.4016 indicate diversity in liquidity positions across the sampled banks.

Capital adequacy, assessed by the ratio of total core capital to risk-weighted assets, exhibits variability with a mean of 0.237095 and a standard deviation of 0.1057016. The minimum value is 0.0370, while the maximum is 0.5708, suggesting differences in the capital adequacy levels of the banks. Firm size, measured by the natural logarithm of total assets, has a mean of 7.713710 and a standard deviation of 0.6283005. The diversity in firm size is evident, ranging from a minimum of 6.0724 to a maximum of 8.6261.

4.3 Diagnostic Tests

The researcher conducted diagnostic tests to ensure that the assumptions of the statistical tests used in the analysis are met. Diagnostic tests helped to identify potential problems such as outliers, multicollinearity, heteroscedasticity, and normality of residuals, which may affect the validity and reliability of the results.

4.3.1 Normality Test

Table 4.2 presents the results of the Kolmogorov-Smirnov test for various variables in the study. The Kolmogorov-Smirnov test is a statistical test used to assess whether a sample follows a particular distribution. In this context, it is applied to determine if each variable's data distribution (ROA, mobile banking services, credit risk, liquidity, capital adequacy, and firm size) deviates significantly from a normal distribution.

Table 4.2: Test for Normality

	Kolmogorov-Smirnov	P-value
ROA	.179	.300
Mobile banking services	.161	.300
Credit risk	.173	.300
Liquidity	.178	.300
Capital adequacy	.175	.300
Firm size	.176	.300

Source: Research Findings (2023)

Based on the results of the Kolmogorov-Smirnov test, there is no strong evidence to suggest that the data for any of the variables significantly departs from the assumed distribution (normal distribution). This implies that the data for ROA, mobile banking services, credit risk, liquidity, capital adequacy, and firm size can be reasonably approximated by the respective theoretical distributions chosen for analysis. However, further analysis and consideration of other statistical tests may be necessary to draw more robust conclusions about the data and its distributional characteristics.

4.3.2 Multicollinearity Test

Table 4.3 provides collinearity statistics, specifically the Tolerance and Variance Inflation Factor (VIF), for variables in the study. Collinearity refers to the extent of correlation between predictor variables in a regression model, and it can cause issues in the interpretation of coefficients and lead to unstable predictions. The results reveal that mobile banking services, credit risk, liquidity, capital adequacy, and firm size

exhibit tolerances ranging from 0.523 to 0.672 with corresponding VIF values between 1.488 and 1.912. Since the VIF was less than 5, it can be implied that there was no severe Multicollinearity, and the data can be used to conduct inferential analysis.

Table 4.3: Multicollinearity

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
Mobile banking services	0.523	1.912
Credit risk	0.528	1.894
Liquidity	0.672	1.488
Capital adequacy	0.598	1.672
Firm size	0.671	1.490

Source: Research Findings (2023)

4.3.3 Heteroscedasticity Test

Heteroscedasticity refers to the situation where the variability of the residuals (the differences between the observed and predicted values) changes across different levels of the predictor variables. The test's chi-square statistic is 0.8247 with 1 degree of freedom, and the associated probability (Prob > chi2) is 0.6318. A high p-value (greater than 0.05) suggests that there is no significant evidence of heteroscedasticity in the data. The results are as shown in Table 4.4.

Table 4.4: Heteroscedasticity Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
chi2(1)	=	0.8247
Prob > chi2	=	0.6318

Source: Research Findings (2023)

Based on the test results, the variability of the residuals in the regression model is approximately constant, and there is no compelling indication of heteroscedasticity.

4.3.4 Autocorrelation Test

Table 4.5 presents the Durbin-Watson statistic, which is a measure used to detect the presence of autocorrelation in the residuals of a regression model. The Durbin-Watson statistic has a value of 2.103. The Durbin-Watson statistic ranges from 0 to 4, with a value close to 2 indicating no significant autocorrelation (positive or negative) in the residuals. In this case, the value of 2.103 suggests that there is little to no autocorrelation in the model's residuals.

