FINANCIAL INNOVATION AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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

Student's Declaration

This research project is my original work and has not been submitted to any institution of higher learning for examination.

Signed:  **Date:** **30th November 2023**

QUINDOS MWANGI KARANJA (D63/65533/2013)

Supervisor's Approval

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

Signed……. **Date**…….

PROF. MIRIE MWANGI

SUPERVISOR

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DEDICATION

To my beloved mother, Anne W. Karanja: Your unwavering encouragement and financial support were the bedrock of my academic journey. You were the architect of my dreams and the believer in my aspirations. Even in your absence, your spirit has been my guiding star, illuminating the path through the darkest nights and the toughest challenges. This achievement is not just a testament to my perseverance but is a monument to the love, sacrifice, and vision you bestowed upon me. Every page written, every discovery made, and every obstacle overcome were steps taken in the glow of your memory. With this accomplishment, I honor your enduring presence in my life and the indelible legacy you have left in my heart.

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ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
ATM	Automated Teller Machines
CBK	Central Bank of Kenya
COVID-19	Coronavirus Disease 2019
EFT	Electronic Fund Transfer
FA	Fintech Adoption
FINTECH	Financial Technology
IMF	International Monetary Fund
IT	Information Technology
MPESA	Mobile phone-based money transfer service
NACOSTI	National Commission for Science, Technology, and Innovation
NIM	Net Interest Margin
NSE	Nairobi Securities Exchange
ROA	Return on Assets
ROE	Return on Equity
SACCO	Savings and Credit Cooperative Organizations
TAM	Technology Acceptance Model
VIF	Variance Inflation Factors

ABSTRACT

This research delves into the intersection of financial innovation and commercial bank performance within the competitive and innovative banking sector of Kenya, which comprises 38 commercial banks. During a period characterized by swift digital evolution, this research delves into how financial innovations affect financial performance of banks. This study is grounded in several theoretical frameworks: the Diffusion of Innovations Theory, which examines how new ideas are adopted and spread; Schumpeter's Theory of Economic Development, focusing on the role of innovation in economic progress; and the Constraint Induced Financial Innovation Theory, which looks at how financial innovations emerge in response to certain constraints. Together, these theories offer a comprehensive approach to understanding both the uptake and the effects of financial innovations. Employing a combination of descriptive and explanatory research designs, the study conducts a thorough investigation on all 38 licensed commercial banks in Kenya, utilizing a census sampling method. The research analyzes secondary panel data over a period of five years, from 2018 to 2022, leveraging descriptive statistics and inferential techniques such as correlation and regression analyses to distill the relationships between financial innovation and bank performance. Key findings from the regression analysis reveal that mobile banking and digital payment systems are significantly beneficial to banks' financial performance, highlighting their indispensable role in the modern financial ecosystem. In contrast, a high liquidity ratio is found to adversely affect profitability, pointing to the opportunity costs of maintaining liquid assets. The study also notes the non-significant impact of fintech adoption, bank size, and capital adequacy on the banks' financial performance, suggesting that these factors may have indirect effects. In conclusion, the study asserts the critical importance of mobile banking and digital payment systems in enhancing the financial performance of Kenya banking sector. It also highlights the negative influence that excessive liquidity can have on profitability, drawing attention to its potential drawbacks in the banking sector. Recommendations include a strategic review and adjustment of mobile banking policies to enhance service delivery, augmented security measures to protect clients, and a proactive approach to educating clients about the advantages of digital payment systems. Additionally, the study advocates for a reassessment of liquidity management practices to bolster financial returns. The conclusions and recommendations of this study offer actionable insights for banking executives and policymakers, indicating a path forward for the Kenyan banking industry to leverage financial innovation for optimal financial performance. This study serves as a call to action for banks to not only embrace the digital revolution but to strategically navigate its challenges to realize greater financial success.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Efficient resource allocation and the promotion of financial inclusion by the financial sector are crucial in driving economic growth and development. This impact is well-documented in studies by Levine (2005) and Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden (2015). Recent years have witnessed the emergence of financial innovation as a key driver of transformation in the global financial sector. This transformation is driven by various factors, including technological advancements, increased competition, and evolving customer preferences (Lerner & Tufano, 2011; Berger, 2003; Tufano, 2003).

Financial innovation encompasses the creation and spread of novel financial instruments, services, and technologies. The primary objectives of these innovations are to enhance operational efficiency, elevate customer experience, and reduce costs, as outlined by Frame & White (2004) and Schueffel (2016). In the context of Kenya, the banking industry has undergone significant changes owing to the adoption of such innovative practices. This transformation is evident in the widespread adoption of mobile banking, digital payment systems, and Financial Technology (FinTech) among commercial banks (Okiro & Ndung'u, 2013).

Despite the fact that financial innovations are now widely used in the banking sector, empirical research that clearly explains how these developments impact bank performance is still lacking. This study aims to shed light on the impact of financial

innovation on bank performance in the Kenyan environment, thereby contributing to the ongoing academic discussion about the relationship between financial innovation and banking effectiveness. This discussion is supported by previous research, including works by Laeven, Levine, & Michalopoulos (2015) and Beck, Chen, Lin, & Song (2016). The study is theoretically anchored in three key frameworks: the Diffusion of Innovations Theory, which delves into how new ideas are embraced; Schumpeter's Theory of Economic Development, which emphasizes the significance of innovation in driving economic growth; and the Constraint Induced Financial Innovation Theory, which explores the emergence of innovation as a reaction to regulatory and external constraints. These theories provide a comprehensive framework for understanding on link between innovation and performance. According to the Constraint Induced Financial Innovation Theory, inefficiencies or other restrictions inside the financial system frequently lead to financial innovations. This theory is supported by a study that examined the impact of financial constraints on innovation, particularly in French manufacturing firms (Lamoreaux, 2007).

Schumpeter's Theory of Economic Development emphasizes the crucial role of entrepreneurs and the innovations they introduce in the process of economic growth. This theory is widely recognized in the field of economics and has been extensively discussed in academic literature (Schumpeter, 1934). The Diffusion of Innovations Theory argues that the diffusion of an innovation occurs over time among individuals within a social system. This theory was proposed by Everett M. Rogers and has been widely used to explain how ideas and technology spread through cultures (Rogers, 2002). These theories

will be instrumental in guiding the research process and interpreting the findings of this study.

1.1.1 Financial Innovation

The process of creating new monetary products and introducing innovative ways for banks to provide their current services is known as financial innovation. It entails introducing new items to specific customers in the financial market (Akani & Tony-Obiosa, 2020). Furthermore, financial innovation is described as the process through which financial sector firms enhance their capabilities to establish improved and new capacities, all while increasing utility (Ali & Parveen, 2021).

Financial innovation, which includes the creation and broad use of new financial instruments, technology, institutions, and practices, has grown rapidly since the turn of the twenty-first century (Frame, Wall, & White, 2018). This wave of innovation, primarily driven by technological advancements, is fundamentally transforming the financial sector by introducing new paths for profitability, risk management, and customer satisfaction (Okiro & Ndung'u, 2013).

Mobile banking, a component of financial innovation, involves using mobile telecommunication devices to provide and access banking and financial services (Shaikh & Karjaluoto, 2015). This innovation has revolutionized banking practices by enabling customers to conduct financial transactions such as funds transfer, balance check, and bill payments from their mobile devices anytime, anywhere (Au & Kauffman, 2008). Research has shown that it enhances operational efficiency, customer engagement, and banks' profitability (Baptista & Oliveira, 2016).

Digital payments, another essential facet of financial innovation, refer to the electronic exchange of funds between accounts, where both the payer and payee are banks. The prevalence of internet connectivity and advancements in secure payment technologies has expedited the rapid growth of digital payments. Digital payments streamline financial transactions, reduce transaction costs, and foster financial inclusion (Arner, Barberis, & Buckley, 2016).

Finally, the adoption of fintech, often regarded as the future of banking, is a crucial part of financial innovation. Fintech refers to the use of cutting-edge technology such as artificial intelligence, blockchain, and data analytics to create more efficient and effective financial services (Zavolokina, Dolata, & Schwabe, 2017). Fintech has the potential to revolutionize traditional banking services, improve risk management, and stimulate revenue growth (Chishti & Barberis, 2016).

These developments have significant ramifications for Kenya's commercial banks, opening doors for expansion, cost cutting, and competitive difference (Central Bank of Kenya, 2020). This research aimed to evaluate the impact of financial innovation on the performance of banks, an area that continues to necessitate deeper exploration.

1.1.2 Financial Performance

The evaluation of a firm’s operational and financial characteristics in order to determine its efficacy and efficiency is known as financial performance. This evaluation is based on the organization's financial records and reports (Gakono, 2021). Assessing the performance of commercial banks necessitates a comprehensive approach, given its complex nature and significant implications for a country's economic stability and growth

(Kosmidou, 2008). The evaluation typically involves financial indicators such as profitability metrics, operational efficiency measures, solvency ratios, and market value indicators (Berger & Humphrey, 1997).

Profitability, commonly measured through metrics such as Return on Assets (ROA) and Return on Equity (ROE), serves as an indicator of a bank's efficiency in generating profits relative to its resources, as discussed by Athanasoglou, Brissimis, & Delis (2008). Operational efficiency, reflected in ratios like the cost-to-income ratio and operating expense ratio, reveals how effectively a bank uses its resources to generate revenue, as highlighted by Bikker & Hu (2002).

