DIGITAL BANKING SERVICES, C.E.O EXPERIENCE AND THE OPERATIONAL EFFICIENCY OF MICROFINANCE BANKS IN KENYA.

BY

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MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENTS)

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF THE DEGREE OF MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENTS) TO THE SCHOOL OF BUSINESS OF KCA UNIVERSITY.

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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Signed:  Date: 27th September 2025

I do hereby confirm that I have examined the master's dissertation of

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And have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

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ABSTRACT.

Microfinance banks plays a crucial role in the economy globally. In Kenya, the microfinance banks contribute 18% to the economy's GDP offering employment to 20% of the population. The primary goal of this study was to evaluate the relationship between the digital banking services and the operational efficiency of Microfinance banks in Kenya. Furthermore, even though the CEO experience moderating role in the relationship between the digital banking services and the operational efficiency has been signified, there is insufficiency on the empirical evidence. The specific objectives of the study were: To investigate the effect of Internet banking, mobile banking and electronic fund transfer on the operational efficiency of microfinance banks in Kenya and to ascertain the moderating effect of CEO experience on the relationship between Digital Banking Services and Operational Efficiency of Microfinance Banks in Kenya. Grounded on the Technology Acceptance, Diffusion of Innovation and Upper Echelons Theory. The study adopted a descriptive research design. The target population for this study was all the 14 Microfinance Banks in Kenya onto which a census was undertaken. Secondary data was collected using a systematic review of the firm's documents and financial reports for a period of five years from 2020 to 2024. A multiple linear regression analysis was adopted in this study. STATA Software version 16 was used to analyze the data collected. Tables and figures was used to present the results from the data analysis. The results indicated that internet banking had a p value of $p=0.001<0.005$, mobile banking had $p=0.028<0.05$ and electronic fund transfer $p=0.003<0.05$. Hence, the digital banking services were statistically significant and influences the operational efficiency. The study also found out the CEO experience as a moderator also significantly affects and influences the operational efficiency. Therefore, the recommendations from the study is that it is very crucial for the microfinance banks to embrace and adopt digital banking services and on the other hand take into consideration on the top management traits as they both influence operational efficiency of microfinance banks in Kenya.

Keywords: Microfinance banks, Digital Banking Services, Digitalization, Operational Efficiency

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ACRONYMS AND ABBREVIATIONS.

ATMs	Automated Teller Machines
CBK	Central Bank of Kenya
CEO	Chief Executive Officer
DBS	Digital Banking Services DBS
EFTs	Electronic Fund Transfers
KBA	Kenya Bankers Association
MFBs	MicroFinance Banks
OLS	Ordinally Least Square
PWC	Price Water Coppers.
SACCOs	Saving and Credit Cooperative Organizations
SPSS	Statistical Package for the Social Sciences
UET	Upper Echelons Theory

OPERATIONAL DEFINATION OF TERMS

Digital Banking Services	Digital Banking Services can be defined as a continuously developing technological financial processes, products and services to distinguish from systematic offerings in rejoinder to the economic changes (Kumarr, 2019).
Financial Innovation	This refers to an improved or enhanced tactics of undertaking daily operations and activities in the financial industry in ensuring that the efficiency performance in regards to delivery of services to the customers and the diversification of products is attained while ensuring that there is a reduction on the operational costs (Arnaboldi & Rossignoli, 2015).
Automation	This refers to the adoption of wide range of technology by use of software and machines to undertake various tasks with no human interventions (Villar & Khan, 2021).
Digitalization	Involves transformation of the firm's digital technologies to create contemporary opportunities and transfigure a corporate model (Petrova & Kuznetsova, 2020).

CHAPTER ONE

INTODUCTION

1.1 Background of the study.

Microfinance banks plays a crucial role in the economy globally. The microfinance banks are established with the main aim being offering financial services to the middle and lower class community who especially consider the commercial banks' services more expense (Okibo & Makanga, 2014). The primary goal is to empower the vulnerable economically so as to help in tackling the issues that that may affect the operational efficiency of the microfinance banks. Lack of collaterals with value is one of the issues that may arise when the customers seek for a small loan (Ali, 2015). Thus the operational efficiency of the microfinance banks is affected in such a situation since the organization have to inject more resources in the disbursement, monitoring and recovering the loans from the customers (Ali, 2015). In Kenya, the microfinance banks contribute 18% to the economy's GDP offering employment to 20% of the population (Rotich et al., 2015). Around the banking industry concept is the adoption and implementation of digital banking services by the microfinance banks to improve the level of operational efficiency.

Microfinance banks are progressively adopting digital banking platforms on offering customer services, financial lending and transactions (Kandie & Islam, 2022). Digital banking services is a key tool that can effectively help the financial institutions on the cost reduction and improved efficiency but the results may generally depend on the CEO experience, financial decision making skills and the style of leadership (Meher et al., 2021). Globally, the microfinance banks serve around 1.4 billion customers, around 76% of adults can access digital banking services which translates to an increase from 51% in the year 2011 (The Global Findex Database, 2017). According to Mohamed (2023), back in 2022, digital banking services was

priced at $803 billion and the future projection by 2030 to increase to $3.3 trillion indicating a growth rate of 20.5% annually. Randoy et al., (2015) argues that, it is very important for financial institutions around the globe to acknowledge how the CEOs traits can impact the cogency of digital banking services in heaving the operational efficiency and the growth of revenues.

Africa intensified the leadership role in digital banking services, with transactions through the mobile money transfer surpassing the $700 billion mark back in 2022 (Afi, 2019). More than 100 million clients are being served by over 400 regulated microfinance banks across the continents of which are in the low income and deprived communities. Through the adoption of digital banking services, the microfinance banks have been able to improve the revenue growth resulting to a reduction in operational costs and increase in digital loan disbursement through automation of services (Dorfleitner, 2022). However, the financial institutions face various challenges like the cybersecurity threats, inadequate digital infrastructure and regulatory barriers. Through a study conducted by PWC back in 2022 on the African microfinance banks, CEOs with an experience of over 10 years financial industry accomplished greater efficiency as compared with the less experienced ones (PwC Report, 2019). This indicates the importance of leadership role in attaining the success of digital banking.

In Kenya, microfinance banking industry play a very important role through financial inclusivity, offering services to over 7 million customers and realizing over KES 500 billion annually (CBK,2020). Digital transactions across the 14 licensed microfinance banks in Kenya accounts for over 60% of all the accounts transactions. According to the Kenya Bankers Association report (2023), the adoption of automated payment systems, mobile banking and disbursements of loans digitally have resulted to an improvement by 15% on loan repayment rates and decrease in in the operational costs by 20%. Various banks have struggled to integrate

financial innovations effectively. Therefor a research indicates that financial institutions especially the microfinance banks with experienced CEOs in the industry reports higher profitability compared to the ones with less proficient leadership (Chua et al., 2023). This raises a fuss on whether the CEOs experience in the microfinance banking industry plays a vital role in the adoption and integration of digital banking in the operational efficiency and success of financial inclusivity.

Microfinance banks use metrics like loan default rates, cost to income ratios, speed of transactions and the overall growth of revenue to assess the operational efficiency (Kandie & Islam, 2022). The Digital Banking Services can be used to improve these important metric indicators through automation of processes, enhancing customer services and reduction on errors. However, this is cemented through the CEOs background in proper financial planning, risk mitigation and the integration of digital banking services as they are key in improving these benefits (Chua et al., 2023). This underpins a major significance of a concrete leadership on the use of financial technology as depicted in the Kenyan microfinance banks for example Kenya Women Microfinance bank and Faulu Microfinance which both leads with the most experienced executives.

1.1.1 Digital Banking Services.

Digital Banking Services can be defined as a continuously developing technological financial processes, products and services to distinguish from systematic offerings in rejoinder to the economic changes (Kumarr, 2019). Digital financial innovations in regards to the financial sector refers to the use and development of emerging financial automations, markets, institutions and tools. Financial service automations illustrate a financial institution's capability to offer important principles, resulting to an important competitive edge and strategies (Santhosh & Aithal, 2024). Financial service automation can be used as an instrument to enhance the productivity of financial institutions with limited resources (Cull & Morduch,

2018). Digital Banking Services (DBS) are type of financial services that are delivered through digital technological channels. Therefore, DBS are digital financial services that can be offered and accessed by customers on their different mobile phones, computers, ATMs and point of sale.

Mamadiyorov et al., (2023), stressed on the importance of digital financial services integration in advancing a competitive edge in the fast growing banking and financial industry globally. Microfinance banks are adapting to fulfill the expectations of customers through the advancement of technology by enacting the daily to daily operations more cost effective, efficient and user friendly (Santhosh & Aithal, 2024). Digitalization began back in the late 1980s when the computers were introduced to the consumer market. This has resulted to an improved consumer awareness of civic autonomy issues through new conduits. Electronic payments help the customers on funds transfers, acquiring services and goods and paying bills without necessarily touching physically regardless of whether one is at home or at the banking hall (Kumarr, 2019). DBS institutes a secure and very efficient alternative way for the government to offer financial assistance and social transfers to the vulnerable citizens especially when there are limited movements and transits for example during the COVID- 19 pandemic.

Automation and technology have eliminated hurdles in the modern society such as time, geography, data acquisition and involvement. This enables clients to interact with different individuals regardless of geographical location and time (Dismas et al., 2018). Therefore, digitalization and technology advancement have intensified the engagement amongst the financial institutions and the official authorities thus enabling a new communication channel. According to Ghani et al., (2018), Automation of services have improved microfinance banks by making service delivery to the customer more user friendly and accessible anytime and from any walk of the globe.

In the African continent, automation of services has had a very tremendous impact on the financial industry as a result of the widespread adoption of the internet banking for the purposes of paying bills which is an important tool in the daily to daily routine for the financial institutions (Afi, 2019). Microfinance banks and the financial industry are increasingly evolving as a result of advancement in the technology and digitalization as experienced in other industries. Automation and digitalization in the microfinance banks in Africa have resulted to cost savings and creation of new income opportunities (Afi, 2019). Advancement in technology have hugely impacted the banking services and non-literate-substantial services like internet banking and payment resolutions. Major microfinance banks have reported a reduction on the customer visits as result of standardizing this services.

Murimi et al., (2021) argues that, The Kenyan financial sector and market has grown tremendously over the years. The financial industry has experienced an improved productivity as a result of enhanced activities and changes in the hierarchical structures. These adjustments are important due to technological advancements and changes on the financial situations. Majority of the microfinance banks in Kenya have adopted new banking innovations in response to the emerging banking customer scenario also known as the Digital Finance (Atieno, 2023). Digital Finance is a type of financial services offered through the internet, personal mobile phones, personal computer or debit and credit cards through a secured digital payment platform. The ability of a financial institution to offer services and goods to its customers efficiently is very important for its operationalization, relevance and performance. Microfinance banks in Kenya has improved and enhanced service delivery to their clients through the integration and implementation of internet banking, mobile banking, ATMs, EFTs and credit cards (Ndungu and Moturi, 2020). Microfinance banks are increasingly adopting and utilizing automation of services through this transmissions platforms due to their several benefits.

The current research study adopts the CEOs experience as the moderating variable to ascertain the relationship between digital banking services and the operational efficiency. According to Fritz and Arthur (2017), apart from moderating variable functioning as an independent variable it also amplifies other external variables on their impact on the dependent variable. Therefore, the moderating variable strengthens and influences the correlation between the dependent variable and the independent variables (Fritz & Arthur, 2017). Furthermore, the necessity to adopt CEOs experience as the moderating variable is acknowledged by Buyl et al (2011). Moreover, other scholars like Aliyu et al (2024) have used the CEOs experience as the moderating variable and proved that a moderator variable augments the connection between the other variables. CEOs experience in terms of how long they have held the position and how conversant are they in making sound decisions, plays a very pivotal role in the implementation of the digital banking services in the institution. Thus, in this study the total number of years the CEO have held the top management position will be adopted as the metric.

1.1.2 Operational Efficiency.

Operational efficiency is the ability of financial institution to proffer a certain extent of monetary mediation services at the minimum possible costs or the capacity to extend the highest level of monetary intermediation services within a specific budget restriction (Oke & Abere, 2019). The ability of a banking institution to amalgamate funds from customers with excess liquidity through savings and apportion the finances realized to customers with liquidity crunch at the minimal possible cost is also known as operational efficiency (Kariuki, 2017). Operational efficiency is generally the strategic road mapping adopted by a financial organization to cut on the expenses and resource refinement through provisioning of improved services to the customers (Oke & Abere, 2019).

In a scenario that resources are scarce and this results to making financial sense by trying to safeguard them while on the other hand trying to maintain a desirable output level.

Therefore, the operational efficiency of every microfinance bank is a very important component of the overall institutions performance (Kariuki, 2017). Moreover, the main aim of operational efficiency is assist in the reduction of resource wastage and output resurgence for a certain budgetary investment. Microfinance banks in Kenya trying all they can to improve their ability offer investment services and improvise their outmoded departments, internet banking, mobile banking and robotic cashiers (Adad, 2016).

Therefore, in order to ascertain a microfinance banks' operational efficiency, the bankers usually the cost/income ratio generally referred to as the efficiency ratio. Therefore, this embodies the total operating expenses borne by a banking institution as a percentage of the operating expenses (Oke & Abere, 2019). The expense of managing a banking institution will involve sustaining the current frameworks or operational procedures that are commonly not of progressive improvement to the firm, consequently, they must retain its commodified state then reserve less on increasing the efficiency. The cost of new services and products or other distribution routes for the customers can be incorporated in the expense of transforming the banking banks (Guyo, 2014). The revenue generated by the financial institution can also be able to remain linked to the expense incurred.

The main aim of operational efficiency is to reduce on waste and superfluity for the purpose of preserving resources which results in the reduction of the operating expenses in order to improve the level of revenue generation and the distribution of financial banking services (Guyo, 2014). The banking institution generally use the operating income ratio to operating costs to measure the operational efficiency of the institution.

1.1.3 Microfinance Banks in Kenya.

Microfinance banks are one of the most important sector of the financial services offered in the low and middle income markets to moderate unfavorable effects of destitution

(Ali, 2015). Microfinance banks are very crucial because they offer financial support to customers who are disadvantaged economically, especially those domestic units which are low income earners in Kenya. The Kenyan government acknowledges the importance of the financial systems and improved access to various financial services in the economy as stance in the economic recovery plan for job creation and prosperity which was overlaid in between the year 2003 to 2007 (Okibo & Makanga, 2014). One of the key economic goals in the Kenya's vision 2030 development plan is universal financial access and the microfinance banks are regarded as one of the financial institutions that will be used to attain this goals (CBK Report, 2023).

Micro-finance alludes to the distribution of various financial services such as offering loans, transfer of money services, savings accounts and insurances to the low income earners customers (Rotich et al., 2015). The Central Bank of Kenya is mandated to regulate and give licenses to microfinance banks in Kenya under the Microfinance Act (Ali, 2015). As a regulator, the CBK have the capacity to offer specific guidelines and advices involving the microfinance banks daily to daily operations. Furthermore, very crucial regulations are promulgated by the CBK such as liquidity obligations, asset quality classifications and core capital provisions and among additional legal provisions. There are 14 Microfinance banks regulated by the CBK (Ali, 2015).