Table 4.5: Test of Autocorrelation

Durbin Watson Statistic
2.103

Source: Research Findings (2023)

4.4 Correlation Results

Table 4.6 presents a correlation matrix, which shows the Pearson correlation coefficients between various variables: ROA, mobile banking services, credit risk, liquidity risk, capital adequacy, and firm size. The correlation coefficient between ROA and Mobile Banking Services is 0.421, which is statistically significant at the 0.01 level (2-tailed). This positive correlation suggests that as the usage of mobile banking services increases, there is a corresponding positive association with the financial performance (ROA) of the commercial banks listed at the Nairobi Securities Exchange.

The correlation coefficient between ROA and credit Risk is -0.533, and it is statistically significant at the 0.01 level (2-tailed). This negative correlation indicates that as credit risk decreases, there is a tendency for an improvement in ROA. The correlation coefficient between ROA and liquidity is 0.198, and it is statistically significant at the 0.05 level (2-tailed). This positive correlation suggests a weak but significant

association between liquidity and financial performance. As liquidity increases, there may be a tendency for an improvement in ROA.

The correlation coefficient between ROA and Capital Adequacy is 0.163, and it is statistically significant at the 0.05 level (2-tailed). This positive correlation implies that higher levels of capital adequacy are associated with better financial performance. Commercial banks with stronger capital positions may experience improved ROA. The correlation coefficient between ROA and Firm Size is 0.593, and it is statistically significant at the 0.01 level (2-tailed). This strong positive correlation indicates that larger-sized commercial banks, as measured by total assets, tend to have higher ROA. Firm size appears to be a key factor positively influencing financial performance.

Table 4.6: Correlation Results

		ROA	Mobile banking services	Credit risk	Liquidity	Capital adequacy	Firm size
ROA	Pearson Correlation	1					
	Sig. (2-tailed)						
Mobile banking services	Pearson Correlation	.421**	1				
	Sig. (2-tailed)	.000					
Credit risk	Pearson Correlation	-.533**	.337*	1			
	Sig. (2-tailed)	.000	.012				
Liquidity	Pearson Correlation	.198**	-.347**	-.144	1		
	Sig. (2-tailed)	.005	.009	.295			
Capital adequacy	Pearson Correlation	.163**	-.219	-.257	.060	1	
	Sig. (2-tailed)	.012	.108	.058	.387		
Firm size	Pearson Correlation	.593**	-.069	-.072	.225**	.023	1
	Sig. (2-tailed)	.000	.617	.601	.001	.743	

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
c. Listwise N=55

Source: Research Findings (2023)

4.5 Regression Results

Table 4.7 presents the summary statistics for the regression model. The coefficient of determination (R Square) is 0.477, indicating that approximately 47.7% of the variance in ROA can be explained by the combination of mobile banking services, credit risk, liquidity, capital adequacy, and firm size. The Adjusted R Square, which accounts for the number of predictors in the model, is 0.436. The standard error of the estimate is 0.263, reflecting the average distance between the observed and predicted values. The overall model fit suggests that the selected predictors collectively contribute to explaining the variation in ROA.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.690[a]	.477	.436	.262986489223983

a. Predictors: (Constant), Firm size, Mobile banking services, Capital adequacy, Liquidity, Credit risk

Source: Research Findings (2023)

The analysis of variance (ANOVA) assesses the overall significance of the regression model. The F-statistic is 11.610, with a corresponding p-value of 0.000. This indicates that the regression model is statistically significant at a conventional significance level of 0.05.

Table 4.8: ANOVA Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.212	5	.803	11.610	.000[b]
	Residual	3.527	49	.069		
	Total	6.739	54			

a. Dependent Variable: ROA

b. Predictors: (Constant), Firm size, Mobile banking services, Capital adequacy, Liquidity, Credit risk

Source: Research Findings (2023)

The regression coefficients provide information about the strength and direction of the relationships between each predictor variable and ROA. Mobile banking services has a positive coefficient of 0.162, and it is statistically significant (p = 0.001). This suggests that an increase in mobile banking services is associated with a positive impact on ROA. Credit risk has a negative coefficient of -0.157, and it is statistically significant (p = 0.000). A higher credit risk is associated with a decrease in ROA. Firm size has a strong positive coefficient of 0.293, and it is statistically significant (p = 0.000). Larger-sized banks, as measured by firm size, tend to have higher ROA. Liquidity has a positive coefficient of 0.003, but it is not statistically significant (p = 0.448), suggesting a weak relationship between liquidity and ROA. Capital Adequacy has a positive coefficient of 0.027, but it is not statistically significant (p = 0.260), indicating a limited impact on ROA.

