

**EFFECT OF MOBILE BANKING ON THE FINANCIAL
PERFORMANCE OF COMMERCIAL BANKS IN KENYA**

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DECLARATION

This research project is my original work and has not been presented for a degree award in any other university.

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This research project has been submitted for examination with my approval as the university supervisor.

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ABBREVIATIONS & ACRONYMS

CBK	Central Bank of Kenya
DOI	Diffusion of Innovation
E Banking	Electronic Banking
KBA	Kenya Bankers Association
M Banking	Mobile Banking
NIM	Net Interest Margin
ROA	Return on Assets
ROE	Return on Equity
SPSS	Statistical Package for Social Sciences
TAM	Technology Accepted Model

DEDICATION

My utmost dedication of this paper goes to my loving family for being a fountainhead of motivation and inspiration during my study. To my beloved parents, am grateful for your sacrifice and commitment in ensuring that I succeed in my academics. May God's blessings shower upon you abundantly.

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ABSTRACT

The study investigates the impact of mobile banking on the financial performance of Kenyan commercial banks, whilst highlighting the shift towards mobile banking services due to technological advancements and widespread use of mobile phones. This study's predictor variables included bank size, liquidity management, and security measure costs while the asset quality, adequacy of capital, and internet banking served as the control variables. Due to the fact that financial success was assessed by utilizing two distinct financial metrics—ROA and ROE—thereby two models existed. The entire population of 39 commercial banks was the target. The selected sample of large peered commercial banks that provided secondary data for a period of five years, from 2018 to 2022. The statistical software, SPSS was utilized for the investigation. The study employed correlation, regression, and ANOVA analyses for further analysis. In model 1, where ROA was the dependent variable, its R^2 value was 26.7%, indicating that 26.7% of the bank's size, volume of mobile transactions, cost of security measures, internet banking, asset quality and capital adequacy explained ROA. In contrast, ROE had an R^2 value of 10.2%. From both models, the results obtained from applying ROA was deemed to be statistically insignificant due to the fact that the value of (0.054) exceeded the conventional significance threshold of 0.05.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Mobile banking created a niche that commercial banks sought out in order to elevate their financial performance. Hasan and Mahmud (2023) indicated that due to the exponential growth experienced in mobile phone infrastructure it laid down a path that banks leveraged to increase its customer base and innovate mobile banking products. In the past, market penetration to the unbanked individuals was quite slow, however, mobile banking has progressively made it possible to provide financial services to the unbanked sector. CBK (2022) reports that the value of mobile money transactions increased by 13.8% from December 2021 to December 2022. Therefore, this indicates that there is a growing need to engage in mobile banking services that commercial banks can exploit to increase their efficiency and profitability.

For the purpose of shedding light on the correspondence between mobile banking and financial performance of commercial banks, the current investigation utilized two foundational theoretical frameworks: the Technology Acceptance Model (TAM) and the Diffusion of Innovation theory (DOI). According to Technology Acceptance Model (Davis,1989) it focuses on how technology is viewed and the willingness of a user to adopt it. Therefore, the outcome is based on the individual's expectations when incorporating technology in their systems. In this study, it provided an understanding of how individuals perceive the adoption and benefits of mobile banking through offering a platform to transact effectively and efficiently regardless of the location, whilst, creating an opportunity for banks to increase income even from the informal sectors. On the other hand, Diffusion of Innovation Rogers (1962) highlighted how an innovation which could be a product or service gains traction and spreads over a given population. The resulting outcome is that more individuals end up embracing it and, in

this study, mobile banking is the innovation. Mobile banking in Kenya started off as just sending or receiving money between individuals through mobile phones, however, over time it has diffused and captured transactions of the business market. Due to this diffusion, some commercial banks have resolved to build their customer base through this and in turn boost their financial performance.

The primary focal point of this paper was directed towards the depository institutions in Kenya that have integrated mobile banking into their services. In the past, commercial bank services have not always been inclusive to all, however, that has changed over the years. Musau (2022) Through the economic pillar of Vision 2030, the Kenyan government welcomed financial inclusion. Commercial banks responded to this drive by accepting and creating products and services for the unbanked people. Geospatial Fin Access Survey (2015) Because of the presence of mobile phone transfer service agents who have been in place from when the launch of mobile financial services was conducted in 2007, over 70% of Kenyans live within three kilometers of a financial access touch point. Some commercial banks have therefore pursued this innovative idea of mobile banking to acquire new clients, retain their customer base through the efficient service provision and build up more deposits that can be attached to investments that will improve the financial health of the bank.

1.1.1 Mobile banking

According to Ho et al. (2020), mobile banking is an improvement over electronic banking that enables users to conduct transactions using software and their mobile phones. According to Abu-Taieh et al. (2022), it is further defined as the use of mobile applications designed to conduct banking transactions and connected to a bank account. Mobile banking, according to Gathu & Njenga (2021), is the practice of utilizing mobile

devices to carry out financial and banking transactions. Since mobile phones are a common element throughout all these definitions, mobile banking can be defined as the utilization of mobile devices by both individuals and companies to engage in financial transactions. Mobile banking has been quite dynamic; however, most recent studies pursue the matter from a wider perspective through tackling adoption of technology as a whole in banking. This overlooks the issues relating to mobile banking as part of innovation since the Fintech space is big. As a result, this research would emphasize mobile banking as a foundational factor influencing the profitability of depository institutions.

Studies done by various researchers measured the variable by just considering the number of users and volume of transaction which only brings to account the concept of financial inclusion. For instance, Sagide & Alexis (2022) utilized the number of users, transaction cost and number of non-transactional services to gauge mobile banking impact on financial performance. Additionally, Barasa (2021) used the quantity of transactions made through mobile banking to measure the variable. However, other important metrics that affect profitability of banks will also be considered in this study with regard to mobile banking.

1.1.2 Financial performance

Jihadi et al. (2021) defined this term as a subjective indicator of a company's ability to make income by effectively and efficiently utilizing its core business mode's assets. It is vital as it provides an overview of the economic health of a company. Through these investors can know whether the company is a good avenue to invest. Ngumo et al. (2020) defined financial performance as a measure of achievement for companies on their objectives, policies and operations stipulated in monetary terms. Additionally, they asserted that shareholders evaluate the achievement of the institution goals depending

on the yield they can anticipate from their investment within a specified time frame. Profitability is a good way to gauge a commercial bank's financial health. As they generate a disparity between the interest rates charged by lenders on loans and the interest received by depositors, bank profitability and interest margins can be considered indicators of the banking system's efficiency. Profitability ratios include return on assets, return on investment, return on equity, and net interest margin. According to Zahariev et al. (2022), external factors such as banking legislation and economic conditions, as well as management decisions made by individual commercial banks, have an impact on ROA. The study also shows that a company's ability to convert shareholder money into net returns is measured by its return on equity (ROE). Felani et al. (2020) utilized ROA as a profitability ratio to measure financial performance, however, they went further to state that it limited their study as they didn't take into account the other financial ratios. Zahariev et al. (2022) stated that ROA showcases how efficiently a financial institution operates while ROE indicated the potential growth of shareholder's investment. Therefore, this study will measure this variable by taking both into consideration in order to provide a more effective approach.

1.1.3 Mobile banking and financial performance

The incorporation of digital technologies into the banking sector has brought about significant transformations in the operational procedures and customer service standards of commercial institutions. Historically, processes that were occasionally laborious required a great deal of human labor. In accordance to Mwangasu et al. (2022), the implementation of mobile banking in commercial institutions has facilitated enhanced customer experiences through streamlined financial service accessibility. This is through allowing them to update their own data and documentation at any time without necessarily needing to be present in the bank. Also, the unbanked individuals

are enabled to access business loans through mobile banking. Elshodovna (2022) More so, it has empowered banks to gain leverage against their counterparts in the market of banking services. Since customers are more informed and are aware of how a good customer experience is like, banks need to create a good mobile banking platform with a good user interface. When the user experiences are good it gives customers a good impression of the banks that have embraced technology and gives them an easier time when making use of their financial services.

In addition to, automation of manual processes and re-allocation of employees to value adding tasks provides new opportunities for more product innovation within the bank. Shahid et al. (2022) This, together with enhanced customer service, would enable banks to offer top-notch services to their clientele and remain abreast of industry developments. When commercial banks have invested in mobile banking, it may be claimed that, overall, the profitability of those institutions has increased.