Banking sector is also viewed as tech-driven banking in the 21st century. Digital advancement and other financial service innovations have hugely transformed the banking industry's philosophy, resulting to Kenya's banking sector being more rivalrous (Mulili, 2024). The banking industry in Kenya operates in a very fast paced and rigorous settings, forcing the institutions to develop and innovate new products, markets and processes. The adoption of digital technology in the finance and banking industry have resulted in new innovations on the distribution methods and offers new breakthroughs on the merchandising strategy (Ndirangu

et al., 2022). Several steps are being taken in the banking industry to offer more enhanced and high quality products and services to the customers. The financial institutions are replacing the paper work and labor intensive approaches with digitally automated methods through which internet banking have been adopted as a planned process to attain an improved competence, reduction on the costs and controlling the operations which in return results in improved operational efficiency, productivity and increase on revenue generation (Ndirangu et al., 2022).

1.2 Statement of the Problem

According to IMF (2014), The microfinance bank's efficiency has reemerged as one of the most crucial item to the investors along with the wider society with the undermined assurance on the management of the financial institutions and as well the various lapses that have been experience in the sector in Kenya. Payment systems adopted by the microfinance banks aids in the operational efficiency which in turn plays a vital role on the development of the institutions in each and every economy (Oke & Abere, 2019). Therefore, the confidence level in the banking industry and the growth of the economy can be affected by the systematic banking efficiency as a result of the low cost of credit which in return results to an enhanced business development (Mulili, 2024).

Although the microfinance banks have been offering financial services to the low income and the underprivileged in the society, there have been a decline on the on the operational efficiency level over a period of time resulting to unstable efficiency on the performance (CBK report 2024). As compared to the previous financial years, in the financial year 2024, the microfinance banks experienced a decline on the operational efficiency and productivity since there was a detrition on the cost-to-income ratio between the financial years 2023 and 2024. This is as result on the increase on the cost-to-income ratio from 61.7% to 69.7%. There was an increase by 37.5% on the operating expenses due to high borrowed funds' interests and the administrative costs. The escalation on the Non-Performing Loans, from

14.5% to 31.7%, led to this situation thus the increasing cost of funds is greatly minimized and thus resulting to the interest income margins being narrowed (CBK, 2024). According to KBA report (2024), the microfinance banks are addressing social equality and climate change through offering innovative products. Moreover, between the financial years 2023 and 2024, there was a cut-back from 57% to 36% on the innovation on the products that are climate-change related (CBK, 2024). In 2024, there was an introduction of an innovative product by 79% of the microfinance banks in Kenya compared to 79% in 2023 (CBK, 2024).

Automation of services makes it easy for the microfinance banks to undertake their business, mitigate the risks and deliver services more effectively to their clients (Mwangi, 2014). Furthermore, a number of microfinance banks in Kenya are facing formidable challenges in terms of expansion and growth, onto which several questions are raised on whether the level of digital automation of services is enough in the management of their operations (Mulili, 2024). Performance of a microfinance bank and operational efficiency are related in such a way that the institution can become sluggish if it doesn't record a remarkable financial performance (Oke & Abere, 2019).

El-Chaarani & El-Abiad (2018), argued that financial innovations significantly influenced the performance of banks while on the other side Eman (2017), insisted that automation of financial services had no significant effect on the performance of banks. Moreover, in a study carried out by Sathiyavany and Shivany (2018), indicated that there was a strong relationship between the automation of financial services and customer satisfaction. Nevertheless, this study did not factor out the impact that digital financial innovations have on the efficiency of the institution. In a local study carried out by Kihuha & Mungai (2023) in regards to the Nairobi County DT SACCOs on both the innovation and performance, specifically focusing on the process innovation only. Ultimately, a study was conducted by

Matayo (2016) on how innovation management affect the development of Microfinance Banks in Nairobi.

Despite the aforementioned, few studies have been undertaken to examine on the effect of digital banking services on the operational efficiency of Microfinance Banks in Kenya and how some of the factors like the CEO characteristics like the CEOs experience come into play. Therefore, the aim of this research study is to examine how digital banking services affects the operational efficiency of MFBs in Kenya taking into account the factor of CEOs experience as the moderating variable.

1.3 The Study Objectives.

1.3.1 General Objectives.

The broad objective of this research study is to determine the effect of digital banking services on the operational efficiency of Microfinance Banks in Kenya and the moderating role of the CEO experience.

1.3.2 Specific Objectives.

The study sought to address the following specific objectives:

i. To investigate the effect of Internet banking on the operational efficiency of microfinance institutions in Kenya.
ii. To establish the effect of Mobile Banking on the operational efficiency of microfinance institutions in Kenya.
iii. To find out the effect of Electronic Fund Transfers on the operational efficiency of microfinance institutions in Kenya.
iv. To ascertain the moderating effect of CEO experience on the relationship between Digital Banking Services and Operational Efficiency of Microfinance Banks in Kenya.

1.4 Hypotheses.

H_{01}: *Internet banking has no significant effect on the operational efficiency of microfinance institutions in Kenya.*

H_{02}: *Mobile Banking has no significant effect on the operational efficiency of microfinance institutions in Kenya.*

H_{03}: *Electronic Fund Transfer has no significant effect on the operational efficiency of microfinance institutions in Kenya.*

H_{04}: *There is no significant moderating effect of CEO experience on the relationship between Digital Banking Services and Operational Efficiency of Microfinance Banks in Kenya.*

1.5 Justification of the study.

The microfinance banks play a very crucial role in the Kenyan economy and as well globally. The microfinance banks offer loans to their customers as way of raising revenues through interests. On the other hand, they accept deposits institutional investors and sole customers. Thus, the research on the effect of digital banking services on the operational efficiency of microfinance banks is justified. This research paper contributes immensely to the already existing limited knowledge on the various digital banking services that can be used to explain the operational efficiency of microfinance banks in Kenya. Therefore, by carrying out this study, the microfinance banks in Kenya will be well informed on the benefits of digitalizing their services and being more innovative financially.

1.6 Significance of the Study.

The research findings of this study was aimed at comprehending and enhancing the relationship between Digital Banking Services, CEOs Experience and the operational efficiency of Microfinance Banks in Kenya. Therefore, this research paper is of great

significance not only to the management of the MFBs but also to the policy makers, scholars and academia.

1.6.1 Significance to the Management.

It is expected that the research findings will used an informative tool to the management of Microfinance Banks in Kenya on the importance and benefits of adopting digital banking services on the stimulation of the operational efficiency of the institution. This will also inform the management on the various digital banking services that can be adopted in boosting the service delivery and as well the output of the organization. This will also assist them on understanding how to face various difficulties faced while executing their duties and responsibilities.

1.6.2 Significance to the Scholars and Academia.

Future scholars and academia will be made aware about future research studies through the gaps in the present study. The findings of this research paper will contribute to the theoretical framework including theories such as technology acceptance model, diffusion innovation theory and the upper echelons theory onto which this research paper is based on. While examining the moderating role of the CEOs experience while investigating the effect of digital banking services on the operational efficiency.

1.6.3 Significance to the Policy Makers.

The outcome of this research study will assist the policymakers in the Kenyan government to comprehend the various type of digital banking services and how they play a role in the operational efficiency of the Microfinance Banks. In return the policymakers will be well informed in the formulation of policies and come up with regulations that will assist in the improvement of the digital banking services adopted. Furthermore, it is expected that the

results of this study will help enhance the existing policies and assist to improvise digital banking services and in return the operational efficiency of Microfinance Banks in Kenya.

1.7 The Scope of the Study.

The main objective of this research paper was to investigate the effect of Digital Banking Services on the Microfinance Banks in Kenya. This study adopted internet banking, mobile banking and electronic fund transfers as the independent variables. The operational efficiency was adopted as the dependent variable and CEOs experience was hypothesized as the moderating variable in the relationship. This study will also provide policymakers, scholars, examiners and management with diverse information and quality materials. This research paper will also be used as concrete foundation for the future studies by researchers on the adoption and integration of financial innovation in the developing countries.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature under the four objectives that cements this study. Firstly, the section commenced by discussing the theoretical review then explores the various theories that anchors the study concept. The chapter proceeds by analyzing the various past empirical reviews with a detailed insight on the perceived relationships. This brings to light on the research gaps that the research paper tends to address. Lastly, the conceptual framework and the operationalization of the variables draws the curtains in this chapter.

2.2 Theoretical Review.

The theoretical review in this study was anchored by three theories which includes the technology acceptance theory, diffusion innovation theory and the upper echelons theory.

2.2.1 Technology Acceptance Theory.

Davis (1986) devised this theory elaborate the impetus that underpins the financial sector institutions' digital innovations know-how. Furthermore, Homaid (2019) argues that this theory tries to explore how individuals or institutions adapt to new technological advancements in lieu of how they are really used to do things. This theory reaffirms that the operationalization of the technological system is strongly instituted by the customer's knowledge, perception, knowhow and the ability to use the system. The model also outlines how the simplicity of the emerging technological systems and products has a direct relationship with the clients' perceptions (Momani & Jamous, 2017).

Furthermore, the technological acceptance model onto which it formulates the basis of this research concept, the frame of mind of the microfinance banks' top management and affiliates operates through the digital banking services must be formerly handled before

attaining the specific goals of adopting the technology. Thus, when all the parties come into an agreement that the implementation of the new digital banking services can be given a go ahead based on its usability and perceived utility (Homaid, 2019). As a result of this, the implementation and general utility of the digital banking services results to an improved operational efficiency of the microfinance banks.

Moreover, the Technology Acceptance Theory have some weakness such as, the microfinance banks should be able to accommodate each and every customer since every customer have different levels and rates of adapting to changes especially new technological advancements to avoid losing some of the customers along the way (Homaid, 2022). In addition, there are other weaknesses like the high cost of integrating the technology and therefor the microfinance banks may not be in a position to feel the pinch of technology in the short run during the implementation processes (Homaid, 2022). Therefore, the researchers will be in good position to access the level at which the digital banking services such as the mobile banking, internet banking, electronic fund transfers and automated teller machines have been adopted and implement through the Technology Acceptance Theory.

Advancement in technology is of great importance in the extent that it explains the reasons as to why the customers embrace and concur with the technological changes (Timbula & Marvadi, 2023). This model was of great importance in this study to the extent that it helped to understand the various digital banking services and shedding the light on the discrepancies on the end consumers of the digital banking services and how they apply them on their daily to daily activities and operations. Therefore, the comprehension of this model offered a detailed basis for investigating the effect of digital banking services on the operational efficiency of microfinance banks in Kenya.

2.2.2 Diffusion of Innovation Theory.

This theory was put forth by Everett Rogers (1962). This model's aim was to clarify the various ways by which different users can spread innovation over a period of time (Kariuki & Mangana, 2024). The main goal of this of this model is to give a clear explanation on how fast new technology proliferate across the globe and how different avenues onto which digital innovations are spread from one demographic to another (Mori & Mlambiti, 2020). Rogers explained on how there is an inter-link between the development of new products and the timeline it covers in the market for it to be accepted by the consumers. Although, Rodgers was convinced that it took time to conceptualize new ideas to be accepted by the end consumer.

Through the diffusion of innovation theory, Rodgers outlined various stages onto which an organization can undergo in the implementation and adoption of digital services. One of the crucial stage was the digital innovation process which involved the customers going into self-assessment in order to be in a position to use and apply the emerging innovation ideas to enable a smooth flow of their operations (Mori & Mlambiti, 2020). This concept is very applicable in the modern era society where the clients mostly in the banking industry are always anxious to understand how the technology works and why it's important before deciding to use it. This phase is of great importance to the microfinance banks as part of the strategic implementation mechanisms as measure to avoid incurring losses in the long run.

Furthermore, the diffusion innovation theory is faced by different weaknesses such as how the modern financial services innovations are penetrating in the banking markets on a daily to daily basis resulting to customers hesitating to give a second mind of thought to activate their ussd especially in the mobile banking sector for the purpose of transactions (Kariuki & Mangana, 2024). Moreover, this model relies on the rate of speed at which the innovations spread across the industry and since various institutions assumes that majority of their customers are well versed with technology, when the speed rate of the spread is low it results

to customers being unable to use it since they don't have a clear understanding about technology (Mori & Mlambiti, 2020). Innovation diffusion theory is also faced with another weakness since it groups the users of technology into five classifications including the innovators, trailblazers, mainstream adopters, post-majority adopters and resisters and if one of the group struggles or fails to comprehend how to put into use the technology it will drag the adoption process among the various customer (Omwanza & Jagongo, 2019).

Over and above those weaknesses, this model equipped the researchers with strategic plans to be in a position to categorize customers in distinct categories and be able to research on how the customers comprehend and perceive technology in regards to the digital banking services. Therefore, this model was of great importance to this research paper on giving a clear explanation of the role that digital banking services play on enhancing the operational efficiency of microfinance banks in Kenya. This model was also pertinent to this research paper as it furnished the researcher with proper guidelines on how digital banking services influences the operational efficiency of Microfinance banks in Kenya.

2.2.3 Upper Echelons Theory.

The Upper Echelons Theory (UET) was instituted by Donald C. Hambrick and Phyllis A. Mason in the year 1984. UET stipulates that the firm's performance and the strategic decisions are partly influenced by the managerial attributes of the top management including the CEO (Ali et al., 2022). The model institutes that the psychological and demographical characteristics of the top management and the executives including the experience, education level, age, tenure and values influences the strategic plans, operations and the overall performance of the firm (Rono, 2018). Moreover, UET posits that the firm's leadership attributes influence the decision makings and customer's perceptions ultimately impacts the institution's directions and effectiveness. Corporate financial decisions including financial leverage influences the operational efficiency of the firm as result of the level of the attributes

the CEO possesses in regards to the level of managerial experience, has been mentioned in different studies such as Shahi and Parekh (2022) and Felix et al., (2025).

Furthermore, UET argues that long-tenured CEO are more committed to serving the organization which in return improves the operational efficiency and the performance of the institution (Ali et al., 2022). In addition, the CEO's career experience instigates that he has already mastered mindsets, philosophies and inclinations from his prior roles which in return can influence policy formulation process, analytical evaluations, strategic plans, operational efficiency and the performance (Ali et al., 2022).

Moreover, as the theory posits that the more the firm is faced by setbacks the more the senior executives' traits and attributes are pivotal and crucial in solving the challenges. Therefore, a concreate foundation evaluating the moderating effect of the CEOs experience on the relationship between Digital Banking Services and the operational efficiency of Microfinance banks in Kenya was provided by an understanding of this theory.

2.3 Empirical Review

Various scholarly studies are discussed under this section and the research constructs as well as the hypothesized relationships.

2.3.1 Internet banking and Operational efficiency.

Internet banking is the process of conducting transactions online (Keskar & Pandey, 2018). Majority of the microfinance banks in Kenya have embraced online banking such that most of services can be accessed by their customers through internet such as requesting for funds, making deposits, paying for services and servicing their loans online (Abdullai et al., 2018). Internet banking have aided on reducing the number of customers who visit the banking halls to acquire services (Murimi et al., 2021). Therefore, internet banking has played a role in the banking industry serving as an online branch to the microfinance banks thus resulting to a

reduction on the operational costs (Murimi et al., 2021). Hence, when the operational expenses are controlled and reduced optimally this results to an enhanced operational efficiency and improvement on the performance to the Microfinance banks.