Table 4.9: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.472	.052		7.038	.000
	Mobile banking services	.162	.013	.114	3.219	.001
	Credit risk	-.157	.042	-.150	-3.376	.000
	Liquidity	.003	.004	.055	.761	.448
	Capital adequacy	.027	.024	.080	1.129	.260
	Firm size	.293	.006	.286	6.723	.000

a. Dependent Variable: ROA

Source: Research Findings (2023)

The coefficient of regression model was as below;

$$\mathbf{Y = 0.472+0.114X_1 - 0.150X_2 + 0.286X_3}$$

Where:

Y = ROA; X_1 = Mobile banking services; X_2 = Credit risk; X_3 = Firm size

4.6 Discussion of Research Findings

This study investigates the impact of mobile banking services on the financial performance of commercial banks listed at the Nairobi Securities Exchange, employing the technology acceptance model, disruptive innovation theory, and the theory of financial inclusion as theoretical frameworks. The study utilizes a comprehensive dataset spanning from 2018 to 2022, encompassing financial information from 11 listed banks. Descriptive statistics reveal the diversity in financial performance, mobile banking services usage, credit risk, liquidity, capital adequacy, and firm size. The correlation analysis underscores significant associations between return on assets (ROA) and mobile banking services, credit risk, liquidity, capital adequacy, and firm size.

The regression analysis further elucidates the impact of the predictor variables on ROA. The model, with an R-squared value of 0.477, indicates that approximately 47.7% of the variance in ROA can be explained by the chosen variables. Mobile banking services emerge as a positive and statistically significant predictor (B = 0.162, p = 0.001), reinforcing its positive association with financial performance. Credit risk, exhibiting a negative coefficient (B = -0.157, p = 0.000), highlights its adverse impact on ROA. Firm size remains a robust predictor (B = 0.293, p = 0.000), affirming its substantial positive influence on financial performance. These regression results provide nuanced insights into the specific contributions of each variable, offering valuable guidance for stakeholders seeking to optimize financial outcomes in a technologically evolving banking landscape.

These findings concur with those of Chhaidar et al. (2022) who examines the dynamic relationship between mobile banking services investments and financial performance, and it explores whether the bank size could influence the performance in the context of

the digital transformation. The fully modified ordinary least squares model is estimated for 23 European banks throughout the whole period ranging from 2010 to 2019 and for the two sub-periods spanning from 2010 to 2014 and from 2015 to 2019. The econometric results show that mobile banking services are positively and significantly related to the bank profitability. The findings also provide evidence that the bank size is a moderator factor in affecting the relationship between digital investments and profitability.

The research findings also concur with Kombe (2023) who studied how commercial banks in Kenya financial performance is influenced by financial innovations. A literature review technique was adopted in the research. The study's overall conclusions demonstrate that financial innovations improve financial performance, as seen by an increase in transactions, the creation of convenience, and decreased maintenance costs. Banks that are incorporating financial innovations are therefore better positioned to boost their revenue and customer satisfaction, both of which are linked to increased performance. According to the report, authorities should make sure that there are laws in place that can foster an environment where banks may keep innovating.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The key aim of the research was determining how mobile banking services influences the performance of commercial banks listed at the NSE. This section includes a summary of the findings from the previous chapter as well as the conclusions and limitations of the study. Additionally, it makes recommendations for potential policy measures. The chapter provides recommendations for further research

5.2 Summary of Findings

This study aims to investigate the influence of mobile banking services on the financial performance of commercial banks listed at the Nairobi Securities Exchange. Adopting the Technology Acceptance Model, Disruptive Innovation Theory, and the Theory of Financial Inclusion as theoretical frameworks, the research employs secondary data extracted from the annual financial reports of 11 listed banks over the period 2018 to 2022. The primary objective is to understand the relationships between the predictor variable, mobile banking services, and the response variable, financial performance measured by Return on Assets (ROA). Control variables such as credit risk, liquidity, capital adequacy, and firm size are considered in the analysis. The methodology incorporates descriptive, correlation, and regression analyses to comprehensively explore the dynamics within the dataset.