The solvency of a bank, which pertains to its ability to meet long-term financial obligations, is often evaluated using capital adequacy metrics, including the Tier 1 capital ratio and total capital ratio, as noted by Naceur & Omran (2011). Additionally, market value indicators such as the price-to-book ratio and market capitalization offer insights into the market's valuation of a bank, a concept explored by Demsetz, Saidenberg, & Strahan (1996).

However, these financial indicators provide a limited perspective of a bank's performance. In recent years, the performance evaluation scope has broadened to include non-financial factors such as customer satisfaction, social responsibility, and innovation capability (Hossain & Leo, 2009). Understanding the effect of financial innovation on a wide range of performance indicators can provide valuable insights for commercial banks, regulators, and policymakers.

In this study, bank performance was measured using a profitability metric, specifically, Return on Assets (ROA). The choice to focus on Return on Assets (ROA) in this study was driven by its widespread acceptance and reliability as a measure of profitability in banking research. By centering the analysis on ROA, the study aims for a more focused examination of how financial innovation impacts the profitability of banks.

1.1.3 Financial Innovation and Financial Performance

Financial innovation, particularly in the realms of mobile banking, digital payment systems, and fintech adoption, has been at the forefront of reshaping the banking landscape. The theoretical underpinnings of this transformation and its implications on financial performance have been extensively explored by renowned academicians. Schumpeter (1934) was among the pioneers to emphasize the role of innovation in economic development. While his work predates the digital revolution, his theory provides a foundation for understanding how innovations, such as mobile banking, can drive efficiency and profitability in financial institutions.

Mobile banking, as a facet of financial innovation, has been heralded as a game-changer for financial inclusivity and operational efficiency. According to King and Levine (1993), the accessibility and convenience provided by mobile banking systems can lead to an increased client base, which can improve banks' financial performance. Digital payment systems, another pillar of financial innovation, have been explored by Merton (1995), who highlighted their role in creating a more integrated and efficient financial market. By facilitating instantaneous transactions and reducing transaction costs, digital payment systems can significantly boost the revenue streams of financial institutions.

The third pillar, fintech adoption, encompasses a wide spectrum of technology developments in the financial sector. Lerner (2006) posited that fintech innovations, by addressing market imperfections and catering to previously underserved segments, can augment the value and performance of financial institutions. Tufano (2003) added a layer of complexity to this discourse by emphasizing the competitive implications of financial innovation. He argued that while early adopters of fintech solutions might experience enhanced financial performance due to a competitive edge, this advantage might diminish as more players in the market adopt similar technologies.

In conclusion, the theoretical relationship between financial innovation, encompassing mobile banking, digital payment systems, and fintech adoption, and financial performance is largely positive. The consensus among scholars like Schumpeter (1934), King and Levine (1993), Merton (1995), Lerner (2006), and Tufano (2003) suggests that embracing these innovations can lead to operational efficiencies, increased revenues, and superior financial outcomes. However, the actual impact can vary based on market dynamics, the specific innovation in question, and the strategic approach of the institution.

1.1.4 Commercial Banks in Kenya

Kenya's banking sector is marked by its dynamic nature and continuous development. As of 2023, there are 38 commercial banks actively operating in the country, each regulated and supervised by the Central Bank of Kenya. These institutions form the cornerstone of Kenya's financial system, providing services to both individual consumers and business entities. Research conducted by Katutu (2019) has revealed that financial innovations, including agency banking, internet banking, and mobile banking, have notably enhanced

the banks financial performance in the Kenyan market. Moreover, Kiplangat and Tibbs (2018) discovered that innovation markedly influences the financial outcomes of banks.

In recent times, financial innovation has emerged as a distinguishing feature of commercial banks in Kenya. Propelled by technological progress and the need to stay competitive within the swiftly changing financial sector, these banks have embraced a range of innovative approaches. Mobile banking, for instance, has seen exponential growth, with platforms like M-Pesa revolutionizing the way Kenyans transact. Digital payment systems have also gained traction, offering customers the convenience of cashless transactions. Furthermore, the adoption of FinTech solutions by these banks has not only streamlined operations but also expanded the range of services available to customers. Such innovations have been critical in reaching out to the unbanked population and encouraging financial inclusion.

In terms of financial performance, commercial banks in Kenya have shown resilience despite global economic challenges. Their adoption of financial innovations has played a significant role in bolstering their performance. For instance, the increased use of digital platforms has reduced operational costs, leading to enhanced profitability. According to Wadesango and Magaya's (2020) research, the use of digital banking services is favorably connected with bank financial performance in Africa.

It is, however, essential to note that while financial innovations offer numerous benefits, they also come with challenges. Cybersecurity threats, regulatory hurdles, and the need for continuous investment in technology are some of the issues banks grapple with. To summarize, commercial banks in Kenya have been proactive in adopting financial

innovations, resulting in a favorable impact on their financial performance. As the banking landscape continues to evolve, it will be interesting to see how these institutions navigate the challenges and opportunities that come with innovation (Central Bank of Kenya, 2023; Wadesango & Magaya, 2020).

1.2 Research Problem

Financial innovation, encompassing realms such as mobile banking, digital payment systems, and FinTech adoption, has emerged as a pivotal force in the banking sector's evolution. Theoretically, these innovations are poised to revolutionize banking operations, offering enhanced efficiency, customer-centric solutions, and potentially improved financial outcomes. Schumpeter (1934) emphasized that innovations, particularly in the financial domain, can serve as catalysts for economic progression. In today's digital age, the promise is that banks, by embracing these innovations, can cater to a broader clientele, thereby amplifying their revenue streams and bolstering financial performance.

In the Kenyan backdrop, this narrative takes on added layers of complexity. With an active banking landscape comprising 38 commercial banks, the Kenyan market is a hotbed of competition and innovation. The Central Bank of Kenya's endeavors towards financial inclusivity have further spurred banks to adopt and integrate innovative solutions. While many banks in Kenya have been quick to jump on the digital bandwagon, the real conundrum is discerning whether these technological forays have tangibly enhanced their financial performance. Given Kenya's unique socio-economic dynamics and regulatory landscape, the interplay between innovation and performance might manifest differently than global trends (Central Bank of Kenya, 2023).

There have been numerous studies conducted globally that aim to unravel the complex relationship between financial innovation and bank performance. For instance, research by Do et al. (2022) in Vietnam has illuminated a positive association between digital transformation initiatives and enhanced bank performance. Similarly, Xi et al. (2022) in their exploration of Chinese banks have underscored the potential of digital payment systems in augmenting financial outcomes. However, a recurring theme in these international studies is their tendency to focus on specific innovation facets, often overlooking the broader innovation ecosystem.

Locally, Kenyan research landscape though burgeoning, offers a somewhat fragmented picture. Numerous scholarly investigations, such as Otieno and Ndede's (2020) work, have scrutinized the effect of digital banking innovation on firms, revealing a favorable correlation with their fiscal outcomes. Furthermore, Gachigo et al. (2022) have looked into how digital payment systems affect mergers and acquisitions, and their findings indicate that these systems are crucial to maintaining the financial stability of institutions. While these studies offer valuable insights, they tend to provide fragmented perspectives that don't completely capture the full extent of how financial innovations affect the bank performance in Kenyan environment.

Despite the extensive body of research, a significant gap in understanding still exists. Existing studies either delve too deeply into specific innovation types or adopt a more generalized stance, often missing the nuanced interplay between diverse financial innovations. Furthermore, the distinct Kenyan context, characterized by a blend of traditional banking norms and contemporary innovations, remains a relatively uncharted domain. The focus of this study was on understanding the performance of commercial

banks in Kenya, particularly in the context of how they are influenced by factors like mobile banking, digital payment systems, and FinTech adoption.

1.3 Research Objective

The aim of this study was to investigate the correlation between financial innovation and the financial success of commercial banks in Kenya.

1.4 Value of the Study

The importance of this study is rooted in its exploration of how financial innovation impacts the performance of commercial banks. By examining and analyzing financial innovations like mobile banking, digital payments, and FinTech adoption, the study contributes to a deeper understanding of these critical areas. Financial institutions, especially commercial banks, must comprehend how financial innovations, financial performance factors, and bank performance interact. The insights gleaned from this study may enable them to devise strategic approaches that utilize financial innovation to enhance performance and competitiveness.

The outcomes of this study have policymakers and regulators thinking about how to create effective and adaptive policies and regulatory frameworks. These frameworks can foster financial innovation while providing safeguards against potential risks linked with emerging financial products and technologies.

This research enriches the literature on financial innovation and bank performance, providing a valuable resource for academics, researchers, and students. The banking sector in Kenya provides a unique empirical context for this study, and the findings could potentially spark further research in this field. This research lays a foundation for future

investigations into the dynamics of financial innovation in various sectors or geographical contexts within Kenya and other developing nations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section offers a comprehensive analysis of the existing literature on the impact of financial innovation on the financial health of commercial banks in Kenya. It comprises three key components: a detailed exploration of the theoretical underpinnings, a critical review of previous empirical studies, and the identification of gaps in existing research. The analysis involves a thorough examination of essential theories related to financial innovation in banking, evaluates the empirical data regarding the correlation between financial innovation and bank performance, and highlights areas that require further investigation, thereby emphasizing the importance of this study.