Van and Uyen (2015) carried out a study on how the internet banking affects the performance banks in Vietnam or generally how the performance of banks is impacted by internet banking. The correlation between the online banking and the performance of the banks was gauged using the fixed effect model and the random effect model. The study adopted an OLS regression model on a sample of 20 commercial banks which accounted for 70% of the total asset to analyze the data. This indicated that 61% of the commercial banks used internet banking.

Halili (2014) carried out a study on how internet banking impacted the performance of banks in the Czech Republic, Poland, United Kingdom, Germany and Latvia. The study focused on 22 commercial banks from the above countries. The researched applied instrumental variable which indicated that online banking was negatively correlated with the indicators of the commercial banks performance which are Return on asset, Return on equity and the margin. The study used panel data and adopted the OLS regression to analyze the data.

Miran and Rasha (2014) undertook a study in Egypt about how the customer satisfaction is affected by the quality dimensions of internet banking. The research examined the perceptions of users towards E-banking and how the bankers offer quality service through E-banking. 500 questionnaires were randomly distributed and the data was analyzed using SPSS software. The result of the study indicated that customer satisfaction is affected by internet banking and as online banking offers quality services.

Okiro and Ndung'u (2013), conducted a study locally on how the performance of financial institutions in Kenya is affected by internet banking. The research did an assessment

research design on the financial institutions in Nairobi. The study adopted the descriptive and qualitative data analysis. Data was collected using stratified sampling where 30 financial institutions were administered with questionnaires. The results of the study indicated that productivity increased due to the effectiveness and efficiency of internet banking.

Furthermore, a study was carried out by Kinyua (2018) on how the transformation of commercial bank efficiency in Kenya have been affected by the emergence of internet banking. The research was carried out from a sample of 42 financial institutions in Kenya. The study took into consideration on whether the customers utilized internet banking. Data was collected using secondary sources in a span of five years. The data analysis indicated that every criterion used was statistically significant. There was no conclusive correlation between the efficiency and the total capital that was available. This research was all about the efficiency onto which is a bit different from the performance and thus the current study's focus.

2.3.2 Mobile Banking and Operational efficiency.

Mobile banking is the process of undertaking transactions by use of mobile phones (Shaikh & Karjaluoto, 2015). Mobile banking has enabled the customers to make deposits, pay their bills and as well acquire services from their accounts by use of the mobile phone gadgets at any given time from any location. This indicates how well the mobile banking services are convenient at any given time (Uwamariya et al, 2020). This in return this have aided a lot on the increase of the Microfinance banks' customer base. Thus this helps to reach into a conclusion that mobile baking has played a very important role in the enhancement of the operational efficiency and the performance of the Microfinance banks.

A study was conducted by Sharma et al., (2020) on how mobile banking impacts the financial performance of banks in India. The research sought to establish the relationship between the mobile banking adoption and the financial performance gathering data from 140

respondents drawn from different banks in India using a simple random sampling technique. The research adopted a quantitative and descriptive research designs. Both the secondary and primary data sources were used to collect data. SPSS software was used to interpret and analyze data collected. The findings of the study indicated that mobile banking had a positive correlation with the financial performance of commercial banks in India.

Morshed et al., (2021), carried out a study on the how the mobile banking affects the Islamic microfinance institutions' performance in Bangladesh. Data was collected from primary source where by a questionnaire survey method was utilized. Data was collected from a sample size of 200 respondents to represent the research study population. Hypotheses was tested using a structural equation modelling. The data was analyzed using the SPSS software whereby the Shapiro- Wilk test and the Kolmogorov-Smirnov test was applied. The study conclusions and findings of the study indicated that mobile banking had a positive effect and significant on the Islamic Microfinance Institutions' performance in Bangladesh.

Bagudu et al., (2017), carried out a study on how the performance of commercial banks is affected by mobile banking in Nigeria. The study employed a simple random method from 22 commercial banks using structured questionnaires to collect data. The researcher adopted descriptive statistics which utilized the graphical charts on the presentation and analysis of the data collected. The study's finding indicated that mobile banking was significantly and positively affecting the commercial banks' financial performance in Nigeria. Therefore, the research findings recommended that financial institution should continue using mobile banking because the level of clients embracing mobile banking indicated an increase on daily basis.

Uwamariya et al., (2020), undertook a research on how the performance of microfinance institutions is impacted by mobile banking in Rwanda. The study collected data using both the secondary and primary data. Secondary data was collected from the Urwego

Opportunity microfinance Banks' annual reports which was made available from the institutions head office. The primary data was gathered using in-depth interviews using semi-structured interviews from a total of 52 respondents specifically from institutions staffs and customers from various institution's branches. The study used a purposeful sampling technique to pinpoint 10 important interviewees from Urwego Opportunity microfinance Banks' top management and loan officers. The study findings indicated that mobile banking helped on improving the efficiency and performance of microfinance institutions.

Ndirangu and Kimani (2022), carried out a study to examine how mobile banking affects the performance of the microfinance banks in Kenya. Positivism philosophy approach and descriptive research design was adopted. Census survey was also utilized in the study. The population target for the study was the 13 microfinance banks in which are regulated by the CBK. Primary data was used to collect the data where questionnaires were self-administered. Statistical Package for Social Science software was used to analyze the data collected. Primary analysis was analysed using the inferential and descriptive statistics. The Kaiser Mayer Olkin and Barlett's test of Sphericity were used to draw a component matrix and in order to reduce on the number of factors factor analysis was utilized. The findings and results of the study indicated that there was a significant effect from the use of mobile banking on the microfinance banks' performance.

Kinyanzui et al., (2018). Also carried out a study on how the operational efficiency of commercial banks in Kenya is affected by mobile credit. Positivism paradigm cemented the study since the study's objective was to establish the relationship between the variables empirically. Both the secondary and primary sources to collect data from banks' customers. 100 customers were drawn from each bank offering mobile credit services. Primary data was collected using questionnaires where closed and open ended questions was put in place. Multiple regression was used to analyze the data collected. Tables and figures were used to

present the results of the data analysis. The SPSS software was utilized to analyze the data collected where the Shapiro test was used. Therefore, the findings and results of the study indicated that the operational efficiency of commercial banks in Kenya increased as a result of mobile credit adoption.

2.3.3 Electronic Fund Transfer and Operational Efficiency.

Electronic Fund Transfers as the mode of conducting a transaction electronically involving two parties from different location (Jain et al., 2021). EFT helps on the reduction of time used in the transaction process since it utilizes technological advancements. A good example of EFT is the RTGS which is a low cost initiative and the transactions are real time from one bank to another (Mwashiuya & Mbamba, 2020). This draws to a conclusion that this is one of the fastest way of funds transfer channel in the banking industry. This study sought to find out the effect of EFTs on the operational efficiency of Microfinance Banks in Kenya.

Ming-Yen et al., (2013), carried out a study on how electronic payment is perceived by consumers in Malaysia. Primary data was used to collect data using self-administered questionnaires with a target of 200 respondents were handed the questionnaires of which only 183 were responses were valid thus were subject to further statistical analysis. Data was analyzed using a multiple linear regression. A four point Likert scale was used. Results and findings were presented using tables and graphs. The sampling adequacy was measured using the Kaiser-Meyer-Olkin measure and the Barlett test of sphericity indicated a high significance level. The findings and the results of the indicated that e-payment was widely embraced by the consumers and thus resulted to a growth on the service delivery in Malaysia.

Jamsheer (2018), examined the implications of Electronic Fund Transfer on the financial performance in reference to the banking sector in India. The study adopted a descriptive research methodology. Primary data was used to collect data where structured

questionnaires was administered. The study also adopted a simple linear regression analysis to analyze the data. A convenient sampling technique was used on population target of 120 industrial bank customers and a total of 20 top management personnel and employees from the banks. Data was presented using tables and graphs. The results and findings of the study concluded that the introduction EFT resulted to an increased level of revenue generated by Indian banks.

Mayanja and Omwono (2022), conducted a study on customer satisfaction is affected by the evolution of Electronic Fund Transfer in banking sector of Uganda where the Stanbic bank was the unit of analysis. The study adopted a cross-sectional approach design where data was collected from the head office of the Stanbic bank of Uganda. The target population of the study was 103 respondents with a sample size of 91 employees. Primary data was collected using field guides interviews and questionnaires where quantitative data was collected from the employees. Qualitative data was collected using informative interviews. Analysis and the interpretation of data collected was done using SPSS Software and as well the Microsoft excel software. The results and the findings of the study concluded that there was a positive significance on the relationship between the customer satisfaction and Electronic Fund Transfer.

Ahmodu et al., (2024), undertook a study on the relationship between electronic fund transfer charges and customer retention value of the Nigerian deposit money banks. The study had a target population of 29 banks in Nigeria. Survey research design was employed to collect data. A sample size of 245 was used as the purposive and stratified sampling techniques were employed. Primary data was collected using questionnaires. Linear regression and descriptive statistics was adopted to analyze the data collected so as to test for the hypotheses. Data was analyzed using the SPSS Software version 20.0. The results of the study indicated that the

Central Bank of Nigeria should very specific on the Electronic Fund Transfer transaction charges so as to increase the customer retention rate.

Nalyanya et al., (2021), examined the relationship between the Electronic Fund Transfer and the service delivery in Kenyan SACCOs with Ng'arisha Sacco from Bungoma as a unit of analysis. Descriptive survey research design was adopted in this study. The target population for the study was 127 respondents. Furthermore, census sampling was embraced sampling the targeted population in eternity. Primary data was gathered using closed-ended structured questionnaires using a fine point Likert scale. Data was analyzed using the SPSS software version 26. Inferential and descriptive statistics was used to analyze data. The findings of the study indicated that there was a moderate strong positive relationship between the EFT and service delivery of Saccos. Therefore, recommendations from the study was that Saccos should embrace EFT so as to enhance service delivery to their customers.

Olungas (2016), investigated the relationship between electronic banking and financial performance of Kenya's microfinance institution in Nairobi County. The study adopted a descriptive research design. The target population for the study was the 12 microfinance institutions in Nairobi County. The data collected was quantitative and descriptive analysis was used for analysis. A multiple linear regression was conducted. The data was analyzed using STATA software version 15. The results and findings of the study indicated that electronic banking had a positive effect on the financial performance of Microfinance institution in Nairobi County.

2.3.4 Digital Banking Services, C.E.O Experience and Operational efficiency

The current research study adopts the CEOs experience as the moderating variable to ascertain the relationship between digital banking services and the operational efficiency. Furthermore, other scholars like Aliyu et al (2024) have used the CEOs experience as the

moderating variable and proved that a moderator variable augments the connection between the other variables. CEOs experience in terms of how long they have held the position and how conversant are they in making sound decisions, plays a very pivotal role in the implementation of the digital banking services in the microfinance banks. The metric of the CEO experience in this study will be how long the CEO have served in the top management position.

Aliyu et al., (2024), examined the moderating role of the CEO experience on the relationship between the capital management and the profitability of the firm. The unit of analysis in this study was Nigeria's listed oil and gas companies. The ex-post facto research design was adopted in this research paper. The annual reports over a period of 10 years in between the year 2013 and 2022 was used to collect secondary data. The study used a population of 10 listed gas and oil companies and as well the census-sampling technique was used to sample the whole population. The inferential and descriptive statistics was used to analyze the data collected with aid of Stata 14. The results and the findings of the study indicated that the moderating role of the CEO experience strongly cements the relationship between the capital management and the firm's profitability. Thus the conclusion of the study was that the firms should fully utilize the CEO's experience in the institution's operations so as to enhance the operational efficiency of the organization.

Chijoke et al., (2023), investigated the moderating role of the CEO attributes including the CEO internal experience on the relationship between the firm's performance and the CEO turnover. The study adopted a probit regression model. Secondary data was collected from the BroadEx website over a period of 10 years from 1999 to 2018. A population target of 350 firms on the London stock exchange was utilized in the study. Unbalanced panel data was used to sample a total of 157 firms. Return on asset was used to measure the firm's performance. Descriptive statistic and the Pearson's correlation was used to analyze the data collected. Tables were used to present the data analyzed. The results and conclusions of the study

indicated that the firm's performance outcome is affected by the CEO's attribute and the board management should be very focused on the attributes such as the CEO internal experience in the process of hiring and firing an executive manager. Therefore, the CEO turnover decisions and widely influenced by the CEO attributes as compared to the firm's prior performance.

Buyl et al., (2011), examined the moderating role of the CEO characteristics including the CEO's shared experience on the relationship between the firm's performance and the top management team diversity. The study utilized data collected from a final sample of 33 top management team comprising of 14 Belgians and 19 Dutch team members. The study used s population target of 206 Dutch and Belgium IT firms where only 54 firms agreed to participate in the research study. Primary data was used to collect where structured interviews was used through the CEOs. Later the CEOs distributed questionnaires to the selected experts in each firm. The study used the Attneave's entropy-based and the Shannon-Wiener measure of information to analyze the data collected. The findings of the study concluded that there was a moderating effect of certain CEO's characteristics including the CEO'S shared experience on the relationship between the firm's performance and the functional diversity of the top management team background.

2.4 Research Gaps.

From the reviewed literatures where majority of them focused on very specific digital banking services which is composed in the wider digitalization platforms. Mobile banking and internet banking have been the most focused digital banking platforms in the past research studies. EFTs as one of the limited researched digital banking platform and as well taking into account on the moderation role of the CEO experience by both local and international studies in the Microfinance banks in Kenya. Thus, this research paper was seeking to fill this research gaps by investigating the automation and the moderation role of the CEO experience in the Microfinance banks. Additionally, most of the research are also framed in different localities

and jurisdictions thus widening the gaps in the reviewed literatures. Therefore, this cements the reasons of undertaking this research.

2.5 Conceptual Framework.

A conceptual framework is a diagram representing the relationship between the variables of the study (Manzani et al., 2017). This sections aids the study in filling the research gaps identified. In the case of this study the internet banking, mobile banking and the electronic fund transfers were the independent variables. The Digital Banking Services were adopted as the moderating variable while as the operational efficiency was the dependent variable. The conceptual framework is diagrammatically presented in Figure 2.1.