The correlation results reveal noteworthy associations between ROA and the independent variables. Mobile banking services show a positive correlation (Pearson's $r = 0.421$, $p < 0.01$), indicating a significant relationship with financial performance. Credit risk exhibits a negative correlation (Pearson's $r = -0.533$, $p < 0.01$), suggesting a potential adverse impact on ROA. Firm size demonstrates a strong positive correlation

(Pearson's r = 0.593, p < 0.01), emphasizing its significant role in influencing financial performance. These statistics provide quantitative insights into the direction and strength of the relationships, setting the stage for a deeper understanding of the factors shaping the financial landscape of the studied banks.

The regression analysis further elucidates the impact of the predictor variables on ROA. The model, with an R-squared value of 0.477, indicates that approximately 47.7% of the variance in ROA can be explained by the chosen variables. Mobile banking services emerge as a positive and statistically significant predictor (B = 0.162, p = 0.001), reinforcing its positive association with financial performance. Credit risk, exhibiting a negative coefficient (B = -0.157, p = 0.000), highlights its adverse impact on ROA. Firm size remains a robust predictor (B = 0.293, p = 0.000), affirming its substantial positive influence on financial performance. These regression results provide nuanced insights into the specific contributions of each variable, offering valuable guidance for stakeholders seeking to optimize financial outcomes in a technologically evolving banking landscape.

5.3 Conclusions

The findings of this study underscore the significant impact of mobile banking services on the financial performance of commercial banks listed at the Nairobi Securities Exchange. The positive correlation between mobile banking services and Return on Assets (ROA) implies that the adoption and utilization of mobile banking technologies contribute positively to the overall financial health of these banks. This aligns with the evolving landscape of the banking industry, where technological advancements play a crucial role in shaping operational efficiency and customer engagement. The study provides empirical evidence supporting the notion that mobile banking services, as a

technological innovation, contribute to improved financial outcomes for the examined commercial banks.

The study reveals a notable negative correlation between credit risk and ROA. This suggests that a higher level of credit risk is associated with a decrease in financial performance. The negative impact of credit risk on ROA emphasizes the importance of robust risk management practices within the banking sector. As financial institutions navigate challenges related to credit quality, the findings underscore the need for vigilant risk assessment and mitigation strategies to maintain and enhance overall financial performance.

The study highlights the significant role of firm size in influencing financial performance. The positive correlation between firm size and ROA suggests that larger-sized banks, as measured by total assets, tend to exhibit higher levels of financial performance. This insight underscores the potential advantages of scale within the banking industry. As banks consider strategic positioning and growth trajectories, the findings imply that a larger scale may confer benefits in terms of financial performance, possibly through economies of scale and enhanced market presence.

5.4 Recommendations for Policy and Practice

Policymakers and regulators should foster an environment that encourages the continued adoption and integration of mobile banking services within the banking sector. This could involve creating supportive regulatory frameworks, incentivizing innovation, and ensuring robust cybersecurity measures to build trust among users. Policymakers should also collaborate with industry stakeholders to establish standards that ensure the security and reliability of mobile banking services, fostering a safe and conducive ecosystem for technological advancements.

Given the observed negative correlation between credit risk and financial performance, banks should prioritize the development and implementation of sound credit risk management strategies. This includes regularly assessing the credit quality of their loan portfolios, leveraging advanced analytics for risk modeling, and implementing proactive measures to mitigate potential credit risks. Policymakers and industry bodies can play a role in promoting best practices by providing guidelines and incentives for effective credit risk management, fostering a resilient banking sector capable of navigating economic uncertainties and challenges.

Considering the positive correlation between firm size and financial performance, policymakers and industry players may want to explore mechanisms that support the growth and sustainability of larger-sized banks. While doing so, attention should be given to maintaining healthy competition within the industry and preventing excessive concentration of power. Policymakers can consider implementing policies that balance the advantages of scale with the need for a diverse and competitive banking sector, ensuring that both large and smaller banks can thrive. Moreover, practitioners should continuously evaluate the efficiency and effectiveness of their operations, seeking opportunities to enhance economies of scale while adapting to the evolving needs of their customer base.