2.2 Theoretical Review

2.2.1 Diffusion of Innovations Theory

Introduced by sociologist Everett Rogers in 1962, the Diffusion of Innovations Theory is a widely embraced framework explaining how novel ideas and technology permeate within and across social systems (Rogers, 1962; Rogers, 2002). Rogers asserts that the adoption process of an innovation entails a series of stages, namely: knowledge phase (awareness and understanding of the innovation), persuasion phase (attitude formation towards the innovation), decision phase (commitment to either adopting or discarding the

innovation), implementation phase (actual use of the innovation), and confirmation phase (reinforcement of the adoption decision).

This study aligns with the Diffusion of Innovations Theory, particularly in its emphasis on financial innovation as an independent variable. The hypothesis postulates a causal relationship between performance results of commercial banks in Kenya and their adoption of innovations—in this case, financial innovations (Gambardella & McGahan, 2010). As per the theory, the implementation of financial innovations could potentially augment the operational efficiency, diminish transaction costs, draw in new customers, and boost revenue growth of these banks (Freeman & Soete, 1997).

The Diffusion of Innovations Theory is beneficial due to its wide applicability, detailed account of the adoption process, and incorporation of various elements influencing the diffusion rate. Nonetheless, the theory somewhat falls short in elucidating why certain innovations are adopted quicker than others and why some fail despite possessing apparent advantages. Criticisms of the theory often stem from its tendency to bias towards innovation and its underestimation of socio-contextual factors (Greenhalgh et al., 2004). However, for the purpose of this study, the Diffusion of Innovations Theory offers a valuable theoretical backdrop to comprehend and interpret the adoption of financial innovations within the banking sector (Wejnert, 2002).

2.2.2 Schumpeter's Theory of Economic Development

Joseph Schumpeter, an economist, developed the Theory of Economic Development at the beginning of the 20th century, highlighting entrepreneurship and innovation as the main forces behind economic development (Schumpeter, 1934). Schumpeter suggested

that entrepreneurs instigate novel production combinations, triggering a "creative destruction" process where obsolete industries are supplanted by innovative and more efficient counterparts.

This study links Schumpeter's Theory of Economic Development to both its independent and dependent variables. The theory accentuates the importance of financial innovations, such as digital banking, unique financial products, and Fintech adoption, which serve as the independent variables. Furthermore, it posits a favorable relationship with the dependent variable - bank performance. According to Schumpeter, banks that actively embrace and implement financial innovations can enhance their performance due to increased operational efficiency, decreased transaction costs, a broader customer base, and stimulated revenue growth (Aghion & Howitt, 1990).

The strength of Schumpeter's theory resides in its focus on innovation as an engine for economic development and the essential role of entrepreneurial activities and risk-taking in advancing economic progress (Nelson & Winter, 1982). However, it has been criticized for overemphasizing the entrepreneur's role and downplaying the influence of socio-economic and institutional environments on innovation and development (Freeman, 1997). Another point of contention is the assumption that all innovations inevitably lead to positive outcomes (Verspagen, 2006). Despite these shortcomings, Schumpeter's theory provides a solid conceptual foundation for understanding the role of financial innovations in economic development and, more specifically, in enhancing banking sector performance.

2.2.3 Constraint Induced Financial Innovation Theory

A contemporary model that illustrates the connection between restrictions, such laws or resource shortages, and the formation of financial innovations is called the Constraint Induced Financial Innovation Theory (Tufano, 1989). This theory posits that challenges or constraints can act as creativity catalysts, urging financial institutions to innovate in order to overcome obstacles or limitations (Lamoreaux & Sokoloff, 2007).

The principle corresponds with financial innovation in the context of this investigation. It infers those external constraints, such as regulatory policies or market conditions, might induce commercial banks listed in Kenya to adopt financial innovations (Lerner & Tufano, 2011). Although the theory does not explicitly delineate the connection with the bank performance, it can be inferred that successful innovations borne out of constraints may bolster a bank's performance through competitive advantage, efficiency improvements, or the creation of new revenue streams.

The key strength of the Constraint Induced Financial Innovation Theory lies in its unique perspective on constraints as a catalyst for financial innovation, contrasting with traditional theories (Lerner, 2006). However, it overlooks potential negative consequences of innovation under constraints, such as elevated risks or the creation of financial products that consumers may not fully comprehend (Kashyap, Rajan & Stein, 2002). Regardless of these limitations, this theory provides substantial value to the present study due to its distinct viewpoint on the driving forces behind financial innovation, thereby offering insights into the motivations for commercial banks in Kenya to adopt innovative practices (Stiglitz & Weiss, 1981).

2.3 Determinants of Financial Performance of Commercial Banks

2.3.1 Liquidity

The liquidity of a commercial bank significantly influences its financial performance. Insufficient liquidity is often seen as a key factor leading to the bankruptcy of such banks (Abate & Mesfin, 2019). However, it is worth noting that having a large amount of liquid assets can result in the bank missing out on potential higher returns from other investment opportunities.

2.3.2 Capital Adequacy

Commercial banks employ several metrics to assess their capital adequacy, such as the total asset to loan ratio, tax to pre-tax operating profit ratio, overhead costs to total asset ratio, non-interest income to total asset ratio, and the total income to employee and shareholder equity ratio (Adhiambo, 2020). These measures are instrumental in determining the effectiveness of how commercial banks administer their capital in relation to their equity and aggregate balance sheet transactions.

2.3.3 Bank Size

There has long been discussion among academics over the correlation between a bank's asset size and financial performance. While some contend that economies of scale help larger banks by reducing overhead and improving financial performance, others counter that these institutions' bureaucratic structures make it difficult for them to adjust to shifting market conditions, which eventually lowers profitability (AlFadhli & AlAli, 2021).

2.4 Empirical Literature Review

The effect of financial innovation on bank performance has been thoroughly investigated in a variety of geographic and banking situations, providing a wealth of information and viewpoints (Laeven, Levine, & Michalopoulos, 2015; Killian, 2020). This section delves into empirical studies focusing on mobile banking, digital payment systems, and FinTech adoption, which are central to our study's context of financial innovation. The aim is to provide a comprehensive understanding of these themes, critically analyzing the methodologies, findings, and relevance of these studies in relation to our research, and identifying gaps our study seeks to address (King & Levine, 1993; Okiro & Ndung'u, 2013).

Mobile banking's adoption and its subsequent benefits have been explored in various regions. Al-Jabri and Sohail (2012) in Saudi Arabia highlighted its role in enhancing customer service. Sarma and Pais (2011) emphasized its significance in financial inclusion, especially in developing nations. In the African context, Kreutzer (2009) reviewed its state in South Africa, while Aker and Mbiti (2010) discussed its role as an innovation for the poor in West Africa. Notably, Jack and Suri (2011) delved into the impact of M-Pesa in Kenya, emphasizing its role in improving financial outcomes. However, the direct impact of such platforms on banks' financial performance remains underexplored, a gap this study aims to address (Otieno & Ndede, 2020; Okiro & Ndung'u, 2013).

Globally, digital payment systems and their influence on bank performance have garnered significant attention. Do et al. (2022) and Xi et al. (2022) highlighted the positive impact of such systems on banks' performance in Vietnam and China,

respectively. In Africa, Wadesango and Magaya (2020) emphasized their contribution to commercial banks' performance in Zimbabwe. Yet, the specific mechanisms through which these systems influence financial performance remain elusive, necessitating further exploration in the Kenyan context (Otieno & Ndede, 2020; Gachigo et al., 2022).

The global adoption of financial technology (fintech) and its implications have been the focal point of numerous studies. Hermuningsih and Rahmawati (2022) in Indonesia and Pierri and Timmer (2020) in the US underscored its positive influence on banks' performance. In Africa, Ally (2022) discussed macro-economic factors influencing commercial banks' performance in Tanzania. In their studies, Sunardi and Tatariyanto (2023) have highlighted the significance of fintech in improving digital banking services in Indonesia, while Carbó-Valverde et al. (2020) have also emphasized this role. Despite the extensive research on the impact of financial technology (fintech) on banking, there is still a substantial need for detailed investigation into its direct effects on the financial performance of commercial banks, particularly in Kenya. This study was conducted to address this knowledge gap.

In a related study by Ashiru, Balogun, and Paseda (2023), the impact of technological advancements such as automated teller machines (ATMs), mobile devices, and internet banking on the financial performance of Nigerian banks was examined. Their research, which spanned from 2012 to 2021, employed the Granger causality test to analyze the causal links between various innovations and the performance of commercial banks. The study included all twenty-four deposit money banks operating in Nigeria. According to their findings, using the Autoregressive Distributed Lag (ARDL) model, it was noted that Point of Sale (POS) banking services had a significant effect on bank performance, which

was attributed to the volume and value of transactions in the banking sector. Therefore, the study recommends expanding access to mobile and electronic banking services, as it was found that ATMs, mobile banking, the use of credit and debit cards, online banking, and agency banking all positively contribute to the long-term performance of deposit money banks in Nigeria.

In summation, although there have been numerous studies exploring the different aspects of financial innovation and their roles in areas such as financial inclusion and customer service, there is still a lack of comprehensive knowledge regarding their direct influence on financial performance. This research intended to close this gap by offering a comprehensive analysis of the variables that affect financial success in the context of modern financial innovations.