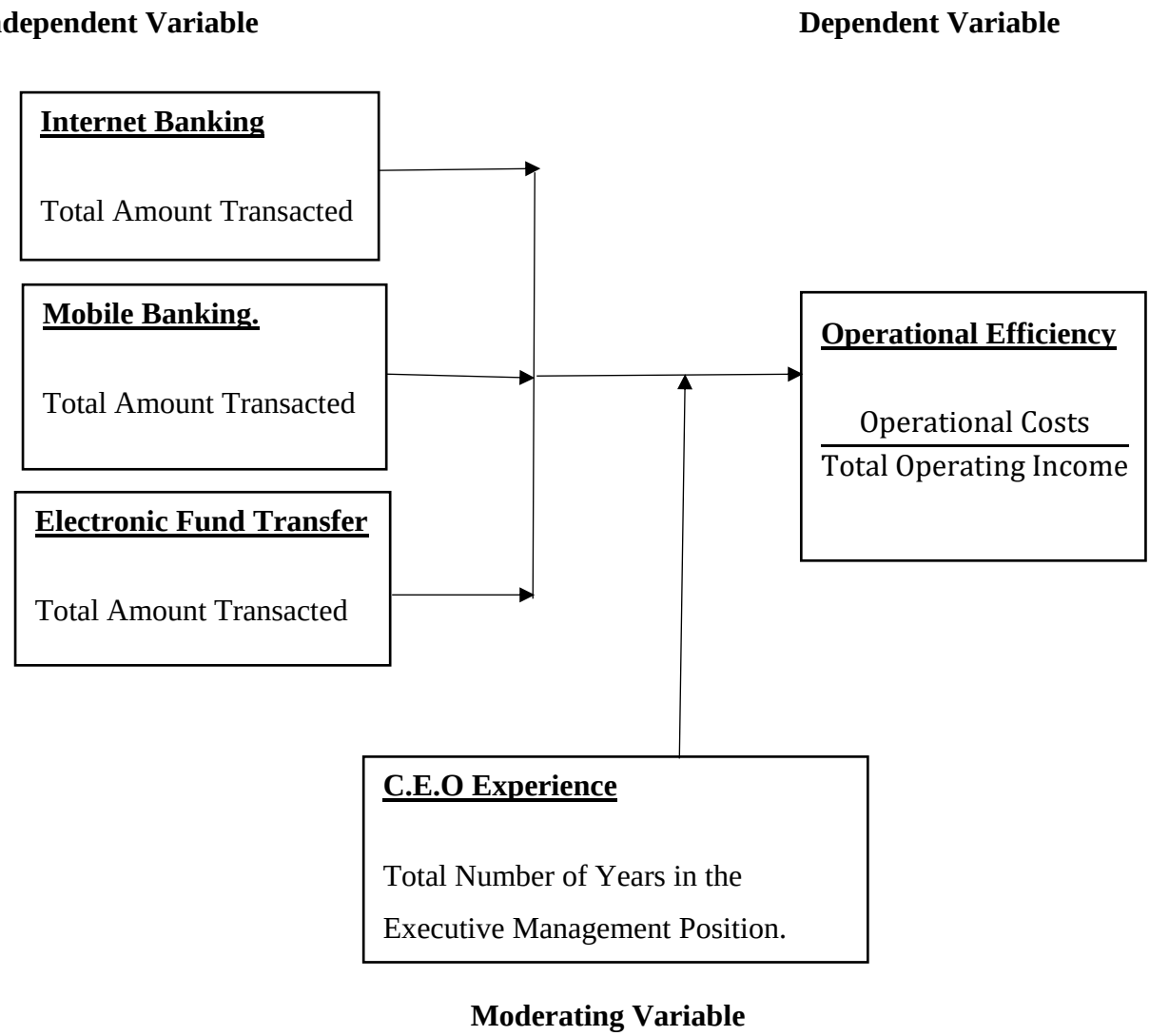

Figure 2. 1: Conceptual Framework ***Source: Author 2025***

FIGURE 2.1:

Conceptual Framework

2.6 Operationalization of the Study Variables.

The dependent and the independent variables are both operationalized to aid the study on the summarization, measuring and analyzing the study hypothesis (Andrade, 2021). The operational efficiency was adopted as the dependent variable while the digital banking services as the independent variable. The independent variables include internet banking, mobile banking and the electronic fund transfer. The CEOs' experience was used as the moderating variable in the relationship between digital banking services and the operational efficiency. The table 2.1 summarizes the operationalization of the study variables in accordance with the reviewed literature.

Study Variables	Type of Variable	Measurement	Scale of Measurements	Supportive Literature
Internet Banking	Independent Variable	Total amount transacted through internet banking / Median of Total amount through internet banking	Ratio	Van and Uyen (2015), Halili (2014), Okiro
Mobile Banking	Independent Variable	Total amount through Mobile banking / Median of Total amount transacted through Mobile banking	Ratio	Sharma et al., (2020), Morshed et al., (2021) and Kinyanzui etal., (2018)
Electronic Fund Transfer	Independent Variable	Total amount through Electronic Fund Transfers / Median of Total amount through Electronic Fund Transfers	Ratio	Ming-Yen et al., (2013), Jamsheer (2018) and Nalyanya et al., (2021)

CEO Experience	Moderating Variable	Total number of years the CEO have served in the CEO position / Median of Total number of years the CEO have served in the Executive Management position	Ratio	Aliyu et al., (2024) and Chijoke et al., (2023)
Operational Efficiency	Dependent Variable	Total Operating costs / Total Operating Income.	Ratio	(Oke & Abere, 2019), (Kariuki, 2017)

TABLE 2. 1: Operationalization of Variables

Source: Author 2025

TABLE 2.1:

Operationalization of Variables

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction.

Research methodologies adopted in this research are discussed under this chapter. Research design, the target population for the research, data collection methods, sample size and data analysis discussions are entailed under this chapter.

3.3 Research Design.

A descriptive research design was used in this research paper. A degree of description on the occurrence of an event was provided extensively under this type of a research design. Descriptive statistics aids a lot in the measuring the effects relationship between the study variables (Siedlecki, 2020). Therefore, description of microfinance banks digital banking services and the operational efficiency was a success through the adoption of this research design. Thus, it was of great importance on giving answers to the formulated hypotheses.

3.4 Target Population

The specific population onto which the required information was gathered from is a target population (Willie, 2024). The Microfinance Banks in Kenya was adopted as the target population in this study. All the 14 Microfinance banks in Kenya as at 31st December 2024 regulated and licensed by the CBK formed the entire population of the study as indicated on Appendix 1.

3.4 Sampling Design.

This study adopted a census also known as complete enumeration where all the 14 Microfinance Banks in Kenya was used in the study. The process of studying the entire unit in the population is known as census ((Kothari, 2004). A census helps in the elimination of

inferential statistics thus enhancement on the study results reliability allowing the population estimates to be more precise.

3.5 Data Collection Procedure and Instrument.

This study adopted the secondary data. Data already collected and analyzed is also known as secondary data (Dunn et al., 2015). Therefore, systematic review of the Microfinance banks in Kenya documents and reports was undertaken. The data from the annual CBK supervision reports, microfinance banks published reports and the institution's industry publications for a total of five financial years from 2020 to 2024 was utilized to comprehend how the microfinance banks have been performing after the COVID-19 era. The reason behind selecting this timeline is because it is up to date and even more current. Data collected was captured and prepared using an excel worksheet subject to the analysis kit.

3.6 Data Analysis.

Descriptive statistics, a panel data regression and the correlation analysis used to analyse the data collected in this study through the aid of the STATA 16 software. The technique of presenting and summarizing a dataset through a range of statistical methods in a comprehensible and coherent form is known as descriptive statistics (Kaur et al., 2018). The mean, coefficient of variation and the standard deviation which forms the descriptive statistics was adopted to analyse the data. To evaluate the relationship between the study variables which include the dependent, independent and the moderating variables a series of regression was undertaken. In addition, to test whether results of the analysis was significant or not, a hypotheses tests were conducted.

To test the effectiveness of digital banking services on the operational efficiency of Microfinance Banks in Kenya a panel linear regression analysis was adopted in this study. The Pearson's correlation coefficient was adopted to evaluate the relationship between digital

banking services and the operational efficiency. The F-statistics was used to determine the overall model's significance while as the p-value was adopted to test for the individual variables' significance. Individual variable's effect is presented by Model 1 below;

$$\mathbf{Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \acute{\epsilon}_{it}} \quad \textbf{……MODEL 1}$$

Where:

Y = Operational Efficiency

$\mathbf{X_1}$ = Mobile Banking (MB)

$\mathbf{X_2}$ = Internet Banking (IB)

$\mathbf{X_3}$ = Electronic Fund Transfers. (EFT)

ε = Error term

Evaluating the direct effect of digital banking services is the very first step as demonstrated by the Model 1. Hayes, (2018) suggested a measure that was used to formulate the moderating role of the CEO's experience on the relationship between digital banking services and the operational efficiency in the second step. As indicated in Model 2, on top of the digital banking services an interactional variable was adopted as dependent variables having an effect on the operational efficiency.

The additional influence on the operational efficiency which is not explained by digital banking services was accounted by the joint dependent variable. Therefore, the change in the operational efficiency was influenced when the combined influence had a statistical significance influence. The interactional influence is demonstrated in Model 2 below.

$$\mathbf{Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 E_{it} + \beta_5 X_{1it} * E_{it} + \beta_6 X_{2it} * E_{it} + \beta_7 X_{3it} * E_{it} + \acute{\epsilon}_{it}}$$

……. MODEL 2

Where:

Y = Operational Efficiency.

β = regression coefficients

ε = Error Term

E = C.E.O Experience

3.7 Diagnostic Tests.

So that we can attain the best linear unbiased estimator different diagnostic test was carried out so that there is adherence of linear regression assumptions. When there is a violation of the classical linear assumptions especially when regressing the variables, the results could have culminated to spurious findings (Leeflang & Allerberger, 2019). The various diagnostic tests under the various assumptions were well detailed under the following subsections.

3.7.1 Multicollinearity Test

It is assumed that multicollinearity is absent in any given linear regression model. Multicollinearity can be characterized as when the predictor variables correlate in a multiple linear regression thus resulting to false results (Tay, 2017). Thus, resulting to the predictor variables becoming unessential when forecasting the outcome variable. A VIF of above 10 and less than 0.1 in the tolerance value indicates the existence of multicollinearity. This indicates that there is a 90% and above of the predictor variable's variation that were being shared with the other variables. Therefore, there were a little concern on the presence of multicollinearity when the tolerance was closer to one and the VIF is below 10.

3.7.2 Autocorrelation.

The scenario when sample data indicates the presence of serial correlation the conclusion is that there is existence of autocorrelation (Born & Breitung, 2016). This study

adopted the Wooldridge Drukker test to determine whether the serial correlation was present. The test results indicating that $p > 0.05$ indicates the absence of autocorrelation. This test helps explain whether the independent variables are relating to each other (Lee, 2014).

3.7.3 Heteroscedasticity Test.

It is assumed that in a linear regression the error term possesses a constant variance or else the homoscedasticity (Idowu et al, 2024). Therefore, violation of this assumption results to heteroscedasticity. Implying the error term is in contrast across all the independent variable values. This results to the erroneousness of the standard errors (Saleh & Rosli, 2024). Moreover, this leads to the significance of the regression coefficients' conclusions being false. To test for heteroscedasticity, this study undertook the Breusch Pagan test. Thus, the absence of heteroscedasticity was exhibited when the p-value was greater than the critical value ($p>0.05$) thus the null hypothesis was not rejected.

3.7.4 The Model Specification Test.

Since this study was gathering panel data, then the study adopted the Hausman test to test whether the fixed effect model or the random effect model would be employed. Thus, one of the key hypothesis test was by testing the fixed effect relative to the random effect (Baltagi &Liu, 2016). The correlation between the unobserved individual specific effect and the regressors results to endogeneity. Therefore, if the p value was less than 0.05 ($p < 0.05$) meaning that it is significant then we come into a conclusion that the fixed effect was the preferred model thus rejecting the null hypothesis. Moreover, you accept the null hypothesis when the $p > 0.05$ (Prob >Chi2) thus concluding that the acceptable model is the random effect model (Zulfikar et al., 2018).

3.7.5 Breusch and Pagan Lagrangian multiplier test for random effect.

This test was used to analyze on whether to adopt the random effect model or ordinary least square model in the panel data analysis (Breitung et al., 2016). The null hypothesis, when adopting the LM test is that the variances across the firms equals to zero meaning that there was no panel effect or across the units there existed no significant difference (Ceesay & Moussa, 2022). We failed to accept the null hypothesis when the $p > 0.05$ thus concluding that the random effect model was appropriate.

3.8 Ethical Considerations.

The ethical guidelines are of great importance when undertaking a research. This helped in upholding the integrity and respect of the participants. Thus, different ethical considerations were adhered to in this research. Therefore, the researcher requested for an approval from KCA University since they oversee the research ethical conducts in the institution and as well a research license from NACOSTI. Moreover, the data collected was anonymized so as to ensure confidentiality. These helped a lot on upholding the companies' privacy and as well safeguarding the data. Furthermore, in this study the findings were reported honestly and accurately with the highest level of integrity so as to ensure that the standards of the ethical conducts are upheld without any compromise.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction.

The main aim of this chapter four was to present the research study's data analysis, findings and the discussions anchored by the research objectives. STATA software version 16 was adopted to perform the statistical, panel data regression and the descriptive statistics. Panel data collected from secondary sources was used to perform the analysis. The nature of the study variables was assessed using the descriptive data analysis while as the moderating effect of the CEO Experience on the efficiency of the microfinance banks in Kenya was determined using the regression analysis. The secondary panel data that was utilized in this research study was collected targeting the 14 microfinance banks in Kenya, regulated by the CBK, over a period of 5 financial years between 2020 and 2024. The theoretical framework and as well the existing literature was an important anchorage on the interpretation of the findings facilitating an insightful understanding on how the digital banking services influences the operational efficiency in the Kenyan banking sector.

4.2 Descriptive Statistics.

According to the data analysis outputs in Table 4.1: Descriptive Statistics offered a very important insight on the central tendency, variability and the distribution of the research study variables for the research study titled Digital banking services, CEO Experience and the Operational Efficiency of Microfinance banks in Kenya. The analysis of the statistics entailed across overall, between the institutions (microfinance banks), and within the institutions (over time) levels.

The results showed that the microfinance banks' operational efficiency ratio from the financial year 2020 up to the financial year 2024 had a mean operational efficiency which was

measured using the operating expense ratio (operating costs / operating income), indicated an overall mean of 0.7992. Operational efficiency is the ability of financial institution to proffer a certain extent of monetary mediation services at the minimum possible costs or the capacity to extend the highest level of monetary intermediation services within a specific budget restriction (Oke & Abere, 2019). This indicated that, between the financial year 2020 and 2024 the microfinance banks incurred high expenses than the banks' capability to raise ample revenues and as well due to non-performing loans, since the operating expense ratio was high. Therefore, this may demotivate some of the investors who might wish to invest in the different financial services that the microfinance banks offer since they can be considered to exhibit lower levels of operational efficiency. On the other hand, the microfinance banks had an overall standard deviation of 0.0469, between the 14 microfinance banks indicated 0.0357 and within the 5 financial year was given by 0.03159. This depicted that there was no deviation of the operating cost efficiency ratio from the mean since the values of the standard deviation are relatively low as assessed using the overall, in between the 14 banks and within the 5 financial years. In the same period the operating expense ratio of the microfinance banks indicated an overall maximum of 0.9149 and a minimum of 0.6651. Therefore, there was an increase on the operational efficiency of the microfinance banks over a period of five years. This indicated that there was varying efficiencies among the microfinance banks.