5.5 Limitations of the Study

The reliance on secondary data from annual financial reports may introduce certain constraints. The data's accuracy and completeness are contingent on the banks' reporting practices, and any inconsistencies or variations in reporting standards among the sampled banks could impact the study's robustness. Additionally, the study's focus on publicly listed commercial banks at the Nairobi Securities Exchange might limit the

generalizability of findings to smaller or non-listed financial institutions, which may have different operational dynamics and risk profiles.

The study's cross-sectional design, analyzing data from 2018 to 2022, may not capture the evolving nature of technological trends and banking practices. The rapid pace of technological innovation implies that newer developments in mobile banking services and their impacts on financial performance may not be fully represented in the study period. A longitudinal study or one that includes more recent data could provide a more dynamic understanding of the relationship between mobile banking services and financial performance over time.

The study's exclusive focus on quantitative data and statistical analyses may overlook qualitative aspects that could contribute to a more comprehensive understanding of the dynamics at play. Factors such as customer perceptions, regulatory changes, and specific bank strategies might be better explored through qualitative research methods, such as interviews or case studies. Qualitative insights could enrich the study by providing a more nuanced perspective on the intricacies of mobile banking adoption and its implications for financial performance.

While the study incorporates control variables such as credit risk, liquidity, capital adequacy, and firm size, there may still be unaccounted factors influencing financial performance. The complexity of the banking environment implies that additional variables, not considered in this study, could contribute to the observed variations in Return on Assets (ROA). Future research could explore a more extensive set of control variables or incorporate qualitative methods to uncover additional nuances in the relationship between mobile banking services and financial performance.

5.6 Suggestions for Further Research

Incorporating a comparative analysis across different regions or countries could yield valuable insights into the contextual factors that influence the relationship between mobile banking services and financial performance. Cultural, regulatory, and economic variations among different banking environments may shape the adoption and impact of mobile banking services differently. A cross-country comparative study would contribute to a more comprehensive understanding of the global implications of technological advancements in the banking sector.

Future research could delve deeper into the qualitative aspects of mobile banking adoption. Interviews, focus groups, or case studies could provide nuanced insights into customer perceptions, preferences, and the challenges faced by banks in implementing mobile banking services. Understanding the human and organizational factors involved could enrich the findings, offering a more holistic view of the adoption process and its implications.

Researchers may explore the emerging landscape of financial technology partnerships and collaborations within the banking sector. Investigating how traditional banks integrate fintech solutions, including mobile banking services developed by third-party providers, could shed light on new models of innovation and their effects on financial performance. Such research could contribute to a more comprehensive understanding of the evolving ecosystem within which banks navigate technological advancements and changing customer expectations.

In addition, a longitudinal study spanning a more extended period could capture the evolving nature of technological advancements and their impact on financial performance. Examining data beyond 2022 would provide a more up-to-date

perspective on the sustained effects of mobile banking services, enabling researchers to observe trends and changes in this relationship over time.

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APPENDICES

Appendix I: Commercial Banks Listed at the NSE

1. Absa Bank Kenya
2. Stanbic Holdings
3. I&M Holdings Ltd
4. Diamond Trust Bank Kenya Ltd
5. HF Group Ltd
6. KCB Group Ltd
7. National Bank of Kenya Ltd
8. NCBA Group
9. Standard Chartered Bank Ltd
10. Equity Group Holdings
11. The Co-operative Bank of Kenya Ltd

Source: NSE (2022)