1.1.4 Commercial Banks of Kenya

The Central Bank of Kenya Act, the Companies Act, the Banking Act, and other prudential guidelines issued by the CBK regulate the banking sector in Kenya. As per the CBK(2022), there is one mortgage financing company and thirty-eight licensed commercial banks. The Kenya Bankers Associations (KBA), which represents the interests of the banking industry, is a grouping of banks. The KBA provides a platform for discussing problems that members have. In Kenya, some commercial banks have embraced mobile banking through their service delivery. Some of these commercial banks include Cooperative Bank, Family Bank, Equity, KCB Bank, Absa, National Bank, NCBA and Standard Chartered Bank. Mobile banking has been achieved by these banks through developing mobile applications and their coalition with mobile network such as Safaricom through their M Pesa product that has navigated through the market.

According to Ndungu and Muturi (2019), the commercial banking sector in Kenya has accomplished developments in various dimensions, including assets, deposits, profitability, and product offerings. In Kenya and across the East Africa Community, the industry has implemented a comprehensive branch network development plan. Additionally, the automation of various services and a transition from over-the-counter banking products to a greater focus on complex customer requirements have all played a role in the increase.

1.2 Research Problem

Implementation of mobile banking has been adapted tremendously in the banking industry since more commercial banks look into these to increase their financial performance and output. Despite the diverse quantity of research conducted to establish the influence of financial services digitalization on bank's financial performance, few have particularly explored mobile banking. The few studies that have been done have produced contradictory results, which makes this one necessary. This study will concentrate on the factors that have led to contradictory results in earlier research and offer a solid conclusion regarding the true impact of mobile banking on Kenya's commercial banks' financial performance.

In their study, Getugi (2023) investigated the connection between the technical proficiency of Kenyan commercial banks and mobile banking. The results indicated that latter is advantageous for commercial banks in Kenya as a result of its widespread technological adoption. In addition, the research identified a correlation between mobile banking usage and enhanced technical proficiency in the banking sector. The outcome of the study aligns with the prevailing agreement that mobile banking has substantially enhanced the operational effectiveness and productivity of commercial institutions. Bonface and Ambrose (2015) conducted a research investigation

concerning the correlation between mobile banking and the financial performance of commercial institutions in Kenya. Further, the study concluded that the speed and security of mobile banking had a positive effect on the financial performance of depository institutions in Kenya. Nevertheless, Hani (2019) unveiled apprehensions in regard to the security of mobile banking due to the malevolent cyber threats that hinder its implementation. Consequently, they established a significant and adverse association between mobile banking and financial performance. The report went forward to underscore the significance of this factor in comparison to the increasing adoption of mobile lending by commercial banks, which contributed to a rise in their profitability.

1.3 Objective of the study

This study's main objective is to determine how mobile banking affects Kenyan commercial banks' financial performance.

1.4 Value of the study

It is hoped that this research paper will provide the government and regulatory bodies with an understanding of how crucial mobile banking is in advancing financial performance, therefore, the need to stipulate policies that have favorable rates and taxes amongst other things, for the benefit of improving commercial bank's financial performance. It will also create a need for the government to develop an enabling environment for the attainment of full financial inclusion which is in sync with Vision 2030.

This study hopes to inform institutions such as of CBK, to come up with better policies especially in regard to regulating the mobile banking services in Kenya. Its findings can assist in improving policy directives on the minimum liquidity requirement, cash reserve ratio, bank's asset size as well as other factors that can stir up economic growth.

This study hopes to act as an existing literature to academicians and students of finance who would use it as reference in order to conduct further studies in relation to this topic. The study also hopes to provide customers with information of where mobile banking is headed thereby assisting them to make better financial decisions when acquiring financial services from these commercial banks. It also aims to inspire industry customers to leverage the rapidly evolving technology to develop their operations through increased efficiency and, as a result, optimize returns. Finally, the study intends to serve as a management guidance tool by illustrating the importance of mobile banking, guaranteeing increased attention to service delivery and allocating sufficient resources to support technological advancements in banking.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provided a theoretical foundation to the study and empirical framework from studies that have been carried out before revolving the same topic. It will also move forward to highlight the determinants of the dependent variable being financial performance with regards to mobile banking and how it influences it. Finally, providing a visual representation with a summary table of what knowledge gaps would be filled with.

2.2 Theoretical Literature

Three theories reinforced the research of this study. These theories have brought different perspectives that has culminated to the foundations of these study.

2.2.1 Technological Advancement Model

The theory was formulated by Davis (1989). It not only brought a perspective on the strategies that are required to measure the acceptance of technology for the purpose of predicting behavior but also the theoretical explanation for the successful implementation of technology. Therefore, it acted as source of informing professionals on the measures to be taken prior to the implementation process of system. As per Davis (1989) TAM composed of a three-step process. In the first stage, external factors are generated by system design elements that incite the perceived usefulness and ease of use. In turn it prompts an informed response that shapes behavior about technology.

However, there have been some critiques made towards this theory. The theory shed light into the factors that lead individuals to utilize technology and blurred the focus on the effect of technology utilization on performance. Goodhue (2007) disagreed with TAM research which implicitly stated that the more technology is utilized the better the performance which he stated is not true in practice. Another discrepancy highlighted by

Goodhue (2007) and Benbasat & Barki (2007) was that little attention was paid to what exactly makes a system useful that is the system design and its fits to the user which both are equally important for the acceptance of technology and achievement of high performance in its utilization. Benbasat & Barki (2007) and Venkatesh et al. (2007) indicated that TAM has reached its maturity state and can no longer be replicated.

According to this hypothesis, banks would consider the cost of technology and how it will affect their business practices. If the technology is found to be suitable, they would adopt it without a shadow of a doubt. This will improve their credit scoring, data analytics, and innovation, which will boost productivity and effectiveness and ultimately improve their financial performance.

2.2.2 Diffusion of innovation theory

Rogers created the concept of diffusion of innovation (DOI) in 1962. It started out in communication, where it illustrated how a concept can gather steam and gradually permeate a social structure. People accept the new concept, behavior, service, or product as a part of the social system as a result of its dissemination. In order to take on the invented product, the individual needs to perceive the product as new or innovative. Therefore, the key to adoption is the perception towards the innovation through which diffusion is made possible. But it also emphasizes how adoption happens in a social system in a stepwise manner, based on which people are more willing than others to try new things.

Some of the notions of DOI have been questioned by critics; Chile (2017), for example, said that the theory placed more emphasis on innovation than on sociocultural diversity. Research has indicated that technological advances are more likely to succeed when users are able to profit from them. However, in areas that face economic hardships or poor infrastructure, it becomes cumbersome for technological innovation to penetrate.

Chile, (2017) further stated that ineffective methods of introducing innovation can limit diffusion. For example, the internet may at times provide information that is false or unreliable and present it as facts, therefore, for a first-time user it may discourage them from utilize it for its benefit and even to adopt.

The majority of disruptive new breakthroughs enable users to use cutting-edge techniques and surpass current technologies or practices. They can even improve a position by surpassing competitors quickly and skipping some steps in an action or process. In Kenya, a large portion of technological investment in the finance sector has been made possible by the use of sophisticated mobile phones. It demonstrated the countless opportunities for commercial banks to enter the market and package mobile services to increase income. In his summary of the impact of mobile money platforms like M Pesa, Aron (2017) makes the case that the use of new technology has outperformed many traditional banking services. As a result, obstacles like the costly overhead of traditional brick-and-mortar banking have decreased.

2.2.3 Financial Intermediation theory

This theory was instigated by Gurley and Shaw in 1960. Primarily it's supported by the agency theory and the notion of informational asymmetry. The majority of the defects resulting from informational asymmetry caused certain types of transaction costs to arise. Financial intermediaries, however, want to get rid of or cut these expenses. Benston & Smith (1976) and Fama (1980) established the transaction cost argument, which was predicated on the differences in the technology that each participant had adopted. As a result, financial intermediaries are viewed as a partnership between private creditors and private debtors that utilize transaction technology to capitalize on economies of scale.

The hypothesis was criticized by Allen & Santomero (1997) from the perspective of how financial intermediaries enter the market to lower transaction costs. According to the idea, understanding intermediaries requires an understanding of the challenges posed by transaction costs and information asymmetry. However, they pointed out that because it's a platform that leads to the sharing of expenses, such during asset evaluation, the intermediaries have an advantage over the individuals. This demonstrates how much easier it is to diversify trading costs than individual expenditures.