The results indicate that the average mean usage of mobile banking is 1.000006. This indicates that the usage of mobile banking on the transactions among the microfinance banks in Kenya was high. The overall standard deviation of 0.426797 indicates a significant variability on the amount transacted across the entire observations. The between standard deviation among the 14 microfinance banks of 0.300572 shows a considerable variation on the average amounts transacted through mobile banking. The within standard deviation of

0.311527 indicates that a single organization's average amount transacted through mobile banking changes from one financial year to another.

The findings also suggest that the average amount transacted using internet banking is 0.999997. With the amounts ranging between 0.304 and 2.0570. The between standard deviation of 0.24431 on the average amount transacted using internet banking stipulates that there was a moderate variation across the various microfinance banks in Kenya. The within standard deviation of 0.294751 on the amount transacted through internet banking under a single organization shows a higher degree of variation over the observation timeline.

Moreover, the results show that the average amount transacted through electronic fund transfers is 0.999999. The results indicated a larger overall standard deviation of 0.547 which stipulated that the data was highly dispersed. The in between standard deviation on the average amount transacted using electronic fund transfers of 0.426767 differed significantly across the 14 microfinance banks in Kenya. The within standard deviation of 0.356176 stipulates that there was substantial variation from year to year on the amount transacted through electronic fund transfer for a single bank.

The CEO experience indicates an average mean of 1.00000 indicating that majority of the CEOs serving in the microfinance banks are experienced. The between standard deviation of 0.407614 shows that there is a wide range on the average number of years on the CEO experience among the different microfinance banks in Kenya. The within standard deviation of 0.155029 is considerably lower, indicating that the level of a single microfinance CEO's experience level changes slightly from one financial year to another. This as a result of the CEO's experience is a slowly but a continuous changing variable.

This stipulates that there was a reasonable consistency on the usage of this digital banking services by the microfinance banks. Therefore, the organizational efficiency of the microfinance banks is positively influenced by the adoption of this digital banking services.

Table 4. 1 Descriptive Statistics

TABLE 4.1:

Descriptive Statistics.

Variable	Type	Mean	Std. Dev.	Min	Max	Observations
Y	Overall	0.799249	0.046914	0.6651	0.9149	N = 70
	Between		0.035734	0.71432	0.85976	n = 14
	Within		0.031591	0.729129	0.856429	T = 5
MB	Overall	1.000006	0.426797	0.2417	1.8654	N = 70
	Between		0.300572	0.38194	1.37272	n = 14
	Within		0.311527	0.326446	1.936306	T = 5
IB	Overall	0.999997	0.378293	0.304	2.057	N = 70
	Between		0.24431	0.6027	1.4154	n = 14
	Within		0.294751	0.431477	1.969977	T = 5
EFT	Overall	0.999999	0.546291	0.2085	2.7137	N = 70
	Between		0.426767	0.38464	1.6391	n = 14
	Within		0.356176	0.217919	2.074599	T = 5
E	Overall	1.0000	0.424913	0.2442	1.7907	N = 70
	Between		0.407614	0.36256	1.53848	n = 14
	Within		0.155029	0.3293	1.45144	T = 5

4.3 Exploratory Trend Data Analysis.

The exploratory data analysis of the operational efficiency was done to survey the microfinance banks' efficiency heterogeneity over a period. The examination was very crucial in resolving whether to adopt the panel data analysis models or to adopt the pooled regression analysis models. Graphs were used to examine the trend on the operational efficiency within a single microfinance bank and among the 14 microfinance banks in Kenya. The study's details are as indicated below.

Figure 4.1 below indicates the trend of the operational efficiency over a period of 5 years for a single microfinance bank. There was a high change in firm 12 and 13 on the bank's efficiency, a scenario that influenced the overall output. Majority of the microfinance banks indicated an upward trend especially from the financial year 2020. There was a great influence especially between the year 2020 and 2021 due to the COVID-19 pandemic. The pandemic, as an economic shock, acted as a catalyst on the transformation of the digital banking services. Due to social distancing and lockdowns strict measures, this shock forced the microfinance banks to adopt various digital banking services like the internet banking, mobile banking and the EFT to offer services to their customers. Due to shifting away from the high costs emanating from the physical branches and use of manual processes, this contributed significantly to the increment of the operational efficiency, a situation that lead to digital banking services being a vital tool to the operations of the banking industry especially from the year 2022 to 2024.

There is no tight clustering of lines but over any given financial year they indicate a wide vertical spread. This implies that some of the microfinance banks are consistently laggards and on the other hand some indicate that they are consistently more efficient. Like for example bank 4, 9, 12 and 13 lines of the plot are located at the top. This may imply that this bunch of banks had optimized their operations optimally, maybe they had invested in technology early enough, large scale or they had a superior top management. Some of the banks

like bank 1, 6 and 8 lines are on the lower end, this might be due to high cost of operational costs that may lead to the institutions struggles or the adoption of the digital banking services was slower.

Furthermore, some of the lines indicates a degree of fluctuations with an upward trend. This indicates that there was a response from the bank on a specific event. For example, bank 6 and 14 indicated a sharp increase stipulating that maybe the technology rollout was successful while bank 4, 12 and 13 indicates a temporary dip which may be caused by the upgrade of the system, economic uncertainty period or a one-off expense. **Figure 4.1** shows that all the microfinance banks indicated a gradual change on the operational efficiency and does not show a time linked fixed effect.

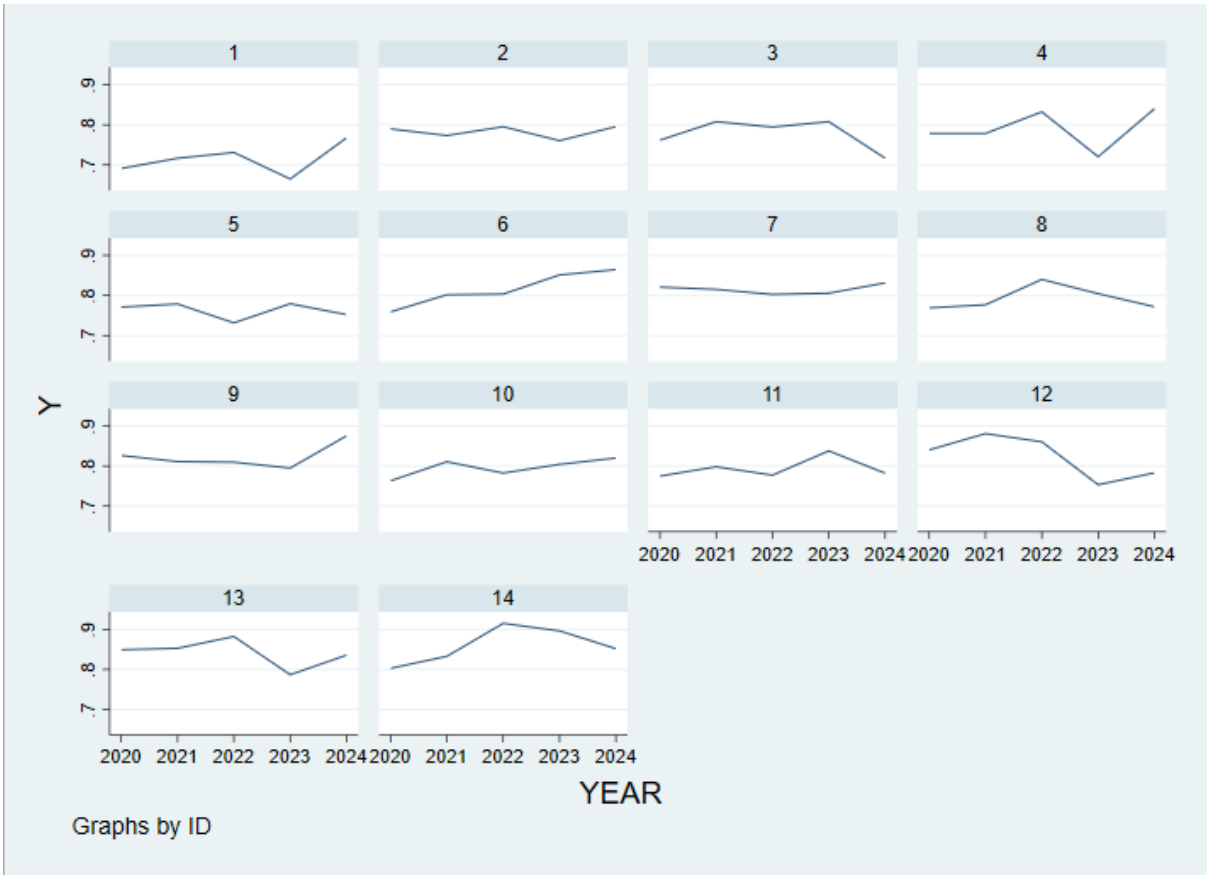

FIGURE 4. 1:

Line Plot for Operational Efficiency

Figure 4.2 shows the usage of mobile banking trend for the 14 microfinance banks in Kenya over a period of 5 financial years from 2020 to 2024. The plots indicated that there was a significant variance between the banks on the usage and adoption of the mobile banking over the 5-year period. Some of the banks indicated a trend that was upward while others showed a stagnation, a downward trend and even volatility. There appears that the influence from the COVID-19 pandemic between the financial year 2020 and 2021, acted as a catalyst for the microfinance banks to improve on the digital offerings of which this trend was sustained through successful strategies.

Moreover, banks 1, 8 and 10 indicated that there was a consistent rise on the transactions through mobile banking, stipulating that maybe the strategies of adopting mobile

banking was successful. This is as result of investing on user friendly mobile applications, intensive marketing campaigns or driving the usage through attractive incentives. There were some erratic patterns on bank 2, 6, 7, 9 and 11 with sharp inclines and declines. This could be as result of system outages, promotional campaigns that were temporary or customers shifting preferences due to actions from other competitors. Furthermore, there was a decrease on the usage of mobile banking and flat line on bank 2, 5, 7, 9 11 and 12. This might suggest that the banks might be struggling competitively, the mobile banking platforms have not been prioritized enough or their customers prefers using other banking platforms or channels.

FIGURE 4. 2:

Line Plot for Mobile Banking

Figure 4.3 illustrates the usage of internet banking trend for the 14 microfinance banks in Kenya from the financial year 2020 to 2024. This helps in visualizing the comparison across

the 14 microfinance banks' performance and as well how the usage of internet banking over time changes for individual bank. There was rapid technological transformation from the financial year 2020 to 2024 due the COVID-19 pandemic. The plot did not exhibit a single uniform pattern but instead there was a blend of volatility, gradual growth and at some point stagnation.

The plot indicates that there was a significant and as well a steady increase for bank 1, 6, 9 and 14 on the usage of internet banking. This suggests that the banks might have invested in a user friendly and well robust channels, intensive marketing and sensitization of the platforms to boost the customers' confidence on the usage of the online services. There was a year to year sharp decrease and increase for bank 2, 4, 5, 7, 8, 9, 10, 12, 13 and 14 on the usage of internet banking. This could be as result of temporally disruption from the major system upgrades promotional campaigns which were temporary or the customers changing preferences due to competitors' influence. This may also stipulate that the online banking strategies are predictable or more of less stable. Moreover, there was a downward trend and flat lines for bank 2, 3, 4, 11 and 13 suggesting that the institutions were struggling competitively on the digital space. This could be as a result of investing inadequately in the online platforms, complicated user interface, customers concern on the security measures or preference by the customers to use other digital channels.

The plot illustrates how the internet banking market is competitive in nature under the Kenyan banking industry. It elaborates that digital banking success depends on the strategic choices a bank adopts rather than foregone conclusions. Banks' adaptability ability to the changing behaviors by their customers and as well focusing on the experience of the users also comes into play. Therefore, there is nothing like one-size-fits-all approach in the banking industry's digital transformation under the diverse trends among the 14 microfinance banks in Kenya.

FIGURE 4. 3:

Line Plot for Internet Banking

Figure 4.4 illustrates the transactions trend of Electronic Fund Transfers across the 14 microfinance banks in Kenya between the financial years 2020 to 2024. Electronic Fund Transfers involves interbank transactions, large amounts and as well corporate payments contrasting from the internet banking as well mobile banking which are mostly associated with retail and small transactions. Thus, not just the consumer behavior is replicated on the plot trends below but as well as the corporate banking health and also the national payment system's efficiency.

The trend plot indicates an upward trend for bank 2, 3, 8 and 13 on the Electronic Fund Transfer transactions. This was as result of higher large scale payments' values and volumes due to an increase in the trade and business activities after the COVID-19 pandemic shock as

the Kenya economy was undergoing the recovery stage. Moreover, this could be also as a result of adoption of digital platforms by the corporations and banks to manage payments on a large-scale through the reduction on the manual transactions and physical checks across the 14 microfinance banks. Some of the microfinance banks which have a very strong focus on the institutional and as well the corporate clienteles might emerge top on the trend plot with higher values transacted through Electronic Fund Transfer. They have a plot line that exhibits an increase that is significant and as well steady like bank 8, this echoes the dominant position held by the microfinance banks in the market. Some of plot exhibit a lower transactional volume which may be as a result of the bank largely focusing on the consumer banking and retailers like bank 1.

Moreover, bank 7, 9, 13 and 14 indicated a sharp plot that increased suddenly, this might be as a result of an acquisition of a major corporate clientele or instituting a unique service that improves an electronic payment which is on a large scale. Further, a plot that have a temporary dip like bank 7, 9, 13 and 14, might be as a result of systems undergoing an upgrade, outage of electronic fund transfers services or a corporate clientele, who is key to the bank, undergoing a temporary economic downturn.

FIGURE 4. 4:

Line Plot for Electronic Fund Transfer

4.4 Correlation Analysis.

The study's correlation analysis on the Digital Banking Services, CEO Experience and the Operational Efficiency of Microfinance banks in Kenya indicated variables which had relationships that were statistically significant as stipulated in table 4.2. Internet banking (r= 0.5711 and p = 0.000) had a positive correlation and as well the strongest with the operational efficiency, stipulating that the banking service tends to highly influence the efficiency of the microfinance banks. This might have been influenced by the higher usage of internet banking by the customers thus resulting to higher operational efficiency.

Mobile banking also was significantly, weaker and positively correlated with the operational efficiency (r = 0.3851, p = 0.001). This stipulates that the operational efficiency

tend to get better as the amount transacted through mobile banking increases. This is as a result of customers embracing mobile banking platforms for transaction purposes. Although it is statistically meaningful but have a weaker relationship compared to electronic fund transfer and internet banking.

Likewise, electronic fund transfer indicates a significant, moderate and statistically significant correlation with the operational efficiency ($r = 0.5160$, $p = 0.0000$). This is as a result of high amounts transacted through the platform thus resulting to the operational efficiency being greater. This might emanate from the large scale amounts and the corporate clients.

On the inter-variable relationships examination, internet banking is positively and significantly associated with mobile banking ($r = 0.2905$, $p = 0.0147$). This might suggest that there tends to have higher usage of internet banking with the microfinance banks with higher usage of mobile banking. Additionally, electronic fund transfer and internet banking are positively correlated ($r= 0.4253$, $p = 0.0002$).