Appendix II: Research Data Collection

Bank ID	Year	ROA	Mobile banking services	Credit risk	Liquidity	Capital adequacy	Firm size
1	2018	0.1605	3.8078	0.0600	1.0966	0.2022	8.3379
1	2019	0.1071	3.8256	0.0700	1.4218	0.3213	8.4239
1	2020	0.0045	3.9366	0.0600	1.4858	0.3911	8.4141
1	2021	0.0225	4.7076	0.0400	1.7358	0.1700	8.4557
1	2022	0.0400	2.7861	0.1200	1.2374	0.1534	8.4859
2	2018	0.0397	2.8513	0.1300	1.9502	0.3909	8.3379
2	2019	0.0421	2.9480	0.1600	1.9346	0.1813	8.4239
2	2020	0.1185	2.6592	0.2000	1.9684	0.1769	6.7611
2	2021	0.0468	2.7969	0.2300	1.2242	0.1700	6.7943
2	2022	0.0662	2.7711	0.0200	1.6434	0.1534	8.2879
3	2018	0.1105	2.4030	0.0600	1.0320	0.1885	8.2067
3	2019	0.0800	2.6147	0.0600	1.9226	0.2020	8.2879
3	2020	0.0468	2.4046	0.1000	1.8973	0.1815	8.3768
3	2021	0.0759	2.1650	0.0800	1.1574	0.1858	8.4253
3	2022	0.2283	8.2019	0.1200	1.5021	0.1793	8.4516
4	2018	0.2214	8.8776	0.1600	1.4648	0.2610	8.4859
4	2019	0.3650	8.0052	0.1400	1.5627	0.1625	8.3379
4	2020	0.0561	8.5523	0.1100	1.4005	0.2008	8.4239
4	2021	0.0168	8.6836	0.1100	1.0634	0.1933	6.0724
4	2022	0.1243	0.7826	0.1700	1.6245	0.1915	6.5049

Bank ID	Year	ROA	Mobile banking services	Credit risk	Liquidity	Capital adequacy	Firm size
5	2018	0.1145	0.9095	0.0500	1.7402	0.2101	7.5107
5	2019	0.1364	1.4783	0.0100	4.3944	0.1536	7.5376
5	2020	0.0400	1.9144	0.0900	4.3820	0.1801	7.5084
5	2021	0.0199	2.3880	0.1000	4.3694	0.1663	7.6403
5	2022	0.0111	2.6507	0.0300	2.2050	0.1955	7.6508
6	2018	0.2872	2.2119	0.0500	2.5238	0.1945	8.3898
6	2019	0.0267	2.2886	0.0100	3.3740	0.4270	8.4802
6	2020	0.0035	2.5349	0.0900	2.8332	0.3933	8.5279
6	2021	0.1599	3.0281	0.0300	3.0200	0.5708	8.5719
6	2022	0.1599	2.9394	0.0500	4.4016	0.4494	8.6261
7	2018	0.1966	2.8013	0.0100	2.3280	0.4576	7.6734
7	2019	0.2632	2.8432	0.0700	1.7710	0.3498	7.7973
7	2020	0.0323	3.8223	0.0900	1.8952	0.3869	7.6170
7	2021	0.0706	2.8331	0.0700	2.1309	0.3316	7.6754
7	2022	0.1038	2.7102	0.0800	1.9554	0.3093	7.6856
8	2018	0.1004	2.6740	0.0100	1.2192	0.1393	7.1251
8	2019	0.0773	2.3577	0.0000	1.1561	0.1399	7.0917
8	2020	0.0718	2.4099	0.0800	1.1158	0.0715	7.1023
8	2021	0.0745	11.3884	0.0700	1.0780	0.0542	7.1695
8	2022	0.0365	9.3893	0.2500	1.5236	0.0370	7.1649
9	2018	0.0635	7.2817	0.1400	1.4882	0.2104	7.4691
9	2019	0.0277	6.7329	0.1600	1.2774	0.2059	7.4211
9	2020	0.0882	5.8688	0.0000	1.2997	0.2304	7.4344

Bank ID	Year	ROA	Mobile banking services	Credit risk	Liquidity	Capital adequacy	Firm size
9	2021	0.0327	4.7591	0.0100	1.1003	0.2227	7.4408
9	2022	0.0327	4.3676	0.0000	1.6298	0.1869	7.4577
10	2018	0.2284	3.8762	0.0300	1.5950	0.2545	7.1018
10	2019	0.3270	3.4674	0.0100	1.4871	0.2412	7.0967
10	2020	0.2227	3.4581	0.0300	1.2846	0.2741	7.0904
10	2021	0.2210	3.4841	0.0400	1.4099	0.2946	7.1179
10	2022	0.2283	3.4685	0.0300	1.0780	0.2853	7.1249
11	2018	0.2175	3.0992	0.0200	1.5236	0.1676	7.1984
11	2019	0.2715	3.5693	0.0400	1.4882	0.1729	7.2791
11	2020	0.2842	3.6862	0.0600	1.0983	0.2216	7.3376
11	2021	0.2461	6.8343	0.2300	1.0861	0.2248	7.4162
11	2022	0.2692	6.7928	0.0300	2.3685	0.3729	7.4263