In their investigation into the effects of financial innovations on the financial performance of commercial banks in Kenya, Kiplangat and Tibbs (2018) adopted a causative research design. The study focused on a group of 215 employees from various Kenyan commercial banks, with a stratified random sampling approach used to select about 170 respondents for the study. The findings underscored the significant role of innovation in enhancing financial performance, particularly highlighting mobile banking as a key contributor due to its cost-effectiveness and user-friendly nature. Although they weren't very good indicators, agency banking, EFT, and online banking were somewhat related to the liquidity part of financial expansion. This study used secondary data, while the previous one used primary data.

Katutu (2019) conducted an analysis on the impact of financial innovations on the financial performance of commercial banks in Kenya, focusing specifically on the country's eight tier one commercial banks. Using data from the Central Bank of Kenya (CBK), the study employed panel data regression analysis to assess performance in relation to various independent variables. The findings indicated a positive correlation between forms of banking such as self-service, agency, online, and mobile banking, and return on assets. This particular study was limited to tier one banks, whereas the current research encompasses all commercial banks in Kenya.

In a separate study, Nekesa and Olweny (2018) explored the relationship between financial innovation and the financial performance of deposit-taking Savings and Credit Cooperative Organizations (SACCOs) in Kajiado County. Adopting a descriptive research design, their study included a sample of forty employees from various deposit-taking SACCOs in the county, selected through stratified sampling. The analysis, which combined both quantitative and qualitative methods and utilized graphs and tables for presentation, also incorporated secondary data from SACCO databases, libraries, and annual reports. The findings revealed that innovations in organizational processes and products significantly influenced the financial performance of the SACCOs. This study provided insights into different facets of financial innovation, adding depth to the context of the current research.

2.5 Conceptual Framework

This research conceptual framework is based on the ideas and empirical findings described in the literature review. It suggests that, taking into account a number of financial performance determinants and control variables, financial innovation, such as

mobile banking, digital payment systems, and FinTech adoption, influences banks performance.

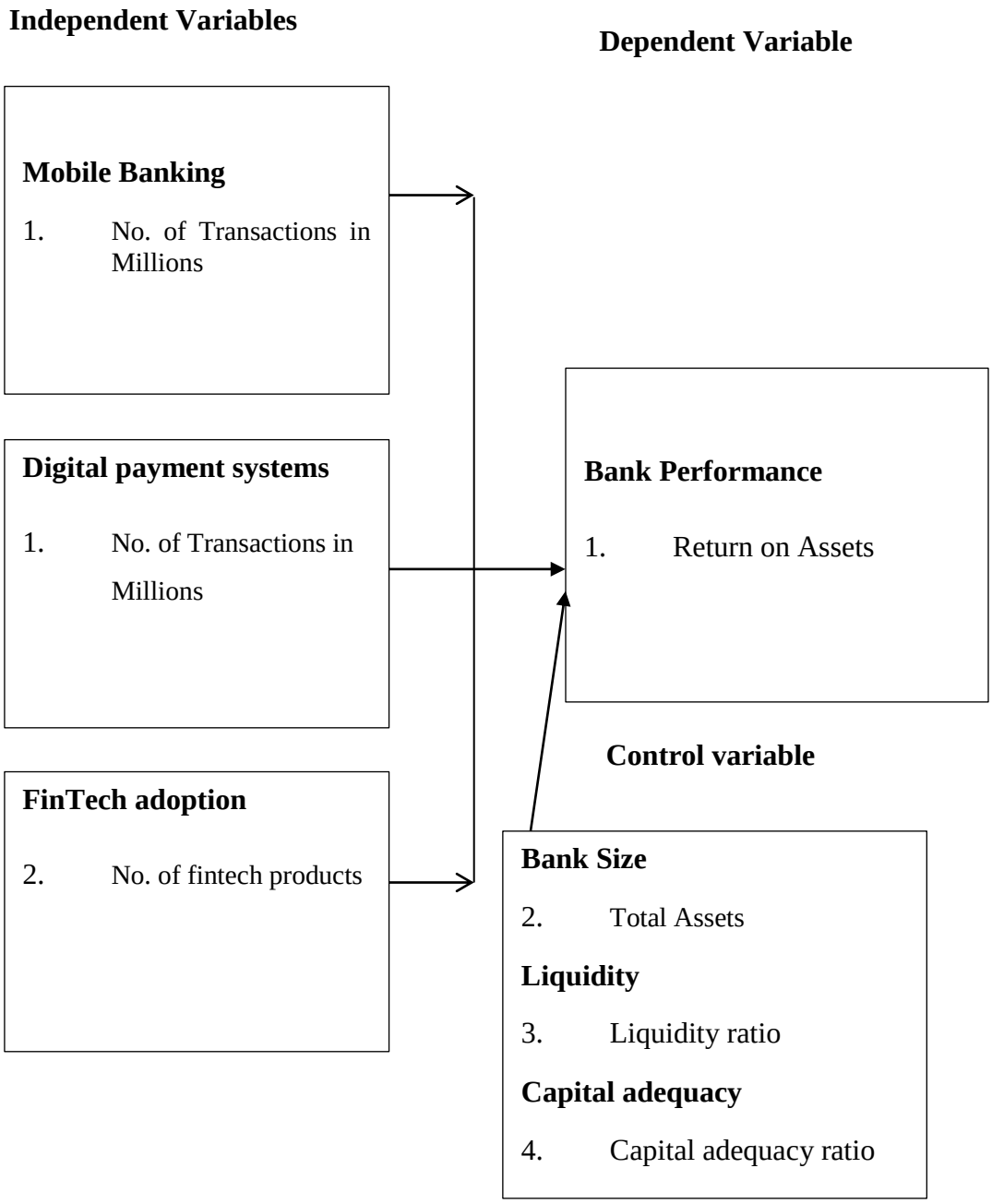

Figure 2.1: Conceptual Framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter delineates the research methodology employed to investigate the link between the financial performance of commercial banks and financial innovation. It encompasses the identification of the study population, the strategies for collecting and analyzing data, as well as the design implemented.

3.2 Research Design

According to Etika & Bala (2017), a research design serves as a strategic plan guiding the execution of a study. In this research, a combination of descriptive and explanatory research designs was employed. Descriptive research, as defined by Cooper & Schindler (2014), is a method used to collect data that helps answer questions about the current status of the issues being studied. Further, explanatory research design was appropriate for identifying causal links between variables (Rahi, 2017). This study's primary goal was to determine whether financial innovation and commercial banks' financial performance are causally related.

3.3 Target Population

The study targeted the entirety of Kenya's operational licensed commercial banks. As per the latest figures available in 2023, there are 38 commercial banks in Kenya, which form the cornerstone of the country's financial system, offering a diverse range of financial

services to both individual consumers and corporate entities (Central Bank of Kenya, 2023).This study employed a census sampling technique to collect data from each member of the defined population. This method, as described by Bryman (2016), is particularly beneficial when the population size is relatively small, as it enhances representativeness and reduces potential sampling errors. Census sampling enhance representativeness as data is collected from every entity in the population.

3.4 Data Collection Method

This study utilized secondary panel data spanning a five-year period, from 2018 to 2022. The data was obtained from the website of the Central Bank of Kenya and was methodically arranged in an Excel template for analysis. This template is provided for reference in Appendix I of the study. The template was structured with rows representing the years of the study period and columns designated for each variable under investigation. The variables included in the data collection process were bank performance, mobile banking, digital payment systems, and fintech adoption.

3.5 Data Analysis

Through a quantitative methodology, this research explored the impact of financial innovations on the performance of banks. The data analysis process was facilitated by the use of the Statistical Package for Social Sciences (SPSS), which offered essential tools for data management and analysis. To succinctly summarize the collected data, descriptive statistical methods, including the calculation of mean, standard deviation, and range (encompassing minimum and maximum values), were utilized. Subsequently, the relationships between the variables were explored using inferential statistical methods, including multiple regression and correlation analysis, as outlined by Hair (2009).

3.5.1 Analytical Model

$$Y_{it} = \beta_0 + \beta_{1it}X_{1it} + \beta_{2it}X_{2it} + \beta_{3it}X_{3it} + \beta_{4it}X_{4t} + \beta_{5it}X_{5it} + \beta_{6it}X_{6t} + \varepsilon it$$

Where; banks to be

Y = Financial performance of commercial banks measured using ROA

X_1 = Mobile banking measured using number of transactions in Millions

X_2 = Digital payment systems measured using number of transactions in Millions

X_3= Fintech adoption measured using number of fintech products

X_4= Bank size measured using total assets

X_5= Liquidity measured using liquidity ratio

X_6= Capital adequacy measured using capital adequacy ratio

β_0 = Constant

β_1 β_2 … β_6= Beta coefficients

ε = error term

3.5.2 Diagnostic Tests

To ensure validity of the analysis results, various diagnostic tests were conducted. Variance Inflation Factor (VIF) was employed to assess presence of multicollinearity in the research, with a VIF value greater than 10 indicating multicollinearity. Additionally, the Kolmogorov-Smirnov test was applied to check if the data conformed to a normal distribution, which is suggested by a probability value (p-value) exceeding 0.05. The

consistency of error variability was also examined; a lack of consistency would indicate the presence of heteroscedasticity in the data. Ignoring heteroscedasticity when running a regression model can lead to skewed parameter estimates. To assess the uniformity of variations, Levene's change fairness test is commonly employed (Parra-Frutos, 2013). In the event when the probability value is larger than 0.5, heteroscedasticity is not present. The Durbin-Watson test was used to see if there is serial correlation among the residuals. Test statistic values that lie between 1.5 and 2.5 are usually regarded as normal. Values outside of this range could cause problems. The Field (2009).

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATIONS

4.1 Introduction

The analysis, presentation, and interpretation of the findings are meticulously detailed in this section. Displayed in tables for clarity, the results are contextualized within the literature reviewed earlier in the study. This research aimed to explore the link between financial innovation and the financial performance of banks operating in Kenya. Comprehensive data was collected from 36 out of the 38 commercial banks targeted, spanning from 2018 to 2022, achieving a response rate of 94 percent.

4.2 Summary Statistics

This section offers a concise overview of the statistical analysis conducted on the research variables. It includes key statistical measures for each variable under study. The results of this analysis are compiled and presented below.

Table 4.1: Summary Data

	N	Mean	Std. Deviation	Min	Max
Financial performance (ROA)	180	0.769	4.626	-30.2	7.4
Mobile banking (No of transactions in millions)	180	10.466	3.800	2.7	19.5
Digital payment systems (No of transactions in millions)	180	4.37	3.558	1	16

Fintech adoption (No of fintech products)	180	25.21	5.527	11	34
Bank size (total assets)	180	144768.6	196462.26	3548	971353
Liquidity (liquidity ratio)	180	55.93	29.466	8	185
Capital adequacy (capital adequacy ratio)	180	21.33	13.597	-61	94

The results indicate that, on average, the annual Return on Assets (ROA), a measure of financial performance, for commercial banks stood at 0.769 percent over the study period. The observed range of ROA spanned from a minimum of -30.2 percent to a maximum of 7.4 percent. These findings suggest that the overall financial performance banks were low during the years 2018 to 2022.

The average annual number of transactions through mobile banking by commercial banks was 10.466 million for the period between 2018 and 2022. The lowest and highest numbers of transactions were 2.7 and 19.5 million respectively.

The average annual number of transactions through digital payment systems by commercial banks was 3.558 million for the period between 2018 and 2022. The lowest and highest numbers of transactions were 1 and 16 million respectively.

For the duration between 2018 and 2022, commercial banks experienced an average annual increase in fintech adoption by 25.21 percent. The data revealed a minimum adoption rate of 11 percent and a maximum of 34 percent over the same period.

The study observed that the capital adequacy of commercial banks fluctuated, with the minimum and maximum values recorded at -61 and 94 percent, respectively. The average capital adequacy ratio stood at 21.33 percent.

Regarding the size of the banks, quantified in terms of total assets, the average annual value was 144,768.6 million. The smallest and largest asset sizes reported by the commercial banks in the study were 3,548 million and 971,353 million, respectively.

As for liquidity, which indicates the banks' ability to cover short-term obligations, the average annual liquidity ratio was 55.93. The liquidity ratios ranged from a low of 8 to a high of 185 across the participating banks.

These varied ranges highlight the diversity in financial health and operational scale among the commercial banks within the Kenyan banking sector during the study period.

4.3 Diagnostic Tests

Diagnostic tests results including multicollinearity test, normality test, autocorrelation test and homoscedasticity test are presented in this section. The aim was to ensure accuracy of regression results.

4.3.1 Multicollinearity test

Multicollinearity was tested using VIF as per the results compiled below.

Table 4.2: Multicollinearity Test

Variables	Tolerance	VIF
Mobile banking	0.25	3.994
Digital payment systems	0.244	4.104

Fintech adoption	0.968	1.033
Bank size	0.228	4.384
Liquidity	0.842	1.188
Capital adequacy	0.935	1.069

From the table, mobile banking had VIF of 3.994, digital payment systems had 4.104, fintech adoption had 1.033, bank size had 4.384, liquidity had 1.188, and capital adequacy had 1.069. The analysis determined that all variables had Variance Inflation Factor (VIF) values below the threshold of 10, suggesting that there was no multicollinearity among the independent variables, which is further supported by the tolerance values, which all exceeded 0.1.

4.3.2 Normality Test

The normality of the data was assessed with the Kolmogorov-Smirnov test, and the outcomes of this analysis are displayed beolw.

Table 4.3: Normality Test using Kolmogorov-Smirnov test

	Statistic	**df**	**Sig.**
Financial performance	.245	180	.066
Mobile banking	.044	180	.200*
Digital payment systems	.168	180	.097
Fintech adoption	.118	180	.057
Bank size	.098	180	.221

Liquidity	.133	180	.333
Capital adequacy	.200	180	.069

The results indicate that all variables had significance (Sig.) values exceeding 0.05. Thus, according to the commonly accepted rule of thumb, the conclusion that the data approximates a normal distribution is drawn from the significance values exceeding 0.05, as this is generally indicative of normality in statistical analyses.

4.3.3 Autocorrelation test

The Durbin-Watson test statistic was used to assess autocorrelation in the study, with the results of this test being presented below.

Table 4.4: Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.678a	0.46	0.441	3.4576	1.623

a) Predictors: (Constant), Capital adequacy, Digital payment systems, Fintech adoption, Liquidity, Mobile banking, Bank size

b) Dependent Variable: Financial performance

The findings reveal Durbin-Watson statistic of 1.623. The value is within the range of 1.5 and 2.5 and therefore no autocorrection.

4.3.4 Homoscedasticity Test

To test for homoscedasticity, the study adopted the Levene's tests and results are shown below.

Table 4.5: Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Financial performance	0.558	4	175	0.694
Mobile banking	0.034	4	175	0.998
Digital payment systems	0.065	4	175	0.992
Fintech adoption	9.242	4	175	0.971
Bank size	0.119	4	175	0.976
Liquidity	0.077	4	175	0.989
Capital adequacy	0.629	4	175	0.642

The findings show that all variables had significance values (sig) higher than 0.05. This supports the acceptance of the null hypothesis, which posits the presence of homoscedasticity.

4.4 Correlation Analysis

The results of the correlation analysis, which explored the relationship between financial innovation and the financial performance of banks operating in Kenya, are presented in Table 4.6.

Table 4.6: Correlation Matrix

	Financial performance	Mobile banking	Digital payment systems	Fintech adoption	Bank size	Liquidity	Capital adequacy
Financial performance	1						
Mobile banking	.606**	1					
	0.000						
Digital payment systems	.333**	.703**	1				
	0.000	0.000					
Fintech adoption	-0.017	-0.011	-0.007	1			
	0.822	0.885	0.93				
Bank size	.476**	.734**	.821**	-0.077	1		
	0.000	0.000	0.000	0.303			
Liquidity	-.213**	0.002	.174*	-0.081	0.001	1	
	0.004	0.983	0.019	0.281	0.993		

Capital adequacy	0.098	0.098	0.028	-0.029	0.038	.185*	1
	0.189	0.192	0.709	0.696	0.613	0.013	
N	180						

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The analysis highlighted a notable positive correlation between mobile banking and the financial performance of commercial banks, evidenced by a correlation coefficient (r) of .606 and a p-value of less than 0.000. This implies that enhancements in mobile banking services are likely to significantly improve the financial performance of these banks.

Furthermore, the study identified a positive and significant link between the use of digital payment systems and the financial performance of commercial banks, demonstrated by a correlation coefficient of .333 and a p-value of less than 0.000. This suggests that developments in digital payment systems positively influence the financial performance of banks.

Additionally, the research found a positive and significant association between the size of a bank and its financial performance, with a correlation coefficient of .476 and a p-value of less than 0.000. This indicates that an increase in a bank's size is likely associated with a substantial improvement in its financial performance.

In contrast, liquidity showed a negative and significant relationship with the financial performance of commercial banks, as indicated by a correlation coefficient of -.213 and a p-value of less than 0.000. This relationship signifies that higher liquidity levels are associated with a decline in financial performance.

Finally, the study discovered that both fintech adoption and capital adequacy did not exhibit a significant correlation with the financial performance of commercial banks. This was reflected in their p-values, which were greater than 0.05 (p=0.822, 0.189 respectively), indicating that these factors did not significantly impact the banks' financial performance.

4.5 Regression Analysis

To assess how financial innovation impacts on the financial performance of commercial banks in Kenya, regression analysis was utilized. This section outlines the results, including the model summary that offers insights into the regression model’s overall effectiveness. Additionally, it discusses the Analysis of Variance (ANOVA), which evaluates the model's statistical significance, and details the coefficients, illustrating the specific relationships and their magnitudes between the dependent variable of financial performance and each predictor variable.

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.678a	0.46	0.441	3.4576

a Predictors: (Constant), Capital adequacy, Digital payment systems, Fintech adoption, Liquidity, Mobile banking, Bank size

Model summary results in Table 4.7 reveal an R squared of 0.46. This denotes that 46 percent of variations in financial performance of commercial banks is explained by financial innovation aspects. The remaining 54 percent can be attributed to factors not included in this study model.

Table 4.8: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1761.886	6	293.648	24.563	.000
	Residual	2068.197	173	11.955		
	Total	3830.083	179			

a) Dependent Variable: Financial performance

b) Predictors: (Constant), Capital adequacy, Digital payment systems, Fintech adoption, Liquidity, Mobile banking, Bank size

The results of the Analysis of Variance (ANOVA) test are presented in the table, demonstrating a notable relationship between financial innovation and the financial performance of commercial banks. This is evidenced by an F-statistic of 24.563 and a p-

value of less than 0.05. These findings indicate that financial innovation is a significant predictor of the financial performance of commercial banks.

Table 4.9: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.047	4.006		-2.508	0.013
	Mobile banking	1.011	0.136	0.831	7.439	0.000
	Digital payment systems	0.507	0.147	0.39	3.448	0.001
	Fintech adoption	-0.012	0.048	-0.014	-0.245	0.807
	Bank size	0.782	0.911	0.1	0.859	0.392
	Liquidity	-0.025	0.01	-0.157	-2.581	0.011
	Capital adequacy	0.018	0.02	0.053	0.914	0.362

a Dependent Variable: Financial performance

Estimated equation:

Y_{it}= -10.047+ 1.011X_{1it} +0.507$_t X_{2it}$-0.025X_{5it}

Where;

Y = Financial performance of commercial banks measured

X_1 = Mobile banking

X_2 = Digital payment systems

X_5= Liquidity measured using liquidity ratio

The regression analysis findings reveal that mobile banking has a positively significant influence on the financial performance of commercial banks, evidenced by a beta coefficient of 1.011 and a p-value of 0.000. Digital payment systems also positively and significantly affect commercial banks' financial performance, as indicated by a beta coefficient of 0.507 and a p-value of 0.001. Conversely, liquidity is associated with a negative and significant effect on financial performance, with a beta coefficient of -0.025 and a p-value of 0.011.

The study also highlights that factors such as fintech adoption, the size of the bank, and capital adequacy do not significantly influence the financial performance of commercial banks. This emphasizes the more significant role of mobile banking and digital payment systems within the sector.

4.6 Discussion of Findings

The results demonstrated a positive and significant correlation between mobile banking and the financial performance of commercial banks, with a correlation coefficient (r) of .606 and a p-value of less than 0.000. This indicates that any variation in mobile banking services is likely to be mirrored by a significant corresponding change in the financial performance of commercial banks in the same direction. Additionally, regression analysis revealed that mobile banking positively and significantly affects the financial performance of commercial banks, as shown by a beta coefficient (β) of 1.011 and a p-value of 0.000. This suggests that for every unit increase in mobile banking usage, there is an expected increase of 1.011 units in the financial performance of commercial banks.

These findings are in line with the research of Al-Jabri and Sohail (2012), who emphasized the pivotal role of mobile banking in enhancing customer service and, by extension, the performance of banking institutions. Sarma and Pais (2011) also emphasized its significance in financial inclusion. Similarly, Jack and Suri (2011) delved into the impact of mobile banking in improving financial outcomes.

The data analysis established a significant and positive correlation between the implementation of digital payment systems and the financial performance of commercial banks, with a correlation coefficient of .333 and a p-value of less than 0.000. This finding suggests that advancements in digital payment systems are positively related to improvements in the financial performance of these banks. Furthermore, the regression analysis highlights the positive effect of digital payment systems, with a beta coefficient of 0.507 and a p-value of 0.001. This indicates that a unit increase in the implementation of digital payment systems is expected to result in a 0.507 unit increase in the financial

performance of commercial banks. These observations align with the research of Do et al. (2022) and Xi et al. (2022), who found that digital payment systems positively impact bank performance. Wadesango and Magaya (2020) also emphasized the significant role of digital payment systems in enhancing the performance of commercial banks, supporting the findings of this study.

Contrastingly, the analysis showed that fintech adoption, bank size, and capital adequacy do not significantly influence the financial performance of commercial banks, as indicated by p-values greater than 0.05. This suggests that these factors have a minimal impact on the financial performance of banks. This finding diverges from the conclusions of Hermuningsih and Rahmawati (2022), and Pierri and Timmer (2020), who highlighted the positive effect of fintech adoption on bank performance. Similarly, Sunardi and Tatariyanto (2023) pointed out the importance of fintech in improving digital banking services.

Additionally, the study revealed a negative and significant relationship between liquidity and the financial performance of commercial banks, with a correlation coefficient of -0.213 and a p-value of less than 0.000. This indicates that an increase in liquidity is associated with a decrease in financial performance. Regression analysis further showed that liquidity negatively impacts financial performance, with a beta coefficient of -0.025 and a p-value of 0.011, suggesting that an increase in liquidity leads to a decrease in the financial performance of commercial banks.

This finding is consistent with the work of Abate and Mesfin (2019), who observed that high liquidity levels might result in missed opportunities for higher returns from alternative investments, potentially negatively affecting a bank's financial performance.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Offering a brief summary and deriving conclusions from the study's findings, the chapter also includes recommendations based on these conclusions and identifies directions for further investigation. The main aim of the research was to examine the connection between financial innovation and the financial performance of commercial banks, focusing particularly on the Kenyan banking sector.

5.2 Summary of the Findings

The findings of this study revealed a significant positive correlation between the use of mobile banking and the financial performance of commercial banks. Further, regression analysis indicated that mobile banking has a notable positive impact on the financial performance of these institutions.

Additionally, the study established that the implementation of digital payment systems significantly and positively influences the financial performance of commercial banks. This connection was also supported by regression analysis, confirming that digital payment systems positively influence financial performance.

Despite observing a significant correlation between bank size and financial performance, the regression analysis did not support bank size as a significant predictor of financial performance.

In contrast, liquidity was found to negatively and significantly affect financial performance. The regression analysis demonstrated that an increase in liquidity is associated with a decrease in the financial performance of commercial banks.

The study also concluded that both fintech adoption and capital adequacy do not significantly impact the financial performance of commercial banks, as reflected in the results of the regression analysis.

5.3 Conclusion

The study concludes with the affirmation that mobile banking plays a significant role in bolstering the financial performance of commercial banks in Kenya. This suggests that innovations in mobile banking are crucial for enhancing the financial outcomes of these institutions.

Additionally, the study determines that digital payment systems are significant contributors to the improved financial performance of commercial banks in Kenya. This indicates that adopting financial innovations in the form of digital payment systems is essential for the enhancement of banks' financial health.

The study also concludes that a higher level of liquidity adversely affects the financial performance of commercial banks in Kenya. The implication here is that maintaining a high level of liquid assets may lead to missed opportunities for higher returns from more lucrative investments, thus negatively impacting profitability.

5.4 Recommendations

This research found that mobile banking plays a significant role in boosting the financial performance of commercial banks. As such, it is advisable for bank management to reexamine their mobile banking strategies to enhance the effectiveness of this innovation in service delivery. Additionally, focusing on strengthening security protocols is crucial to protect client transactions and maintain their trust.

The study also underscored the beneficial effects of digital payment systems on the financial performance of commercial banks. Banks are encouraged to actively inform their clients about the benefits of digital payment systems, fostering broader adoption and use.

Moreover, the study indicated that high liquidity levels can adversely affect the financial performance of commercial banks. Banks should, therefore, reassess their approaches to liquidity management, aiming to balance optimal financial returns with the necessity of fulfilling short-term financial obligations.

5.5 Limitations of the Study

The study's reliance on secondary data introduces several limitations, primarily because such data is inherently retrospective and may not accurately reflect the current operational realities of the banks or capture the fluidity of customer behaviors and their motivations for banking choices. While the annual financial statements used offer historical insight into bank performance, they fall short in predicting future trends or encapsulating the full spectrum of strategic initiatives undertaken by the banks. To

address this limitation, the research incorporated the most recent secondary data available to provide a more current perspective.

The study's methodological approach did not encompass the insights of key bank stakeholders, particularly the executive decision-makers within the banks. The absence of primary data collection meant that the nuanced views and strategic reasoning behind the adoption of financial innovations by bank management were not directly captured in the study, which could have provided a richer, more comprehensive understanding of the phenomena under investigation.

The research's contextual setting, being confined to the Kenyan banking sector, implies that the extrapolation of the results to banking institutions in other countries should be approached with caution. Different regulatory, economic, and technological environments may yield divergent impacts of financial innovation on bank performance.

Furthermore, while the study scrutinized the effect of mobile banking, digital payment systems, and fintech adoption, these are but a subset of the possible innovations affecting bank performance. The research did not address other burgeoning technological advancements, such as blockchain and artificial intelligence, which are rapidly reshaping the financial landscape. Future studies could cast a wider net to explore these and other innovations, and could also employ mixed-methods approaches or longitudinal designs to capture primary data and track the evolving impact of these innovations over time. This comprehensive approach would potentially offer a more holistic and intricate understanding of how financial innovation strategically impacts on financial performance of Kenya’s banking sector.

5.6 Areas for Further Studies

This study ventured into the intricate dynamics between financial innovation and the financial health of Kenya's commercial banks, with a focus on mobile banking, digital payment systems, and fintech adoption. Collectively, these innovations were instrumental in explaining 46 percent of the fluctuations seen in the financial performance metrics of the banks surveyed. Notably, this indicates a substantial but not comprehensive account of the factors influencing bank performance, suggesting the existence of other significant drivers not captured by this research.

Looking to the future, there is a rich vein of potential research opportunities, particularly in emergent financial technologies such as blockchain, which could have profound implications for bank performance. Blockchain's promise of enhanced security, transparency, and efficiency presents a frontier ripe for academic inquiry, especially in the context of its adoption and impact on banking operations and profitability.

Further, there is a salient opportunity for enriching future studies by incorporating primary data from the vantage point of the banking sector's pivotal stakeholders. Direct engagement with bank management could unveil the strategic considerations, expectations, and reservations surrounding the adoption of financial innovations. Such firsthand insights could illuminate the strategic impetus behind embracing these technologies and their perceived value in fostering financial growth and stability.

In-depth interviews, surveys, and case studies involving bank executives could provide a granular view of the decision-making processes, internal assessments of risk and reward, and the alignment of technological innovations with long-term business strategies. This

approach could unravel the complex tapestry of factors that influence the adoption and efficacy of financial innovations in enhancing the financial performance of banks. The inclusion of these additional research dimensions would not only broaden the empirical evidence but also deepen the theoretical understanding of the symbiotic relationship between financial innovation and bank performance.

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APPENDICES

Appendix 1: Raw Data

Bank	Period	ROA (%)	Mobile banking	Digital payment systems	Fintech adoption	Total assets	Liquidity	Capital adequacy
KCB	2018	5	19.5	16.30	23	5.744786	107.5	19
KCB	2019	4.9	18.7	15.50	26	5.793597	109.9	19.5
KCB	2020	3.11	18.5	15.40	33	5.696202	134.4	16.7
KCB	2021	4.9	17.9	15.10	11	5.917188	120.6	17.5
KCB	2022	5	17.7	14.80	25	5.987377	116.8	17.1
EQUITY Group	2018	5.6	17.6	14.00	23	5.608956	24	15.3
EQUITY Group	2019	5.1	17.3	13.00	31	5.641978	35	22.5
EQUITY Group	2020	2.13	17.3	12.80	31	5.879867	32.2	31.2
EQUITY Group	2021	4.7	17.1	12.80	18	5.943205	70.7	21.1
EQUITY Group	2022	4.7	17	12.20	24	5.951343	72.6	26
Co-operative Bank	2018	4.3	16.6	11.50	24	5.583006	33.9	20.2
Co-operative Bank	2019	4.5	16.5	11.50	31	5.610983	33.1	22.7
Co-operative Bank	2020	3.41	16.2	11.30	28	5.824549	31.1	15.4
Co-operative Bank	2021	3.9	16	10.80	21	5.732705	28.7	15.2
Co-operative Bank	2022	4.8	16	10.60	24	5.7498	30.3	16.2
I & M Holdings	2018	3.8	16	10.40	24	5.434061	39	30.2
I & M Holdings	2019	4.7	15.8	9.60	26	5.454374	67	23.2
I & M Holdings	2020	3.63	15.8	9.50	31	5.452659	41	20.2
I & M Holdings	2021	3.4	15.6	9.50	18	5.737776	59	16.3
I & M Holdings	2022	3.7	15.5	9.40	20	5.792155	34	15.8
Standard Chartered Bank of Kenya	2018	4	15.2	9.30	24	5.455035	65.6	17.3
Standard Chartered Bank of Kenya	2019	4.2	15.1	8.80	32	5.512368	78.1	17.9
Standard Chartered Bank of Kenya	2020	2.15	14.9	8.30	31	5.577418	78.4	32.7
Standard Chartered Bank of Kenya	2021	3.6	14.9	8.30	16	5.6322	83.3	30.7
Standard Chartered Bank of Kenya	2022	4.2	**14.6**	**8.30**	**22**	5.678783	81.4	30
Stanbic Bank	2018	3.1	14.5	8.10	29	5.431496	72	22.5
Stanbic Bank	2019	2.8	14.4	8.00	26	5.449503	71	27.6
Stanbic Bank	2020	1.96	14.4	7.70	29	5.513048	51	48.4
Stanbic Bank	2021	3	14.4	7.70	22	5.525189	37	48.5
Stanbic Bank	2022	4.5	14.3	7.70	25	5.581644	55	18.8
Diamond Trust Bank of Kenya	2018	3.3	14.2	7.50	25	5.264707	57	32.3
Diamond Trust Bank of Kenya	2019	3.2	13.9	7.40	29	5.448634	45	37.3
Diamond Trust Bank of Kenya	2020	1.26	13.8	7.30	33	5.691624	61	27.2
Diamond Trust Bank of Kenya	2021	1.4	13.7	7.30	12	5.488271	70	22.5
Diamond Trust Bank of Kenya	2022	3.9	13.7	7.10	26	5.499013	69	52.2

NCBA Group	2018	3.1	13.7	7.00	26	5.36083	54	16.4
NCBA Group	2019	2	13.7	6.90	31	5.360141	31	9.1
NCBA Group	2020	1.41	13.6	6.80	31	5.503772	27	8.1
NCBA Group	2021	3.1	13.6	6.80	15	5.504062	17	9.2
NCBA Group	2022	3.1	13.5	6.60	25	5.591421	28	5.3
HF Group	2018	-0.7	13.4	3.50	28	4.992253	33.8	16.5
HF Group	2019	0	13.2	3.20	32	5.366081	41.1	14
HF Group	2020	-1.77	13.2	3.20	32	5.220926	46.2	15.8
HF Group	2021	-1.3	13.2	6.10	19	5.256191	52.2	17
HF Group	2022	7	13.2	6.10	21	5.145591	53.8	18.8
Absa	2018	3.2	13.1	5.70	24	5.285145	53	33.9
Absa	2019	3.2	13.1	5.70	27	5.290156	61	15.8
Absa	2020	2.2	13.1	5.50	28	5.027162	58	15
Absa	2021	3.4	13	5.40	12	5.117072	54.5	14.5
Absa	2022	3.6	12.8	5.30	26	5.287298	56.2	26.4
Citibank N.A Kenya	2018	6.6	12.80	5.30	24	5.379139	25	19.3
Citibank N.A Kenya	2019	5.8	12.7	5.20	28	4.93267	37	33.2
Citibank N.A Kenya	2020	5.15	12.7	5.10	31	5.494418	51	25.4
Citibank N.A Kenya	2021	4.5	12.7	4.90	19	5.51372	43	22.2
Citibank N.A Kenya	2022	1.8	12.4	4.80	22	5.555421	63	19.5
Bank of Baroda (K) Limited	2018	4.2	12.30	4.80	29	4.982868	43	18.5
Bank of Baroda (K) Limited	2019	3.8	12.3	4.80	30	5.089956	51	16.4
Bank of Baroda (K) Limited	2020	1.26	12.3	4.70	29	4.875808	64	20.9
Bank of Baroda (K) Limited	2021	1.4	12.2	4.70	13	4.938855	69	22.5
Bank of Baroda (K) Limited	2022	3.2	12.2	4.50	26	5.085109	79	21.2
Bank of India	2018	3.9	12.20	4.40	28	4.753054	27	27.4
Bank of India	2019	4.5	12.1	4.30	27	4.797192	76	28.5
Bank of India	2020	3.64	12.1	4.30	33	5.065221	33	13.5
Bank of India	2021	4	11.9	4.30	19	5.047987	58	16.2
Bank of India	2022	2.9	11.8	4.20	23	5.108785	32	20.6
Prime Bank Limited	2018	2.1	11.70	4.00	27	4.883309	42	22.7
Prime Bank Limited	2019	2.3	11.5	4.00	29	4.993588	44	21.1
Prime Bank Limited	2020	1.59	11.5	3.90	32	4.957085	43	14.3
Prime Bank Limited	2021	2.8	11.3	3.80	17	5.102029	50	15.9
Prime Bank Limited	2022	2.5	11.3	3.80	26	5.147376	67	17.2
Victoria Commercial Bank Limited	2018	1.4	11.20	3.80	27	4.414723	49.2	22.7
Victoria Commercial Bank Limited	2019	1.7	11.2	3.70	32	4.849098	51.1	29.8
Victoria Commercial Bank Limited	2020	1.46	11	3.70	31	4.89867	52.1	18.6
Victoria Commercial Bank Limited	2021	2.3	11	3.70	18	5.165965	59.3	16.2

Victoria Commercial Bank Limited	2022	4	11	3.50	23	4.518158	63.4	17.1
National Bank of Kenya Limited	2018	0.5	11.00	3.50	25	5.041164	34.7	19.9
National Bank of Kenya Limited	2019	1.6	10.8	3.50	27	5.061239	30.7	43.9
National Bank of Kenya Limited	2020	0.78	10.8	3.50	31	4.5758	33.1	18.7
National Bank of Kenya Limited	2021	0.9	10.7	3.40	21	4.535307	37.1	17.9
National Bank of Kenya Limited	2022	0.6	10.7	3.30	20	5.154634	43.4	20.9
Habib Bank A.G Zurich	2018	1.7	10.60	3.30	25	4.272027	43.6	42.6
Habib Bank A.G Zurich	2019	7.4	10.6	3.00	27	4.509699	59.3	23.7
Habib Bank A.G Zurich	2020	1.49	10.6	3.00	33	4.495086	63.3	8.3
Habib Bank A.G Zurich	2021	2.6	10.6	2.90	24	4.617105	37.2	9.3
Habib Bank A.G Zurich	2022	2.2	10.6	2.90	23	4.581631	21	12.6
Gulf African Bank Limited	2018	1.7	10.50	2.80	25	4.79328	47.6	26.9
Gulf African Bank Limited	2019	1.7	10.5	2.80	31	4.82549	41.4	16.6
Gulf African Bank Limited	2020	1.27	10.4	2.80	28	4.578525	49.3	16.3
Gulf African Bank Limited	2021	1.8	10.4	2.70	17	4.576088	38.9	27.3
Gulf African Bank Limited	2022	2.3	10.4	2.60	20	4.539829	38.26	25.4
Guaranty Trust Bank (Kenya) Limited	2018	2.2	10.40	2.60	26	4.495766	41.4	15.9
Guaranty Trust Bank (Kenya) Limited	2019	1.6	10.4	2.60	29	4.332856	45.3	14.5
Guaranty Trust Bank (Kenya) Limited	2020	1.66	10.3	2.60	28	4.43476	47	34.4
Guaranty Trust Bank (Kenya) Limited	2021	0.6	10.3	2.60	11	5.01447	50.1	23.6
Guaranty Trust Bank (Kenya) Limited	2022	1.3	10.2	2.50	27	4.716688	61.03	29.7
Guardian Bank Limited	2018	1.9	10.20	2.50	28	4.441349	34.9	15.8
Guardian Bank Limited	2019	1.4	10.1	2.50	27	4.209138	32.7	27
Guardian Bank Limited	2020	0.25	10.1	2.40	29	5.103263	33.8	26.3
Guardian Bank Limited	2021	2.4	10.1	2.40	13	4.392715	50.1	19
Guardian Bank Limited	2022	4.2	9.9	2.40	25	4.112672	51.6	19.1
First Community Bank Limited	2018	1.2	9.80	2.40	26	4.19874	184.8	27.1
First Community Bank Limited	2019	1.5	9.8	2.40	30	4.250552	172.8	24.6
First Community Bank Limited	2020	1.09	9.7	2.30	32	4.341375	122	31.5
First Community Bank Limited	2021	1.9	9.6	2.20	16	4.455667	132.4	26.6
First Community Bank Limited	2022	1.3	9.3	2.20	20	4.629267	162.4	34.5
African Banking Corporation Limited	2018	0.9	9.30	2.20	28	4.23955	34.62	17.6
African Banking Corporation Limited	2019	0.3	9.2	2.10	27	4.403522	44.63	17.9
African Banking Corporation Limited	2020	0.45	9.2	2.10	30	4.51379	46.87	21.6
African Banking Corporation Limited	2021	1.2	9.1	2.10	22	4.6382	50	22
African Banking Corporation Limited	2022	1.6	8.9	2.10	21	4.48934	48	17.3
M-Oriental Bank Limited	2018	1.1	8.80	2.10	25	4.394522	32.6	16.1

M-Oriental Bank Limited	2019	1	8.7	2.10	26	4.522778	33.3	17.8
M-Oriental Bank Limited	2020	0.31	8.6	2.10	33	4.04226	37.1	17.5
M-Oriental Bank Limited	2021	0.7	8.6	2.10	17	4.500936	36.1	19.4
M-Oriental Bank Limited	2022	0.6	8.6	2.10	26	4.688856	38	20.5
Paramount Bank Limited	2018	0.6	8.60	2.00	28	4.160318	9.5	94.5
Paramount Bank Limited	2019	0.6	8.5	2.00	30	4.690912	20	44.9
Paramount Bank Limited	2020	0.85	8.5	2.00	28	4.525045	23	14.9
Paramount Bank Limited	2021	0.3	8.4	2.00	24	4.636989	62.2	13.8
Paramount Bank Limited	2022	1.7	8.2	2.00	21	4.194736	58.9	14.9
Development Bank of Kenya Limited	2018	1.5	8.20	2.00	29	4.024363	84.8	16.2
Development Bank of Kenya Limited	2019	0.7	8	1.90	27	4.185347	72.8	18.7
Development Bank of Kenya Limited	2020	0.45	8	1.90	31	4.056066	83.7	17.1
Development Bank of Kenya Limited	2021	0.8	7.9	1.90	12	4.913591	87.4	53.1
Development Bank of Kenya Limited	2022	1.8	7.9	1.90	20	4.140288	80	40.3
Bank of Africa Kenya Limited	2018	1	7.80	1.90	26	3.979594	67	70.1
Bank of Africa Kenya Limited	2019	0.2	7.7	1.90	29	4.434772	66	29.9
Bank of Africa Kenya Limited	2020	0.33	7.6	1.80	30	4.226806	53	17.7
Bank of Africa Kenya Limited	2021	1.3	7.6	1.80	17	4.413182	64	27.9
Bank of Africa Kenya Limited	2022	0.5	7.6	1.80	20	4.567802	59	8.9
UBA Kenya Bank Limited	2018	0.2	7.50	1.80	24	4.21272	36.8	15.1
UBA Kenya Bank Limited	2019	0.5	7.4	1.80	30	3.995083	36.4	30.9
UBA Kenya Bank Limited	2020	0.11	7.2	1.70	33	4.272839	37.4	22.2
UBA Kenya Bank Limited	2021	0.8	7	1.70	22	4.0951	55	30.5
UBA Kenya Bank Limited	2022	1.4	6.8	1.70	21	4.12496	63	17.5
Middle East Bank (K) Limited	2018	1	6.80	1.70	29	4.012626	36	5.4
Middle East Bank (K) Limited	2019	0.7	6.7	1.70	32	4.736109	43.1	14.4
Middle East Bank (K) Limited	2020	0.04	6.7	1.70	29	4.113442	46.1	17.9
Middle East Bank (K) Limited	2021	0.3	6.7	1.70	17	4.048675	44.4	9.1
Middle East Bank (K) Limited	2022	0.1	6.7	1.60	21	5.005288	41.7	18.6
Mayfair Bank Limited (297)	2018	-1	6.70	1.60	26	4.733927	42	18
Mayfair Bank Limited (297)	2019	0.9	6.7	1.60	30	4.02181	44	21.1
Mayfair Bank Limited (297)	2020	0.01	6.6	1.60	33	4.236084	45	17.4
Mayfair Bank Limited (297)	2021	0.7	6.5	1.50	30	4.248856	53	17.9
Mayfair Bank Limited (297)	2022	0.2	6.4	1.50	13	4.741687	61.7	18.4
SBM Bank (Kenya) Limited	2018	-3.9	6.40	1.50	20	3.813247	42	23.6
SBM Bank (Kenya) Limited	2019	-0.6	6.3	1.50	28	4.185602	46	19.6
SBM Bank (Kenya) Limited	2020	-0.41	5.8	1.50	29	4.364457	44	10.8
SBM Bank (Kenya) Limited	2021	0.6	5.8	1.30	31	4.560397	43	24.7
SBM Bank (Kenya) Limited	2022	0.5	5.8	1.30	19	4.227681	47	15.8

Consolidated Bank of Kenya Limited	2018	-1.6	5.60	1.30	25	3.709355	89	25.6
Consolidated Bank of Kenya Limited	2019	-4.2	5.6	1.30	27	3.729234	76	34.7
Consolidated Bank of Kenya Limited	2020	-2.03	5.5	1.30	27	4.975101	81	41.4
Consolidated Bank of Kenya Limited	2021	0.5	5.5	1.20	30	4.120936	80.5	39.3
Consolidated Bank of Kenya Limited	2022	0.1	5	1.20	24	4.91253	79.5	41.6
Sidian Bank Limited	2018	-3.3	4.80	1.20	23	3.549984	24.4	54
Sidian Bank Limited	2019	-6.6	4.8	1.20	23	4.01011	82.4	19.5
Sidian Bank Limited	2020	-2.76	4.7	1.20	26	4.485892	62	23.1
Sidian Bank Limited	2021	0.4	14.3	1.10	33	4.129077	65.6	17.2
Sidian Bank Limited	2022	-0.3	14.1	1.10	11	4.410305	61.4	14.3
DIB Bank Kenya Limited	2018	-3.8	12.20	1.10	22	4.069853	51	16.5
DIB Bank Kenya Limited	2019	-8.8	11.4	1.00	25	3.836107	49	16
DIB Bank Kenya Limited	2020	-5.22	9.2	0.90	28	4.110118	41	27.3
DIB Bank Kenya Limited	2021	-1.3	7.4	0.80	33	4.135355	41	16.5
DIB Bank Kenya Limited	2022	-1.7	5.7	0.80	34	4.246523	34	12.1
Family Bank Limited	2018	-0.7	5.50	0.80	16	4.128916	14.2	12.7
Family Bank Limited	2019	-0.7	4.6	0.70	23	4.252379	10.48	-22
Family Bank Limited	2020	-1.77	4.2	0.60	27	4.104794	12.34	-20.6
Family Bank Limited	2021	-4.4	3.8	0.60	29	4.23777	8.91	-60.6
Family Bank Limited	2022	-2.4	3.7	5.00	33	4.164412	7.56	-10.9
Ecobank Kenya Limited	2018	-2.2	3.60	0.80	11	4.285602	52.3	18.6
Ecobank Kenya Limited	2019	-13.3	3.6	1.70	23	3.964876	116.8	17.4
Ecobank Kenya Limited	2020	-24.59	3.6	4.30	27	4.652411	138.4	18.3
Ecobank Kenya Limited	2021	-30.2	3.3	6.60	27	4.154819	134.8	18.1
Ecobank Kenya Limited	2022	-2.7	2.9	8.60	30	4.211921	144.3	17.8
Spire Bank Limited	2018	-16.6	2.80	2.30	12	4.108937	59	19.9
Spire Bank Limited	2019	-6.7	2.7	2.20	22	4.110163	67	18.7
Spire Bank Limited	2020	-19.81	5.5	1.90	28	4.122642	63	17.7
Spire Bank Limited	2021	-10.2	6.9	7.60	28	4.716821	72	18.5
Spire Bank Limited	2022	-2.9	9.1	4.60	29	4.191814	77	21.4