Conclusively, correlation among the variables does not suggest causation. When operation efficiency and digital banking services indicate a strong correlation does not imply beyond doubt that one causes another. They might be caused by other unobservable variables like the overall strategy by the microfinance banks on the adoption of technology. The findings underpin the importance of embracing digital banking services in enhancing and improving the operational efficiency of microfinance banks in Kenya.

Table 4. 2: Pairwise Correlation

TABLE 4.2:

Pairwise Correlation

Variable	Y	MB	IB	EFT	E
Y	1				
MB	0.3851*	1			
(p)	-0.001				
IB	0.5711*	0.2905*	1		
(p)	0.0000	-0.0147			
EFT	0.5160*	0.1996	0.4253*	1	
(p)	0.0000	-0.0976	-0.0002		
E	0.0898	-0.1294	0.0481	0.021	1
(p)	-0.46	-0.2859	-0.6926	-0.8628	

4.5 Diagnostic Tests.

4.5.1 Multicollinearity

According to Tay (2017), it is assumed that multicollinearity is absent in any given linear regression model. Multicollinearity can be characterized as when the predictor variables correlate in a multiple linear regression thus resulting to false results. Thus, resulting to the predictor variables becoming unessential when forecasting the outcome variable. A VIF of above 10 and less than 0.1 in the tolerance value indicates the existence of multicollinearity. This indicates that there is a 90% and above of the predictor variable's variation that is being shared with the other variables. This research paper adopted the values of VIF to test for multicollinearity. The coefficients of the regression interpretability can be compromised when multicollinearity is on a high level (Tay, 2017).

Table 4.3 represents multicollinearity statistics which indicates that the values of the individual variables' inflation variance factor is closer to 1, with a mean VIF of 1.17. This indicates that the explanatory variables internet banking, mobile banking, electronic fund transfers and the CEO experience had minimal correlation among them. Therefore, the VIF values are acceptable since they are below 10 and there is no concern about multicollinearity in this model. Thus, the regression analysis interpretability and reliability is well supported since it is unlikely that predictors that are highly correlated will cause the derived regression estimates to be distorted.

Table 4. 3: Multicollinearity Test

TABLE 4.3:

Multicollinearity Test

Variable	VIF	1/VIF
IB	1.3	0.770454
EFT	1.23	0.812664
MB	1.13	0.887972
E	1.03	0.975064
Mean VIF	**1.17**	–

4.5.2 Autocorrelation Test.

Woodridge test was used to test for panel data autocorrelation analysis in this study. According to results in table 4.4, the p-value 0.5299 > 0.05 thus an indication that the panel data has no presence of serial correlation.

Table 4. 4: Autocorrelation Test.

TABLE 4.4:

Autocorrelation Test.

Wooldridge Test for Autocorrelation in Panel Data

Null Hypothesis (H_0)	**F(df1, df2)**	**Test Statistic**	**p-value**
No first-order autocorrelation	F(1, 13)	0.417	0.5299

4.5.3 Heteroscedasticity Test

It is assumed that in a linear regression the error term possesses a constant variance or else the homoscedasticity (Idowu et al, 2024). Therefore, violation of this assumption results to heteroscedasticity. Implying the error term is in contrast across all the independent variable values. This results to the erroneousness of the standard errors (Saleh & Rosli, 2024). This research study used the Breusch Pagan Cook- Weisberg test to test for this condition. According to Idowu et al (2024), there indicates no presence of heteroscedasticity when the $p>0.05$.

Since the test that was carried out as indicated in table 4.5 indicates a p-value of 0.6559, we fail to reject the null hypothesis. Thus, the residuals of the regression model indicated a constant variance. Therefore, the homoscedasticity assumption holds since from the data there was no presence of heteroscedasticity.

Table 4. 5: Heteroscedasticity Test.

TABLE 4.5:

Heteroscedasticity Test

Test	$\chi^2(1)$	Prob > χ^2	Decision	Interpretation
Breusch-Pagan / Cook-Weisberg Test	0.2	0.6559	Fail to reject H_0	No evidence of heteroskedasticity; variance is constant (homoskedasticity).

4.6 Panel Data Analysis.

The 14 microfinance banks that are licensed by Central Bank of Kenya were adopted to conduct this study through a 5-year period between the financial years 2020 to 2024, indicating a total of 70 (14*5) data points. The study adopted a panel data analysis. Then the Stata software version 16 was used to perform the analysis panel data tests as discussed and indicated below:

4.6.1 Hausman Test

Hausman test was adopted to test whether the fixed effect model or the random effect model will be employed. Thus, one of the key hypothesis test is by testing the fixed effect relative to the random effect (Baltagi & Liu, 2016). The results from table 4.6, indicated that the p-value was 0.0543 thus failing to reject the null hypothesis, indicating that the coefficients' differences were not systematic. There was no significant endogeneity bias according to the test between the estimators of the random and fixed effects. The appropriate model for this analysis was considered to be the random effect. Thus assuming that there was no correlation between the explanatory variables and the unobserved individual effects hence providing a more effective estimation.

Table 4. 6: Hausman Test

TABLE 4.6:

Hausman Test.

Test	χ^2(df)	Value	Prob > χ^2	Decision
Hausman Test (H_0: difference in coefficients not systematic)	$\chi^2(3)$	7.63	0.0543	Fail to reject H_0 → Random Effects preferred

4.6.2 Breusch and Pagan Lagrangian multiplier test for random effect.

The langrage multiplier test is carried out to test whether to adopt the random effect model or the pooled ordinary least square model. The results in table 4.7 indicated a p value of 0.2315 thus failing to reject the null hypothesis since there was no random effect. Therefore, suggesting that the most appropriate model to adopt in the data analysis is the pooled ordinary least square model over the random effect model.

Table 4. 7: Lagrangian multiplier test

TABLE 4.7:

Breusch and Pagan Lagrangian multiplier test for random effects

Test	Statistic	Value	Prob > χ^2	Decision
Breusch-Pagan LM (H_0: Var(u) = 0)	chibar^2(01)	0.54	0.2315	Fail to reject H_0 → Pooled OLS is preferred over Random Effects

4.7 Model Fitting.

4.7.1 Direct Relationship Model Fitting

Table 4.8 indicates the three study variables which are mobile banking, internet banking and electronic fund transfer affect the operational efficiency of microfinance banks in Kenya,

with the moderating variable being the CEO experience. The R-squared of the model was 0.459, stipulating that the variation in the operational efficiency can be explained by the digital banking services variables by approximately 45.9%. The analysis indicates an F-statistic of 18.63and a p-value of 0.000 indicating that the model is generally statistically significant at a confidence level of 0.05, this stipulates that the predictor variables jointly impacts the operational efficiency of microfinance banks in Kenya.

The results indicate that an increase by one unit in mobile banking (MB) transacted amount is associated with a unit increase by 0.0234 on the operational efficiency (Y), ceteris paribus. The coefficient indicates a p value of 0.0104 and a t value of 2.2500, meaning that it is highly significant statistically. This suggests that mobile banking plays a role in the improvement of efficiency and as well on streamlining the operations of the microfinance banks in Kenya. The results of the current research study are well understood through the technology acceptance theory, which highlights that the advancement in technology is of great importance in the extent that it explains the reasons as to why the customers embrace and concur with the technological changes (Timbula & Marvadi, 2023). This is a clear indication that customers embrace technology to save time to undertake transactions rather than not visiting the banking halls, thus indicating that customers and users of mobile banking embraces technological changes.

On the other hand, internet banking shows a p value of 0.0010 and a t value of 3.6500 at a significance level of 5%, indicating that the relationship with operational efficiency is positively and statistically significant. The coefficient of internet banking is 0.0465, this implies that, ceteris paribus, improvement on the amount internet banking transaction by one unit leads to an increase on the operational efficiency by 0.0465. Internet banking indicates a higher implicit on the operational efficiency compared to the other two digital banking services. Showcasing its importance on the overall performance of the microfinance bank. The results

of this research are in accordance to the diffusion of innovation theory. This model's aim is to clarify the various ways by which different customers can spread innovation over a period of time (Kariuki & Mangana, 2024). The main goal of this model is to give a clear explanation on how fast new technology proliferate across the globe and how different avenues onto which digital innovations are spread from one demographic to another (Mori & Mlambiti, 2020).

Likewise, electronic banking transfer shows a p value of 0.0030 and a t value of 3.1200 at a significance level of 5%, implying a positively and significant relationship with the operational efficiency. The coefficient is 0.0269, this indicates that the operational efficiency improves with 0.0269 when the electronic fund transfers transaction increases with one unit, ceteris paribus. This affirms that large value payments through electronic transfers plays a very vital role on the improvement of the bank's efficiency. Similarly, the study findings are in line with the technology acceptance theory which stipulates that the simplicity of the emerging technological systems and products has a direct relationship with the clients' perceptions (Momani & Jamous, 2017). This is as a result of an increase on the amount transacted through electronic fund transfer platform over the years by the microfinance banks in Kenya, indicating that the customers have embraced the channel. Furthermore, the research findings concurred with the diffusion of innovation theory which aims to clarify the various ways by which different users can spread innovation over a period of time (Kariuki & Mangana, 2024). Thus the adoption of electronic fund transfer platforms have helped the microfinance banks to embrace and offer services timely to the different customers over a period of time.

The model's constant term indicates a coefficient of 0.7022 at a significance level of 5% and highly significant with a p value of 0.0000, it indicates the expected operational efficiency on a baseline level when the predictor variables are zero hypothetically. Thus, it is very independent of the digital channel's transacted amount.

Conclusively, there is a strong evidence from the regression analysis that the digital banking services are very vital factors of the operational efficiency of the microfinance banks in Kenya. This is as result of the operational efficiency being positively and statistically impacted by mobile banking, internet banking and the electronic fund transfer. The variable with the highest predictive power is internet banking then electronic fund transfer follows and then the mobile banking. The importance of digitalizing services in the banking sector is underscored through the overall model's significance and its capacity to interpret a significant element of the variation in operational efficiency.

Therefore, the models' regression equation is as indicated below;

$$\mathbf{Y_{it} = 0.7022 + 0.0234X_{1it} + 0.0465X_{2it} + 0.0269X_{3it} + \varepsilon_{it}}$$ **……Model 1**

$\mathbf{Y_{it}}$ = Operational Efficiency (Y) of a microfinance bank over time.

$\mathbf{X_{1it}}$ = Mobile Banking (MB) Volumes over time.

$\mathbf{X_{2it}}$ = Internet Banking (IB) Volumes over time.

$\mathbf{X_{3it}}$ = Electronic Fund Transfer Volumes (EFT) over time.

Table 4. 2: Model Fitting.

TABLE 4.8:

Direct Relationship Regression

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
MB	0.0234	0.0104	2.2500	0.0280	0.0026	0.0443	**

IB	0.0465	0.0127	3.6500	0.0010	0.0211	0.0720	***
EFT	0.0269	0.0086	3.1200	0.0030	0.0097	0.0441	***
Constant	0.7022	0.0141	49.6300	0.0000	0.6740	0.7305	***
Mean dependent var	0.799	SD dependent var	0.047				
R-squared	0.459	Number of obs	70				
F-test	18.63	Prob > F	0.0000				
Akaike crit. (AIC)	-265.6	Bayesian crit. (BIC)	-256.63				

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

4.7.2 Moderation Effect Model Fitting.

Under this extended regression analysis, we are testing not only how the digital banking services influence operational efficiency of microfinance banks in Kenya, but also the moderation of the CEO's experience on the effect of mobile banking, internet banking and electronic fund transfer on the efficiency. The model indicates a strong explanatory power with an R-squared of 0.7080, stipulating that the model's interaction and independent variables explains approximately 70.80% of the variance in operational efficiency. Moreover, the F-statistic value is 21.459 and a p-value of 0.0000 indicating that the model is highly significant statistically at a confidence interval of 1%. Therefore, this confirms that the overall model can be relied as a predictor of operational efficiency, and predictors collectively influence operational efficiency. The findings of the research were in line with the upper echelons theory, which stipulates that the firm's performance and the strategic decisions are partly influenced by the managerial attributes of the top management including the CEO (Ali et al., 2022). Further, the upper echelons theory argues that long-tenured CEO are more committed to serving the organization which in return improves the operational efficiency and the performance of the institution (Ali et al., 2022). Moreover, the chief executive officer's career experience instigates that he has already mastered mindsets, philosophies and inclinations from

his prior roles which in return can influence policy formulation process, analytical evaluations, strategic plans, operational efficiency and the performance of the organization (Ali et al., 2022).

The individual variables analysis indicates that mobile banking has a coefficient of -0.0346 and a p-value of 0.1760. This suggest that mobile banking statistically insignificant at a confidence level of 0.05. Thus, there is no significant by mobile banking on the operational efficient, when the CEO experience is zero. Likewise, the internet banking indicates a coefficient of -0.0105 and a p-value of 0.7040. Thus, negative and statistically insignificant, stipulating that internet banking have no significant effect on the operational efficiency, when the CEO experience is zero. On the other hand, electronic fund transfer has a coefficient of -0.0579 and a p-value of 0.0070, stipulating that it is negatively and statistically significant. An increase with one unit in the transactions through electronic fund transfer is associated with a decrease in operational efficiency with 0.0579, when the CEO experience is zero.

The interactions between the CEO experience and mobile banking (EMB) shows a coefficient value of 0.0406 and a p-value of 0.0910, this indicates that is positive and marginally statistically significant at a confidence interval of 1% ($p< 0.1$). This stipulates that as the CEO's experience increases, the mobile banking's negative relationship with the operational efficiency becomes less negative or weaker. Likewise, the interaction between internet banking and the CEO experience (EIB) indicates a coefficient of 0.0616 and a p-value of 0.0098, this implies that is positively and statistically significant at a confidence interval of 5%. This stipulates that the benefits of internet banking seem to be leveraged better by CEOs who are more experienced.

Moreover, the interaction between the CEO experience and the electronic fund transfer (EEFT) shows a coefficient of 0.0809 and a p-value of 0.0000, this implies that the interaction is positively and highly statistically significant. Thus, signifying that there is a reduction on the

negative relationship between the operational efficiency and the electronic fund transfer or certainly becomes positive when there is an increase on the CEO's experience. Thus suggesting that utilization of EFT is more effective under more experienced CEOs, subduing the negative effect detected when the CEO experience was zero.

In conclusion, a complex but on the other hand an insightful picture is provided by the regression analysis. The primary effects indicate that digital banking services and the CEO experience (when the experience is zero) might have a relationship with the operational efficiency which is insignificant or negative, there is a powerful moderating effect revealed by the interaction variables. CEOs who are more experienced are more productive on the implementation of this digital banking services so as to improve on the operational efficiency as implied by the significant and positive interaction terms for electronic fund, mobile banking and internet banking. A combination of the positive interaction effects and the main negative effects indicates that digital banking services contributes to the improvement of the efficiency when combined with a leadership that is experienced. Therefore, adoption of digital banking services is not just enough but also the CEOs' expertise is a very critical element in the ability of the microfinance banks to leverage on these investments.

Hence, the model's regression equation is:

$$\mathbf{Y_{it} = 0.8926 - 0.0346X_{1it} - 0.0105X_{2it} - 0.0579X_{3it} - 0.1734E + 0.0406EX_{1it} + 0.0616EX_{2it} + 0.0809EX_{3it} + \varepsilon_{it}}$$ **……Model 2**

$\mathbf{Y_{it}}$ = Operational Efficiency (Y) of a microfinance bank over time.