This idea is pertinent to our research since digital technology has made banking operations and service delivery easier. Banks use technology to increase operational efficiency. Banks can now use mobile banking as a platform to use as middlemen in their daily operations. Because of the openness and free exchange of information, it has not only increased client, bank trust and confidence but also improved cost-cutting, customer retention, and given banks a competitive edge.

2.3 Determinants of Financial Performance

Numerous factors have been linked to a bank's financial performance, according to several studies. Heffernan & Fu (2010), for example, discovered that a number of financial ratios and macroeconomic variables had a major impact on financial success. Correspondingly, some of the factors that have influenced this research have been highlighted in this segment.

2.3.1 Financial Inclusion

Financial inclusion, according to Lufti et al. (2021), is the endeavor to make financial services accessible and reasonably priced for all people and organizations, irrespective of cost and location. Therefore, this is a situation whereby all people and businesses can access financial services to facilitate their needs and wants. It empowers them to save,

take credit and insurance. Mobile banking has enabled this by providing individuals from the rural areas and socio-economical marginalized groups to get financial services. This has also led to a few micro finance institutions to be set up in the rural areas due to the potential witnessed through mobile banking.

Ahmad et al. (2020) Some commercial banks have liaised with mobile networks to make this possible while others have set mobile agents across the country just to be able to capture the market. Due to the increase in the use of mobile banking, banks are working towards implementing it in their operation in order to increase their revenue and replicate it on their overall financial performance.

2.3.2 Size of the bank

Commercial banks' size has an influence on its financial performance. The study conducted by Trinh et al. (2020) large, highly leveraged financial institutions are more prone to experiencing reduced expenses and enhanced efficiency. Banks can use economies of scale by expanding their product portfolio to attract a larger client base, leveraging on their substantial size. Moreover, it leads to a reduction in risks, which significantly affects financial performance.

Yuanita (2019) depicts that larger banks find it simpler to engage with mobile networks, who already have the economies of scale to grow and provide better prices, and to make financial arrangements. This way they are able to invest in mobile banking and lower marginal costs which lead to the increase of the bank's profit margin.

2.3.3 Liquidity management

Dzapasi (2020) defined liquidity as the capability of banks to pay off their financial obligations as they fall, however, it's also the ability to honor maturing deposits for banks. According to Wuave et al. (2020), profitability as determined by ROA, ROE, and NIM is favorably correlated with an appropriate degree of liquidity management.

Mobile banking requires the utilization of float accounts, in that each agent is supposed to maintain a balance of electronic money in their agent account. In the event a customer wishes to send money to someone, they exchange cash for e-money through paying cash to the agent and the agent send the e money to their mobile wallet, thereby increasing the amount of transaction and customer's e money and at the same time reducing the agents e money. Correspondingly, the opposite happens in the event of a withdrawal by the customer.

Defina et al. (2021) Due to these continuous transactions, the agents' electronic money or cash balance may be exhausted, and customers are unable to withdraw or deposit. Normally, this poses a challenge to the agents facilitating this m banking services whereby they become illiquid to execute operations optimally with not too little or too much cash or e money float. Therefore, it is essential for a bank to have better liquidity management strategies in mobile banking, otherwise it might cause a ripple effect to their financial performance.

2.3.4 Security

Similar to any other technology-driven product, mobile banking acceptance is impacted by people's feelings of uneasiness. Oh & Kim (2022) Most individuals are always concerned about the safety of using mobile money, breach of their personal information among other safety reasons. These concerns are valid as the security risks of the mobile space need to be analyzed. Lack of technological advancements increases the risk as well as new inexperienced entrants in the mobile banking sector, this is because as much as they would come up with innovative products, they may tend overlook security measures.

Security risks are also observed in the mobile application developments that provide mobile banking services. The quantity of personal data that the programs acquire, along

with information about the customers' actual whereabouts, has highlighted privacy problems. Ghani et al. (2022) Therefore, commercial banks that are implementing these m banking services need to educate their customers on the risks and vulnerabilities involved and how they can mitigate such risks, otherwise it might end up reducing customer retention to its mobile products.

2.4 Empirical Literature

In this segment, it avails research studies carried out in the past and revolve the determinants highlighted. This provides a basis on what to be expected whilst projecting the future outcome.

2.4.1 Financial Inclusion

Harwood (2021) shows that mobile banking has a big impact on financial equality among Kenyan depository institutions. The research shows that mobile deposits, cash withdrawals through mobile platforms, and mobile money exchanges all have a big effect on getting people to utilize banks. So, mobile banking has made it easier for people to get to important services and has also allowed financial services to reach areas that weren't before. By cutting down on manual paperwork and documentation, minimizing bank branch maintenance, and shortening wait times in banking halls, mobile banking assists banks in cutting costs as suppliers or providers of financial services. Mutinda et al. (2018) This study's conclusion was that Kenya can see growth in the financial sector which is made possible by innovations in financial inclusion, such mobile banking. Consequently, in order to achieve full financial inclusion, the government must establish policies and regulations that foster an enabling environment.

2.4.2 Liquidity Management

Musili (2020) did a study on how digitizing financial services has changed the way Kenyan commercial banks handle their cash flow. Its finding was that the rise of mobile

banking and other technological changes in the banking sector caused a huge impact on the liquidity of Kenya's private banks. Additionally, it's essential to point out that, similar to online banking, the number of activities in mobile banking grew over time. This might be because cell phones have become easier for more people to get overtime and because banks have put a lot of money into mobile banking technology.

However, Alim (2021) studied on how liquidity risk management affected the financial health of Pakistani banks and generated some conclusions. Its findings deduced that liquidity has a good impact on the financial performance of Pakistani depository institutions. For business banks to offer mobile banking, they need to have enough cash on hand to handle the number of transactions. But having a lot of cash on hand always comes with a missed chance. This is because cash-like assets have low interest rates, and banks have a hard time paying depositors when they want to take their money out.

2.4.3 Size of the Bank

A study on the impact of bank size on financial performance was carried out by AlFadhli et al. (2021) while employing data from Kuwaiti banks. The study showed that this topic has always been controversial among researchers, since some banks tend to enjoy the economy of scale which results to less overhead expenses, thereby, experiencing better financial performance than small, peered banks. Mobile banking requires technological advancements in the infrastructure of a bank therefore, large peered banks may be at a better advantage to take it off the ground than the small banks. Other research view large banks as bureaucratic institutions which denies them flexibility to respond to economic changes thereby yielding lower profits.

Research on the impact of business characteristics on the financial performance of Kenya's listed commercial banks was conducted by Nyabaga & Wepukulu (2020). The study's conclusion was that banks should concentrate on increasing the amount of their

assets because the results showed that bank size significantly improved ROE and ROA. However, there were other internal factors such as leverage and capital adequacy as they also did have a significant effect on ROE. This shows us that it is vital to grow your asset's size which influences the bank's size to navigate through banking technological innovations.

2.4.4 Security

Based on the viewpoint of youthful users, Jahan & Shahria (2022) conducted a study founded on the factors influencing consumer satisfaction of mobile banking in Bangladesh. The study makes it abundantly evident that loyalty in Bangladesh mobile banking is heavily impacted by satisfaction. The pleasure of this nation's youth clients with mobile banking was influenced by a number of things. The most important of those are cost, relative advantage, expense, responsiveness's influencing power, security, and convenience. It emphasizes how convenience and security are weak factors when it comes to customer satisfaction, suggesting that young customers' satisfaction with mobile banking is less dependent on these two factors because they are already accustomed to their account pin numbers and mobile security codes, even though these were initially concerns. These findings of mobile banking security were different from those of the majority of researchers, who came to the conclusion that in Bangladesh, mobile banking reveals security, trust, and assurance as the dominant factors influencing customer satisfaction. Jannat & Ahmed (2015); Islam et al. (2019); Kabir (2013).

According to Bonface & Ambrose (2015), who studied mobile banking and the financial performance of Kenyan commercial banks, mobile banking's security and speed was highlighted to experience a favorable impact on performance. As a result of numerous financial institutions that have demonstrated excellent performance, there is

now a sufficient pool of capital available for willing investors to borrow from, increasing earnings. The research goes on to showcase a positive impact through the financial service security provided by customers through M-banking services. Amadala (2019) expressed concerns about the security of mobile banking in Kenya, pointing out that phishing is probably going to get worse since hackers can now use account holders' credit card and banking information to perform crimes. As a result, mobile banking security is crucial, and if it is not looked into, it may affect how well mobile banking works to boost Kenyan commercial banks' bottom lines.

2.5 Conceptual Framework

It was this idea that led to the study of the links between Kenyan commercial banks' size, liquidity, security, and mobile banking, as well as their financial success. Figure 2.1 showcases a visual presentation of the idea. Both the predictor and response variables in the framework come from the study of literature. The framework makes it clear how mobile banking services are linked to the bank's financial success. The research paper employs profitability metrics like ROA and ROE to gauge financial health. According to the study, asset quality, capital adequacy, and internet banking can change the link between mobile banking services and commercial banks' performance. The strength of the link between two can be expounded by the fact that different commercial banks offer different mobile banking services.

Independent Variables

Dependent Variable

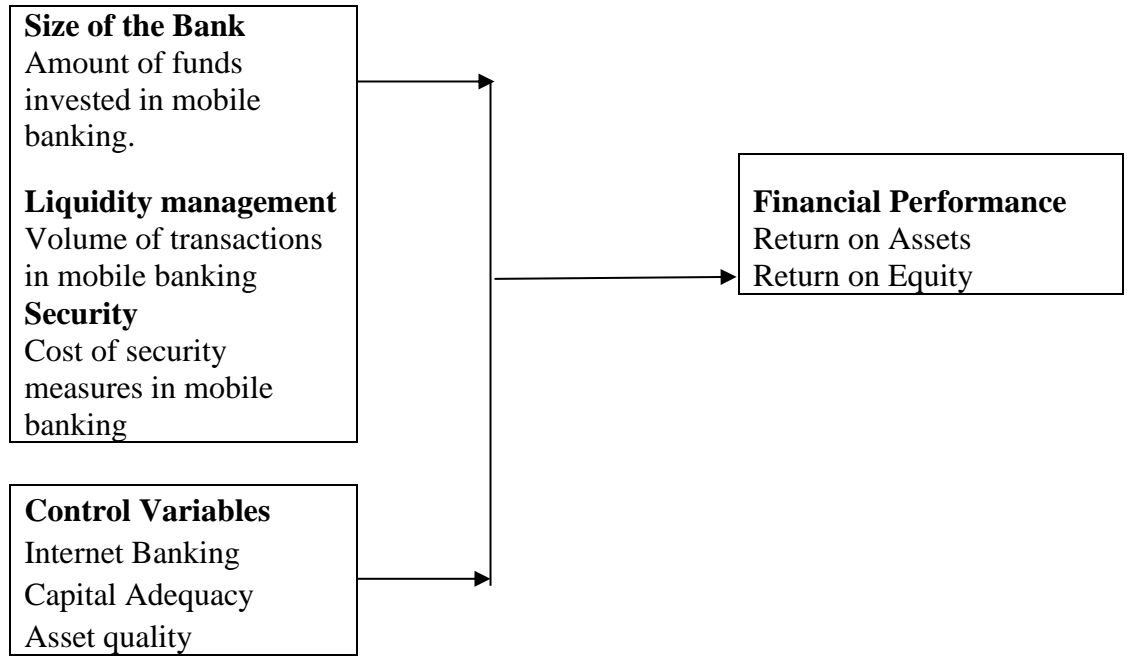


Figure 2.1: Conceptual Framework

2.6 Summary of Literature review and Knowledge gaps

Variables	Author (year)	Study Title	Methodology Used	Findings	Knowledge Gaps	Focus of Current Study
Financial Performance of Commercial Banks	Ombati (2021)	Effect of Financial Innovation on the Financial Performance of Commercial Banks in Kenya	The study employed the longitudinal research design	Mobile banking had a positive significant effect on the efficiency of commercial banks.	The gap identified in the study was that mobile banking was limited to measuring the value of mobile banking transactions.	The study took into account more aspects of mobile banking that can influence the financial performance of commercial banks in Kenya The study utilized purposive sampling which will pick a sample of commercial banks that have implemented mobile banking long enough to provide a conclusive trend on the influence of mobile banking on the financial performance of commercial banks in Kenya
Financial Performance of Commercial Banks	Omondi (2022)	Effect of Financial Innovation on the Performance of Commercial Banks in Kenya	The study employed the longitudinal research design	Mobile banking lowers the performance of banks due to stiff competition from other money providers	The gap identified in the study was that the sample was entire population of commercial banks in Kenya which doesn't give a true representation on the impact of mobile banking	The study employed longitudinal approach in order to establish the trend in mobile banking and its impact on the financial performance of commercial banks in Kenya
Financial Performance of Commercial Banks	Bonface & Ambrose (2015)	Mobile Banking and Financial Performance of Commercial Banks in Kenya	The study adopted the cross sectional survey design	Generally, mobile banking has improved the financial performance of commercial banks.	The gap identified in the study was that the research design used was cross section which only provide understanding of the study at a particular point in time	The study employed longitudinal approach in order to establish the trend in mobile banking and its impact on the financial performance of commercial banks in Kenya.

Table 2.1: Summary of Literature review and Knowledge gaps

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter's features the research design, methods, data collection procedure and analysis that was applied throughout the investigation of this study. It also addresses sampling methods, target population and data analysis.

3.2 Research Philosophy

Sanya (2021) described research philosophy as the fundamental investigation of overarching and fundamental questions concerning reality, knowledge, and the values of a specific society. Positivism was the most suitable research philosophy to be implemented, given that this study was guided by hypotheses, a characteristic that aligns with positivism. Furthermore, this research employed secondary data that was beyond the control of the investigator.

3.3 Research design

The descriptive survey type of research design was employed since it provided a wider perspective that would be accurate and systematic in a view that will aid to have a proper understanding about the research problem. According to Siedlecki (2020), descriptive research design carries out its study since it doesn't manipulate any of the variables but instead describes the sample or the variables. Therefore, its capable to look through the characteristics of a population and goes further to identify obstacles that exist within.

3.4 Target Population

In accordance to the CBK (2022) report it is composed of 39 commercial institutions that formed the scope of the survey. In light of the research's objective these institutions constituted the target population for the analysis. The target population, as defined by Kaelo (2022), is the specific group from which the desired data is generated.

3.5 Sample Size and Sampling Technique

To accomplish the aim of this research, the sampling method utilized was the purposive sampling technique whereby a sample of prominent peer banks was selected which additionally benefited from economies of scale resulting from their size and were capable of reaching unbanked sectors. Sakyi Mweshi. (2010) To generate the most accurate data possible, purposive sampling is predicated on the criterion of identifying the most suitable cases for the research. Consequently, the present study employed a sample of the large peer commercial banks as designated by the CBK (2022). Standard Chartered Bank (K) Ltd, Diamond Trust Bank Kenya Ltd, Stanbic Bank Kenya Ltd, I & M Bank Ltd, Co-operative Bank of Kenya Ltd, NCBA Bank Kenya PLC, and Absa Bank Kenya PLC are among these financial institutions. CBK (2022) Given that the sample accounts for 75.14% of the market share in the banking sector, the sample would furnish a more comprehensive understanding of its future trajectory and the implications it may have on financial performance. Therefore, it's not only capable to give a trend but also a true position in this study as they have operated longer for their financial ratios to capture on the benefits and constraints that arise from implementing mobile banking transactions.

3.6 Data Collection

Data was generated from secondary sources, which included findings from previous research articles. Also, the websites of the nine commercial banks, their financial statements, and the CBK annual reports proved to be a reliable source to acquire information. This study will provide recent findings based on data collected and analyzed between 2018 and 2022.

3.7 Data Analysis

After the data was gathered, it was cleaned, sorted, and looked over to make sure it was full and consistent. Descriptive statistics for example, mean, maximum, and standard deviation was then conducted and the given dataset was processed through a statistical software for social sciences (SPSS) to pull out examples of traits and important trends.

3.7.1 Diagnostic Tests

Patterns can be found by using a multivariate regression model to analyze dependent and independent variables. In order to make sure the data set is consistent with the multiple regression analysis assumptions, the study performed tests for normality, autocorrelation, heteroscedasticity, and multicollinearity.