$\mathbf{X_{1it}}$ = Mobile Banking (MB) Volumes over time.

$\mathbf{X_{2it}}$ = Internet Banking (IB) Volumes over time.

$\mathbf{X_{3it}}$ = Electronic Fund Transfer Volumes (EFT) over time.

E = CEO Experience (Moderating Variable)

Table 4. 3: Model Fitting (With Moderating Variable)

TABLE 4.9:

Model Fitting (With Moderating Variable)

Y	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
MB	-0.0346	0.0252	-1.3700	0.1760	-0.0851	0.0159	
IB	-0.0105	0.0276	-0.3800	0.7040	-0.0658	0.0447	
EFT	-0.0579	0.0206	-2.8100	0.0070	-0.0992	-0.0166	***
E	-0.1734	0.0292	-5.9400	0.0000	-0.2318	-0.1150	***
E_MB	0.0406	0.0236	1.7200	0.0910	-0.0066	0.0878	*
E_IB	0.0616	0.0258	2.3800	0.0200	0.0098	0.1133	**
E_EFT	0.0809	0.0186	4.3500	0.0000	0.0437	0.1181	***
Constant	0.8926	0.0343	26.0100	0.0000	0.8240	0.9612	***
Mean dependent var	0.7990	SD dependent var	0.0470				
R-squared	0.7080	Number of obs	70.0000				
F-test	21.4590	Prob > F	0.0000				
Akaike crit. (AIC)	-300.8110	Bayesian crit. (BIC)	-282.8230				

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

4.7.3 Hypothesis Testing

The first research hypothesis was **H_{01}**: Internet banking has no significant effect on the operational efficiency of microfinance banks in Kenya. The research findings in table 4.7 the internet banking had a p-value of 0.0010 indicating that the p value is less than 0.05 ($p<0.05$). Thus stipulating that internet banking have a significant effect on the operational efficiency of microfinance banks in Kenya. Thus rejecting the developed research hypothesis **H_{01}.** This was in line with a study conducted by Okiro and Ndung'u (2013), a study that established a positive correlation between internet banking and the efficiency. The study established that, due to the technology advancement and digitalization of services by the financial institutions, it has

become very prevalent on the digitalization of services like the adoption of internet banking globally.

The second research hypothesis was **H_{02}**: Mobile Banking has no significant effect on the operational efficiency of microfinance banks in Kenya. The research findings in table 4.7 the mobile banking had a p-value of 0.0280 indicating that the p value is less than 0.05 ($p<0.05$). Thus stipulating that Mobile Banking have a significant effect on the operational efficiency of microfinance banks in Kenya. Thus rejecting the developed research hypothesis **H_{02}.** The results align with the study carried out by Uwamariya et al., (2020). The study findings indicated that mobile banking helped on improving the efficiency and performance of microfinance institutions.

The third research hypothesis was **H_{03}**: Electronic Fund Transfer has no significant effect on the operational efficiency of microfinance banks in Kenya. The research findings in table 4.7 the electronic fund transfer had a p-value of 0.0030 indicating that the p value is less than 0.05 ($p<0.05$). Thus stipulating that Electronic Fund Transfer have a significant effect on the operational efficiency of microfinance banks in Kenya. Thus rejecting the developed research hypothesis **H_{03}.** The findings of this study is in concurrence with a study carried out by Nalyanya et al., (2021), which concluded that there was a moderate strong positive relationship between the electronic fund transfers and service delivery of financial institutions. Therefore, recommendations from the study was that financial institutions should embrace electronic fund transfers so as to enhance service delivery to their customers.

The fourth research hypothesis was **H_{04}**: There is no significant moderating effect of CEO experience on the relationship between Digital Banking Services and Operational Efficiency of Microfinance Banks in Kenya. The research findings in table 4.8 the CEO Experience had a p-value of 0.0000 indicating that the p value is less than 0.05 ($p<0.05$). Thus

stipulating that CEO experience have a significant moderating effect between the digital banking services and the operational efficiency of microfinance banks in Kenya. Thus rejecting the developed research hypothesis **H_{04}.** This concurs with the findings from a study carried out by Aliyu et al., (2024), which indicated that the moderating role of the CEO experience strongly cements the relationship between the capital management and the firm's profitability. Thus, concluding that the institutions should fully utilize the CEO's experience in the institution's operations so as to enhance the operational efficiency of the microfinance banks.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction

The summary of the findings, recommendations and conclusions of the study is discussed in details under this chapter. Guided by the research objectives, the chapter commences with the results' summary, focusing on the effect of internet banking, mobile banking and electronic fund transfer on the operational efficiency of microfinance banks in Kenya. The chapter also highlights the moderating role of the CEO experience and the conclusions deduced from the research findings. To guide the microfinance banks, scholars and policy makers, the research provides recommendations which are policy oriented and as well a practical on the enhancement of the digital banking services for the improvement on the operational efficiency. Finally, future research areas are also identified in this chapter, limitations of the study and further academic inquiry's directions are also suggested.

5.2 Summary.

5.2.1 Internet Banking and Operational Efficiency.

One of the research objectives for this study was to investigate the effect of internet banking on the operational efficiency of microfinance banks in Kenya. A positive relationship was stipulated between the two as per the research study's results. The study's results were also in line with the study carried out by Kinyua (2018), which indicated that there was a positive relationship between the efficiency and the adoption of internet banking. The study concluded that the financial institutions should embrace internet banking services to improve on the productivity and the efficiency so as they can thrive competitively in the market.

Moreover, the study results also indicated that there is a positive relationship between internet banking and the operational efficiency of microfinance banks in Kenya. The study also

established that over the years, there have been an increase on the usage and adoption of internet banking. It is very crucial to understand that it's not only the financial terms that can be used to measure the Microfinance banks' performance (Eman, 2017). The regression models' coefficients that have been established, forms the base of the research findings. Therefore, the study indicates that internet banking is statistically significant and affects the operational efficiency of Microfinance banks in Kenya.

Microfinance banks have experienced losses due to high staffing costs and non-performing loans and from the study, the adoption of internet banking helps a lot in the enhancement of the operational efficiency thus resulting to expense cutbacks. Therefore, microfinance banks should ensure that the customers are well informed on the usage of internet banking so as to improve on the spread of the services form one customer to another. Further, the results of this study was also in concurrence with the technology acceptance theory which stipulates that that the operationalization of the technological system is strongly instituted by the customer's knowledge, perception, knowhow and the ability to use the system (Momani & Jamous, 2017).

5.2.2 Mobile Banking and the Operational Efficiency.

The second research objective for this study to establish the effect of mobile banking on the operational efficiency of microfinance banks in Kenya. The findings indicated that the relationship between mobile banking and the operational efficiency is highly significant statistically. This suggests that mobile banking plays a role in the improvement of efficiency and as well on streamlining the operations of the microfinance banks in Kenya. The moderating role of the CEO experience indicated a significant effect with microfinance banks with more experienced CEOs that have adopted mobile banking channels indicating a more and better efficiency and as well service delivery compared to the institutions with the less experienced ones.

Similarly, in a study carried out by Kinyanzui et al., (2018), the findings and results of the study indicated that the operational efficiency of banks in Kenya increased as a result of mobile credit adoption. Furthermore, a study by Morshed et al., (2021), indicated that that mobile banking had a positive effect and significant on the Islamic Microfinance Institutions' performance and efficiency in Bangladesh. This stipulates the importance of adopting mobile banking services to streamline the operations.

The current research study is well understood through the technology acceptance theory, which highlights that the advancement in technology is of great importance in the extent that it explains the reasons as to why the customers embrace and concur with the technological changes (Timbula & Marvadi, 2023). This is a clear indication that customers embrace technology to save time to undertake transactions rather than not visiting the banking halls, thus indicating that customers and users of mobile banking embraces technological changes. This is as result of mobile banking charges being lower compared to the over the counter charges. Moreover, the volume transacted through mobile banking have increased overtime according to these study findings. Therefore, it is of great importance for microfinance banks to embrace mobile banking services to enhance the operational efficiency and as well improve services delivery to the customers. In return boosting the customers' confidence.

5.2.3 Electronic Fund Transfer and Operational Efficiency.

The third specific objective for this research was to find out the effect of electronic fund transfers on the operational efficiency of microfinance banks in Kenya. The study indicated that there was a positive relationship between electronic fund transfers and the operational efficiency of microfinance banks in Kenya. The moderating role of the CEO experience indicated a significant effect with microfinance banks with more experienced CEOs that have adopted electronic fund transfer channels indicating a more and better efficiency compared to the institutions with the less experienced ones.

The findings of this study is in concurrence with a study carried out by Nalyanya et al., (2021), which concluded that there was a moderate strong positive relationship between the electronic fund transfers and service delivery of financial institutions. Therefore, recommendations from the study was that financial institutions should embrace electronic fund transfers so as to enhance service delivery to their customers. Similarly, according to a study undertaken by Mayanja and Omwono (2022), the results and the findings of the study concluded that there was a positive significance on the relationship between the customer satisfaction and the adoption of Electronic Fund Transfer.

Furthermore, Olungas (2016) carried out a research study on the relationship between electronic banking and financial performance of Kenya's microfinance institution in Nairobi County. The results and findings of the study indicated that electronic banking had a positive effect on the financial performance of Microfinance institution in Nairobi County. This cements the effect of electronic fund transfers adoption among the financial institutions.

Similarly, the study findings are in line with the technology acceptance theory which stipulates that the simplicity of the emerging technological systems and products has a direct relationship with the clients' perceptions (Momani & Jamous, 2017). This is as a result of an increase on the amount transacted through electronic fund transfer platform over the years by the microfinance banks in Kenya, indicating that the customers have embraced the channel. Furthermore, the research findings concurred with the diffusion of innovation theory which aims to clarify the various ways by which different users can spread innovation over a period of time (Kariuki & Mangana, 2024). Thus the adoption of electronic fund transfer platforms have helped the microfinance banks to embrace and offer services timely to the different customers over a period of time.

5.2.4 Digital Banking Services, CEO Experience and Operational Efficiency.

CEO experience materialized as a substantial moderator in the relationship between digital banking services and the operational efficiency among the microfinance banks in Kenya. The study findings indicate that the microfinance banks with more experienced CEOs have an upper hand in terms of the efficiency and performance level of the institution. Thus, a combination of the positive interaction effects and the main negative effects from indicates that digital banking services contributes to the improvement of the efficiency when combined with a leadership that is more experienced. This concurs with the findings from a study carried out by Aliyu et al., (2024), which indicated that the moderating role of the CEO experience strongly cements the relationship between the capital management and the firm's profitability. Thus, concluding that the institutions should fully utilize the CEO's experience in the institution's operations so as to enhance the operational efficiency of the organization.

Operationally, banks with experienced top management benefits from having departments which are specialized and as well a workforce that is dedicated on ensuring that the implementation of the digital banking services is successful. This can be made possible through the utilization of the limited available resources to integrate and implement the digital banking services. The CEO utilizes his expertise and experience on ensuring that the IT department integrates the digital banking services with the various services and products offers so as to enhance and improve the operational efficiency of the institution. On the other hand, the CEO can task the IT department on the implementation and upgrading of the digital banking services on a stipulated timeline so as to streamline the operations on a timely basis without glitches.

Finally, the results from the regression analysis indicated a positive moderation effect of the CEO's experience on the relationship between the digital banking services and the operational efficiency. Microfinance banks with more experienced top management not only

play a role on the implementation and the integration of the digital banking services but also experience a higher efficiency from the services. The results echo the conclusions from a study by Buyl et al., (2011), which indicated that there was a moderating effect of certain CEO's characteristics including the CEO's experience on the relationship between the firm's performance and the functional diversity of the top management team background. Thus, the adoption of digital banking services is not just enough but also the CEOs' expertise is a very critical element in the ability of the microfinance banks to leverage on these investments.

5.3 Conclusions.

The aim of this study was to examine the influence of digital banking on the operational efficiency of microfinance banks in Kenya, the moderating variable being in introduced as the CEO experience. The study concluded that the digital banking services are statistically significant with the operational efficiency of the microfinance banks in Kenya. The mobile banking statistically and significantly affects the operational efficiency of microfinance banks in Kenya. Thus, the correlation analysis indicated that there was a positively significant relationship between the mobile banking and the operational efficiency of the microfinance banks in Kenya. An indication that the operational efficiency is enhanced through an increase on the amount transacted using mobile banking platform.

Moreover, the study also concluded that there is a significant effect by the internet banking on the operational efficiency of microfinance banks in Kenya. The correlation analysis findings indicated that there is a positively significant relationship between the internet banking and the operational efficiency of the microfinance banks in Kenya. Thus, the operational efficiency of the microfinance banks improves with an increase in the amount transacted through internet banking.

Furthermore, the study concludes that electronic fund transfer has a significant effect on the operational efficiency of microfinance banks in Kenya. The findings as per the correlation analysis indicates that the electronic fund transfer have a positive relationship with the operational efficiency of microfinance banks in Kenya. Similarly, an increase on the amount transacted through electronic fund transfers results to an improvement on the operational efficiency of microfinance banks in Kenya.

The research findings also indicated that the moderating of the CEO experience indicated an important and a significant moderating effect on the study parameters thus influencing the operational efficiency of the microfinance banks in Kenya. Therefore, the findings stipulated that the CEO experience is a very vital factor that moderates the efficiency of the microfinance banks in Kenya. In conclusion, the microfinance banks should also take into consideration to other factors like the top management trait when adopting the digital banking services since they play a very key role in the implementation and the integration of the services.

5.4 Limitations of the Study.

This research paper was limited to 5 years' period between the financial years 2020 to 2024. An indication that a longer periods results may differ with the current study's period analysis. The research was also limited to the reality that other factors also affect the operational efficiency of microfinance banks in Kenya. Factors like the banks' size, regulations from the government and various macro-economic factors in Kenya. Therefore, digital banking services does not perform in isolation. Rather, the operational efficiency of microfinance banks in Kenya is influenced by a consolidation of all this factors together. Therefore, to overcome this limitation the operational efficiency of microfinance banks was contemplated without isolating other factors.

5.5 Recommendations of the Study.

The main aim of this study was seeking to establish the relationship between digital banking services and the operational efficiency of microfinance banks in Kenya with the CEO experience as moderator. The findings from the study can aid to foreknowledge in both theoretically and practically as indicated in the discussions below.

5.5.1 Recommendations for policy

Recommendation from the study is that the CBK, as the microfinance banks regulator, should increase on the regulatory support through a continuous development of policies and regulations that encourages the adoption of digital financial services and strategies to promote the operational efficiency, financial inclusion, customer centered and the performance of microfinance banks in Kenya. For example, an increase on the limit amount a customer can transact through mobile banking platforms like the MPESA in a day can improve the usage and the amount transacted through the digital banking services even by the microfinance banks. Also, the regulations on the cryptocurrency exchanges can aid on the expansion of digital payment wallets. The microfinance banks should also ensure that proper sensitization to the customers on the usage and the importance of the digital banking services in place and done regularly.