A test for normalcy is performed under the assumption that the response variable results are regularly distributed. A normal distribution is characterized by a coefficient of kurtosis of three and is not skewed. The study employed Bera and Jarque to formalize this in order to determine if the coefficient of skewness and the coefficient of excess kurtosis are jointly zero, as well as to test the residuals for normality. Additionally, the Durbin Watson test—which looks for first-order autocorrelation because it presumes a link between an error and its predecessor—was used to find autocorrelation. On the other hand, a more comprehensive test for the order autocorrelation is the Breusch- Test for Godfrey. It is false that there is absence of autocorrelation if the test statistic is higher than the important number shown in the statistical tables.

White's general test, which is thought to be one of the finest methods because it makes few assumptions regarding the form of heteroscedasticity, was used to discover heteroscedasticity. As a result, the model is estimated, and the residuals are determined. Subsequently, the auxiliary regression is performed, and the resulting R^2 is multiplied by the quantity of observations. The null hypothesis that the disturbances are

homoscedastic is not acceptable if the test statistic is higher than the appropriate value from the statistical table.

When independent variables have a strong association with one another, this is referred to as multicollinearity. The premise of multiple regression is the absence of multicollinearity. It can be difficult to determine the correlation between the variables since, if it is neglected, the R^2 value will be high but the standard errors of each individual coefficient will be high. Moreover, the parameter confidence intervals will be excessively large, which could lead to incorrect conclusions from the significance test. Measuring the degree of multicollinearity can be done most easily by examining the matrix of correlations between separate variables.

3.7.2 Analytical Model

Multiple regression analysis was used to ascertain the relationship between the independent and dependent variables.

Regression model $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$ Where is shown below.

Y: The bank's first-year financial performance

X1: The amount of money a bank has allocated to mobile banking is shown by this.

X2 represents the number of transactions made using mobile banking.

X3: This is the cost of the security precautions that go into mobile banking.

X4 represents the number of transactions made through internet banking.

X5: Capital adequacy calculated by dividing risk-weighted assets by core capital.

X6: The ratio of non-performing to total loans indicates the asset quality.

α - Is the intercept or constant

ε : This is the error term, or random term, with a mean of 0 and a normal distribution around that value.

Regression coefficients, denoted as β_1 – β_6 , indicate the total amount of money that changes Y for each unit that the dependent variable is altered.

3.7.3 Significance Tests

R^2 was employed in the research to determine the difference that mobile banking gives insight into the underlying causes of financial performance variations. The values of R^2 and n were calculated using a multivariate regression model. In the end, we had a relationship between the two variables which were studied. In order to check the individual variable beta's reliability, an ANOVA table was employed. The results of the ANOVA table were then used to determine whether the model was statistically suitable. For the purpose of verifying the relevance of R, the F test was used, which also closely tests R^2 . The threshold of significance was set at 95%, which implies that anything below 0.05 indicated that the hypothesis is valid and anything greater than 0.05 indicates that the hypothesis is invalid.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION OF FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter aspired to make it clearer how the study's results should be interpreted and how the data was analyzed. The study's main focus was to find a link between mobile banking and the performance through (ROA and ROE) of the business banks. Diagnostic tests and detailed analysis were both done at the same time.

4.2 Descriptive Statistics

There are two ways to measure financial success, so the section was split into two models. ROA showed how well the bank ran its operations, and ROE showed how much money shareholders could make from their investments. It follows that return on asset was the response variable in the first model while return on equity served the same purpose in the second model.

Model 1: Dependent Variable (ROA)

Table 4.1 uses return on assets (ROA) to show how well private banks are doing financially. The independent variables are, the size of the bank, internet banking, liquidity management, cost of security, quality of assets and capital adequacy. It was necessary to do detailed analysis on the compiled data to comprehend what it meant.

Table 4.1 Descriptive Statistics (Model 1)

	N	Mean	Std. Deviation
ROA	45	3.00%	0.31%
Bank Size	45	10,164.44	11,895.98
Liquidity Management	45	3,880.14	2,588.90
Cost of security	45	1,136.08	548.72
Internet Banking	45	193.33	104.62
Capital Adequacy	45	15.36%	1.99%
Asset quality	45	10.00%	3.82%

Model 2: Dependent Variable (ROE)

In table 4.2, ROE is utilized as measure of financial performance for commercial banks while the predictor variables include: liquidity management, bank size, cost of security, internet banking, capital adequacy and asset quality. From table 4.1 and 4.2 there are 45 observations derived from the sample size and the number of periods studied ($9 \times 5 = 45$).

Table 4.2: Descriptive Statistics (Model 2)

	N	Mean	Std. Deviation
ROE	45	18.60%	2.14%
Bank Size	45	10,164.44	11,895.98
Liquidity Management	45	3,880.14	2,588.90
Cost of security	45	1,136.08	548.72
Internet Banking	45	193.33	104.62
Capital Adequacy	45	15.36%	1.99%
Asset quality	45	10.00%	3.82%

4.3 Diagnostic Tests

These test were conducted to ascertain the model viability, through conducting the normality, heteroscedasticity, multicollinearity and autocorrelation test.

4.3.1 Normality Test

Jarque & Bera (1987) used skewness and kurtosis to test the normality of the data distribution in their normality test. There is less regular distribution of the data if the skewness and kurtosis values are further from zero. This study's data had a normal distribution because the skewness and kurtosis numbers were very close to zero.

Table 4.3: Normality Test

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Unstandardized Residual	45	-5.6165	3.21828	0	2.02548277	-0.865	0.354	0.312	0.695
Valid N (list wise)	45								

4.3.2 Multicollinearity Test

Shrestha (2020) used the Variance Inflation Factor (VIF) number to look out for multicollinearity. The VIF value tells you how much the predicted regression coefficient's variance is inflated if the independent factors are linked. When the VIF number is 10 or more, there is multicollinearity.

Table 4.4: Multicollinearity Test

Collinearity Statistics		
Variables	Tolerance	VIF
(Constant)		
Bank Size	0.152	6.575
Liquidity Management	0.127	7.893
Cost of security	0.403	2.483
Internet Banking	0.422	2.367
Capital Adequacy	0.735	1.361
Asset quality	0.401	2.491

In this analysis, table 4.4, indicates that all the variables had a VIF value of below 10 which implied multicollinearity was absent in the data

4.3.3 Heteroscedasticity Test

One of the often-employed statistical techniques for identifying heteroscedasticity is White's general test. To find heteroscedasticity, it is typically used in conjunction with other techniques like graphical analysis. It was used to run both models, and figure 2.2 shows the scatter plots. Nikan (2022) states that there is no heteroscedasticity when the dots form an ambiguous paradigm and are dispersed on both sides of the Y axis, as is the situation in figure 2.2.

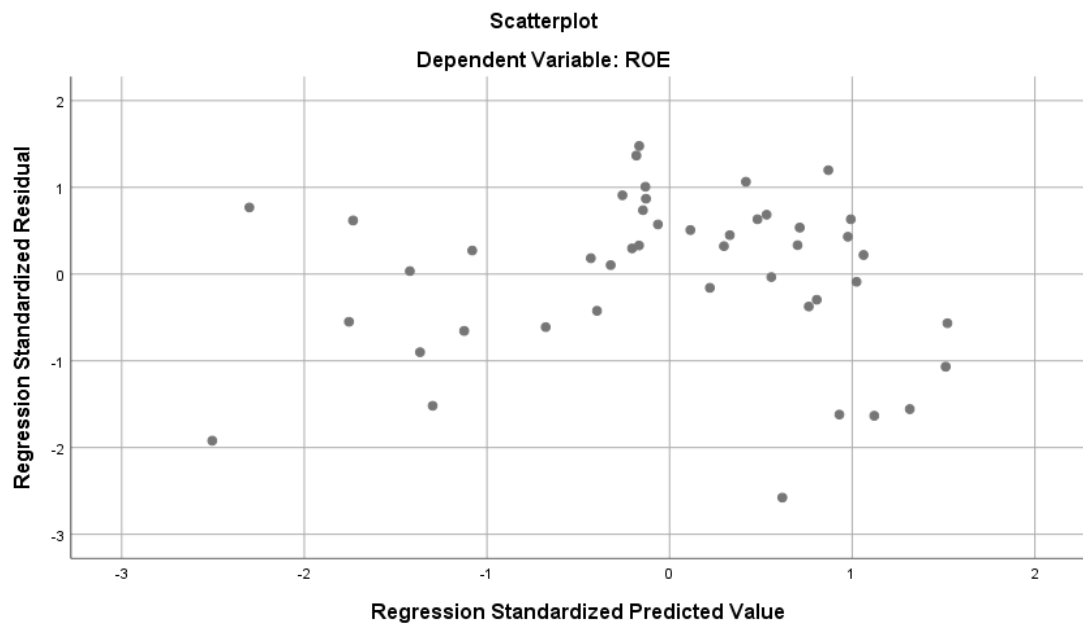
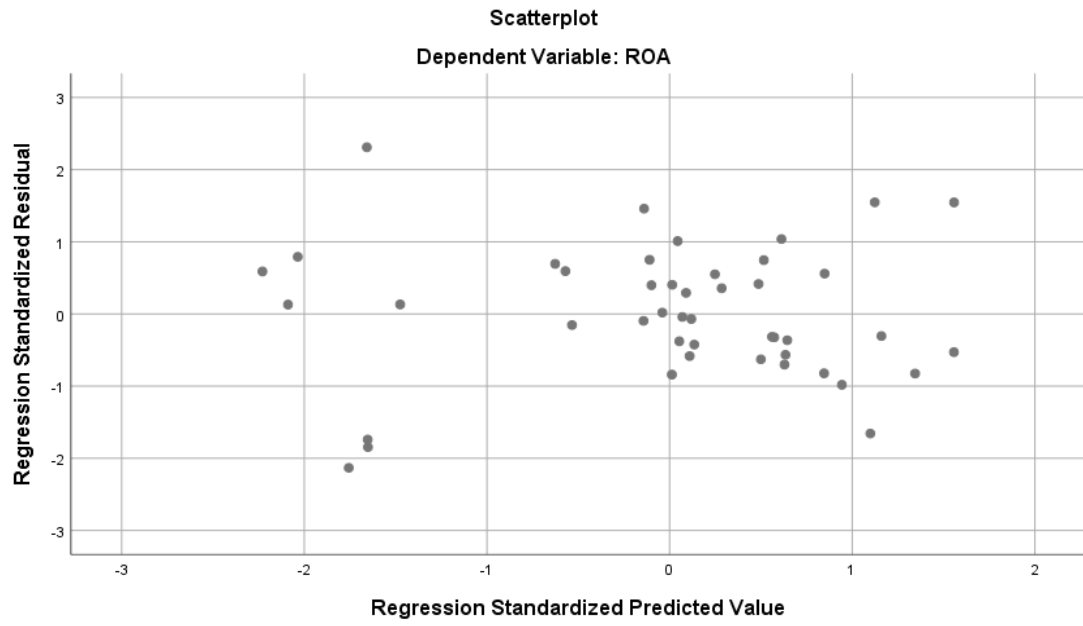


Figure 2.2: Heteroscedasticity Test

4.3.4 Autocorrelation Test

According to, Garson (2012) the decision when using Durbin Watson test for autocorrelation is that the p- value should range from 1.5-2.5. If the value falls below the range, then we conclude there is autocorrelation.

Table 4.5: Autocorrelation Test

Model 1 (ROA)

R	R Squared	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.516 ^a	0.267	0.151	0.28908	1.934

Model 2 (ROE)

R	R Squared	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.319 ^a	0.102	-0.04	2.17953	1.893

From this analysis, the value in the two models were within the range, therefore, there was absence of autocorrelation.

4.4 Correlation Analysis

With a 95% confidence level correlation analysis was used to discover the direction and strength of the connection between each independent and dependent variables. For instance, table 4.6 illustrates ROA to be having a negative correlation with amount of funds invested in mobile banking (-0.079) alongside the volume of mobile banking transactions (-0.195) which explained that these variables decrease when the return on assets tend to increase. However, the positive correlation with cost of security measures (0.119), internet banking (0.201), capital adequacy (0.147) and asset quality (0.191)

indicate that return on assets and these variables move along the same direction when it increases.

Table 4.6: Correlation Results (Model 1)

		ROA	Bank Size	Liquidity Management	Cost of Security	Internet Banking	Capital Adequacy	Asset quality
Pearson Correlation	ROA	1	-0.079	-0.195	0.119	0.201	0.147	0.191
	Bank Size	-0.079	1	0.529	0.395	0.411	0.057	0.136
	Liquidity Management	-0.195	0.529	1	0.693	0.59	-0.18	0.446
	Cost of Security	0.119	0.395	0.693	1	0.55	0.036	0.56
	Internet Banking	0.201	0.411	0.59	0.55	1	0.163	0.668
	Capital Adequacy	0.147	0.057	-0.18	0.036	0.163	1	0.111
	Asset quality	0.191	0.136	0.446	0.56	0.668	0.111	1

Furthermore, the correlation between return on equity (ROE) was negative with the following variables: volume of mobile banking transactions (-0.117), quantity of funds invested in mobile banking (-0.134), internet banking transactions (-0.02), and capital adequacy (-0.078) is illustrated in Table 4.7. An increase in return on equity (ROE) is associated with a corresponding rise in both the cost of security and asset quality, as indicated by the positive correlation of (0.083) and (0.084), respectively.

Table 4.7: Correlation Results (Model 2)

		ROE	Bank Size	Liquidity Management	Cost of Security	Internet Banking	Capital Adequacy	Asset quality
Pearson Correlation	ROE	1	-0.134	-0.117	0.083	-0.02	-0.078	0.084
	Bank Size	-0.134	1	0.529	0.395	0.411	0.057	0.136
	Liquidity Management	-0.117	0.529	1	0.693	0.59	-0.18	0.446
	Cost of Security	0.083	0.395	0.693	1	0.55	0.036	0.56
	Internet Banking	-0.02	0.411	0.59	0.55	1	0.163	0.668
	Capital Adequacy	-0.078	0.057	-0.18	0.036	0.163	1	0.111
	Asset quality	0.084	0.136	0.446	0.56	0.668	0.111	1

4.5 Regression Analysis

From table 4.8, R squared was 0.267, which showed that 26.7% of the volume of mobile banking transactions, cost of security, banking size, internet banking, capital adequacy and asset quality explain the return on assets.

Table 4.8: Model 1 Summary

R	R Squared	Adjusted R Square	Std. Error of the Estimate
.516 ^a	0.267	0.151	0.28908

Table 4.9: Model 2 Summary

R	R Squared	Adjusted R Square	Std. Error of the Estimate
.319 ^a	0.102	-0.04	2.17953

As indicated in Table 4.9, R was 0.319. The aforementioned value represents the magnitude and orientation of the linear association between the response and predictor variables. R² denoted the proportion of the return on equity variability attributable to factors including bank size, security measure expenses, mobile and internet banking transaction volume, asset quality and capital adequacy, which is 0.102. The highlighted independent variables in Model 2 explain approximately 10.2% of the variance in the ROE. The standard error indicates the degree of prediction accuracy, while the modified R-Square indicates potential areas for improvement.

4.6 ANOVA Analysis

The dependent variables (ROA, ROE) and the independent factors (liquidity management, bank size, cost of security measures, capital sufficiency, and asset quality) significant relation are established by ANOVA. Table 4.10 demonstrates that the predictor variables caused a statistically negligible impact on the response variable and that neither model was significant. The significance level of 0.05 was exceeded by the Sig. values of 0.054 and 0.637 for ROA and ROE, respectively.

Table 4.10: Model 1 ANOVA (ROA)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.154	6	0.192	2.302	.054 ^b
Residual	3.175	38	0.084		
Total	4.33	44			

Table 4.11: Model 2 ANOVA (ROE)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	20.496	6	3.416	0.719	.637 ^b
Residual	180.514	38	4.75		
Total	201.01	44			

Based on table 4.10 and 4.11, the significance level implies that the model may not provide a significant improvement in explaining the variability in the dependent variable.

4.7 Regression Coefficient Results

Table 4.12, provides the results of regression coefficients whereby, the following independent variables including; cost of security, internet banking and asset quality had positive coefficients. Bank size, liquidity management and capital adequacy had negative coefficients which indicated that one unit of the amount invested in mobile banking, volume of mobile banking transactions and capital adequacy results to a decrease of (0.02), (0.719) and (0.066) respectively on the return on assets. Additionally, the positive coefficients that were positive indicated that the variables were directly related to the return on asset, which meant that as cost of security, internet banking and asset quality of the commercial banks increased, the return on asset increased.

$$Y=2.989 - 0.02X_1 - 0.719X_2 + 0.383X_3 + 0.412X_4 - 0.066X_5 + 0.033X_6 + 0.378$$

Table 4.12: Regression Coefficients (Model 1)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.989	0.378		7.912	0
Size of the Bank	-5.37E-07	0	-0.02	-0.117	0.907
Liquidity Management	-8.71E-05	0	-0.719	-3.034	0.004
Security Cost	0	0	0.383	1.802	0.079
Internet Banking	0.001	0.001	0.412	1.863	0.07
Capital Adequacy	-0.01	0.024	-0.066	-0.429	0.67
Asset quality	0.003	0.017	0.033	0.159	0.874

From table 4.13, cost of security, internet banking and asset quality have positive coefficients which meant that a unit increase in them will subsequently have an increasing effect of (0.322), (0.035) and (0.084) on the return on equity. However, amount invested in mobile banking, volume of mobile banking transactions and capital adequacy had negative coefficients which highlighted an inverse relationship.

$$Y = 20.777 - 0.07X_1 - 0.393X_2 + 0.322X_3 + 0.035X_4 - 0.172X_5 + 0.084X_6 + 2.849$$

Table 4.13: Regression Coefficient (Model 2)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	20.777	2.849		7.294	0
Size of the Bank	-1.26E-05	0	-0.07	-0.363	0.718
Liquidity Management	0	0	-0.393	-1.498	0.142
Security Cost	0.001	0.001	0.322	1.37	0.179
Internet Banking	0.001	0.005	0.035	0.143	0.887
Capital Adequacy	-0.184	0.182	-0.172	-1.011	0.318
Asset quality	0.047	0.127	0.084	0.371	0.712

4.8 Discussions of Research Findings

R^2 represented the ratio of variability attributable to various factors such as bank size, cost of security precautions, mobile and internet banking transaction volume, asset quality, and capital adequacy which is 0.267 in model 1. In this instance, the highlighted independent variables account for roughly 26.7% of the variance in the ROA while a 10.2% in explaining ROE in model 2.

Based on the regression analysis, where ROA was the dependent variable, there is a substantial negative and significant correlation ($\beta = -0.719$, $p = 0.004$) between the volume of mobile banking transactions and ROA. Conversely, the ROA ($\beta=0.383$, $p=0.079$) was positively correlated with the cost of security measures associated with mobile banking, but this relationship was not significant. This runs counter to the findings of Muthii (2019), who showed that mobile banking costs had a favorable and significant impact on a bank's efficiency.

According to regression results with ROE as the dependent variable, the amount invested had a negative and insignificant relationship with the banks' ROE ($\beta = -0.07$, $p = 0.718$). The study by Irawati et al. (2019) demonstrated that bank size has a favorable and significant impact on banks' financial performance, which contradicts this finding. Furthermore, it was shown that the number of mobile banking transactions had a insignificant negative impact on the ROE ($\beta = -0.393$, $p = 0.142$), which is consistent with the research carried out by Sirengo & Muturi (2022).

The cost of security measures involved in mobile banking, internet banking and asset quality had a non-significant positive influence on ROE whereas capital adequacy had a non-significant negative effect.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The findings from the preceding chapter are recapitulated in this segment, along with the study's conclusion and its limitations. Further, it emphasizes the suggestions made for future study areas and policy.

5.2 Summary of Findings

The research findings from the first model, which employed ROA as its dependent variable, are summarized in this section. The amount invested in mobile banking and return on assets (ROA) indicated an unfavorable link, as indicated by the negative correlation of (-0.079) between the two variables. Furthermore, there was a negative connection (-0.195) between the number of mobile banking transactions. This showed that the bank size and liquidity management decreased as return on assets grew. For the first model, the R squared was 0.267, meaning that the ROA was explained by 26.7% of the bank's size, volume of mobile transactions, security measure costs, online banking, capital adequacy, and asset quality.

Additionally, the second model utilized ROE as its dependent variable, which generated a few findings. ROE represents a negative correlation of (-0.134) on bank size, (-0.117) on volume of mobile banking transactions, (-0.02) on internet banking and (-0.078) on capital adequacy while a positive correlation with both cost of security measures (0.083) and asset quality (0.084). Table 4.9 illustrated that 10.2% of ROE was explained by the bank's size, volume of mobile transactions, cost of security measures, internet banking, capital adequacy and asset quality. From both models, ROA provided statistically insignificant results by generating a value of (0.054) that exceeds the typical

significance value of 0.05. Therefore, the model may not provide a significant improvement in explaining the variability of ROA.

5.3 Conclusion

The objective of the research was to ascertain the interrelationships among mobile banking, ROA and ROE, as performance indicators for commercial banks. The researcher looked at how the independent factors affected the two financial performance measures using the same variables in both models. These independent factors included the amount of money invested in mobile banking, mobile banking transactions, the cost of security measures, internet banking transactions, capital sufficiency, and asset quality.

Cost of security, online banking, and asset quality all had positive coefficients in the first model (where ROA was the dependent variable) of (0.383), (0.412), and (0.033), respectively, suggesting a clear relationship between the factors and return on asset. As a result of the marginal gains, the positive coefficients showed that improving online banking transactions, the price of security precautions, and the quality of assets all contributed to better bank performance. The return on assets was negatively correlated with bank size, liquidity management, and capital adequacy, with respective coefficients of (0.02), (0.719), and (0.066).

On the other hand, three independent variables—the amount invested in mobile banking, the volume of transactions in mobile banking, and capital adequacy—had negative coefficients in the second model, which included ROE as the dependent variable, suggesting an inverse association with ROE. The cost of security measures (0.322), internet banking (0.035), and asset quality (0.084) all had positive coefficients that confirmed their direct correlation with return on equity. The performance of

commercial banks was positively impacted by these variable changes, although the benefits were not significant.

The study's focus was to find out how (ROE), (ROA), and mobile banking are related as ways to measure how well business banks are doing financially. As one of the things that would decide how valuable mobile banking was to banks' profits, the study's main focus was to pinpoint other aspects of mobile banking that might have an effect on financial performance. For example, quite a variety of studies haven't considered the cost of the security measures associated with mobile banking. While most banks have shifted to mobile banking these days, not all of them have the economies of scale to draw reliable conclusions about how mobile banking has affected their financial performance. For this reason, the study concentrated on purposefully choosing the sample used in order to paint a realistic picture of where mobile banking might be headed. Additionally, by gathering data from 2018 to 2022, this study demonstrated the use of the longitudinal approach, which uses data from a specific period of time to see its changes.

5.4 Recommendations for Policy and Practice

In order to make recommendations for practice and policy, it is also necessary to take into account a number of different aspects, including the competitive landscape, technological infrastructure, regulatory environment, and consumer behavior. The amount of money the bank spent on mobile banking and the number of transfers that happened through it hurt its performance, according to the study. Consequently, it is advised that regulatory agencies give commercial banks incentives to make investments in mobile banking technology and increase the scope of their online services. This can be achieved by taking into account tax breaks or other financial benefits for banks that make a substantial contribution to the expansion of mobile banking. This will lessen the

load that commercial banks carry when it comes to developing and running mobile banking.

This study recommended collaboration with telecommunications companies for the purposes of scaling and reducing the expense of investing funds towards mobile banking as it would be a joint venture which may in turn increase the financial performance.

The study recommended advocating for interoperability between different mobile banking platforms to enhance convenience for users. It would encourage the collaboration among banks, mobile network operators, and fintech companies to create a seamless and integrated financial ecosystem. In turn, this would assist in building up the volume of mobile banking transactions for commercial banks, which may in turn result to a positive influence on the bank's financial health.

5.5 Limitations of the study

One big problem with this study is that it only looked at Kenya's biggest peer commercial banks as a group, which doesn't really show what all commercial banks are like. Because the Central Bank regulates so many commercial banks, this sample size might not fully show how medium-sized and smaller peer commercial banks feel about mobile banking and how it affects their financial performance.

Furthermore, the study only examined a small number of independent variables, ignoring other significant elements that can have an impact on how well commercial banks function, such as operational effectiveness, working capital, and management effectiveness. It's possible that this narrow focus prevented a thorough grasp of all the factors influencing the sector.

In addition, the research only looked at (ROE) and (ROA) as the dependent variables, ignoring other crucial performance indicators like operational profit margin and net

interest margin. The study might be unable to consider the intricacy of factors impacting the general performance of commercial banks if it does not take a wider variety of performance metrics into account.

5.6 Suggestion for Future Research

As a result of the research's constraints, upcoming research should concentrate on other ways to measure financial performance, like earnings per share, operational profit, and net profit. These are also better ways to determine financial success.

In the future, scholars may choose to extend the duration of their research to identify patterns in the business cycle and provide insights into how mobile banking affects commercial banks' (ROA) and (ROE). The result would have a big influence on this study because it would either support or refute its findings.

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APPENDICES

Appendix 1: List of Commercial Banks

1	Absa BANK Kenya Plc
2	Access Bank (Kenya) PLC
3	African Banking Corporation Ltd
4	Bank of Africa (K) Ltd
5	Bank of Baroda (Kenya) Limited
6	Bank of India
7	Citibank N.A. Kenya
8	Consolidated Bank of Kenya Ltd
9	Co-operative Bank of Kenya Ltd
10	Credit Bank Plc
11	Diamond Trust Bank Kenya Ltd
12	Development Bank of Kenya Ltd
13	DIB Bank Kenya Ltd
14	Ecobank Kenya Ltd
15	Equity Bank Kenya Ltd
16	Family Bank Ltd
17	First Community Bank Ltd
18	Guaranty Trust Bank
19	Guardian Bank Ltd
20	Gulf African Bank Ltd
21	Habib AG Zurich
22	HFC Ltd
23	I & M Bank Ltd
24	KCB Bank Kenya Ltd
25	Kingdom Bank Ltd
26	Mayfair CIB Bank Ltd
27	Middle East Bank (K) Ltd

28	M-Oriental Bank Ltd
29	National Bank of Kenya Ltd
30	NCBA Bank Kenya PLC
31	Paramount Bank Ltd
32	Prime Bank Ltd
33	SBM Bank Kenya Ltd
34	Sidian Bank Ltd
35	Spire Bank Limited
36	Stanbic Bank Kenya Ltd
37	Standard Chartered Bank Kenya Ltd
38	UBA Kenya Bank Ltd
39	Victoria Commercial Bank Plc

Source: CBK (2022)

Appendix 2: Data Collection Form

Year	Commercial Bank	ROA	ROE	Size of the Bank Amount of funds invested in mobile banking (Ksh)	Liquidity Management Volume of transactions in mobile banking (Ksh)	Security Cost of security measures involved in mobile banking (Ksh)	Internet Banking Volume of transactions in internet banking (Ksh)	Capital Adequacy Core capital to risk weighted assets (%)	Asset quality Non performing loans to total loans (%)
	Equity Bank Ltd								
2018									
2019									
2020									
2021									
2022									
	KCB Bank Kenya Ltd								
2018									
2019									
2020									
2021									
2022									
	Co-operative Bank of Kenya								
2018									
2019									
2020									
2021									
2022									
	NCBA Bank								
2018									
2019									
2020									
2021									

2022									
	Absa Bank								
2018									
2019									
2020									
2021									
2022									
	Standard Chartered Bank								
2018									
2019									
2020									
2021									
2022									
	Diamond Trust Bank								
2018									
2019									
2020									
2021									
2022									
	Stanbic Bank Kenya								
2018									
2019									
2020									
2021									
2022									
	I &M Bank Ltd								
2018									
2019									
2020									
2021									
2022									

Appendix 3: Research Data

Year	Commercial Bank	ROA	ROE	Size of the Bank	Liquidity Management	Security Cost	Internet Banking	Capital Adequacy	Asset quality
	Equity Bank Ltd			(Billions)					
2018		3.4%	19.8%	1,838.1	1,302.2	609.4	81.9	14.2%	6.0%
2019		3.0%	20.2%	2,015.6	1,591.9	705.2	100.9	12.6%	8.3%
2020		2.7%	15.8%	2,099.8	1,737.0	874.1	216.5	13.3%	7.9%
2021		3.3%	16.8%	6,025.3	2,844.9	1,250.4	257.0	20.0%	6.1%
2022		3.7%	19.8%	9,731.3	3,978.5	1,288.8	393.1	18.7%	15.6%
	KCB Bank Kenya Ltd								
2018		3.2%	21.8%	2,035.5	1,508.2	1154.4	61.4	15.2%	5.0%
2019		3.1%	20.7%	6,456.6	2,917.7	815.2	97.6	14.6%	7.5%
2020		2.1%	14.4%	13,215.4	5,554.5	1004.1	109.4	15.3%	8.1%
2021		2.7%	15.7%	19,515.6	7,456.5	1,149.4	157.2	12.7%	7.1%
2022		3.2%	21.7%	22,654.5	5,887.8	1,220.7	287.1	13.2%	12.6%
	Co-operative Bank of Kenya								
2018		3.2%	18.3%	2,016.9	1,615.2	1109.4	108.9	15.8%	7.0%
2019		3.3%	19.2%	6,376.1	3,501.9	987.2	201.9	16.0%	10.3%
2020		2.2%	12.7%	12,212.5	7,757.0	874.1	305.5	16.3%	9.9%
2021		3.0%	17.3%	19,270.6	9,987.9	3,264.2	307.0	15.4%	18.1%
2022		3.63%	21.2%	21,260.9	7,662.5	2,210.1	415.1	15.6%	14.0%
	NCBA								
2018		3.0%	17.4%	2,038.2	1,271.4	813.3	91.7	19.1%	8.9%
2019		3.1%	18.4%	2,021.7	1,345.7	765.1	99.6	17.0%	11.3%
2020		2.9%	13.4%	3,001.3	1,588.5	774.2	202.4	15.19%	10.1%
2021		3.3%	18.5%	5,002.4	2,775.7	950.4	197.3	15.53%	18.23%
2022		3.4%	20.3%	6,654.2	3,675.4	992.8	267.3	14.01%	12.0%
	Absa Bank								
2018		2.9%	18.9%	1987.5	1299.87	711	88	13.85%	5.15%
2019		2.85%	19.8%	2087.4	1509.86	716.85	102.35	13.6%	7.35%
2020		3.1%	16.1%	2100	1698.76	880.45	215.45	12.75%	8.15%

2021		2.94%	16.2%	70015	2900	1223.55	260	19.55%	6.85%
2022		3.1%	20.4%	1004.76	3965.4	1279	401	19.76%	14.65%
	Standard Chartered Bank								
2018		2.9%	20.45%	2056.7	1570.65	1134.5	63	16.25%	5.15%
2019		2.87%	19.78%	6678.5	2897.45	835.45	98.5	13.71%	6.95%
2020		3.4%	16.4%	14001.4	5453.65	1010.9	110.5	14.9%	8.35%
2021		2.9%	17.7%	19667.4	7389.63	1165.4	160.35	13.15%	7.16%
2022		3.1%	20.4%	24098.76	5978.35	1235.45	290.5	12.74%	11.9%
	Diamond Trust Bank								
2018		2.90%	19.1%	2345.7	1595.4	1114.56	110.35	14.86%	6.9%
2019		3.0%	20.1%	6543.2	3490.87	975.65	205.45	15.85%	10.25%
2020		2.8%	18.7%	12009.8	7600	885.55	312.43	15.98%	10.05%
2021		2.9%	18.4%	20765.4	9875.45	3125.45	308.97	14.87%	19.45%
2022		2.98%	20.25%	22007.6	7555.98	2255.65	423.65	14.95%	13.85%
	Stanbic Bank Kenya								
2018		2.76%	18.6%	2065.8	1325.75	865.55	93	19.15%	9.15%
2019		3.12%	19.1%	2045.7	1310.9	770.15	100.45	18.56%	10.85%
2020		2.87%	15.7%	3023.54	1557.85	775	203.31	14.25%	10.7%
2021		2.9%	19.8%	5015.75	2667.87	946.54	198.65	14.83%	18.55%
2022		3.0%	19.5%	6790.87	3576.98	1001.25	270.75	15.16%	12.95%
	I &M Bank Ltd								
2018		3.15%	20.65%	2109.76	1523.45	1140.95	65	14.7%	5.25%
2019		3.08%	21.45%	7102.34	2901.78	875.15	98.35	15.14%	7.35%
2020		2.23%	18.45%	12345.6	5467.89	1010.85	110.75	14.85%	8.45%
2021		2.81%	18.76%	20198.54	7656.43	1150.65	161.25	13.75%	7.36%
2022		2.95%	18.7%	23987.55	5875.98	1225.55	289.65	14.25%	12.98%