The regulators should also advice end encourage the institutions to embrace the appointment of top management leaders who have a proven record on digital transformation and management of resources and finances since the operational efficiency is significantly influenced by the CEO experience. The study can also recommend programs and standard certifications on executive leaderships through a joint partnership between the Central Bank of Kenya and the Association of Microfinance Institutions in Kenya so as to harness and encourage the top management leadership and the CEOs to embrace and adapt to any changes on the regulatory frameworks and advancement on technology in the banking industry.

Furthermore, the policy makers should promote and as well encourage the institutions of higher learning, the banking industry regulators and the fintech companies to form a partnership with the aim of a continuous research. This will play a very vital role on providing contemporary insights on the collaborative influence between the developing digital banking landscape and the dynamics on the CEO governance on the microfinance banks' operational efficiency.

5.5.2 Recommendations for Practice.

The study also recommends that the microfinance banks should consistently adopt and embrace the use of digital banking services so as to improve on the efficiency and as well the overall performance of the organization. Additionally, more resources should be allocated on the strategies that aid on the improvement and enhancement of the digital banking services to improve on the service delivery to the customers. The microfinance banks should also consider investing on high end security measures like hiring experienced staff who can monitor and prevent cybersecurity threats like hacking and spoofing in return boosting customers' confidence level. Additionally, the institutions should also consider using complex security systems and software to mitigate the same threats. Therefore, the study recommends that the microfinance banks in Kenya should adopt and invest on the digital banking services taking into consideration on the top management leadership traits in order to foster and enhance the efficiency and the performance of the organization.

Moreover, the study also recommends that the microfinance banks can enter into a partnership with the fintech companies and as well the providers of technology so as to improve on the operational efficiency and as well on the level of innovation. Payment systems which are more advanced, credit scoring models which are AI driven and a centralized database record keeping can be enhanced and accelerated through such collaborations between the institutions. Furthermore, the microfinance banks can improve on the customer satisfaction, needs and

devotion through personalization of services, seeking feedbacks regularly from the clients and embracing the users testing especially when implementing and formulating the digital banking services and products.

5.5.3 Recommendations for Theory.

Digital trust connection to the operational efficiency in the banking industry should be advanced through theoretical suggestions and recommendations by the future scholars. An integration on the theoretical future models between the resource-based view theory and the theory of technological innovation can help to understand and offer an explanation on how the adoption of technology and the experience of the top management leadership influence the operational efficiency jointly. Furthermore, the fusion of the diffusion of innovation theory, technology acceptance theory and the upper echelons theory through the formulation of a hybrid theoretical structure can help to explain how the top management experience and adoption of technology shape and influence the operational efficiency jointly. This can offer a very insightful picture moving beyond the secluded theories in the comprehension on the transformation of technology and the performance of the microfinance banks in the growing markets.

5.6 Suggestions for Further Study.

The main aim of the study was to assess the effect of digital banking services on the operational efficiency of microfinance banks with the CEO experience as the moderating variable. The indicated that digital banking services have a positive effect on the operational efficiency of microfinance banks and the CEO experience plays a key role on the moderation of the study parameters. A study can be carried out on the factors limiting the adoption of digital banking services by the microfinance banks in Kenya. This will aid in making policies that will encourage the adoption of the digital banking services by other financial institutions. The study also recommends a further study on the relationship between digital banking services

and the efficiency of other financial institutions like the digital credit providers or the SACCOs. This is because the majority of the studies that have been reviewed previously focused mostly on the commercial banks.

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APPENDICES

APPENDIX I: Microfinance Banks in Kenya.

1	Branch (formerly Century Microfinance Bank Limited)
2	Caritas Microfinance Bank Limited
3	Choice Microfinance Bank Limited
4	Umba Microfinance Bank Limited
5	Faulu Microfinance Bank Limited
6	Kenya Women Microfinance Bank PLC
7	LOLC (formerly Key Microfinance Bank PLC)
8	Sumac Microfinance Bank Limited
9	U & I Microfinance Bank Limited
10	Rafiki Microfinance Bank Limited
11	Salaam Microfinance Bank (formerly Uwezo Microfinance Bank Limited)
12	SMEP Microfinance Bank Limited
13	Muungano Microfinance Bank PLC
14	On it Microfinance Bank Ltd (formerly Maisha Microfinance Bank Limited

Source: CBK 2025

APPENDIX II Data Collection Matrix

ID	YEAR	Total Amount Transacted Through Internet Banking	Total Amount Transacted Through Mobile Banking	Total Amount Transacted Through Electronic Fund Transfer	Total Number of Years in the Executive Position.	Operational Costs	Total Operating Income
1	2020						
1	2021						
1	2022						
1	2023						
1	2024						
2	2020						
2	2021						
2	2022						
2	2023						
2	2024						

APPENDIX III: BUDGET

Item	Description	Estimated Cost (KES)
Data Collection	Survey distribution and data gathering costs	11,000
Printing and Stationery	Printing surveys, consent forms, and stationery for data collection	4,000
Transportation	Travel costs for field visits to the microfinance banks	20,000
Data Analysis Software	Basic software license for data analysis (e.g., Excel, SPSS)	3,000
Research Assistant Fee	Payment for temporary assistant support for data entry	9,000
Communication	Phone and internet costs for coordinating with respondents	6,000
Miscellaneous	Contingency funds for unexpected expenses	7,000
Report Printing	Printing final report copies for submission	5,000
Total		**65,000**

APPENDIX IV: Work plan of the Activities

	APRIL/MAY	JUNE/JULY	JULY/AUG	AUG/SEPT
Proposal development				
Proposal submission				
Data collection				
Data entry and Analysis				
Thesis writing				
Thesis submission and examination				

APPENDIX V: ETHICAL CLEARANCE LETTER

Thika Road, Ruaraka
P.O. Box 56808-00200 Nairobi Kenya
Pilot Line: +254 20 8070408/9

Tel: +254 20 3537842
Fax: +254 20 8561077
Mobile: +254 734 888022, 710 888022
Email: kca@kca.ac.ke
Website: www.kca.ac.ke

KCA UNIVERSITY SCIENTIFIC & ETHICS REVIEW COMMITTEE

REF: KCAU/SERC/ SOB0175 Date: 21ST JULY 2025

TO: WACHIRA MOSES MUNDIA (19/04534)

Dear Sir/Madam,

RE: DIGITAL BANKING SERVICES, C.E.O EXPERIENCE AND THE OPERATIONAL EFFICIENCY OF MICROFINANCE BANKS IN KENYA

This is to inform you that KCA University Scientific Ethics Review Committee (KCAUSERC) has reviewed and approved your above research proposal. Your application approval number is *KCAUSERC/SOB0175*. The approval period is *21st July 2025 – 21st July, 2026.*
This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by *KCAUSERC.*
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KCAU*SERC* within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to *KCAUSERC* within 72 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to *KCAUSERC.*

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely

Dr. Caroline Ntara
Chairperson
KCA University Scientific & Ethics Review Committee

APPENDIX VI: DISCLAIMER FORM FOR SECONDARY DATA COLLECTION

KCA UNIVERSITY SCIENTIFIC AND ETHICS REVIEW COMMITTEE

DISCLAIMER FORM FOR PRINCIPAL INVESTIGATORS (PIS) COLLECTING SECONDARY DATA

This Disclaimer Form serves to release the Scientific and Ethics Review Committee (SERC), KCA University, and the National Commission for Science, Technology, and Innovation (NACOSTI) from any liability concerning the unlawful or unethical use of data collected by the Principal Investigator (PI) in their research. By signing this form, the Principal Investigator acknowledges and agrees to comply with all relevant data protection laws, including the Data Protection Act of Kenya and other applicable regulations.

1. Acknowledgment of Liability

The Principal Investigator (PI) acknowledges and agrees that the Scientific and Ethics Review Committee (SERC) of KCA University and NACOSTI shall not be held liable or responsible for any unlawful, unethical, or unauthorized use of the data collected as part of the research project. The PI is solely responsible for ensuring that the data is collected, stored, and processed in compliance with all applicable data protection laws.

2. Compliance with Data Protection Laws

The PI is required to adhere to the following data protection laws in the collection, storage, and processing of data in Kenya:

- **Kenya Data Protection Laws**:
    - The PI must ensure compliance with the *Data Protection Act of 2019* of Kenya, which governs personal data collection, processing, and storage.
    - The PI is responsible for obtaining informed consent (Where applicable) from research participants and ensuring that personal data is collected for legitimate purposes, stored securely, and used only in accordance with the stated purposes.
    - The PI must implement appropriate security measures to protect personal data from unauthorized access or misuse, and ensure that data is only retained for as long as necessary.

3. Liability Release and Disclaimer

The PI agrees that the Scientific and Ethics Review Committee (SERC) and KCA University are not liable for any actions taken by the PI that are in violation of applicable laws. This includes, but is not limited to, the misuse, unauthorized disclosure, or improper handling of data that is in violation of the laws outlined above.

Additionally, the PI agrees that NACOSTI, as the regulatory body overseeing scientific research in Kenya, shall not be held liable for any breaches or failures in compliance resulting from actions taken by the PI, including any unauthorized use of data.

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4. Data Use and Research Details

The PI is required to provide specific details about the data to be collected in the sections below:

- **Type of Data**
  (Please describe the nature of the data to be collected, e.g., personal, sensitive, demographic, health data, etc.):

The data to be collected for this study will primarily consist of secondary data, which may include demographic, financial, and operational performance indicators of microfinance banks in Kenya. The study will focus on metrics related to digital banking services, C.E.O experience, and operational efficiency.

- **Purpose of Data Collection**
  (Please explain the primary objectives of the research and how the data will be used):

The primary objective of the research is to investigate the relationship between digital banking services, CEO experience, and the operational efficiency of microfinance banks in Kenya. The data collected will be used to analyze patterns, correlations, and potential causal links among these variables to determine how leadership experience and the adoption of digital banking influence institutional performance. The findings will provide empirical insights to inform policy recommendations, guide strategic decisions within the microfinance sector, and contribute to academic discourse on financial inclusion and digital transformation in developing economies.

- **Method of Data Collection**
  (Please specify the methods that will be used to collect data, e.g., surveys, interviews, observations, etc.):

The study will utilize a quantitative research approach based on the collection of secondary data from reputable and publicly accessible sources such as the Central Bank of Kenya (CBK) reports, audited financial statements of microfinance banks, and industry publications.

- **Data Storage**
  (Please describe how and where the data will be stored, including any digital or physical storage methods used to ensure security):

All data used in this research will be stored electronically on a password-protected computer and backed up on an encrypted external storage device to ensure data integrity and security. The data will be organized in structured files with restricted access, available only to the researcher and academic supervisor.

- **Data Access**
  (Please specify who will have access to the data during and after the research process):

Access to the data will be strictly limited to the principal researcher conducting the study. During the research process, no other individuals will have permission to view, modify, or handle the data. In the event that guidance is required from an academic supervisor, only anonymized or aggregated data will be shared for review purposes. After the completion of the research, the data will be securely archived by the researcher and will not be made available to third parties unless required for academic verification or publication, in which case all identifying information will be removed to ensure confidentiality.

- **Retention Period**
  (Please indicate how long the data will be kept and the conditions under which it will be disposed of or anonymized):

The collected data will be retained for a period of five years following the completion of the research to allow for possible academic review, publication, or replication of the study. During this period, the data will remain securely stored in encrypted digital format, accessible only to the principal researcher. After the five-year retention period, all data files containing identifiable or institutional information will be permanently deleted from all storage devices. Any data intended for long-term academic use will be fully anonymized to remove all identifiable references before being archived or shared for scholarly purposes.

5. Consent and Understanding

By signing this form, the PI acknowledges understanding the terms and conditions outlined above, including the legal obligations to adhere to Kenyan data protection laws. The PI understands that they are solely responsible for ensuring the lawful collection, processing, and storage of data.

---

6. Signatures

- **Principal Investigator (PI) Name**: **WACHIRA MOSES MUNDIA**
- **Research Project Title**: **DIGITAL BANKING SERVICES, C.E.O EXPERIENCE AND THE OPERATIONAL EFFICIENCY OF MICROFINANCE BANKS IN KENYA.**
- **Date of Data Collection**: **From 30th July, 2025**
- **Researcher Signature**: 
- **Date**: **25th july, 2025.**

APPENDIX VII: DATA COLLECTION LETTER

Thika Road, Ruaraka
P.O. Box 56808-00200 Nairobi Kenya
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Tel: +254 20 3537842
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Mobile: +254 734 888022, 710 888022
Email: kca@kca.ac.ke
Website: www.kca.ac.ke

BOARD OF POSTGRADUATE STUDIES

KCAU/BPS/2025 *Date: Thursday, August 07, 2025*

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: WACHIRA MOSES MUNDIA- REG NO. 19/04534

It is my distinct pleasure to introduce Wachira Moses Mundia, a student at our institution pursuing a Master of Science in Commerce- Finance & Investment degree within the School of Business.

Moses is conducting research on the topic ***"Digital banking services, C.E.O experience and the operational efficiency of microfinance banks in Kenya."*** which is part of the requirements of the program he is pursuing. The research as well as the data procured thereof shall be used for academic purposes only. Any assistance accorded to him is highly appreciated.

In case of further inquiry, do not hesitate to contact the undersigned.

Yours faithfully,

DR. JACKSON NDOLO
DIRECTOR, BOARD OF POST GRADUATE STUDIES

APPENDIX VIII: NACOSTI INTRODUCTORY LETTER

Thika Road, Ruaraka
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Tel: +254 20 3537842
Fax: +254 20 8561077
Mobile: +254 734 888022, 710 888022
Email: kca@kca.ac.ke
Website: www.kca.ac.ke

BOARD OF POSTGRADUATE STUDIES

KCAU/BPS/2025 *Date: Thursday, August 07, 2025*

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION (NACOSTI)
P.O BOX 30623-00100
NAIROBI

Dear Sir/Madam,

RE: WACHIRA MOSES MUNDIA- REG NO. 19/04534

It is my distinct pleasure to introduce Wachira Moses Mundia, a student at our institution pursuing a Master of Science in Commerce- Finance & Investment degree within the School of Business.

Moses is conducting research on the topic *"Digital banking services, C.E.O experience and the operational efficiency of microfinance banks in Kenya."* His study has been reviewed and approved by the University's Ethics Review Committee, Certificate No. KCAU/SERC/SOB0175. The Approval period is from 21st July 2025 to 21st July 2026.

Any assistance accorded to him is highly appreciated.

Yours faithfully,

DR. JACKSON NDOLO
DIRECTOR, BOARD OF POST GRADUATE STUDIES

APPENDIX IX: RESEARCH LICENSE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **592664**

Date of Issue: **25/August/2025**

RESEARCH LICENSE

This is to Certify that Mr.. Moses Mundia Wachira of KCA University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: DIGITAL BANKING SERVICES, C.E.O EXPERIENCE AND THE OPERATIONAL EFFICIENCY OF MICROFINANCE BANKS IN KENYA. for the period ending : 25/August/2026.

License No: **NACOSTI/P/25/4178930**

592664

Applicant Identification Number

Ag. Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions