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

BY

HANI MOHAMED

UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

SUMMER 2019
EFFECT OF MOBILE BANKING ON THE FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA.

BY

HANI MOHAMMED

A Project Report Submitted to the Chandaria School of Business in Partial Fulfillment of the Requirement for the Degree of Masters in Business Administration (MBA)

UNITED STATES INTERNATIONAL UNIVERSITY-AFRICA

SUMMER 2019
STUDENT’S DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the United States International University in Nairobi for academic credit.

Signed: ______________________  Date: ______________________

Hani Mohamed (ID 654459)

This research project has been presented for examination with my approval as the appointed supervisor.

Signed: ______________________  Date: ______________________

.  Dr. Agnes Ogada

Signed: ______________________  Date: ______________________

.  Dean, Chandaria School of Business
COPYRIGHT

All rights reserved. No part of this proposal may be produced or transmitted in any form or by any means, electronic, mechanical, including photocopying, recording or any information storage without prior written permission from the author.

© Copyright by Hani Mohammed, 2019
ABSTRACT

The study focused on investigating the effect of mobile banking on financial performance of commercial banks. Specifically, the study aimed to: establish the effect of mobile banking access has on the financial performance of commercial banks, establish the effect of mobile banking loans on financial performance of commercial banks, and establish the effect of mobile banking risks on financial performance of commercial banks.

The study employed descriptive research designs. The targeted population for the study comprises of senior employees of (43) commercial banks licensed under the Central Bank of Kenya. Simple random sampling was used to draw a sample of three hundred and thirty five employees of commercial banks. Primary data was gathered through structured questionnaires which were administered in person. Whereas, secondary data was retrieved from the publications from the Central Bank of Kenya, Communication Authority, and the Kenya Bankers Association. Data analysis was performed through SPSS Version 22.0. Descriptive statistics was expressed as frequencies, percentages, mean, mode, and median. Inferential statistics was presented through regression analysis and Pearson Correlations. Simple linear regression between each of the three and the dependent variable was performed. Output of the findings was presented in the form of, charts, tables and figures.

Regarding the first study objective, the study revealed that mobile banking access and financial performance of commercial banks have a strong positive correlation (r = 0.677, p<0.05). It was found that clients had access to mobile banking 24/7, reduction it time required to make banking transaction, ease of transacting through mobile banking, limitation of physical barriers in conducting financial transactions including remote areas, and the overall aim of service delivery in financial transactions were key to the success of mobile banking.

The second research objective sought to establish the effect of mobile loans on financial performance. Results suggested a very weak positive correlation. The Pearson correlation coefficient value was r= 0.531 and the significance level p<0.05, implying a significance of the findings at 5% significance level. The findings generally revealed that banks are increasingly innovating digital lending platforms as an alternative to provide clients with quicker loans.
Lastly, the third research objective focused on establishing the effect of mobile banking risks on financial performance of commercial banks in Kenya. The findings revealed a significant negative relationship between mobile banking risks and financial performance of commercial banks. The Pearson correlation coefficient value was $r=-0.325$ and the significance level $p< 0.05$ implying significance of the findings at 5% significance level. Poor network coverage in the remote areas was a major obstacle to faster transactions on mobile banking platforms. Backdoor attacks, spywares, malwares, and unauthorized access were major security concerns on mobile banking platforms.

Based on the findings of the first research objective, the study concludes that as commercial bank increases their mobile banking coverage, has enhanced awareness among consumers and trained them on the applications of mobile banking, reducing the threats and risks of mobile banking. This way banks would attract more customers to their banking platforms and therefore improved financial performance. The study concludes that many consumers are embracing digital loans offered by banks, providing an opportunity for the banks to strengthen digital lending as the next strategic source of competitive performance in the bank’s loan portfolio. Lastly, the study concludes that although mobile banking has enhanced financial performance of commercial banks, the risks associated with the internet and technology advancement possess danger to the success of mobile banking.

The study recommends that there is need for banking sector to enter into a partnership arrangement with the telecommunication service providers so that the internet and network coverage countrywide can be strengthened. The study further recommends that commercial banks should invest in consumer awareness with regard to emerging products and services in the mobile banking window. Additionally, the study urges that commercial banks should deploy adequate resources in conducting research that could aid product innovation on existing mobile banking platforms. On the third objective, the study urges that Central Bank of Kenya should ensure adequate implementation of the Guidance Note on Cybersecurity it issued 2017. The guidance laid out the regulatory standards to industry participants on assessment and mitigation of Cybersecurity threats.
ACKNOWLEDGEMENT

First of all I am indebted to the GOD ALMIGHTY for giving me an opportunity to excel in my effort to complete my thesis.

I would like to express my sincere gratitude to my supervisor Dr. Agnes Ogada for providing her invaluable guidance, comments and suggestions throughout the course of the project and constantly motivating me to work hard.

Lastly but not the least, am very grateful to my mum for guiding me in every step I took.
DEDICATION
I dedicate this research project to God Almighty for the gift of life and my family for their love and encouragement.
# TABLE OF CONTENTS

STUDENT'S DECLARATION ........................................................................................................... ii
COPYRIGHT .................................................................................................................................. iii
ABSTRACT .................................................................................................................................... iv
ACKNOWLEDGEMENT ................................................................................................................ vi
DEDICATION .................................................................................................................................. vii
LIST OF TABLES ........................................................................................................................ xi
LIST OF FIGURES ...................................................................................................................... xii
LIST OF ABBREVIATIONS ......................................................................................................... xiii

CHAPTER ONE .......................................................................................................................... 1
1.0 INTRODUCTION ................................................................................................................... 1
1.1 Background of the Study ....................................................................................................... 1
1.2 Problem Statement .............................................................................................................. 7
1.3 General Objective ............................................................................................................... 8
1.4 Specific Objectives ............................................................................................................. 8
1.5 Significance of Study .......................................................................................................... 8
1.6 Scope of the Study ............................................................................................................. 9
1.7 Definitions of Terms ......................................................................................................... 9
1.8 Chapter Summary ............................................................................................................. 10

CHAPTER TWO ........................................................................................................................ 11
2.0 LITERATURE REVIEW ....................................................................................................... 11
2.1 Introduction ....................................................................................................................... 11
2.2 Effect of Mobile Banking Access on Financial Performance of Commercial Banks ............................................ 11
2.3 Effect of Mobile Loans on Financial Performance of Commercial Banks ......................... 16
2.4 Effect of Mobile Banking Risks on Financial Performance of Commercial Banks ............ 22
2.5 Chapter Summary ............................................................................................................ 27
CHAPTER THREE............................................................................................................ 28
3.0 RESEARCH METHODOLOGY .................................................................................. 28
  3.1 Introduction ......................................................................................................... 28
  3.2 Research Design .................................................................................................. 28
  3.3 Population and Sampling Design ........................................................................ 29
  3.4 Data Collection Methods .................................................................................... 30
  3.5 Research Procedures .......................................................................................... 31
  3.6 Data Analysis Methods ....................................................................................... 32
  3.7 Chapter Summary ............................................................................................... 33

CHAPTER FOUR .............................................................................................................. 34
4.0 RESULTS AND FINDINGS ...................................................................................... 34
  4.1 Introduction ......................................................................................................... 34
  4.2 Response Rate ..................................................................................................... 34
  4.3 Demographic Findings ....................................................................................... 34
  4.4 Mobile Banking Access and Financial Performance of Commercial Banks ...... 38
  4.5 Mobile Loans and Financial Performance of Commercial Banks ..................... 41
  4.6 Mobile Banking Risks and Financial Performance of Commercial Banks ....... 48
  4.7 Chapter Summary ............................................................................................... 55

CHAPTER FIVE ................................................................................................................ 56
5.0 DISCUSSION, CONCLUSION, AND RECOMMENDATION ............................... 56
  5.1 Introduction ......................................................................................................... 56
  5.2 Summary ............................................................................................................. 56
  5.3 Discussion ............................................................................................................ 57
  5.4 Conclusion .......................................................................................................... 64
  5.5 Recommendation ............................................................................................... 65
REFERENCES.................................................................................................................................67

APPENDICES...........................................................................................................................................81

Appendix I: Permission to Conduct Research Letter ................................................................. 81
Appendix II: Nacosti Research License ....................................................................................... 82
Appendix III: Questionnaire ........................................................................................................... 83
Appendix IV: Secondary Data Collection Sheet M Banking Loans ........................................... 87
Appendix V: M Banking Transactions (Kes. Billions) ................................................................. 88
Appendix VI: Mobile Banking Loans ............................................................................................ 89
Appendix VII: Financial Performance (Roa) ............................................................................... 90
LIST OF TABLES

Table 3.1: Sample Size Distribution .................................................................................. 30
Table 3.2: Reliability Tests .................................................................................................. 32
Table 4.1: Response Rate ................................................................................................... 34
Table 4.2: Descriptive Statistics Mobile Banking Access and Financial Performance of Commercial Banks ........................................................................................................... 39
Table 4.3: Correlation Between Mobile Banking Access and Financial Performance ...... 40
Table 4.4: Model Summary for Mobile Banking Access and Financial Performance ...... 40
Table 4.5: ANOVA for Mobile Banking Access and Financial Performance ................. 40
Table 4.6: Coefficients for Mobile Banking Access and Financial Performance ............. 41
Table 4.7: Descriptive Statistics For Mobile Loans and Financial Performance of Commercial Banks ........................................................................................................... 43
Table 4.8: Descriptive Statistics For Mobile Banking Transactions .................................. 44
Table 4.9 : Correlation Between Mobile Loans and Financial Performance .................... 46
Table 4.10 : Model Summary for Mobile Loans and Financial Performance ................. 47
Table 4.11: ANOVA for Mobile Loans and Financial Performance ................................. 47
Table 4.12: Coefficients for Mobile Loans and Financial Performance ........................... 47
Table 4.13: Descriptive Statistics For Mobile Loans and Financial Performance of Commercial Banks ........................................................................................................... 49
Table 4.14: Correlation Between Mobile Banking Risks and Financial Performance ...... 53
Table 4.15: Model Summary for Mobile Banking Risks and Financial Performance ........ 54
Table 4.16: Coefficients for Mobile Banking Risks and Financial Performance ............... 54
Table 4.17 : ANOVA for Mobile Banking Risks and Financial Performance ................. 55
LIST OF FIGURES

Figure 4.1: Gender of Respondents ................................................................. 35
Figure 4.2: Marital Status of Respondents ......................................................... 36
Figure 4.3: Age of Respondents ................................................................. 36
Figure 4.4: Education Levels of Respondents .................................................. 37
Figure 4.5: Bank Tier ........................................................................ 37
Figure 4.6: Position in the Bank ................................................................. 38
Figure 4.7: Total Mobile Loan Applications ..................................................... 45
Figure 4.8: Total Amount of Mobile Loans ....................................................... 45
Figure 4.9: Forms of Cyber Attacks on Mobile Banking ..................................... 50
Figure 4.10: Mobile Banking Cyber Attacks -2018 ........................................... 50
Figure 4.11: Mobile Banking Cyber Threat Advisories-2018 ............................... 51
Figure 4.12: Mobile Banking Cyber Attacks -2017 ........................................... 51
Figure 4.13: Mobile Banking Cyber Threat Advisories 2017 ............................... 52
Figure 4.14: Mobile Banking Cyber Attacks-2016 ............................................ 52
Figure 4.15: Mobile Banking Cyber Threat Advisories 2016 ............................... 53
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>CBA</td>
<td>Commercial Bank of Africa</td>
</tr>
<tr>
<td>CBK</td>
<td>Central Bank of Kenya</td>
</tr>
<tr>
<td>CGAP</td>
<td>Consultative Group to Assist the Poor</td>
</tr>
<tr>
<td>DDOS</td>
<td>Denial of Service Attack</td>
</tr>
<tr>
<td>DTB</td>
<td>Diamond Trust Bank</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings Before Interest and Tax</td>
</tr>
<tr>
<td>GSMA</td>
<td>Global System for Mobile Communications</td>
</tr>
<tr>
<td>KCB</td>
<td>Kenya Commercial Bank</td>
</tr>
<tr>
<td>MoBEF</td>
<td>Mobile Banking Evaluation Framework</td>
</tr>
<tr>
<td>NIC</td>
<td>NIC Bank Kenya Plc,</td>
</tr>
<tr>
<td>PIN</td>
<td>Personal Identification Number</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on Assets</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on Equity</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message Services</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Sahara Africa</td>
</tr>
</tbody>
</table>
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Mobile banking or M-banking is a term used for performing banking transaction via mobile devices such as mobile phones or tablets to execute banking transactions (Anyasi & Otubu, 2012). Tiwari, Buse and Herstatt (2006) define mobile banking as any form of transaction that encompasses the transfer of control or rights to use goods and services, which is started and/or concluded by using mobile access to various networks. This is through the assistance of an electronic device such as mobile phones or tablets. Nasikye (2009) states that Mobile banking (m-banking) involves the use of a mobile phone or another mobile device to undertake financial transaction linked to a client account.

According to Al-Jabri (2015), it has been seen that over the past few years that the advancement in information technology has completely transformed the manner in which various organizations are operating and conducting their business on a day to day basis. The established advancement in technology has consequently brought about the progress that we see now of mobile banking and online banking in the banking industry. This has entirely changed the manner in which commercial banks and financial institutions go about their businesses. Through internet and mobile banking, financial organizations are in a position to offer banking services online and via mobile devices. This has also enabled the customers to have access to simple and readily available financial services and other remunerations. M banking also facilitates quicker and economical monetary transfer, increasing the volume of trade and access to finance for a large portion of the unbanked in developing countries (Maimbo, 2010).

Globally, banks that are aided by technological improvements have resorted to the various encounters by implementing various innovative strategies, which systematically highlight on making an effort to increase the customer satisfaction rate. This can be done through providing better products and services while at the same time doing what is necessary to reduce the operational costs (Sohail & Shanmugham, 2003). During a conference presentation in Istanbul, Turkey, Tiwari, Buse, and Herstatt (2006) indicated that various studies have shown that in order to be in line with the dynamics in the operating environment, banks and other financial institution having to embrace mobile...
banking in order to satisfy the customer demands. Therefore, up-and-coming partnerships in financial institution and other service providers has led to the growth of mobile banking as the different customers can conduct their daily banking needs through their mobile devices.

Using a case study of India, Gupta and Herma (2015) opine that commercial banks have already begun investing in mobile technology and security. They are introducing and developing smartphone apps, introducing various new features such as remote deposit of checks, and educating consumers among others. Therefore, this indicates that mobile banking acceptance among consumers has been increasing when compared to the situation of mobile banking penetration a year ago. In reference to Campbell and Frei (2013), several banks believe that the mobile banking channel will be of great support in reducing transaction costs as well as increasing customer commitment and retention. This has been indicated as to be quite comparable to the envisioned benefits of online banking that were set out many years ago.

Mahdi and Mehrdad (2010) used chi-square to investigate the influence of mobile banking in Iran and their findings from the viewpoints of customers is that, mobile banking caused higher return to Iranians. In other words, Iran financial institutions provide services that the customers are gaining satisfaction with specific reference to the use of mobile banking. Mahdi and Mehrdad (2010) concluded that ATMs in banking sectors will make cash circulation decreases, the competence of banking sector will improve, as client banking costs decrease (less cash fees to pay), service provider/shop keeper costs will reduce, and bank costs decrease (less checking, cash storage and processing costs).

Successful mobile banking penetration in developing economies has been witnessed in South Asia and Africa. Sub-Sahara Africa had more unique subscribers than Latin America by late 2014, placing the region third behind Asia Pacific and Europe. By the end of 2015, SSA unique subscribers had risen from 200 million in 2010 to 386 (Rouse & Verhoef, 2016). Recently, The Africa Development Bank (2017) estimated that mobile money account adoption in Sub-Saharan Africa had outpaced growth in the rest of the world. The report signals a growing trend for M banking on the continent. From empirical context, studies carried out in Africa suggest mixed findings regarding the
impact of mobile banking on the performance of banking sector. For instance, Tchouassi (2012) sought to find out whether mobile phones really work to extend banking services to the unbanked using empirical lessons from selected sub-Saharan Africa countries. The study noted that poor, vulnerable and low-income households in Sub-Saharan Africa (SSA) countries often lacked access to bank accounts and faced high costs for conducting basic financial transactions. The invention of a mobile phone presented a great opportunity for the provision of financial services to the unbanked. In addition to technological and economic innovation, policy and regulatory innovation was needed to make these services a reality.

Chigada and Hirschfelder (2017) reviewed existing research on mobile banking diffusion while investigating the adoption of mobile banking in Sub-Saharan Africa (SSA). This was a literature survey, analysing mobile money literature during the period 2006–2016. Because of the current explosiveness of mobile money in SSA, the focus of this literature survey was limited geographically to South Africa, Zimbabwe and Kenya. The results of the literature survey and the real-world examples mainly show that a transnational application of mobile money service systems is difficult to implement.

A different study by Ayinla (2018) examined the effects of adoption of internet banking on performance in the banking industry in Nigeria. Convenience sampling method was adopted. Copies of a questionnaire were distributed among a sample of 156 respondents from six banks out of the population of 22 banks. It was observed that the adoption of internet banking does not significantly affect the performance of Nigeria banks as cost of operation has not reduced, profitability has not increased, level of fraud has been on the increase and influx of customers to the banking hall have also not reduced. Moreover, Okon and Amaegberi (2018) estimates the impact of mobile banking transactions on bank profitability in Nigeria using selected banks data from Electronic payment system office, Central Bank of Nigeria statistical bulletin from 2007-2016. The positive and statistically significant relationship between mobile banking and profitability of mobile banks in Nigeria indicates that mobile banking is a major factor that contributes to old and new banks performance in Nigeria.
In Rwanda, Harelimana (2017) aimed at providing an analysis of the impact of mobile banking on financial performance of Unguka Bank Ltd for a period of 2012 to 2016. Both Quantitative and Qualitative research methods such as questionnaires and interview were used towards answering the research questions in order to generate primary data. Questionnaires were distributed to all senior, employees and managers who have experience with mobile banking to fully understand the topic under research. The interview was also administered to managers in order to fully understand the topic under research. It was found that the four independent variables moderately predict the performance of Unguka bank Ltd. The results confirm the hypothesis because the linear regression F-test results are significant at \( p < 0.05 \). The study conducted a multiple regression analysis so as to determine the regression coefficients (\( \beta \)) which shows that all the independent variables have a significant contribution to Unguka Bank Ltd-Nyarugenge branch.

Financial institutions which have had difficulty providing profitable services through traditional channels to poor clients (Ivatury & Mas, 2008). Today Mobile banking is viewed as the ‘fifth channel’ of banking such that it has become a channel of its own and not an appendage of online banking hence a greater integration with back end core banking systems. As a result many unbanked population have been brought on board to main banking stream thereby enabling banks tap on the resources much needed to grow their revenue base as well as their customer base as occasioned in the recent launch of M-shwari partnership between Commercial Bank of Africa with Safaricom which has improved financial performance.

Local studies such as that conducted by Wambari (2009) sought to establish the importance of mobile banking in the day to- day running of small businesses in Kenya and to understand the challenges involved in using m-banking as a business tool and appreciate the advantages and disadvantages therein. The study elaborated that the adoption and use of mobile phones is product of a social process, embedded in social practices such as SMEs Practices which leads to some economic benefits. Ritho and Jagongo (2015) aimed to investigate the mobile banking effects on Commercial Banks financial performance in Kenya. The duo concludes that M-banking services have high positive influence on the financial performance of commercial banks in Kenya. M-Banking helped to promote efficiency and confidence in the financial system which has
attracted public trust. Additionally, with mobile banking taking over, many of the banking institutions are recording high amount of deposits and thus creating enough pool of for willing investors to borrow thus increased profits.

Mutua (2017) applied descriptive research design on the three major mobile phone service providers who provide mobile phone services and 43 commercial banks operating in Kenya as at December 2012. The study focused on a 5 year period. During the study period, the amount of money transacted through the mobile money transfers increased steadily from 0.06 billion in 2007 on its launch to 118.08 billion by the last month of the analysis. The growth was motivated by the convenience offered by the service. A weaker relationship was established between mobile banking and financial performance of commercial banks.

An additional study by Kathuo, Rotich, and Anyango (2015) focused on mobile banking technology in relation to its effect on commercial banks’ financial performance indicators namely: Return on Assets (ROA) and Return on Equity (ROE) in Kenya. The study applied descriptive research design. The target population included the 42 commercial banks operating in Kenya as at December 2014. The analysis of the quantitative data was limited to descriptive statistics while qualitative data was presented through narration. The study established that the number of mobile banking transactions has tremendously increased in the last five years since the introduction of M-banking. The findings revealed that many mobile banking products are being offered by banks such as Fund Transfer between Accounts/ E-funds transfer, Bill Payment, order for cheque books and bank statements and therefore concluded that the financial performance of the banks that provide these mobile banking products has improved because they ensure efficiency of the banking services.

A recent research by Mabwai (2016) determined the effects of mobile banking on the financial performance of commercial banks using a descriptive research design of the registered commercial banks in Kenya. Purposive sampling was employed to select the main commercial banks engaging in mobile banking and thus focused on 8 commercial banks in Kenya. Data was analysed using descriptive and regression analysis. The results reveal that the number of mobile banking transactions, capital adequacy, markets share and the size of the assets had a positive influence on the financial performance of
commercial banks. The above studies suggest the increasing adoption and use of mobile banking in the local banking institutions. As a result, there is need to understand the role of M banking on the performance of these banks. The reason to understand these factors and the subsequent influence of mobile banking on banks’ performance is important issue of research and it will be the undertaking of this study.

According to the Central Bank of Kenya (2017) Bank Supervision Report, the Kenyan banking sector remained resilient on the backdrop of turbulence in 2017, characterized by interest rate capping, unfavorable weather conditions and a prolonged electioneering period. The sector’s gross loans and advances decreased by 5.68 percent from KSh.2.29 trillion in December 2016 to KSh.2.16 trillion in December 2017. However, total net assets grew by 8.1 percent from Ksh.3.7 trillion in December 2016 to KSh.4.0 trillion in December 2017. Customer deposits increased by 10.75 percent from Ksh.2.62 Trillion in December 2016 to Ksh.2.90 Trillion in December 2017. The growth could be linked to the increased deposit mobilization by commercial banks through various online trading platforms. The pre-tax profit for the sector decreased by 9.6 percent from Ksh.147.4 billion in December 2016 to Ksh.133.2 billion in December 2017. The decrease in profitability was attributed to a higher decrease in income compared to a marginal decrease in expenses. The banking sector income declined by 3.12 percent in the period ended December 2017 whereas expenses marginally decreased by 0.5 percent over the same period.

The banking sector remained well capitalized with capital adequacy ratio standing at 18.8 percent in 2017, well above the regulatory requirement of 14.5 percent. The banking sector average liquidity ratio as at December 2017 stood at 43.7 percent as compared to 40.3 percent registered in December 2016. The increase in the ratio is mainly attributed to a higher growth in total liquid assets compared to the growth in total short-term liabilities. Total liquid assets grew by 16.32 percent while total short-term liabilities grew by 10.35 percent. The banking sector’s average liquidity in the twelve months to December 2017 was above the statutory minimum requirement of 20 percent. The ratio of gross non-performing loans to gross loans increased from 9.2 percent in December 2016 to 12.3 percent in December 2017. This was mainly attributed to a challenging business environment in 2017.
1.2 Problem Statement

Mobile banking remains an avenue for increasing the profitability of commercial banks, as mobile banking services are geared towards increasing the velocity and circulation of money in the economy. This generates more profits for the banks through commission incomes as well as gradual reduction in overhead expenses. Thus translating into improvement in banks’ profitability (Ayo, Adewoye, & Oni, 2010). However, this uptake of the service comes along with several financial costs, challenges and risks on the part of service providers as well as customers. The rush by commercial banks and other players in the financial and communications industry has created a paradigm shift in the operations and financial performance of these players immensely (Nyangosi, 2008). Too, Kemboi, and Ayuma (2016) add that mobile banking has been greatly used by various banks; however adoption of this mobile platform has not been clearly seen to be translating into the performance of the banks.

As such, studies have been conducted to establish how mobile banking has impacted performance of commercial banks in the Kenyan context. Kigen (2011) studied the impact of mobile banking on transaction costs of microfinance institutions where he found out that by then, mobile banking had reduced transaction costs considerably, though the greatest impediment was small customer base that had subscribed to mobile banking. Using Secondary data and a causal research design, Mwange (2013) states that Mobile Banking had a moderate effect on profitability of commercial banks in Kenya. Aduda and Kingoo (2012) studied the relationship between electronic banking and financial performance of commercial banks in Kenya. The study revealed that e-banking has strong and significance marginal effects on returns on asset in the Kenyan banking industry. Munaye (2009) studied the application of mobile banking as a strategic response to Equity Bank’s turbulent business environment. The study reviewed the concept of mobile banking as a strategic response where its effects on financial performance were not considered.

Mobile banking has continued dominate the Kenyan financial space. However, despite the continued adoption and implementation of Mobile banking by various banking institutions in Kenya, evidence showing how mobile banking influences financial performance of these banks remains limited. Inorder to invest in mobile banking,
commercial banks need to know how it influences financial performance and how banks can take advantage of these accruing benefits. This research, therefore, aimed to bridge the existing gap by establishing the effect of adoption of mobile banking on the financial performance of commercial banks in Kenya.

1.3 General Objective

The general objective of this study was to establish the effect of mobile banking on the financial performance of Commercial Banks in Kenya.

1.4 Specific Objectives

1.4.1 Establish the effect of Mobile Banking Access on the financial performance of commercial banks.
1.4.2 Establish the effect of Mobile Banking Loans on financial performance of commercial banks.
1.4.3 Establish the effect of Mobile Banking Risks on financial performance of commercial banks.

1.5 Significance of Study

This study is significant to different stakeholders in the field as follows:

1.5.1 Managers

Through the findings of this study, the management of commercial banks can be able to strategize on how to realize maximum benefits from mobile banking.

1.5.2 Policy Makers

For the policy makers and agencies like the Central Bank of Kenya (CBK), the findings of this study can inform the policy formulation especially with regard to regulating the mobile banking services in Kenya. The research findings add dimension that may help improve policy direction with regard to regulation of mobile banking as well as factors that spur economic growth.
1.5.3 Academicians
To the academicians and students of finance, this study assists build the knowledge base in the discipline by adding on the existing literature on mobile banking and financial performance. The scholars can use the study as a source of reference material besides suggesting areas where future research may be conducted.

1.6 Scope of the Study

The study was carried out in 43 commercial banks in Nairobi City County. The target population entailed all the top managers of selected banks; Corporate Level, Business Unit, and Functional Levels of management. The study was carried out between July 3rd and July 15th 2019. The limitations of the study included low cooperation from the respondents due to the nature of their tight schedules. Additionally, the use of descriptive research design meant the introduction of confounding variables in play. However, these limitations were mitigated through the use of pilot study which helped in redefining the questionnaire to enhance the ease of answering the questions. To enhance high response rate, the researcher made phone call follow-ups after every three days.

1.7 Definitions of Terms
1.7.1 Mobile Banking
Mobile banking or M-banking can be defined as the use of mobile devices such as mobile phones or tablets to execute banking transactions (Anyasi & Otubu, 2012).

1.7.2 Mobile Banking Access

Refers to the ease of accessing mobile banking services through mobile devices or making banking services usable through a mobile device (Agbemabiese, Anim, & Nyanyofio, 2015).

1.7.3 Mobile Loans

These are the amount of borrowed funds through the Mobile banking platform (Oromo, 2015).
1.7.4 Mobile Banking Risks

These entails the business risks associated with mobile banking. It also incorporates the tech-based risks such as malware attack, hacking which are common among financial systems (He, Tian, & Shen, 2015).

1.7.5 Financial Performance

Financial performance refers to the degree to which the return on assets for commercial banks increase or decrease as a result of operations from mobile banking (Adam, 2014).

1.7.6 Commercial Banks

These are financial institutions that accept deposits, make loan and advances for a short period of time through mobile platforms (Nakamura, 2012).

1.8 Chapter Summary

The chapter covered the introduction to the study. In detail the following sections were discussed: background to the study, the problem statement was identified, the research objectives were stated, the significance of the study was highlighted, the scope of the study was explained as well as definition of operational terms in mobile banking and financial performance of commercial banks. Chapter two focuses on the review of empirical studies and existing literatures on the subject under investigation. Chapter three discusses the research methodology adopted by the study. Chapter four presents results and findings. Chapter five presents’ the discussion, conclusions and recommendations.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

The Chapter presents theoretical background, a review of empirical studies based on the research questions and finally presents the conceptual framework for the study. This chapter is subdivided into three core subsections. The first sub-section reviews empirical cases related to the effect of access to mobile banking and financial performance of commercial banks. The second subsection analyzes empirical findings in line with the mobile loans and financial performance of commercial banks. The third subsection discusses the studies related to the mobile banking risks and how they impact financial performance of commercial banks.

2.2 Effect of Mobile Banking Access on Financial Performance of Commercial Banks

The importance of service accessibility in banking sector as reflected in the number of banking offices per unit of market area that represents an important component of service provided to financial consumers where banking offices are relatively spares (Gunther, 2003). Mobile banking has bridged this gap by providing quick access to financial services and products on touch of a button. This section reviews literature in relation to mobile banking access and financial performance of commercial banks. In detail, the section is discussed under three themes of ease of accessibility and security, time and convenience, and lastly, the infrastructural development of mobile banking among commercial banks.

2.2.1 Easy Accessibility and More Secure

Jen and Michael (2006) indicate that Mobile banking has created unprecedented opportunities for banks and businesses globally, in the ways they organize financial product development, delivery, and marketing via the Internet. While it offers new opportunities to banks, it also poses many challenges such as the innovation of IT applications, the blurring of market boundaries, the breaching of industrial barriers, the

Mobile banking depends on providing customers, partners, and employees with access to information, in a way that is controlled and secure (Soludo, 2005). Technology must provide security to meet the challenges encountered by mobile Banking. Virtually all software and hardware vendors claim to build secure products, but what assurance does an E-Banking have of a product’s security? Mobile Banking want a clear answer to the conflicting security claims they hear from vendors. How can you be confident about the security built into a product? Independent security evaluations against internationally-established security criteria provide assurance of vendors’ security claims. Customer expectation, in terms of service delivery and other key factors have increased dramatically in recent years, as a result of the promise and delivery of the internet.

In Ireland, Verrecchia (2016) employed a quantitative method in conducting online survey using a snowball sampling technique in data collection. Findings indicated that perceived trust, perceived usefulness and compatibility as important influencing factors on consumers’ behavioural intention to adopt mobile banking in Ireland. Perceived ease of use, perceived risk and self-efficacy were found not to be significant factors influencing consumers’ behavioural intention towards mobile banking in Ireland.

McGregor (2013) did a study titled mobile banking, increasing access to financial services. This research analyzed how this technology helps unbanked and under banked populations decrease financial risk and gain entry to more secure financial services. The results indicated that consumers could increasingly turn to mobile phones to meet personal financial needs when banking services are not generally available. This is referred by Klein and Mayer (2011) as the transformative model. In similar study, the importance of mobile banking is indicated as threefold: Firstly, providing financial services in locations without banks. Secondly, it raises important regulatory and competition policy issues and thirdly, by splitting and separating financial services into its component parts, it gives important conceptual insights into the nature of financial services.
In South Africa, Masinge (2010) examined the factors influencing the adoption of mobile banking by the Bottom of the Pyramid (BOP) in South Africa, with a special focus on trust, perceived cost and perceived risk including the facets of perceived risks: performance risk, security/privacy risk, time risk, social risk and financial risk. Data from this study was collected through a physical hardcopy survey in townships around Gauteng. The research found that customers in the BOP considered adopting mobile banking as long as it was perceived to be useful and perceived to be easy to use.

In Zimbabwe, Chitungo and Munongo (2013) analysed the factors that influence mobile banking adoption in the rural Zimbabwe through extending the technology acceptance model. The researcher adopted use of stratified random sampling and the results of the study suggested that factors such as perceived usefulness, PEOU, relative advantage, personal innovativeness and social norms influenced the intention to accept and use mobile banking. In Tanzania, Makongoro (2017) recommended that recommended that banks invest massively in mobile banking and other information technology innovations in order to further promote efficient service delivery and increase adoption of mobile banking services. Employing descriptive research design, Manali (2017) sought to identify the strategic benefits and challenges of mobile banking in the Kenyan commercial banks. The findings indicated that m-banking increases sales volume, reduces the cost of distribution, can be used as an image product, and is a source of revenue and increases customer satisfaction.

### 2.2.2 Time and Convenience

Risk refers to the difficulties to navigate the mobile banking (finding the appropriate services). It could also be related with the lost time in seeking mobile banking (Forsythe, & Shi, 2003). However, fundamentals are about the speed of the internet on the side of the customer. Mobile Banking is generally recognized by every bank. The customer can control their bank account at any location around the country with the use of mobile internet. It is extensively recognized by the banks anywhere and anytime. When it comes to checking our account statements, it is much more convenient in that we can get them immediately and it is only possible with the online and mobile banking. Mobile Banking provides us immediate effect of banking transaction on our mobiles with SMS and Mini statements on our mobile devices.
Amin, Rahim, and Abdul (2014) held opinion that alleged credibility is an element of behavioral intention to use an information system. According to Mattila (2016) it is believed that the implementation of mobile banking service would be made possible if it is well matched with the customer’s bank transaction requirements. Compatibility of an innovation is more likely to be implemented, if it is well matched with job accountabilities, customer’s requirements and value system (Argarwal & Prasad, 1998). Liou (2008) observe that in Taiwan, many researches are done in mobile banking and their goal is to develop a much faster service than PC internet banking because it is now realized that mobile banking plays a vital role in customer’s point of view and also from commerce point of view.

In their literature review which includes 55 studies, Shaikh and Karjaluoto (2015) report that most of the articles published in the m-banking literature between 2005 and 2014 address the motivations, attitudes, behavioural intention, social systems, and associations that influenced the potential adopters of that technology. Moreover, the two most significant drivers of intentions to adopt m-banking are perceived usefulness and attitude. Other scholarly works looks at adoption from critical point of customer perspectives. By this perspective, Ghobadian, Speller, and Jones (1994) indicate that the customer sought for quality with less emphasize on cost and perceived quality and these two rather facilitate adoption process. Sought quality is the level of quality customers explicitly or implicitly demand and expect from service providers. The sought quality (customer expectations) is created due to several factors – primarily, the expectations are formed during a previous personal experience of a customer with a service, and the customer is influenced by the experiences of the other users and by the image of an organization. Accordingly, Ghobadian et al. (1994) posited that the perceived quality emphasis on the overall impression a customer has and experiences about the level of quality after service realization. By extension, Khan (2001) indicates that the potential difference between the sought quality and the perceived quality gives the service provider an opportunity to measure customer satisfaction based on formulating the precise and actual criteria according to which the customers are assessing the service.

Oluoch (2012) did a study on the factors effecting the adoption of mobile banking in Kenya a case of bank customers within Nakuru municipality. This study found that perceived usefulness had a positive impact on mobile banking adoption while perceived
risk was found to have a negative impact. With a sample size of 60 Mobile Banking consumers, Kasyoki (2012) focused on establishing the factors that spurred the adoption of mobile banking among customers of mobile banking in Kenya. The study found out that the respondents used mobile banking because they found it cheap, safe and reliable to a greater extent. The study also found out that mobile banking has a range of services, is convenient in doing bank transactions and access to the bank service, saves time and has a good connection speed. The banks customers expect mobile banking to proceed with their expectations and to be secure. The customers also expect not to lose any privacy and any amount of money when doing mobile banking transactions.

2.2.3 Internet and Network Infrastructure

Bons, Alt, and Lee (2012) argue that most retail banks nowadays offer an Internet channel where clients may access their accounts, and to a greater or lesser extent initiate instructions, change personal data and the like. Ching et al (2011) aimed at extending the Technology Acceptance Model (TAM) to investigate mobile banking acceptance in Malaysia. Specifically, the study examined the relationship between constructs of perceived innovativeness, perceived ease of use, social norms, perceived risks and perceived relative advantage towards behavioural intention in adopting mobile banking. The results indicated that among all the factors under consideration, only social norms was found to be statistically insignificant in the study. Aziz, Badrawy, and Hussein (2014) propose a framework to explore and compare the dimensions and barriers that affect consumer's intention to use or adopt different self-service banking technologies in the Egyptian context. Data collected, was statistically analyzed using Chi square test, frequencies and cross tabulations. The results indicate that the three groups differ significantly with respect to usage, value, risk, tradition and image barriers. Moreover, significant relations between decisions of adoption with Internet banking experience, level of education, type of mobile owned and mobile Internet experience were also noted.

Al-jabri (2012) studied mobile banking adoption by looking at the application of diffusion of innovation theory. The findings suggest that banks in Saudi Arabia, should offer mobile banking services that are compatible with various current user requirements, past experiences, lifestyle and beliefs in order to fulfill customer expectations. Mari and Minna (2003) carried out research on adoption of mobile banking in Finland. The results
from the study indicated that certain attributes of M-banking innovation drive it usage. The attributes include; relative advantage, compatibility and communication. The investigation of complexity and risk of using M-banking yielded no support as being barriers to adoption. The findings also revealed that, technology perceptions and certain demographical variables of the customers have a significant impact on adoption.

Zarifopoulos and Economides (2009) provide a comprehensive Mobile Banking Evaluation Framework (MoBEF). This framework consisted of 164 criteria categorised into six categories: interface, navigation, content, offered services, reliability and technical aspects. The study concludes that banks would be interested in increasing the number of their regular customers as well as the number of their mobile customers. Offering multiple channels would attract new regular customers. Customers would have the flexibility to use any available alternative channel. Offering easy to use, secure and reliable mobile banking would attract mobile customers. In Finland, Laukkanen and Lauronen (2005) interviewed customers and found that customers perceive location-free access and the ability to react immediately to the service need as valuable for the creation of convenience and efficiency in service consumption.

2.3 Effect of Mobile Loans on Financial Performance of Commercial Banks

Mobile credit uses the mobile phone to provide credit services to the underserved (GSMA, 2016). Relative to conventional credit, digital credit offers several key differences, of which CGAP. First, the process from loan application through approval is nearly instantaneous. Second, evaluation of loan applications is automated, since digital credit products leverage historical user data to generate credit scores. Third, loans can be processed remotely, without requiring the customer to visit a store or agent in person. A final distinguishing feature of digital credit is that loan decisions are frequently determined based on the analysis of unconventional sources of digital data, rather than the traditional credit scores calculated by a traditional credit bureau. This section reviews literature related to mobile loans of digital credit in relation to the products offered through mobile lending, the uptake, and default patterns.
2.3.1 Mobile Loans Products

Mobile phones, identity-linked digital footprints, automated credit scoring, agent networks and credit information sharing - the building blocks of digital credit - have enabled providers to deliver loans quickly and at scale (Gubbins & Totolo, 2018). Mobile loans were measured through the amount of money loaned through mobile banking service. The currently dominant form of digital credit is short-term, high interest rate loans made directly to consumers (Soursourian, 2018). In the most common scenario, which is a bank-telco partnership, the bank originates the loan, but customer interactions – including loan disbursal and repayment – are done via the mobile money platform. Loan amounts are not very large - the average M-Shwari loan is about USD 12 (Cook and McKay 2015). Loan terms are typically no longer than a month (e.g., M-Shwari) but may be as short as a week (e.g., Airtel Malawi). Though consumers are not usually officially charged an interest rate, they are instead charged a fixed “facilitation fee.” Late fees vary from provider to provider, and loans are not usually collateralized. While some companies automatically deduct mobile money balances in the case of late payment, companies are typically not able to deduct directly from airtime recharges (the mobile money and airtime systems are normally separate).

As in traditional models of lending, providers of digital credit employ dynamic incentives and punishment to reduce moral hazard and to incentivize repayment. Timely repayment of M-Shwari 4 loans increases the probability of getting a larger loan in the future. Customers of Branch – an appbased lender – who repay their loans on time are more likely to qualify for larger loans (increasing from USD 2.50 to USD 500), with longer repayment periods (increasing from 2 weeks up to 1 year), and at lower interest rates (with APR ranging from 180 percent to 15 percent). Interest rates on many products, like Timiza Wakala loans and Tigo Nivushe loans provided by Airtel Tanzania and Tigo Pesa respectively, are determined largely by previous borrowing behavior. Further, many existing digital loan providers discourage default by one or more of these punishments: affecting access to future loans, automatic deduction of outstanding loan amount from linked mobile savings or mobile money accounts, or blacklisting defaulting borrowers with credit bureaus.
Chakraborty (2018) posits that digital way of lending save a lot of cost over the manpower as well as the fixed asset by any banking or financial institution and also upon the transactions which are made on the daily basis or recorded by manual procedure. First, is the technology and data processing; in today's world technology is very cheap and the data processing services provided all over world are the talk of the town. Therefore it becomes easy to handle many customers at different locations at a time. Secondly, is speed; collection of borrowers information its validation and disbursement of loan becomes easy and in pace that a loan applicant can get this loan instantly in a day or two. Thirdly is the multilevel network; digital lending performs various processes on diverse levels where lending institutions with different organizations and channels get associated at one place, which ultimately brings a huge network of Institution growing together. Fourth is about borrower satisfaction; the customer who gets associated with such technological advancement and efficient organization get a good support from their side and feels satisfied over the services provided to him in such short period of time.

Wainaina (2017) researched the effect of mobile based loans management practices to the financial performance of commercial banks in Kenya. The study adopted a descriptive research design. The respondents consisted of a sample of 52 credit risk and finance managers of the commercial banks in Kenya selected for the study, selected from a study population size of 86. Primary data was collected using structured questionnaires. The data was analyzed using descriptive and inferential statistics. The study concluded that credit scoring and repayment period had a significant positive influence on financial performance of commercial banks in Kenya. Further, the study concluded that default patterns and risk profile had a significantly negative influence on financial performance of commercial banks. Finally, the study concluded that credit scoring had a greater influence on the financial performance of commercial banks, followed by default patterns, repayment period and then risk profile.

2.3.2 Uptake of Mobile Loans

Slade, Williams, Dwivedi, and Piercy (2015) contend that mobile payments emerged as an answer for a neglected need instead of as a technology-led innovation. The researchers point out that mobile payments represent a culmination of innovations, integrating payment systems with mobile gadgets, to offer consumers the capacity to start, approve
and/or complete a financial operation in which funds are transferred through mobile system to the desired receiver. Their study only focused on effect of mobile payments, but did not look at the mobile loans which are a key component of mobile commerce.

Tchouassi (2012) sought to find out whether mobile phones really work to extend banking services to the unbanked using empirical lessons from selected sub-Saharan Africa countries. This study sought to discuss how mobile phones could be used to extend banking services to the unbanked, poor and vulnerable population. The study noted that poor, vulnerable and low-income households in Sub-Saharan Africa (SSA) countries often lacked access to bank accounts and faced high costs for conducting basic financial transactions. The mobile phone presented a great opportunity for the provision of financial services to the unbanked. In addition to technological and economic innovation, policy and regulatory innovation was needed to make these services a reality.

Mobile banking, as indicated by GSMA (2016) report demonstrated incredible income expansion. Vodacom reported that M-Pesa in Tanzania represented 22.6% of service income in year 2015. Millicom Group reported that aggregate income from mobile money related operations in nine markets in Sub-Saharan Africa and Latin America and the Caribbean expanded by 23.1% in quarter 3 of 2015 when contrasted with 2014. MTN Group (2016) reported that MTN Mobile Money revenue increased by 55.8 per cent in 2015, accounting for 16.8 percent of its total revenue in Uganda, 6.0 per cent in Ghana, and 6.2 per cent in Rwanda. In its financial year 2015 report, Orange announced an increase of 64 per cent in revenues generated by mobile money as compared to the previous year. Therefore, most commercial banks’ clients prefer using their phones to access any service, as opposed to having to visit the physical establishments and line up to get services, according to Ellen (2018). They no longer can afford the time. However, one major issue of concern is the fact that lending through the use of mobile based methods presents a challenge in terms of the risk of returns in interest income.

According to Cook (2017), in 2017 just over a third (34.8 percent) of Kenya’s adult, mobile phone owning population (approximately 7 million people) had used digital credit. Among these borrowers, 64.2 percent are active: they either had an outstanding digital loan at the time of the survey, or had taken a loan in the 3 months prior to the survey. Individuals in rural areas represent both the majority of digital borrowers as well as the
largest addressable market (individuals with mobile phones who have not used digital loans). A dominant majority (over three quarters) of digital borrowers across both urban and rural markets have taken loans provided by M-Shwari, around a third have taken loans from KCB MPESA and about 1 in 10 have taken loans from Equity Eazzy. The two leading app-based digital loan products (Tala and Branch) have jointly captured around 6.7% of the market (approximately 1.3 million adults).

The variation in market share by provider across rural and urban areas is minimal. Nairobi, Mombasa and South Rift (comprised of Kajiado, Narok, Bomet and Kericho Counties) are the regions with the highest concentrations of digital credit users, while North Eastern and Upper Eastern (comprised of Garissa, Wajir, Mandera, Marsabit and Isiolo counties) are the regions with the lowest concentration of digital credit users. In totality, mobile banking applications have changed how Kenyans get credit facilities, by doing away with lengthy paperwork, demand for securities or lengthy appraisal by credit officers (Totolo, 2018).

A report by Cytonn Investment (2017) examined banks performance in year 2016 anticipated an expansion in mobile credit loaning. The report further noted that Barclays bank profit before tax reduced to Kes. 10.85 billion shillings, or £84 million from Kes.12.07 billion recorded an year earlier, largely attributed to increased provisions for bad debts and the rate cap. Equity Bank Group net profit declined by 5.9% to Kes. 15.2 billion from Kes. 16.2 Billion in 2015. On the other hand their total operating income rose by 12.5% from the previous year to Kes. 50.3 billion. Cooperative bank however had its profit grow from Kes 10.5 billion from Kes. 8.6 billion 23% increase, majorly as a result of adoption of their mole banking platform -MCoop Cash. Standard chartered delivered growth in profitability despite challenging market conditions. Interest income grew by 13 per cent to Kes. 25.6 billion.

Murunga and Kibati (2014) determined the effect of mobile-based lending platform on non-performing loans in commercial banks in Nakuru town, Kenya. A sample of 64 credit officers was obtained from the study population using stratified random sampling method. A structured questionnaire was used to collect data. A pilot study was carried out prior to the main study with the aim of determining both the reliability and validity of the research instrument. The study observed that loan appraisal process was a very important element
of mobile-based loans in respect of NPLs. The null hypothesis was rejected. The study also found that, the more commercial banks emphasized on lending through the mobile platform, the more they were likely to record NPLs.

2.3.3 Default Pattern of Mobile Based Loans

FSD-Kenya, in partnership with the Central Bank of Kenya (CBK), Kenya National Bureau of Statistics (KNBS) and CGAP conducted a nationally representative phone survey with over 3,000 Kenyans to find out. The findings suggest that digital credit has become a leading source of credit in Kenya and that it is mostly used to finance working capital and day-to-day consumption needs. But it also suggests many borrowers are struggling to repay.

The rise of the digital credit market has raised concerns about the risk of excessive borrowing and over-indebtedness among lower-income households. Digital loans are easy to obtain, short-term, carry a high interest rate and are available from numerous bank and nonbank institutions. The survey found that 14 percent of digital borrowers were repaying multiple loans from more than one provider at the time of the survey. This means over 800,000 Kenyans were juggling multiple digital loans. Although having multiple loans is not necessarily an indicator of debt distress, it is important to closely monitor the market going forward and detect possible risks.

Nyaga’s (2013) objectives were; to investigate current awareness and uptake of various mobile money services, to determine if mobile money services uptake has any impact on SMEs growth through increased sales or savings and loan accessibility, establish if mobile money service qualities of low cost, convenience and accessibility result in increased SMEs performance and establish if mobile money services are considered efficient and reliable by SMEs in Naivasha Town. It was established that mobile money has made a significant contribution to the SME sector. Majority of the traders rely on it as opposed to the formal banking sector for their day to day transactions. Secondly, it is evident that all the respondents in this study had a clear understanding of the basic functions of mobile money services. Mobile money services have a positive impact on sales. Efficiency and reliability contribute more to mobile money utility and SMEs growth. It is worth noting that majority of the respondents had reservations on the
convenience and cost of the service as a result of problems associated with the functionality of the service.

A survey by Soursourian (2018) reveal that nearly half of digital borrowers in each country reported having repaid a loan late at some point. In Tanzania, 31 percent reported having defaulted, as did 12 percent in Kenya. Twenty percent of digital borrowers in Kenya and 9 percent in Tanzania reported reducing food purchases to repay a loan. And a significant minority in each market reported poor transparency—such as not understanding the loan costs or terms—which correlates with higher levels of late repayment and default.

Though mobile loans are easy to obtain, short-term, carry a high interest rate and are available from numerous bank and non-banking institutions (Kariuku, 2018). About three million borrowers reported late loan repayments that attracted hefty penalties with nine per cent of defaulters being reported to the credit reference bureau as risk-averse loanees. Nakayiza (2013) did a study on the outcome of interest rates to the loan portfolio’s performance of the commercial banks, and the study concentrated on Centenary Bank, based in Entebbe street branch Uganda. The study revealed that despite the fact that the Bank had endeavored to adhere to set regulations in extending credit, still there were customers’ defaulting credit repayment and thereby increasing in number the impact of bad debts to the bank’s performance. As a result, this generated risk in performance of the loan portfolio and influenced its profitability. Further, the study findings indicated there was lack thereof of effectively looking at the impact of interest rates increase to the loan repayment history and trends.

2.4 Effect of Mobile Banking Risks on Financial Performance of Commercial Banks

Mobile banking is vulnerable to various forms of risks. Apparently, most of these risks are launched on the mobile banking application. Risks emanating from mobile banking have been regarded as the greatest hindrance to building sustainability in the performance of this young and promising industry. Security concerns present significant challenges for financial institutions providing mobile banking services, and each delivery channel poses unique risks for institutions and customers (Kopchik, 2011). The risks include attack to mobile banking systems, privacy and security concerns, trust issues, and the ethical
culture of mobile banking. Hence, this section discusses the security risks, financial risks, as well as the ethical framework of mobile banking.

2.4.1 Security Risk

As the wireless technology has become more advanced and has spread in wide range same in mobile banking different types of security risks has been raised. One of the main and most important issues faced by the users is security which works as obstacle in adoption of new technology (Wang et al. 2006). According to (Mattila, 2016) it is trustworthy to use mobile in banking sector. While Fain and Robberts (1997) proved that risk is not the product it is the perception of human. This perception influences the consumer to adopt mobile banking. A research conducted by Wang et al. 2006 suggested that the individual may worry about security like as loss of connection, data transmitted and loss of money concern while using mobile banking. According to (Black et al. 2001; Kuisma, Laukkanen, & Hilfunen, 2007) the mobile banking services providers must develop such a mechanism which ensure the security of financial transactions and very sensitive data. The security must fool proof and not allowed to unauthentic usage. As (Brown et al. 2004; Laukkanen & Lauronen, 2005) suggested that the sensitive information must only be used by related persons, the users must give the surety of their financial transactions which will influence to adopt. Many researchers like (Souranta, 2003; Laukkanen & Lauronen, 2005; Soroor, 2006) argued that only the security is not great concern which resists the customers to adopt the mobile banking. As (Souranta, 2003) suggested that there are many other barriers to adopt the mobile banking such as personalization, mobility and location.

ABI Research estimates that over 56 billion smartphone apps, plus another 14 billion tablet apps, were downloaded worldwide in 2013 (Grimshaw, 2014). During 2013, the Webroot Mobile Threat Research team saw an exponential increase in Android-based malware to over 1.59 million malicious or potential unwanted applications (PUAs). The Webroot Mobile Threat Research team is finding that only 45 percent of all apps are truly trustworthy or benign. Such high volumes of app creation and downloads provide numerous opportunities for cybercriminals to find weak spots and infect customer devices. In 2015, the British insurance company Lloyd’s estimated that cyber-attacks cost businesses as much as $400 billion a year, which includes direct damage plus post-attack disruption to the normal course of business. Some vendor and media
forecasts over the past year put the cybercrime figure as high as $500 billion and more (Morgan, 2016).

Koening-, Palmer, and Moll (2010) investigated the barriers towards Mobile Banking System adoption among young people in Germany. Their study was based on the Technology acceptance model (TAM) model. They received 155 responses from all the questionnaires that were sent, they also used a structure equation modeling (SEM) approach to test the hypothesis. The results of the study indicated that compatibility, perceived usefulness, and risk are significant indicators for the adoption of Mobile banking systems in Germany.

Dineshaw and Steven (2013) investigated the complex factors that prevent customers from adopting and using mobile banking services in Mauritius. The researchers used a quantitative approach, they also combined the TAM and IDT together with perceived risk and cost construct to investigate perception of m-banking in Mauritius. The study revealed that age, gender and salary had no influence on adoption but rather, Convenience, compatibility and banking needs influenced banking adoption. On the other hand, Perceived security risk and reliability were found to be the only obstacles to m-banking usage but also that m-banking usage is not associated with age, gender and salary.

Yao (2013) in a study of user adoption factors of mobile banking services based on trust and distrust perspective argues that the quality of information that customers have will affect adoption, he says currently there exist information asymmetry between the user and the bank where the bank is in information superior position which is well aware of the operation mechanism and product advantages of the mobile banking. On the contrary, the user is the inferior party. Porteous (2007) found that, most unbanked people were unbanked because of “economic reasons”, which relate in part to their work status and in part to their perception that formal employment was a prerequisite for opening a bank account. The study also found that young people tend not to have bank accounts and see less need for them and that mbanking users in general have a higher income, are more likely to live in urban areas, are in formal employment and slightly older than banked people with mobile phones. Porteous (2007) argues that, the early adopter profile appear to correlate more with the desired functionality than with factors which imply risk.
tolerance such as age. Additionally, a high proportion of the banked population either does not understand Mbanking or have never heard about it. Despite these high levels of ignorance about Mbanking, banked people still have a strong disapproving attitude.

According to Ayana (2014), the major barriers Ethiopian banking industry faces in the adoption of Electronic banking are: security risk, lack of trust, lack of legal and regulatory framework, Lack of ICT infrastructure and absence of competition between local and foreign banks. Lack of suitable legal and regulatory framework for E-commerce and Electronic payment is another impediment for the adoption of new technology in banking industry. There is no separate legislation that deals with electronic banking including enforceability of the validity of electronic contracts, digital signatures and intellectual copyright and restricts the use of encryption technologies and High rates of illiteracy. Low literacy rate is a serious impediment for the adoption of E-banking in Ethiopia as it hinders the accessibility of banking services. For citizens to fully enjoy the benefits of Ebanking, they should not only know how to read and write but also possess basic ICT literacy (Gardachew, 2010).

2.4.2 Financial Risk

As the banking has become very important need of life and the risk of loss of money could hamper the experiences with banking and other financial institutions. From financial risks a major obstacle to adopt mobile banking is the cost of mobile banking (Tarasewich, Nicleerson, & Warkatin, 2002). The current mobile banking is linked with mobile phone so there should a mobile set and wireless internet connection which causes financial problems (Nah, Siau, & sheng, 2005). A study by (Luarn & Lin, 2005) argued that financial costs create negative impact on behavioral intention for adoption of mobile banking. The analysis done by Sadi, Azad, and Noourdin (2010) in the Sultanate of Oman by 196 respondents, resulted that high financial cost was main problem for not adopting mobile banking. The misuse of bank account, the error in transaction and monetary losses are known as the financial risk (Lee & Kim, 2007). Lee, Lee, and Kim (2007) proposed that there are basically five risks considered by consumers and banks, performance risk, social risk, security risk, financial risk, and time risk. All these risks are hurdles for adoption of mobile banking and especially the social risks were found with insignificant effects on the behavioral intention for mobile banking adoption (Lee & Kim, 2007).
Kenyan banks benefited particularly from the adoption of the Internet because of their universal character. As with many European banks—unlike US banks prior to enactment of the Gramm-Leach-Bliley Act of 1999, Kenyan banks have enjoyed the advantages of "broad banking" (Barth, Brumbaugh, & Wilcox, 2000). Banks have been allowed to offer all sorts of financial products and engage in a wide variety of financial business (including securities trading and mutual funds management). Valverde and Rodríguez (2007) find that cost and profit global scope economies improve significantly when including mutual funds along with other earning assets, showing certain cross selling and portfolio diversification benefits in the Kenyan banks.

2.4.3 Ethics

There are lots of chances are unethical conduct in business, it is due to moral and very critical ethical issues in mobile banking organizations, as these financial institutions have yet nor worked to handle these issues (Boatright 2009). Every institution has their own written industry principles, operating methods and ethical codes (Badi & Badi, 2009). There is lack of secrecy and confidence on internet, so it is a big obstacle for mobile banking adoption (Quelch & Klein, 1996; Cockburn & Wilson 1996). No work has been done by the different financial institutions regarding the ethic, as the telecom companies are introducing emerging technologies very rapidly. It will conduct of unethical business and will destroy the trust of both customers and financial institutions, if no effective steps have been taken for ethical way of transactions (Boatright 2009). As each business firm has its own business principles, methods, procedures, processed same each firm must have very clear and written ethical codes (Badi & Badi, 2009).

Ibrahim, Fayaz, Shahid, and Akbar (2015) analyzed the impact of risk and ethics on consumer behavior with regard to the utilization of mobile banking in Pakistan. The correlation results showed that there is insignificant relationship with Ethic, and significant relationship was found with Risk. The regression results showed that R square was 0.621, which stated that the independent variables (Risk and ethics) have 62% effect on dependent variable Mobile banking adoption and the model can predict the research results.
Biteya (2013) studied the challenges facing mobile banking services in reaching customers in Tanzania at NMB in coastal Region. A sample size of 80 respondents comprising of customers and bank staff were given questionnaires and interviewed accordingly. The findings showed that majority of respondents knew few services offered by NMB through mobile banking. The study revealed that few customers fear the use of extension of mobile banking services offered by the bank through mobile banking. They fear insecurity, high charges and unreliability of services. However, some customers do not use the services due to little knowledge on the services offered through mobile banking. The study further showed that distance from nearest branch or ATM affected customers from using mobile banking effectively.

Applying a descriptive research design, Karanja (2017) sought to investigate the risks facing mobile banking among the commercial banks in Kenya. The study population consisted of 41 informational technology managers in each of the 41 commercial banks registered in Kenya as at 30th June 2016. With regard to the first objective the study sought to determine risks arising as a result of malware and majority of the respondents agreed that there were no reported risks arising from malware virus attack on the mobile banking platform. The second objective established that challenges arising because of security and to some little extent security on third party intrusion, loss of privacy. The third objective established that there is a great use of one time SMS verification codes together with the normal Personal Identification Number (PIN).

2.5 Chapter Summary
Chapter is about literature review. Specifically, this chapter has looked at the theoretical background, the empirical studies and publications in relation to the effect of mobile banking. The next chapter outlines the research methods that the research will utilize in accomplishing the study.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives details on the approaches that the researcher incorporated to make preparations for the study, gather data and analyze the data. The specific sections contained therein are the research design, population, data collection method, data analysis and presentation for the study.

3.2 Research Design

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring the researcher effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data (De Vaus, 2016). McMillan and Schumacher (2014) defined the term research design as a blueprint for choosing subjects, research sites and data gathering techniques to answer the research questions. The function of a research design is to ensure that the evidence obtained enables you to effectively address the research problem logically and as unambiguously as possible (Trochim, Donnelly, & Arora, 2015).

The current study employed descriptive research designs. Descriptive studies are conducted in investigative research, to enable researchers to get information, summarize, present data and deduce its meaning for the reason of explanation (Creswell, 2014). According to Babbie (2014) descriptive design is adopted when gathering information in relation people’s attitude, sentiments and behaviors. Descriptive research design was more appropriate because the study sought to build a profile about the effect of mobile banking on financial performance of commercial banks in Kenya. In the current study, the independent variables were mobile banking access, mobile loans, and mobile banking risks, whereas, financial performance of commercial banks formed dependent variable.
3.3 Population and Sampling Design

3.3.1 Population
A population can be defined as the total collection of components about which the researcher wishes to make some interpretations. A component can be defined as the focus on which the measurement is being taken and is the unit of the study (Cooper & Emory 2015). The target population included all the senior employees in the forty three commercial banks in Nairobi City County. Respondents from management level had accumulated sufficient experience with regard to their role in the strategic positioning mobile banking as a key window for financial performance in commercial banks. This population had the potential to provide the relevant information on the impact of mobile banking banks’ performance.

3.3.2 Sampling Design

3.3.2.1 Sampling Frame
According to Cooper and Schindler (2014) a sampling frame can be defined as a list of all the components from which the sample is derived and clearly connected to the population. For the purpose of this study, the sample frame for the study was the employees of the Kenya based commercial banks that have implemented mobile banking.

3.3.2.2 Sampling Technique
The study adopted stratified random sampling technique. Stratified random sampling is a technique which attempts to restrict the possible samples to those which are ``less extreme'' by ensuring that all parts of the population are represented in the sample in order to increase the efficiency. Stratification may often produce a gain in precision of the estimates of characteristics of the whole population (Kareem, Oshungade, & Oyeyemi, 2015). The cost of conducting the survey is expected to be less for stratified sampling when strata are formed keeping administrative convenience in mind. Cooper and Schindler (2014) defined simple random sampling as the basic sampling technique whereby a sample for study from a population is selected. Simple random sampling normally reduces the sampling error in the population. This technique is free of classification error, and it involves least possible advance knowledge of the population other than the frame. Its simplicity also makes it rather easy to deduce the data collected. This in turn increases the accuracy of any estimation methods used.
3.3.2.3 Sample Size

Sample size refers to the number of cases, subjects or respondents that are considered enough for data collection (Kombo & Tromp, 2010; Mugenda & Mugenda, 2008). To get the sample size, the researcher used 30% of each of the population stratum. The basis for the population strata was drawn from the commercial banks’ three levels of management. The strata were extracted from the Human Resource records of selected commercial banks. Israel (2007) recommends that a sample size of 30% is desirable for descriptive studies. The sample consisted of corporate, business, and functional staff members as well as junior bank employees. The respondents are individuals knowledgeable with the questions at hand and are the most senior persons of the commercial banks.

Table 3.1: Sample Distribution

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>Population</th>
<th>Sample Proportion</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Level</td>
<td>258</td>
<td>30%</td>
<td>77</td>
</tr>
<tr>
<td>Business Unit</td>
<td>344</td>
<td>30%</td>
<td>103</td>
</tr>
<tr>
<td>Functional</td>
<td>516</td>
<td>30%</td>
<td>155</td>
</tr>
<tr>
<td>Total</td>
<td><strong>1118</strong></td>
<td><strong>30%</strong></td>
<td><strong>335</strong></td>
</tr>
</tbody>
</table>

3.4 Data Collection Methods

According to Creswell (2014) data collection can be defined as means by which information is acquired from the selected subjects of a study. The study used both primary and secondary data. Structured questionnaires formed basic tool for collecting quantitative data for the analysis. The preference for a questionnaire was based on the fact that respondents are able to complete it without help, anonymously, and it is cheaper and quicker than other methods while reaching out to a larger sample (Bryman, 2016; Cohen, Manion, & Morrison, 2011). A total of three hundred and thirty five questionnaires were distributed for the survey through drop and pick method. The questionnaire comprised of four sections: The first section tested questions about demography of respondents. The second section focuses on questions about mobile banking access and financial performance of commercial banks. The third section presented questions about mobile loan and financial performance of commercial banks. The fourth section outlines
questions regarding mobile banking risks and financial performance of commercial banks. Likert Scale was applied in the study. The Likert scale was rated by the respondents based on five points with 1 signaling lowest level of agreement (strongly disagree) and 5- indicating highest level of agreement (strongly agree). Croasmun and Ostrom (2011) recommend that Likert scales are useful in social science and attitude research projects. The tools for secondary data encompassed financial statement and mobile banking reports from relevant organizations. Hence, secondary data sources were utilized through the use of previous publications from Information and Central Bank of Kenya and the Communication Authority of Kenya. A period of between 2013-2018 was preferred. Data regarding reports of commercial banks’ financial performance was obtained from the Central Bank of Kenya annual reports. Furthermore, reports regarding the number of cyber-attacks and mobile banking security threats were sourced from Communication Authority of Kenya and reports from various players in the financial and technology sectors such as publications from Financial Sector Deepening Kenya.

3.5 Research Procedures

After the approval of the proposal, the researcher obtained a letter of introduction from Chandaria School of Business and NACOSTI. The researcher exposed the questionnaire to pretesting whereby a pilot study was conducted. The pilot study engaged 10% of the respondents, drawn from the sample size of 335. Thereafter, validity test was conducted. Twycross and Heale (2017) defined validity as the extent to which an instrument measures what it purports to measure. Content validity was the instrumental type of validity for the current study. The researcher focused on whether the questionnaire adequately covered all the content that it should with respect to the study variables. To measure validity, each of the pretest respondents rated the questionnaire on a scale of 1 to 5 where 5 showed the level of agreement with the factor in question. The respondents were free to make comments on the questionnaire concerning difficult wording, limited option or missing options. To ensure credibility of secondary data, the researcher prequalified all the publications on data reliability, suitability, and adequacy as recommended by Bowley (2008).
Data reliability was assessed to establish whether or not the pilot survey produced consistent results. Reliability is seen as the degree to which a test is free from measurement errors, since the more measurement errors occur the less reliable the test (McMillan & Schumacher, 2006). In the current study reliability was measured through Cronbach Alpha. All the scores were above a threshold of 0.70, qualifying for further analysis. Findings are illustrated in Table 3.2.

The researcher with the help of the research assistant administered the questionnaires to the respondents in person. The researcher and the research assistant explained the questions to the respondents the importance of the study and then administered the questionnaires to them. The researcher gave respondents seven working days to fill the questionnaires. It was assumed by the researcher that the period was long enough for the respondents to reply to the questionnaires more diligently and appropriately. However, as a measure of ensuring higher response rates, the researcher contacted the respondents to get updates concerning the progress of the survey.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Cronbach Alpha</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Banking Access</td>
<td>256</td>
<td>0.907</td>
<td>Accepted</td>
</tr>
<tr>
<td>Mobile Loans</td>
<td>256</td>
<td>0.796</td>
<td>Accepted</td>
</tr>
<tr>
<td>Mobile Banking Risks</td>
<td>256</td>
<td>0.824</td>
<td>Accepted</td>
</tr>
<tr>
<td>Financial Performance</td>
<td>256</td>
<td>0.722</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

3.6 Data Analysis Methods

Data analysis normally refers to a methodology that is used to make interpretations from the data collected by means of a methodical and impartial identification of specific features (Bryman & Bell 2015). In this study, data analysis was carried out through Statistical Package for Social Science. Editing was undertaken before data analysis. The study applied both construct and content validity as recommended by Polit and Hungler (2006) whereby questionnaires were divided into various sections to ensure each section assesses information for every objective as well as close tie with the conceptual framework while thirty (11% of sample size) respondents were randomly selected to undertake pilot study. In this study, descriptive statistics such as means, percentages, and
frequencies were used to give meaning to the data. Data was presented in tables and figures.

Pearson’s correlation technique was used to assess the strength and association between the independent variables and financial inclusion. Regression analysis was also employed where the researcher assessed fitness of the model (R - Square), ANOVA (Analysis of Variance) and regression of coefficients were adopted in the analysis. Data was presented using tables and figures. The fitness of the model explained the extent to which all the independent variables jointly explain financial performance. ANOVA statistics explained the overall significance of the model using the 0.05 conventional level of significance.

Specifically, the following regression model was adopted;

\[ Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu \]

Where;
- \( Y \) = Financial Performance (Return on Assets= EBIT (1 - Tax Rate)/Assets)
- \( X_1 \) = Mobile Banking Access
- \( X_2 \) = Mobile Banking Loans
- \( X \) = Mobile Banking Risks
- \( \alpha \) = constant
- \( \mu \) = error term
- \( \beta_1, \beta_2, \beta_3 \) = beta coefficients

3.7 Chapter Summary

As seen above, this chapter is all about the research methodology. It has defined and explained the chosen research design which was used in this project. It also explains the population and sampling design. That is, it specifies and shows the population size and it also defines and explains the chosen sampling design that is, the sampling frame, the sampling technique and the sampling size. It also helps understand the data collection methods, the research procedures and the data analysis methods. The next chapter presents the results and findings in relation to the study’s specific objectives.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction
This chapter presents the analysis and findings of collected data relating to the respondents’ perceptions with a view to establishing the effect of mobile banking on the financial performance of Commercial Banks in Kenya. First, the chapter presents demographic characteristics of the respondents. Thereafter, results related to the access of mobile banking and financial performance of commercial banks. Next are the findings regarding mobile loans and financial performance of commercial banks in Kenya. Lastly, the results about mobile banking risks and financial performance of commercial banks in Kenya.

4.2 Response Rate
As mentioned in the section 3.5, the questionnaire was spread to the targeted respondents (senior banking employees) for two weeks. After ten days, the total responses received were 256, an equivalent of 76% response rate. The total 256 responses make the result fairly accurate. Therefore, it was deemed adequate enough to prequalify the analysis of the rest of the data and present the findings thereafter.

Table 4.1: Response Rate

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responded</td>
<td>256</td>
<td>76%</td>
</tr>
<tr>
<td>Failed to Respond</td>
<td>79</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>335</td>
<td>100</td>
</tr>
</tbody>
</table>

4.3 Demographic Findings
This section contains demographic profile of the respondents. The demographic variables presented are gender, age, marital status, education level, bank tier as well as the position held by the respondent in the bank. In practice, demographic characteristics of the respondents are important in assisting the researcher in the determination of the effectiveness of the respondent to answer the survey questions. In the current study,
demographic findings are expressed as percentages computed from the proportions of total frequencies.

4.3.1 Gender of Respondents

The sample consisted of 40% female and 60% male. The ratio of gender distributions, female to male was two to three (i.e. 2:3). The imbalance in gender percentage was due to low numbers of women in the sampled employed population. The demographic profile is displayed in Figure 4.1.

![Gender distribution chart]

**Figure 4.1: Gender of Respondents**

4.3.2 Marital Status of Respondents

The largest group of the respondents considering marital status was that of the married which constituted 63% of the Kenyan data sample. The large number of married respondents supports the age group of the distribution of the samples since the majority of the respondents were aged 30 years and older. The singles respondents were 30% while the divorcees formed 2% as shown in Figure 4.2.
4.3.3 Age Category of Respondents

Figure 4.3 shows that the largest age group in the bank data sample was between the age group of 31-40 years consisting of 35% closely followed by the age group of 41-50 years consisting of 24%. Age range 21-30 years came third at 20%. Those aged 51 years and above came fourth at 12%. Participants younger than 20 years of age had a low percentage of 9%. Age of the respondents signals high maturity level and experience in responding to the questionnaire.

4.3.4 Education Levels of Respondents

For the repartition of respondent based on education level, a big number of respondents have first degree, 47% of all respondents. The respondents with masters were 22% and 6% for ‘PhD’ qualifications whereas, for the respondents with diploma level of education was 7% while 3% had attained PhD as reflected in Figure 4.5. Possession of formal high school and post high school education implies that the respondents had accumulated adequate knowledge needed in responding to the questionnaire.
4.3.5 Bank Tier
The study sought to determine the tier or the category of commercial banks in Kenya. The highest proportion of banks was drawn from the second tier, 42%, followed by the first tier, 34%, and lastly the third tier only made up 24% of the banks. These findings indicate that the study was majorly centered on medium sized and large commercial banks in Kenya.

4.3.6 Position in the Bank
The study sought to determine different positions held by the respondents. It was revealed that majority of the respondents were subordinate staffs (48%), followed by supervisors (26%), then the heads of the departments or functional units (18%) while the managers comprised only 8% of the study population. With the respondents occupying critical roles in the banking sector, they had better practical experience with mobile banking hence suitable to respond to the questionnaire.
4.4 Mobile Banking Access and Financial Performance of Commercial Banks

The section presents the findings related to mobile banking access and financial performance of commercial banks. The section is further subdivided into three subsections. The first subsection presents descriptive findings; the second subsection is about correlations while the third subsection concerns regression analysis.

4.4.1 Descriptive Statistics

The study sought to establish the effect of mobile banking access on financial performance of commercial banks in Kenya. 45% of the respondents strongly agreed that mobile banking enabled 24/7 accessibility to financial services. 52% of the respondents indicated that time spent on mobile banking was low compared to the traditional banking. Additionally, 53% of the respondents agreed that clients could easily transact, pay bills and access their accounts through mobile banking. 44% of the respondents agreed that clients could bank anywhere, check their balance and also access their bank statements. 51% of the respondents also agreed that mobile banking was accessible virtually. 53% of the respondents agreed that beside ease in banking, clients could also raise their concerns and grievances. 42% of the respondents agreed that mobile banking had made it possible for accessibility of financial services in the remote areas. It was further revealed that mobile banking had led to increased profitability as shown by 54% level of agreement by the respondents. More than a half of the respondents acknowledged that mobile banking enhanced service delivery through efficiency and higher effectiveness. The findings for
mobile banking access and financial performance of commercial banks are presented in Table 4.2.

Table 4.2: Descriptive Statistics Mobile Banking Access and Financial Performance of Commercial Banks

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>MEAN</th>
<th>StDev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile banking has enabled 24/7 accessibility to financial services</td>
<td>4.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Time spent in mobile banking is low compared to the traditional banking</td>
<td>3.7</td>
<td>0.9</td>
</tr>
<tr>
<td>Our clients can easily transact, pay bills and access their accounts through mobile banking</td>
<td>4.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Our clients can bank anytime anywhere, check their balance and access bank statements.</td>
<td>4.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Mobile banking is accessible, in terms of virtual locations and general national footprint.</td>
<td>4.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Clients can easily interact with bank; express themselves without visiting their branches</td>
<td>4.4</td>
<td>0.7</td>
</tr>
<tr>
<td>There is great potential of using this for tapping into the unbanked community</td>
<td>4.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Mobile banking has led to accessibility of financial service to customers in remote areas</td>
<td>4.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Mobile banking has led to profitability of commercial banks.</td>
<td>4.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Mobile banking increases effectiveness and efficiency of service delivery.</td>
<td>4.5</td>
<td>0.9</td>
</tr>
<tr>
<td>OVERALL MEAN</td>
<td>4.1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

KEY: SD- Strongly Disagree, D- Disagree, N- Neutral, A- Agree, SA-Strongly Agree, StDev-Standard Deviation

4.4.2 Correlation Analysis

The study determined the direction and strength of the relationship between mobile banking access and financial performance of commercial banks in Kenya. Pearson correlation was employed. The study established a strong positive correlation between
mobile banking access and financial performance of commercial banks ($r = 0.677^{**}$, $p<0.000$) with a significance level of 0.5%. The output of correlation analysis is shown in Table 4.3.

**Table 4.3: Correlation Between Mobile Banking Access and Financial Performance**

<table>
<thead>
<tr>
<th>Correlations</th>
<th>ROA</th>
<th>Mobile Banking Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>0.677^{**}</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.677^{**}</td>
<td>1</td>
</tr>
</tbody>
</table>

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

### 4.4.3 Regression Analysis

The study conducted a simple linear regression between the independent variable, mobile banking access and the dependent variable, financial performance of commercial banks (proxied as return on assets). The value of adjusted R squared is a coefficient of determination which indicates the variation in dependent variable resulting from the changes in the independent variable. As indicated in Table 4.4, the value of R square was 0.458 implying a 45.8% variation in the financial performance of commercial banks is due to mobile banking access.

**Table 4.4: Model Summary for Mobile Banking Access and Financial Performance**

<table>
<thead>
<tr>
<th>Model Summary(^b)</th>
<th>Regression</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>R Std. Error of the Durbin-Watson Estimate</th>
<th>F</th>
<th>Sig.(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>1</td>
<td>0.677(^a)</td>
<td>0.458</td>
<td>0.456</td>
<td>214.524</td>
<td>0.000</td>
</tr>
<tr>
<td>Predictors: (Constant), Mobile Banking Access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent Variable: ROA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.5: ANOVA for Mobile Banking Access and Financial Performance**

<table>
<thead>
<tr>
<th>ANOVA(^a)</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Regression</td>
<td>1</td>
<td>111.032</td>
<td>214.524</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>254</td>
<td>0.518</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>255</td>
<td>242.496</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: ROA
b. Predictors: (Constant), Mobile Banking Access
\[ Y = 1.935 + 0.629 X_1 \] \hspace{1cm} \text{Equation I}

The above regression equation implies that constant performance of banking institutions is at 1.935 units before the influence of factors associated with mobile banking. But a unit increase in financial accessibility leads to 0.629 unit increase in the financial performance of the banking sector. The results were summarized in Table 4.6.

Based on the findings of the correlation coefficients, the following regression model was developed;

**Table 4.6: Coefficients for Mobile Banking Access and Financial Performance**

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficientsa</th>
<th>Unstandardized Coefficients</th>
<th>Standardized t Coefficients</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Constant)</td>
<td>1.935</td>
<td>0.170</td>
<td>11.398</td>
<td>0.000</td>
</tr>
<tr>
<td>1</td>
<td>Mobile Loans</td>
<td>0.629</td>
<td>0.043</td>
<td>0.677</td>
<td>14.647</td>
</tr>
</tbody>
</table>

a. Dependent Variable: ROA

**4.5 Mobile Loans and Financial Performance of Commercial Banks**

The section presents the findings related to mobile loans and financial performance of commercial banks. The section is subdivided into three subsections. The first subsection presents descriptive findings; the second subsection is about correlations while the third subsection concerns regression analysis.

**4.5.1 Descriptive Statistics**

The second objective sought to establish the effect of mobile loans on financial performance of commercial banks in Kenya. 44% of the respondents were neutral on whether mobile loans increased non-performing loans or not. It was revealed that mobile loans led to increased profitability in commercial banks as reflected by 50% of the respondents who agreed. 40% of the respondents agreed that the application of credit scoring method in mobile lending process had led to increased revenue. 35% of the respondents agreed that there were minimum cases of loan default. Again, 37% of the respondents acknowledged that the bank had implemented some measures to reduce mobile loan default. 25% of the respondents disagreed that mobile loans increased credit risk for the bank resulting to huge financial losses. 46% of the respondents were neutral.
when asked whether repayment of mobile loans delayed for 30 days. 40% of the respondents were neutral on whether the probability of default on mobile loans was higher than that with normal loans. 38% of the respondents disagreed when asked whether mobile loans were repaid on time. 52% of the respondents indicated that mobile loans were repaid upon intervention by the bank.

Data by the FinAccess Digital Credit Tracker (2017) show that 26 percent of Kenyans are digital borrowers, and about 17 percent borrowed digital loans in the last 90 days. There are more than 20 digital credit providers in Kenya, including; Mshwari, KCB M-Pesa, M-Coop Cash, and Equity Bank’s Eazzy Loan. The digital credit ecosystem also includes a range of non-bank, credit-only lenders that currently operate outside of the regulatory perimeter of CBK (Wasike & Mulanga, 2018). As at March 2017, the volume of new mobile loans approved monthly by commercial banks had increased by 53 percent, while the value of new mobile loans approved monthly increased by 81 percent. In March 2017, 8.6 million mobile loans were approved, representing a total value of KSh 34.5 million (CBK, 2018).

Mobile loans tend to be short-term and require no collateral, and are generally low in value. Most of the lending platforms use mobile phone-based data, such as call records or social media data, to make near-immediate lending decisions via automated processes. The convenience of these platforms has in part driven their rapid growth, with Mshwari reaching 12 million customers in only three years (Vidal & Hwang, 2017). The loan sizes range, on average, between KSh 1000 to 5000 to start, but larger loans can be accessed through repeated borrowing or positive savings behaviour, among other factors as determined by specific lenders. The fees charged on digital loans generally range between 6 percent to 10 percent monthly for a one month loan, which is relatively expensive as compared to traditional formal loans, (microfinance institutions, for example, tend to average near 30 percent annually) (Mazer & McKee, 2017).
Table 4.7: Descriptive Statistics For Mobile Loans and Financial Performance of Commercial Banks

<table>
<thead>
<tr>
<th>MOBILE LOANS VARIABLES</th>
<th>SD (%)</th>
<th>D (%)</th>
<th>N (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>Mean</th>
<th>St Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of mobile loan platforms increases the nonperforming loan portfolio.</td>
<td>6</td>
<td>29</td>
<td>44</td>
<td>18</td>
<td>4</td>
<td>2.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Mobile loans have led to increased profitability of commercial banks.</td>
<td>0</td>
<td>2</td>
<td>22</td>
<td>50</td>
<td>27</td>
<td>4.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Use of credit scoring systems has increased the revenue generated from mobile loans.</td>
<td>3</td>
<td>8</td>
<td>24</td>
<td>40</td>
<td>25</td>
<td>3.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Presence of well-defined repayment mobile loan periods has boosted commercial banks income.</td>
<td>5</td>
<td>9</td>
<td>28</td>
<td>35</td>
<td>23</td>
<td>3.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Commercial banks have put measures in place to reduce default patterns</td>
<td>2</td>
<td>7</td>
<td>24</td>
<td>37</td>
<td>30</td>
<td>3.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Use of mobile loan systems increases the risk profile, for commercial banks</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>9</td>
<td>4</td>
<td>2.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Mobile loan customers delay to repay by less than 30 days</td>
<td>2</td>
<td>21</td>
<td>46</td>
<td>23</td>
<td>7</td>
<td>2.2</td>
<td>0.9</td>
</tr>
<tr>
<td>The probability of default is higher for mobile loans compared to other loans.</td>
<td>4</td>
<td>18</td>
<td>40</td>
<td>30</td>
<td>8</td>
<td>2.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Mobile loan clients always pay on time</td>
<td>24</td>
<td>38</td>
<td>31</td>
<td>7</td>
<td>1</td>
<td>3.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Mobile loan borrowers usually make the payment before the intervention measures.</td>
<td>24</td>
<td>52</td>
<td>22</td>
<td>2</td>
<td>0</td>
<td>3.2</td>
<td>1.0</td>
</tr>
<tr>
<td>OVERRAL MEAN</td>
<td>3.1</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KEY: SD- Strongly Disagree, D-Disagree, N- Neutral, A- Agree, SA- Strongly Agree, StDev-Standard Deviation.

4.5.1.1 Mobile Banking Transactions

The study further analysed descriptive statistics from secondary data which was obtained from the Central Bank of Kenya. The mean volume of mobile banking transactions in 2013 stood at 9 9.44 billions in 2013, 9.67 billions in 2014, 9.95 billion in 2015, 10.33...
billion in 2016, and 10.78 billion in 2017 billion which rose to 11.96 billion in 2018. The standard deviation for 2013 was 0.62 billions through 2017 which increased to 1.12 billions in 2018. A negative kurtosis was obtained from the analysis of data, implying that our dataset is flatter that the normal distribution. Consequently our dataset is skewed positively indicating that the mean is greater than the median, which is greater than the mode. All the values for Skewness range in -1and +1 while Kurtosis ranges between -2 and +2. In detail, 2013 registered Kurtosis of -0.49, so as 2014, 2015 and 2016. The year 2017 saw a higher negative Kurtosis of -0.50 and -0.59 in 2018. The skewness in 2013 was at 0.35, 2014 through 2017 reported skewness of 0.35 while a much lower skewness of 0.28 was reported in 2018. Looking at the overall credit landscape (Table 4.8), mobile loans seem to have taken the position of an all-purpose borrowing tool with broad appeal. With close to 25 percent of mobile owners currently using them, mobile loans are now the most common types of loans in use. These results are presented in Table 4.8.

Table 4.8: Descriptive Statistics for Mobile Banking Transactions

| MOBILE BANKING TRANSACTIONS (KES. BILLIONS) |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| YEAR             | 2013             | 2014             | 2015             | 2016             | 2017             | 2018             |
| Total            | 306.80           | 311.58           | 319.19           | 328.38           | 340.93           | 355.71           |
| Mean             | 9.44             | 9.67             | 9.95             | 10.33            | 10.78            | 11.96            |
| Median           | 9.33             | 9.56             | 9.84             | 10.22            | 10.67            | 11.97            |
| Mode             | 9.11             | 9.34             | 9.62             | 10.00            | 10.45            | 10.50            |
| Standard Deviation | 0.62             | 0.62             | 0.62             | 0.62             | 0.62             | 1.12             |
| Skewness         | 0.35             | 0.35             | 0.35             | 0.35             | 0.35             | 0.28             |
| Kurtosis         | -0.49            | -0.49            | -0.49            | -0.49            | -0.50            | -0.59            |

Source: Central Bank of Kenya (2018)

4.5.1.2 Mobile Loans Applicants

Between 2012 and 2013, only CBA and Equity had developed mobile lending platform. However, in 2013, more banks adopted the innovation with Cooperative Bank Launching its M-Coop Cash. Subsequent years witnessed more banks adopting the new technology with KCB, Barclays and lately NIC and DTB banks launched their own mobile lending apps. Figure 4.7 illustrates the trend with which the number of mobile loan applications has grown over the years. The analysis ignored the non-banking mobile lenders such as Branch and Tala.
4.5.1.3 Mobile Loans Advanced

Figure 4.8 shows the trend with which the size of mobile loans has grown since the inception of M-Shwari (a partnership between Safaricom and the Commercial Bank of Africa in late 2012. The graphs reveal that Equity Bank, Commercial Bank of Africa, and Commercial Bank of Kenya, are the market leaders in the advancement of mobile loans in the Kenyan financial market. The graph further reveals an upward growing trend of volumes of mobile loans disbursed over the years. This is the case in the wake of commercial banks racing towards attaining 100% transaction through mobile and internet channels.

**Figure 4.7: Total Mobile Loan Applications**

**Source:** Central Bank of Kenya (2018)

**Figure 4.8: Total Amount of Mobile Loans**

**Source:** Central Bank of Kenya (2018)
4.5.2 Correlation Analysis

To assess the strength and direction of the relationship, pairwise correlation analysis was done for the independent and dependent variables. The correlation coefficient was used as a measure of strength and direction of a linear relation between pair variables. The coefficient ranges between -1 and +1, and if close to one, the relationship between the pair is strong and vice-versa.

The results in Table 4.9 show that there was a moderate correlation between the independent variables. The correlations was significant 0.05 level of significance (r=0.531**, p<0.05). These results therefore reveal that there is a positive relationship between mobile loans and the financial performance of commercial banks.

Table 4.9: Correlation Between Mobile Loans and Financial Performance

<table>
<thead>
<tr>
<th>Correlations</th>
<th>ROA</th>
<th>Mobile Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>0.531**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td>N</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.531**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>256</td>
<td>256</td>
</tr>
</tbody>
</table>

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

4.5.3 Regression Analysis

Table 4.10 shows the regression model summary results. The results show the values of R, R2, adjusted R2, and the standard error of estimate. The results show that the independent variables had a moderate positive correlation with the financial performance of commercial banks (R2 = 0.531). The model accounted for 28.22% of the variance in performance as shown by the R2. Table 4.12 shows the results of the regression coefficients. The significance is shown in terms of t-values and the p-values. Since the p-value is less than the significance level (5%), our sample data provide sufficient evidence to conclude that our regression model fits the data better than the model with no independent variables.
Table 4.10: Model Summary for Mobile Loans and Financial Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>R Std. Error of Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.531&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.282</td>
<td>0.279</td>
<td>0.82795</td>
<td>1.270</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Mobile Loans  
b. Dependent Variable: ROA

Table 4.11: ANOVA for Mobile Loans and Financial Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>68.381</td>
<td>1</td>
<td>68.381</td>
<td>99.754</td>
<td>0.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Residual</td>
<td>174.116</td>
<td>254</td>
<td>0.685</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>242.496</td>
<td>255</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: ROA  
b. Predictors: (Constant), Mobile Loans

\[ Y = 2.413 + 0.953 \]  
Equation II

The above regression equation implies that constant performance of banking institutions is at 2.413 units before the influence of factors associated with mobile banking. But a unit increase in financial accessibility leads to 0.953 unit increase in the financial performance of the banking sector. The results were summarized in Table 4.15. Based on the findings of the correlation coefficients, the following regression model was developed:

Table 4.12: Coefficients for Mobile Loans and Financial Performance

| Model | Unstandardized Coefficients | Standardized T Coefficients | Sig. | 95.0% Confidence Interval for B |
|-------|-----------------------------|-------------------------------|------|---------------------------|----------------|
| 1     | (Constant) 2.413 0.396 | 6.093 0.002 | -0.366 | 1.193 |
| Mobile Loans 0.953 0.095 | 9.988 0.000 | 0.765 | 1.141 |

a. Dependent Variable: ROA
4.6 Mobile Banking Risks and Financial Performance of Commercial Banks

The section presents the findings related to mobile banking risks and financial performance of commercial banks. The section is subdivided into three subsections. The first subsection presents descriptive findings; the second subsection is about correlations while the third subsection concerns regression analysis.

4.6.1 Descriptive Statistics

The last research objective aimed at establishing the effect of mobile banking risks on financial performance of commercial banks in Kenya. 33% of the respondents agreed that poor network delayed transactions through mobile banking. 38% of the respondents agreed that users of mobile money were scared of losing their money or making mistakes during transactions. 35% of the respondents noted that backdoor attacks were a major concern to mobile banking. 36% of the respondents agreed to the presence of spyware which gathered vital information about their systems. 19% of the respondents agreed that deception of system administrators for their own financial gain was a common occurrence. 30% of the respondents agreed that radical programmers stole the PINs for mobile banking users. 18% of the respondents agreed that there were incidences of authorized access to mobile banking systems by the former colleagues at the bank. 22% of the respondents agreed that carelessness among the users of mobile banking prompted unauthorized access to the mobile banking systems. Also 31% of the respondents agreed that criminal deception by the customer was a popular trend. Findings are shown in Table 4.13.
Table 4.13: Descriptive Statistics for Mobile Loans and Financial Performance of Commercial Banks

<table>
<thead>
<tr>
<th>MOBILE BANKING RISKS</th>
<th>SD (%)</th>
<th>D (%)</th>
<th>N (%)</th>
<th>A (%)</th>
<th>SA (%)</th>
<th>Mean</th>
<th>StDev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to poor network of mobile in some areas may take a lot of time to do transactions through Mobile Banking</td>
<td>5</td>
<td>10</td>
<td>32</td>
<td>33</td>
<td>20</td>
<td>3.5</td>
<td>1.1</td>
</tr>
<tr>
<td>When transferring money through Mobile Banking the users afraid that they will lose money due careless and mistakes.</td>
<td>3</td>
<td>7</td>
<td>31</td>
<td>38</td>
<td>20</td>
<td>3.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Backdoor attacks that allow secret entry points into the mobile banking programs</td>
<td>4</td>
<td>16</td>
<td>36</td>
<td>35</td>
<td>9</td>
<td>3.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Presence of spywares which gather information from our mobile banking platform systems</td>
<td>6</td>
<td>13</td>
<td>30</td>
<td>36</td>
<td>15</td>
<td>3.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Radical programmers who break into our web servers to replace information with unwanted content</td>
<td>15</td>
<td>36</td>
<td>38</td>
<td>10</td>
<td>2</td>
<td>2.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Criminal deception by system administrators for financial gain</td>
<td>6</td>
<td>18</td>
<td>44</td>
<td>24</td>
<td>8</td>
<td>3.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Radical programmers who steal mobile banking PINs and codes</td>
<td>5</td>
<td>13</td>
<td>37</td>
<td>30</td>
<td>16</td>
<td>3.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Unauthorized Access Former colleagues using old passwords to gain unauthorized access to our mobile banking system</td>
<td>17</td>
<td>28</td>
<td>31</td>
<td>18</td>
<td>6</td>
<td>2.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Unauthorized persons gaining access to mobile banking systems when the users carelessly leaves their computers</td>
<td>15</td>
<td>23</td>
<td>30</td>
<td>22</td>
<td>10</td>
<td>2.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Criminal deception by customers</td>
<td>6</td>
<td>17</td>
<td>33</td>
<td>31</td>
<td>14</td>
<td>3.3</td>
<td>1.1</td>
</tr>
</tbody>
</table>

OVERALL MEAN | 3.2     | 1.1

KEY: SD- Strongly Disagree, D- Disagree, N-Neutral, A-Agree, SA-Strongly Agree, StDev-Standard Deviation

4.6.1.1 Forms of Threats To Mobile Banking

The study aimed at establishing the forms of cyber-attacks commonly associated with mobile banking. The computation was based on a three year average (2016, 2017, and 2018) cyber-attacks reports from the Communication Authority of Kenya. Thus, fraud which posed greatest threat to mobile banking was executed through the following means; 71.46% of the launched attacks towards the mobile banking system were malware attacks.
Next were the web application attacks at 15.73%, Denial of Service attacks came third at 12.78%, system misconfiguration at 0.03%, and online impersonation came last at 0.01%. The findings are shown in Figure 4.9.

<table>
<thead>
<tr>
<th>Form of Cyber Attack</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malware attacks</td>
<td>71.46%</td>
</tr>
<tr>
<td>Web application attacks</td>
<td>15.73%</td>
</tr>
<tr>
<td>Botnet/DDOS</td>
<td>12.76%</td>
</tr>
<tr>
<td>System Misconfiguration</td>
<td>0.03%</td>
</tr>
<tr>
<td>Online Impersonation</td>
<td>0.01%</td>
</tr>
</tbody>
</table>

**Figure 4.9: Forms of Cyber Attacks on Mobile Banking**

*Source: Communication Authority of Kenya Annual Report (2018)*

### 4.6.1.2 Trend of Mobile Banking Attacks (2016-2018)

Findings in Figures 4.10 and 4.11 shows cyber-attacks against mobile banking and the number of advisories taken respectively. Based on Figure 4.10, the numbers of cyber threats against mobile banking were on the rise from the first quarter through the last quarter.

**Figure 4.10: Mobile Banking Cyber Attacks -2018**
In the same year, the number of advisories against cyber-attacks on mobile banking rose from 6226 to 14504 in the fourth quarter.

Figure 4.11: Mobile Banking Cyber Threat Advisories-2018

In the preceding year, mobile banking online attacks dropped from 12263560 in the first quarter to 3462294, approximately a 56% decrease. This was positive outlook however the figures remain extremely high. In the same year, despite decline in cyber-attacks, the number of advisories launched was extremely low with the rise only being witnessed in the third quarter, 85925, which later fell to year low 2455. The findings further confirmed the mismatch between cyber threats against mobile banking and the number of advisories launched by commercial banks to raise alert on the malicious activities on the mobile banking platforms. The results for 2017’s cyber-attacks and the associated advisories are shown in Figures 4.12 and 4.13.

Figure 4.12: Mobile Banking Cyber Attacks -2017
The highest number of advisories was registered in the third quarter of 2017 with the lowest being reported in the fourth quarter. The results for 2017’s cyber-attacks advisories are shown in 4.13.

![Mobile Banking Cyber Threat Advisories 2017](image)

**Figure 4.13: Mobile Banking Cyber Threat Advisories 2017**

In 2016, the highest number of mobile banking attacks was experienced in the fourth quarter, 1380958 with the first quarter registering the lowest cyber-attacks against mobile banking, 893477. Like the subsequent years, the number of cyber threat advisories remained low with the least being witnessed in the second quarter at 4596 advisories. The results are captured in Figures 4.14 and 4.15.

![Mobile Banking Cyber Attacks 2016](image)

**Figure 4.14: Mobile Banking Cyber Attacks-2016**

It is quite discouraging that the number of attacks directed towards mobile banking cannot be compared with the advisories issued by the commercial banks. The ratio is very
low, implying most of the cyber-attacks against mobile banking are either successful or go undetected.

![Mobile Banking Cyber Threat Advisories 2016](image)

**Figure 4.15: Mobile Banking Cyber Threat Advisories 2016**

### 4.6.2 Correlation Analysis

A correlation analysis was carried out between mobile banking risks and financial performance of commercial banks. The results showed a weak negative relationship between the two variables ($r = -0.325$). The relationship was also found to be significant at 5% level of significance ($p<0.05$), implying that our model was accurate for making assumptions involving the independent variable. The findings for correlation analysis are summarized in Table 4.14.

**Table 4.14: Correlation Between Mobile Banking Risks and Financial Performance**

<table>
<thead>
<tr>
<th>Correlations</th>
<th>ROA</th>
<th>Mobile Banking Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>-0.325**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>-0.325**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>256</td>
<td>256</td>
</tr>
</tbody>
</table>

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

### 4.6.3 Regression Analysis

Table 4.15 shows the regression model summary results. The results show the values of $R$, $R^2$, adjusted $R^2$, and the standard error of estimate. The results show that the
independent variables had a moderate positive correlation with the financial performance of commercial banks ($R^2 = 0.106$). The model accounted for 10.6% of the variance in performance as shown by the $R^2$. Table 4.12 shows the results of the regression coefficients. The significance is shown in terms of t-values and the p-values. Since the p-value is less than the significance level (5%), our sample data provide sufficient evidence to conclude that our regression model fits the data better than the model with no independent variables.

Table 4.15: Model Summary for Mobile Banking Risks and Financial Performance

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>R Std. Error of Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.325</td>
<td>0.106</td>
<td>0.102</td>
<td>1.33969</td>
<td>2.248</td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Mobile Banking Risks
b. Dependent Variable: ROA

Table 4.16: Coefficients for Mobile Banking Risks and Financial Performance

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Regression</td>
<td>53.878</td>
<td>1</td>
<td>53.878</td>
<td>30.019</td>
<td>0.000b</td>
</tr>
<tr>
<td>1</td>
<td>Residual</td>
<td>455.872</td>
<td>254</td>
<td>1.795</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>509.750</td>
<td>255</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: ROA
b. Predictors: (Constant), Mobile Banking Risks

$Y = 3.883 - 0.323X_3$ ................................................................. Equation III

The above regression equation implies that constant performance of banking institutions is at 3.883 units before the influence of factors associated with mobile banking. But a unit increase in financial accessibility leads to 0.323 unit decrease in the financial performance of the banking sector. The results were summarized in Table 4.17.

Based on the findings of the correlation coefficients, the following regression model was developed:
Table 4.17: ANOVA for Mobile Banking Risks and Financial Performance

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>(Constant)</td>
<td>3.883</td>
<td>0.167</td>
<td>23.300</td>
<td>0.000</td>
<td>3.555 - 4.212</td>
</tr>
<tr>
<td>Mobile Banking Risks</td>
<td>-0.323</td>
<td>0.059</td>
<td>-0.325</td>
<td>-5.479</td>
<td>-0.440 - 0.207</td>
</tr>
</tbody>
</table>

a. Dependent Variable: ROA

4.7 Chapter Summary

The chapter presented findings concerned with the impact of adopting mobile banking in the banking sector. The study analysed and interpreted both descriptive and inferential statistics. Results indicate that mobile banking access has been improved over the years. Commercial banks have ensured 254/7 availability of mobile banking services, they have managed to address customer care needs through mobile banking, and banks have also managed to bridge the physical barriers that were associated with the traditional banking model. Additionally, the findings revealed that commercial banks are increasingly opting for mobile lending which has helped increase the profitability of commercial banks. Commercial banks are now offering loans through mobile lending apps or through sms dial. They have also managed to tap into the unbanked customer segment. Lastly, findings recognized the increasing trend of technology related risks associated with mobile banking such as phishing, malware, and general fraud committed on mobile banking. These risks had a weak negative impact on the financial performance of commercial banks. The next chapter provides the discussion, conclusion, and recommendation of the study findings.
CHAPTER FIVE
5.0 DISCUSSION, CONCLUSION, AND RECOMMENDATION

5.1 Introduction

The discussion chapter focuses on the summary, conclusion, and discussion of the results in relation to existing empirical studies. It contains reflection on the research result, possible improvement and recommendation and for policy makers and academia.

5.2 Summary

The primary objective of this study was to establish effect of mobile banking on the financial performance of commercial banks in Kenya. The study was guided by the following research objectives: That is, to establish the effect of mobile banking access on the financial performance of commercial banks in Kenya. To establish the effect of Mobile Banking Loans on financial performance of commercial banks. To establish the effect of Mobile Banking Risks on financial performance of commercial banks.

The study based on dual research designs; mixed and descriptive designs. The targeted population for the study comprises of all the forty three (43) commercial banks licensed under the CBK. The sample frame for the study comprises of all the senior employees of these banks who are in charge of the mobile banking unit. A sample of fourteen (14) commercial banks was used in the study which was drawn through simple random sampling. Both primary and secondary data were utilized in the study. Primary data was collected through structured questionnaires which were administered in person. Data analysis was carried out through the SPSS Version 22. Descriptive statistics entailed frequencies, percentages, mean, and standard deviation. Inferential statistics were presented through regression analysis and Pearson Correlations. Simple regression analyses of variables under the study were performance and the determinants of financial performance in commercial banks (mobile banking access, mobile loans, mobile banking risks, and ROA). Output of the findings was presented in the form of tables and figures.

Regarding the first study objective, the study revealed that mobile banking access and financial performance of commercial banks have a fairly strong positive correlation (r = 0.677, p<0.05). Furthermore, regression analysis revealed the existence of a significant relationship between the two variables (R² = 0.458, p<0.05). The ANOVA coefficients
indicated that a unit increase in mobile banking access resulted to 0.629 unit increase in the performance of commercial banks. Therefore, it could be argued that access to mobile banking 24/7, reduction it time required to make banking transaction, ease of transacting through mobile banking, limitation of physical barriers in conducting financial transactions including remote areas, and the overall aim of service delivery in financial transactions were key to the success of mobile banking.

The second research objective sought to establish the effect of mobile loans on financial performance. Results suggested a very weak positive correlation. The Pearson correlation coefficient value was 0.531 and the signficante level p<0.05, implying a significance of the findings at 5% significance level. The findings generally reveled that banks are increasingly innovating digital lending platforms as an alternative to provide clients with quicker loans.

Lastly, the third research objective focused on establishing the effect of mobile banking risks on financial performance of commercial banks in Kenya. The findings revealed a significant negative relationship between mobile banking risks and financial performance of commercial banks. The Pearson correlation coefficient value was -0.325 and the signficicate level p< 0.05 implying significance of the findings at 5% significance level. The R value of 0.106 shows that a unit increase in mobile banking risks contributed to a 10.6% unit decline in the financial performance of commercial banks.

5.3 Discussion
5.3.1 Mobile Banking Access and Financial Performance of Commercial Banks

The first research objective sought to establish the relationship between mobile banking access and financial performance of commercial banks. A fairly strong and significant positive relationship was obtained. This is consistent with the results of previous studies such as Kithaka (2014). The findings resonate well with Kathuo, Rotich, and Anyango (2015) established that the number of mobile banking transactions has tremendously increased in the last five years since the introduction of M-banking. The study thus concludes that, banks that have adopted M-banking services have to a large extent increased their customer outreach, and hence have improved their financial performance.
The study agrees with Kemboi, Ayuma, and Kiprop (2014) who concluded that mobile banking would make it easier to send money to receiver instantly. It also concluded mobile banking ensures easy track of lenders and easy monitoring; it concluded mobile banking helps to ensure quick transfer of funds as it saves on time, that mobile banking ensures easy payment of bills and avoids cash payments and concluded mobile banking payment of bills affects productivity of banks within the area.

The findings support previous research by Hernando and Nieto (2007) on the effect of mobile banking and financial performance of Spanish commercial banks determined that banks that executed mobile banking were able to entice more customers and this definitely directed to increased contact to customer deposits leading to positive financial performance. The study further resonates with Khan, Bagudu, and Abdul-Hakim (2017) who conclude that mobile banking positively and significantly impacts financial performance of Nigeria based commercial banks. The study further agrees with Haddad and Asfour (2014) that there is a statically significant impact of the overall dimensions of mobile banking service on customer E-satisfaction. From customers’ perspective the benefits of mobile banking service in terms of convenience to perform banking transactions in anytime, anywhere and easy way to use.

Tier one banks tend to have sufficient resources for investing in mobile banking. This implies huge client base and high penetration of mobile banking among their users. As a result, they are likely to post higher performance associated with mobile banking. The study found that there was a strong relationship between financial performance of commercial banks and size of the banks and mobile phone banking. Adoption of mobile phone banking has helped banks reduce costs and reach a greater customer base.

According to Migdadi (2012) the international trend was toward decreasing the number of branches as a result of investing in alternative delivery service channels as automatic teller machines (ATM), which reduced operating cost for example the Bank of America closed one third of their overall branch network while increasing automatic machines by declined over 9% from 6,480 in 1983 down to 5,876 in 1993. Consumers may access the websites or application based on how easy they are to use and how effective they are in helping them accomplish their tasks (Zeithaml, Parasuraman, & Malhotra, 2002).
A survey of 2,600 banking customers in six African countries released by a global management consulting firm McKinsey in April 2019 showed that majority of customers (53 per cent) across the economic segments preferred either Internet or mobile channels compared to 26 per cent who said they preferred visiting branches. Aware of this development, financial service providers are breaking the four walls model of banking in favour of digital products.

In West Africa, Nigeria’s Fidelity Bank Plc sought to boost customer numbers by 20% in 2018 by pushing its digital channels and offering loans to low-income borrowers via their mobile phones. The bank hoped to increase its clients from 4.5 million in 2018 and expects return on equity to rise to 13% from 11.8%. More than 150,000 customers had applied for digital loans since it started providing them a month later (Chiku, 2018). The current study is in line with Khan, Bagudu, and Abdul-Hakim (2017) who concludes that mobile banking positively and significantly affects the financial performance of commercial banks in Nigeria.

Tchouassi (2012) looked to see whether mobile phones truly work to extend banking services to the unbanked using empirical lessons from selected Sub-Saharan Africa Countries. The outcome of the study shows that vulnerable, poor and low income households in Sub-Saharan Africa countries frequently lacked access to bank account and confronted high cost for directing fundamental financial transactions. Mobile phone introduced awesome opportunities for the provision of financial services to the unbanked. In addition to technological and economic innovation, policy and regulatory innovation were needed to make these services a reality.

### 5.3.2 Mobile Loans and Financial Performance of Commercial Banks

The second research objective sought to establish the effect of mobile loans on financial performance of commercial banks. Results suggested a moderate positive and significant relationship between mobile banking and financial performance of commercial banks. The study agrees with Nzayisenga (2017) who establishes that mobile lending has a positive impact on the level of financial performance of commercial banks. Also, the findings are in agreement with Yousof (2018) who establishes that mobile banking has a direct and significant effect on the performance of commercial banks. The study supports Waiganjo (2018) who observed that monthly value moved through mobile banking, and
that the number of users of mobile banking does influence financial profitability of the banks to a very great extent.

The study outcome concurs with Mokoro. et al. (2010) who assert that financial institutions are faced with the onerous challenge of processing many small loans which contributes significantly to increase in transaction costs. Indeed, a number of studies have shown that the introduction of mobile banking has been made as an extension of services to existing clients and to increase the client base and not necessarily to reduce costs. Further, the analysis also agrees with Kumar, et al (2010) who assert that the cost savings per transaction or customer will be relatively low, and so the economic justification for this new channel rests on high volumes of transactions. They add that MFIs should do a thorough cost-benefit analysis to understand their cost drivers and evaluate whether mobile banking would reduce those costs.

The study opines with Kajewski (2014) who found that mobile banking had increased profitability of commercial banks. Mobile loans are also cost cutting from the supplier side. Banks do not need to hire staff to screen loan applicants’ documents and gather information or collateral in order to make a judgment about their creditworthiness. Instead, the entire credit assessment procedures are purely automated. In essence, mobile loans have transformed the process for both borrowers and lenders.

Convenience and disbursement speed are the two primary reasons digital borrowers prefer mobile loans to other types of loans. These perceived advantages are consistent across most population segments. Financial Sector Deepening Kenya (2018) reports that in 2017, just over a third (34.8 percent) of Kenya’s adult, mobile phone owning population (approximately 7 million people) had used digital credit. A dominant majority (over three quarters) of digital borrowers across both urban and rural markets have taken loans provided by M-Shwari, around a third have taken loans from KCB MPESA and about 1 in 10 have taken loans from Equity Eazzy. The two leading app-based digital loan products (Tala & Branch) have jointly captured around 6.7% of the market. KCB offers 90 percent of its loans via KCB M-Pesa (Mbogo, 2018). The Kenyan digital credit market is led by CBA’s M-Shwari followed by KCB’s M-Pesa, Equity Eazzy, Tala, and MCoop Cash in that order.
However, there are grey areas that commercial banks must focus on. A study by Wei (2013) that fear of loans, lack of need and lack of awareness are the three most common reasons that mobile owners do not borrow digitally. The three least common reasons were dislike of certain product features (such as the size of the loan or the loan period), lack of trust and lack of account requirements (such as not having a mobile money account). It is therefore upon commercial banks to address the anomalies and fear surrounding the adoption of mobile loans.

Totolo (2018) reports that mobile loans have experienced a tremendous growth: Mshwari disbursed KSh 230 billion loans since inception in 2012 and Kenya Commercial Bank, the largest institution by asset size in Kenya, now provides 90% of its loans through the KCB Mpesa platform. Equity Bank reported the disbursement of KSh 57 billion since 2014.

5.3.3 Mobile Banking Risks and Financial Performance of Commercial Banks

The findings with regard to the effect of mobile banking on financial performance of commercial banks revealed a negative and significant relationship. Mobile banking was affected by malicious cyber threats such as phishing, denial of service attack, malware attack, and mobile application attack. Despite high growth rate of subscription to mobile and internet banking, risks associated with mobile banking such as fraud and money laundering was a still a serious threat hence and impediment towards the adoption of mobile banking. In the same dimension, Cruz, Neto, and Laukkanen (2010) studied the factors inhibiting the adoption of mobile banking among internet users in Brazil. Based on their finding they concluded that mobile banking was less common among banks’ clientele. They identified risk, cost, complexity, and lack of understanding about the relative advantages of these services as the main barriers of using mobile banking services.

The finding support previous conclusion by Amadala (2019) who states that phishing is likely to go up, where hackers obtain account holders details through credit cards and banking details to commit crime. OnNet Services, a Poland based cyber security firm which foretold theft of Sh11 million at four Barclays Bank Auto Teller Machines (ATM) over the Easter holiday, could be linked three local hacker communities to bank heists in Kenya. The agency had on April 17, 2019 through a tweet warned that a hacker cartel
going by the name SilentCards was targeting an institution during Easter festivities. There are other malicious activities giving Kenyan commercial banks hard time. Ignorant customers especially the young ones have become easy targets.

The study resonates well with Olongo (2013) who show that banks’ financial performance variable Return on Assets (ROA) has significantly been affected by fraud loss with negative correlation. The study supports previous sentiments by Kamanthe, Kiragu, and Musumba (2018) that commercial banks need to address security concerns for the increasing online banking fraud cases. Using Nigeria as a case study, Adesina and Ayo (2010) argues that for the case of developing countries, benefits of internet banking have been recognized. However reasons such as low-level trust in the security measures of internet banking are attributed to the reluctance and low adoption of internet banking. This point is stressed by Eastlick and Lotz (2011) who observe that the main contributing factor in electronic commerce growth therefore is trust. Additionally, another challenge emanates from the fact that internet penetration in rural areas is still at infancy phase, which may discourage the investment in mobile banking (Gikandi & Bloor, 2010).

According to Wasonga (2019), most of these crimes are conducted by organized groups. Such fraud leads to the loss of colossal sums of money from banks and other financial institutions, according to police records that indicate a loss of Ksh 17 billion in 2016 up from Ksh 14 billion in 2015. Early 2018, the National Bank of Kenya (NBK) admitted to having lost Sh29 million in a fraud attack. Wainainah (2019) adds that in 2018, Kenya saw 29.7 percent of its mobile users have their devices attacked by a range of malware including adware, Risk Tool and Trojan-Dropper. Most mobile malware is downloaded onto mobile devices from dubious applications on the App Store which are embedded with the malicious programmes. Once installed by the users, the software takes over the device.

Besides, cybercriminals can use accessibility services to hijack a perfectly legitimate application and force it, for example, to launch a banking app to make a money transfer right there on the victim’s device. Techniques have also appeared to counter dynamic analysis; for example, the Rotexy Trojan checks to see if it is running in a sandbox. However, this is not exactly a new thing, since we have observed such behavior before. That said, it should be noted that combined with obfuscation, anti-dynamic analysis techniques can be effective if virus writers manage to infiltrate their Trojan into a popular
app store, in which case both static and dynamic processing may be powerless. Although sandbox detection cannot be said to be common practice among cybercriminals, the trend is evident, and we are inclined to believe that such techniques will become very sophisticated in the near future.

Nevertheless, the study disagrees with Karanja (2017) who asserts that commercial banks had strived to address risks related to malware attacks. To him, only hacking was still a common challenge among many commercial banks at the time of undertaking this study. Global statistics reveal that over the last few years, Android banking malware evolved – with several peaks in 2016. The overall number of attacked users was 786,325. 2017 was more stable and the number of users who encountered mobile malware reached 515,816. But then there was a game changer. In April 2018 the number of attacked users started to rise rapidly, with the overall figure reaching 1,799,891 – which means that it has more than tripled in just a year. The report further observes that taking the overall number of detections, the absolute leaders in 2017 were Asacub, Faketoken and Hqwar.

Cyber security experts suggested that the cyber-attacks against financial services institutions are becoming more frequent and more sophisticated (Cuomo, 2014; Ryan, 2014). Overall, there are several cyber security concerns with regard to mobile banking. Security on mobile banking is complicated because of the variety of mobile devices and platforms (Lee, Zhang, & Chen, 2013). The security and privacy of sensitive financial data is one of the main concerns in acceptance of the mobile banking applications (Elkhodr, Shahrestani & Kourouche, 2012). The limited privacy protection experience and fewer resources of inde-pendent developers decrease the effectiveness of cyber security protection on the mobile applications (Balebako & Cranor, 2015). The weak and rigid authentication provided by signature, PIN, password and Card Security Code (CSC) in mobile banking have numerous flaws and loop-holes (Edge & Sampaio, 2009).

Default is common enough that an estimated 2 million people have been reported to the Kenyan credit bureau for M-Shwari default, many for sums of a few dollars (Francis, Blumenstock, & Robinson, 2017). Digital credit products reviewed often have relatively high interest rates and charge multiple fees, which may adversely affect borrowers – at least relative to less costly products they might access. Most products require borrowers to provide social media and other personal information to receive loans, potentially
supporting individuals without a formal credit history to access formal loans but raising privacy concerns (Anderson, Reynolds, & Klawitter, 2018).

Overall, the study disputes previous findings by that the relationship between mobile banking and financial performance of commercial banks rests in a weak positive correlation. Instead, the study argues that the link between the two variables is positive and significant with the exception of mobile banking risks which pose a negative impact.

5.4 Conclusion

5.4.1 Mobile Banking Access and Financial Performance of Commercial Banks

The findings revealed that mobile banking has a positive and significant effect on the financial performance of commercial banks. With greater use of all types of mobile services, mobile banking is expected to continue growing. Mobile banking provides greater convenience for customers as it allows them to accomplish tasks “on the go.” However, there is need to eliminate any existing barrier and challenges that could hinder easier access to mobile banking by customers. This study therefore concludes that as a commercial bank increases its mobile banking coverage, enhanced awareness among consumers and trained them on the applications of mobile banking, reduced the threats and risks of mobile banking, banks would attract more customers mobile to their banking platforms and therefore an improved financial performance.

5.4.2 Mobile Loans and Financial Performance of Commercial Banks

The findings indicated that mobile loans such as transactions through bank lending apps had a moderate strong correlation with the financial performance of commercial banks. The study hence concludes that many consumers are embracing digital loans offered by banks, providing an opportunity for the banks to strengthen digital lending as the next strategic source of competitive performance in the bank’s loan portfolio.

5.4.3 Mobile Banking Risks and Financial Performance of Commercial Banks

The findings showed that mobile banking was inherent with various risks. The risks could be categorized into two- the internal risks majorly commissioned by the bank’s insiders and the other being launched by the outside attackers on the banking systems including
banks’ consumers. As a result, the study concludes that although mobile banking has enhanced financial performance of commercial banks, the risks associated with the internet and technology advancement possess danger to the progress of mobile banking.

5.5 Recommendation

5.5.1 Recommendations For Improvement

5.5.1 Mobile Banking Access and Financial Performance of Commercial Banks

There is need for banking sector to enter into a partnership arrangement with the telecommunication service providers so that the strength of internet and network coverage countrywide can be strengthened. The study further suggests that commercial banks should focus beyond enhanced accessibility and begin evaluating the effectiveness of customer service offered by mobile banking.

5.5.2 Mobile Loans and Financial Performance of Commercial Banks

The study recommends that commercial banks should invest in consumer awareness with regard to emerging products and services tailored to mobile banking. Commercial banks should deploy adequate resources in conducting research that could aid product innovation on existing mobile banking platforms. The study recommends for both the government and the banking sector to reach consensus on the proposal, consideration, and implementation of the most effective and consumer friendly mobile banking model which can help save the pockets of mobile banking users. This is because there have been complaints from some consumers that digital lending by some commercial banks have stringent credit collection policies and procedures. Lastly, banks need to be transparent with pricing, fees and other charges and find ways to help customers comprehend terms and conditions.

5.5.3 Mobile Banking Risks and Financial Performance of Commercial Banks

It is evident that mobile banking is suffering from frequent system attacks. To mitigate this risk, banking institutions should implement controls to verify the person accessing the mobile banking service is the customer. The Central Bank of Kenya should ensure adequate implementation of the Guidance Note on Cybersecurity it issued 2017. The
guidance laid out the regulatory standards to industry participants on assessment and mitigation of Cybersecurity threats. This can play a significant contribution towards supervisory guidance on strong customer authentication that applies to mobile banking. Furthermore, possession of the mobile device alone should not be enough to permit access to the mobile banking application. At the very least, access to the device should be password protected and users seeking access to the mobile banking service should be subject to strong authentication. Lastly, stakeholders in the mobile banking sector need to invest in regular cybersecurity awareness training for employees to educate them not to click on links or open attachments received from untrusted sources. For instance, conducting simulated phishing attack to ensure that they know how to distinguish phishing emails. To address the risks posed to business continuity and the associated reputational risk arising from the increasing digitization of financial services, the Central Bank of Kenya issued a Guidance Note on Cybersecurity in 2017 that laid out the regulatory standards to industry participants on assessment and mitigation of Cybersecurity threats.

5.5.2 Recommendations for Further Studies

This research is conducted only in commercial banks based in Nairobi City County. Therefore, further studies may consider respondents from other banks and out of Nairobi. The researcher considers only three independent variables among a number of factors that might affect mobile banking adoption and financial performance, hence, future studies may consider additional variables. Perceived technological risks indicated a negative relationship; therefore, further research is recommended on the effect of trust to perceived risk of mobile banking at the low income market. It would be of interest to explore the geographic effect, such as in rural areas, where it takes much longer and is more costly to access the nearest banking facilities. Lastly, the use of mobile loans is an emerging concept within the banking business model. Perhaps another study could assess the effectiveness of credit scoring strategies employed by banks in mobile lending.
REFERENCES


https://www.cgap.org/blog/who-are-kenyas-financially-excluded


International Journal of Mobile Communications, 3(4);325–338


Soroor, J. (2006). Application Of Intelligent WW Services To Mobile Real-Time Coordination In Supply Chains. In 4th IASTED International Conference on Communications, Internet and Information Technology (CIIT 2005), Cambridge, USA.


Suoranta, M. (2003). Adoption of mobile banking in Finland. Journal of Money, Credit and Banking, 54(38); 1662-1671.


USAID 2012. Uganda Mobile Money Assessment and Case Study. Examining Cash Payment Streams and their Electronic alternatives amongst USAID Implementing Partners, November 2012


APPENDICES

Appendix I: Permission to Conduct Research Letter

TO WHOM IT MAY CONCERN

19TH JULY 2019
Dear Sir/Madam,

REF: PERMISSION TO CONDUCT RESEARCH- HANI MOHAMED ABDULLAHI
STUDENT ID NO. 654459.

The bearer of this letter is a student of United States International University (USIU)-Africa pursuing a master’s Degree in Business Administration.

As part of the program, the student is required to undertake a dissertation on the “Effect of Mobile Banking of Financial Performance of Commercial Banks in Kenya” requires him to collect data.

Please note that information provided will be treated with utmost confidentiality and will only be used for academic purposes.

Kindly assist the student get the appropriate data and should you have any queries contact the undersigned.

Yours Sincerely

Prof. Amos Njuguna
Dean School of Graduate Studies, Research and Extension
Tel: 0730 116 442
Email: amnjuguna@usiu.ac.ke

p.o.box 14634-00600 Nairobi, Kenya  | tel:254-730-116-000  | info@usiu.ac.ke
www.usiu.ac.ke
Appendix II: Nacosti Research License

Ref No: 837155
Date of Issue: 23/August/2019

RESEARCH LICENSE

This is to certify that Ms. Hani Abdullahi of United State International University -Africa, has been licensed to conduct research in Nairobi on the topic: Effect of Mobile Banking on Financial Performance of Commercial Banks in Kenya for the period ending: 23/August/2020.

License No: NACOSTI/P/19995

3837155
Applicant Identification Number

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.
Appendix III: Questionnaire

The purpose of this questionnaire is to identify and analyze the impact of mobile banking on the financial performance of commercial banks in Kenya. Kindly, respond by selecting the response among the choices given that best represents your views.

SECTION 1: DEMOGRAPHIC INFORMATION

(Please tick [✓] appropriately)

1. What is your gender?  Male [ ]  Female [ ]

2. Marital Status: Single [ ]  Married [ ]  Divorced [ ]  Other [ ]

3. Age: 20 or under [ ]  21-30 [ ]  31-40 [ ]  41-50 [ ]  51+ [ ]

4. Level of education:
   High School and Below [ ]  Diploma [ ]  First degree [ ]  Masters [ ]  Ph.D. [ ]

5. Kindly indicate the tier in which your bank belongs
   Tier 1 [ ]  Tier 2 [ ]  Tier 3 [ ]

6. Position in your Organization:
   Manager [ ]  Departmental Head [ ]  Supervisor [ ]  Subordinate Staff [ ]
Section 2: Mobile Banking Access and Performance of Commercial Banks

Kindly indicate by ticking (√) the extent to which the following factors of mobile banking access influence performance of commercial banks on a 5-point Likert scale. 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree.

<table>
<thead>
<tr>
<th>MOBILE BANKING ACCESS</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mobile banking has enabled 24/7 accessibility to financial services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Time spent in mobile banking is low compared to the traditional banking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Our clients can easily transact, pay bills and access their accounts through mobile banking.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Mobile banking is accessible, in terms of virtual locations and general national footprint.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Our clients can bank anytime anywhere, check their balance and access bank statements.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Our clients can easily interact with their bank; express their opinions and grievances without visiting their branches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. There is great potential of using this in agent banking for provision of banking services to unbanked community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Mobile banking has led to accessibility of financial service to many customer in remote areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Accessibility of banking service through mobile banking has led to profitability of commercial banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Mobile banking increases effectiveness and efficiency of service delivery in commercial banks in Kenya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Section 3: Mobile Loans and Performance of Commercial Banks

Kindly indicate by ticking (√) the extent to which the following elements of mobile loans influence performance of commercial banks on a 5-point Likert scale. 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree.

<table>
<thead>
<tr>
<th>Mobile Loans</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. The use of mobile loan platforms increases the nonperforming loan portfolio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. The advancement of mobile loans to customers has led to increased profitability of the commercial banks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. The use of credit scoring systems has increased the revenue generated from mobile loans by the commercial banks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. The presence of well-defined repayment mobile loan periods has boosted commercial banks income, since there are minimum cases of default.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. The commercial banks have put measures in place to ensure that there are minimum default patterns.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. The use of mobile loan systems increases the risk profile, where commercial banks are likely to loss more finances compared to other types of loans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Mobile loan clients always pay on time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Mobile loan borrowers usually make the payment before the intervention measures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Mobile loan customers delay to repay by less than 30 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. The probability of default is higher for mobile loans compared to other loans.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 4: Mobile Banking Risks and Performance of Commercial Banks

Kindly indicate by ticking (✓) the extent to which the following elements of mobile banking risks influence performance of commercial banks on a 5-point Likert scale. 1-Strongly Disagree, 2-Disagree, 3Neutral, 4-Agree and 5-Strongly Agree.

<table>
<thead>
<tr>
<th>Financial Accessibility</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Due to poor network of mobile in some areas may take a lot of time to do transactions through Mobile Banking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. When transferring money through Mobile Banking the users afraid that they will lose money due careless and mistakes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Backdoor attacks that allow secret entry points into the mobile banking programs without normal security check</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Presence of spywares which gather information from our mobile banking platform systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Radical programmers who break into our web servers to replace information with unwanted content</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Criminal deception by system administrators for financial gain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Radical programmers who steal mobile banking PINs and codes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Unauthorized Access Former colleagues using old passwords to gain unauthorized access to our mobile banking system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Unauthorized persons gaining access to mobile banking systems when the users carelessly leaves their computers it logged on</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Criminal deception by customers for financial gain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix IV: Secondary Data Collection Sheet M Banking Loans

<table>
<thead>
<tr>
<th>Year/ Amount Kes ('000)</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Loans</td>
<td>306.80</td>
<td>311.58</td>
<td>319.19</td>
<td>328.38</td>
<td>340.93</td>
<td>355.71</td>
<td>394.77</td>
</tr>
<tr>
<td>Applied (Billions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Cyber Attacks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>2,547,487</td>
<td>4,333,006</td>
<td>25,474,338</td>
</tr>
<tr>
<td>Launched Against M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advisories launched</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16,425</td>
<td>22,285</td>
<td>3,489,258</td>
</tr>
<tr>
<td>against M Banking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyber Attacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attacks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Performance</td>
<td>3.07%</td>
<td>2.98%</td>
<td>2.65%</td>
<td>2.17%</td>
<td>1.82%</td>
<td>2.33%</td>
<td>3.07%</td>
</tr>
<tr>
<td>(ROA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix V: M Banking Transactions (Kes. Billions)

<table>
<thead>
<tr>
<th>BANK/YEAR</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya Commercial Bank Ltd</td>
<td>10.27</td>
<td>10.50</td>
<td>10.78</td>
<td>11.16</td>
<td>11.61</td>
<td>12.42</td>
</tr>
<tr>
<td>Standard Chartered Bank Ltd</td>
<td>10.65</td>
<td>10.88</td>
<td>11.16</td>
<td>11.54</td>
<td>11.99</td>
<td>12.09</td>
</tr>
<tr>
<td>Cooperative Bank of Kenya Ltd</td>
<td>10.22</td>
<td>10.45</td>
<td>10.73</td>
<td>11.11</td>
<td>11.56</td>
<td>11.65</td>
</tr>
<tr>
<td>CFC Stanbic Bank Ltd</td>
<td>9.75</td>
<td>9.98</td>
<td>10.26</td>
<td>10.64</td>
<td>11.09</td>
<td>11.18</td>
</tr>
<tr>
<td>Equity Bank Ltd</td>
<td>10.65</td>
<td>10.88</td>
<td>11.16</td>
<td>11.54</td>
<td>11.98</td>
<td>12.08</td>
</tr>
<tr>
<td>Commercial Bank of Africa Ltd</td>
<td>9.33</td>
<td>9.56</td>
<td>9.84</td>
<td>10.22</td>
<td>10.67</td>
<td>10.86</td>
</tr>
<tr>
<td>National Bank of Kenya Ltd</td>
<td>8.67</td>
<td>8.90</td>
<td>9.18</td>
<td>9.56</td>
<td>10.00</td>
<td>11.50</td>
</tr>
<tr>
<td>Citibank N.A.</td>
<td>10.56</td>
<td>10.79</td>
<td>11.07</td>
<td>11.45</td>
<td>11.90</td>
<td>14.64</td>
</tr>
<tr>
<td>Diamond Trust Bank Ltd</td>
<td>9.74</td>
<td>9.97</td>
<td>10.25</td>
<td>10.63</td>
<td>11.08</td>
<td>13.30</td>
</tr>
<tr>
<td>I&amp;M Bank Ltd</td>
<td>9.11</td>
<td>9.34</td>
<td>9.62</td>
<td>10.00</td>
<td>10.45</td>
<td>12.54</td>
</tr>
<tr>
<td>Prime Bank Ltd</td>
<td>9.80</td>
<td>10.03</td>
<td>10.31</td>
<td>10.69</td>
<td>11.14</td>
<td>13.37</td>
</tr>
<tr>
<td>Bank of Baroda Ltd</td>
<td>9.11</td>
<td>9.34</td>
<td>9.62</td>
<td>10.00</td>
<td>10.45</td>
<td>10.50</td>
</tr>
<tr>
<td>Bank of Africa Ltd</td>
<td>9.11</td>
<td>9.34</td>
<td>9.62</td>
<td>10.00</td>
<td>10.45</td>
<td>10.50</td>
</tr>
<tr>
<td>Bank of India</td>
<td>9.55</td>
<td>9.78</td>
<td>10.06</td>
<td>10.44</td>
<td>10.89</td>
<td>10.94</td>
</tr>
<tr>
<td>Ecobank Ltd</td>
<td>9.71</td>
<td>9.94</td>
<td>10.22</td>
<td>10.60</td>
<td>11.05</td>
<td>11.11</td>
</tr>
<tr>
<td>Family Bank Ltd</td>
<td>8.77</td>
<td>9.00</td>
<td>9.27</td>
<td>9.66</td>
<td>10.10</td>
<td>10.15</td>
</tr>
<tr>
<td>Habib AG Zurich</td>
<td>9.18</td>
<td>9.41</td>
<td>9.69</td>
<td>10.07</td>
<td>10.52</td>
<td>12.62</td>
</tr>
<tr>
<td>Consolidated Bank of Kenya Ltd</td>
<td>9.71</td>
<td>9.94</td>
<td>10.22</td>
<td>10.60</td>
<td>11.05</td>
<td>13.26</td>
</tr>
<tr>
<td>Fidelity Commercial Bank Ltd</td>
<td>9.01</td>
<td>9.24</td>
<td>9.52</td>
<td>9.90</td>
<td>10.35</td>
<td>12.52</td>
</tr>
<tr>
<td>Victoria Commercial Bank Ltd</td>
<td>9.21</td>
<td>9.44</td>
<td>9.72</td>
<td>10.10</td>
<td>10.55</td>
<td>12.66</td>
</tr>
<tr>
<td>Habib Bank Ltd</td>
<td>8.89</td>
<td>9.12</td>
<td>9.40</td>
<td>9.78</td>
<td>10.22</td>
<td>11.65</td>
</tr>
<tr>
<td>Equatorial Commercial Bank Ltd</td>
<td>8.89</td>
<td>9.12</td>
<td>9.40</td>
<td>9.78</td>
<td>10.23</td>
<td>12.28</td>
</tr>
<tr>
<td>First Community Bank Ltd</td>
<td>9.03</td>
<td>9.26</td>
<td>9.53</td>
<td>9.91</td>
<td>10.36</td>
<td>10.46</td>
</tr>
<tr>
<td>Credit Bank Ltd</td>
<td>10.24</td>
<td>10.48</td>
<td>10.75</td>
<td>11.13</td>
<td>11.58</td>
<td>13.90</td>
</tr>
<tr>
<td>Oriental Commercial Bank Ltd</td>
<td>8.16</td>
<td>8.39</td>
<td>8.67</td>
<td>9.05</td>
<td>9.50</td>
<td>11.59</td>
</tr>
</tbody>
</table>

*Source: Central Bank of Kenya Website*
### Appendix VI: Mobile Banking Loans

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya Commercial Bank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.3</td>
<td>5.6</td>
<td>6.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Cooperative Bank of Kenya</td>
<td>-</td>
<td>-</td>
<td>2.7</td>
<td>5.1</td>
<td>6.9</td>
<td>8.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Commercial Bank of Africa</td>
<td>2.1</td>
<td>4.3</td>
<td>5.6</td>
<td>7.2</td>
<td>8.4</td>
<td>10.1</td>
<td>11.1</td>
</tr>
<tr>
<td>Equity Bank</td>
<td>3.2</td>
<td>6.9</td>
<td>7.4</td>
<td>8.1</td>
<td>9.3</td>
<td>11.2</td>
<td>12.7</td>
</tr>
<tr>
<td>Barclays</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.3</td>
</tr>
<tr>
<td>DTB</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.1</td>
</tr>
<tr>
<td>NIC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Source: Central Bank of Kenya Website

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya Commercial Bank</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2450</td>
<td>7550</td>
<td>9815</td>
<td>12760</td>
</tr>
<tr>
<td>Cooperative Bank of Kenya</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>173</td>
<td>750</td>
<td>5250</td>
<td>6720</td>
</tr>
<tr>
<td>Commercial Bank of Africa</td>
<td>-</td>
<td>-</td>
<td>1037</td>
<td>11150</td>
<td>15430</td>
<td>20521.9</td>
<td>26678</td>
</tr>
<tr>
<td>Equity Bank</td>
<td>85</td>
<td>165</td>
<td>0</td>
<td>11150</td>
<td>15430</td>
<td>20521.9</td>
<td>26678</td>
</tr>
<tr>
<td>Barclays</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8457</td>
</tr>
<tr>
<td>DTB</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3362</td>
</tr>
<tr>
<td>NIC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2154</td>
</tr>
</tbody>
</table>

Source: Central Bank of Kenya Website
### Appendix VII: Financial Performance (ROA)

<table>
<thead>
<tr>
<th>BANK</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Banking Corporation Ltd</td>
<td>2.90%</td>
<td>2.90%</td>
<td>1.49%</td>
<td>1.61%</td>
<td>0.82%</td>
<td>0.98%</td>
</tr>
<tr>
<td>Bank of Africa (K) Ltd</td>
<td>2.00%</td>
<td>2.00%</td>
<td>0.33%</td>
<td>-2.07%</td>
<td>-0.03%</td>
<td>-0.04%</td>
</tr>
<tr>
<td>Bank of Baroda (K) Ltd</td>
<td>4.80%</td>
<td>4.80%</td>
<td>4.35%</td>
<td>3.65%</td>
<td>5.26%</td>
<td>6.31%</td>
</tr>
<tr>
<td>Bank of India</td>
<td>4.10%</td>
<td>4.10%</td>
<td>3.74%</td>
<td>3.49%</td>
<td>4.79%</td>
<td>5.75%</td>
</tr>
<tr>
<td>Barclays Bank of Kenya Ltd</td>
<td>5.80%</td>
<td>5.80%</td>
<td>5.44%</td>
<td>5.01%</td>
<td>3.68%</td>
<td>4.42%</td>
</tr>
<tr>
<td>CFC Stanbic Bank (K) Ltd</td>
<td>4.10%</td>
<td>4.10%</td>
<td>4.31%</td>
<td>3.56%</td>
<td>2.34%</td>
<td>2.88%</td>
</tr>
<tr>
<td>Citibank N.A. Kenya</td>
<td>7.00%</td>
<td>7.00%</td>
<td>5.22%</td>
<td>6.33%</td>
<td>6.49%</td>
<td>7.98%</td>
</tr>
<tr>
<td>Co-operative Bank of Kenya Ltd</td>
<td>3.60%</td>
<td>3.60%</td>
<td>4.43%</td>
<td>4.14%</td>
<td>4.31%</td>
<td>5.30%</td>
</tr>
<tr>
<td>Commercial Bank of Africa Ltd</td>
<td>-0.80%</td>
<td>-0.80%</td>
<td>2.57%</td>
<td>3.14%</td>
<td>3.31%</td>
<td>4.07%</td>
</tr>
<tr>
<td>Consolidated Bank of Kenya Ltd</td>
<td>4.70%</td>
<td>4.70%</td>
<td>-1.82%</td>
<td>0.35%</td>
<td>-3.26%</td>
<td>-4.01%</td>
</tr>
<tr>
<td>Credit Bank Ltd</td>
<td>1.00%</td>
<td>1.00%</td>
<td>-1.02%</td>
<td>-1.74%</td>
<td>1.23%</td>
<td>1.51%</td>
</tr>
<tr>
<td>Development Bank of Kenya Ltd</td>
<td>1.80%</td>
<td>1.80%</td>
<td>1.88%</td>
<td>1.05%</td>
<td>0.35%</td>
<td>0.43%</td>
</tr>
<tr>
<td>Diamond Trust Bank (K) Ltd</td>
<td>4.90%</td>
<td>4.90%</td>
<td>4.47%</td>
<td>3.69%</td>
<td>3.05%</td>
<td>3.75%</td>
</tr>
<tr>
<td>Ecobank Kenya Ltd</td>
<td>-3.30%</td>
<td>-3.30%</td>
<td>-1.09%</td>
<td>0.18%</td>
<td>-2.68%</td>
<td>-0.65%</td>
</tr>
<tr>
<td>Equatorial Commercial Bank Ltd</td>
<td>1.00%</td>
<td>1.00%</td>
<td>-2.78%</td>
<td>-4.53%</td>
<td>-2.34%</td>
<td>-2.48%</td>
</tr>
<tr>
<td>Equity Bank Ltd</td>
<td>7.70%</td>
<td>7.70%</td>
<td>7.26%</td>
<td>6.56%</td>
<td>5.78%</td>
<td>6.13%</td>
</tr>
<tr>
<td>Family Bank Ltd</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.24%</td>
<td>3.55%</td>
<td>-1.99%</td>
<td>-2.11%</td>
</tr>
<tr>
<td>Fidelity Commercial Bank Ltd</td>
<td>2.50%</td>
<td>2.50%</td>
<td>1.80%</td>
<td>-1.84%</td>
<td>-0.63%</td>
<td>-0.67%</td>
</tr>
<tr>
<td>First Community Bank Ltd</td>
<td>1.80%</td>
<td>1.80%</td>
<td>0.67%</td>
<td>0.07%</td>
<td>1.25%</td>
<td>1.33%</td>
</tr>
<tr>
<td>Giro Commercial Bank Ltd</td>
<td>2.80%</td>
<td>2.80%</td>
<td>3.13%</td>
<td>3.03%</td>
<td>4.02%</td>
<td>4.26%</td>
</tr>
<tr>
<td>Guaranty Trust Bank Ltd</td>
<td>1.60%</td>
<td>1.60%</td>
<td>2.08%</td>
<td>1.86%</td>
<td>1.92%</td>
<td>2.04%</td>
</tr>
<tr>
<td>Guardian Bank Ltd</td>
<td>3.00%</td>
<td>3.00%</td>
<td>2.59%</td>
<td>2.25%</td>
<td>1.44%</td>
<td>1.53%</td>
</tr>
<tr>
<td>Gulf African Bank Ltd</td>
<td>2.70%</td>
<td>2.70%</td>
<td>3.11%</td>
<td>4.42%</td>
<td>0.81%</td>
<td>0.86%</td>
</tr>
<tr>
<td>Habib Bank A.G. Zurich</td>
<td>4.30%</td>
<td>4.30%</td>
<td>5.29%</td>
<td>3.53%</td>
<td>4.09%</td>
<td>4.34%</td>
</tr>
<tr>
<td>Habib Bank Ltd</td>
<td>6.20%</td>
<td>6.20%</td>
<td>5.63%</td>
<td>4.74%</td>
<td>5.35%</td>
<td>5.67%</td>
</tr>
<tr>
<td>Housing Finance</td>
<td>3%</td>
<td>2.12%</td>
<td>2.52%</td>
<td>2.12%</td>
<td>0.06%</td>
<td>0.67%</td>
</tr>
<tr>
<td>I&amp;M Bank Ltd</td>
<td>5.50%</td>
<td>5.50%</td>
<td>5.64%</td>
<td>5.66%</td>
<td>4.09%</td>
<td>4.34%</td>
</tr>
<tr>
<td>Jamii Bora Bank Ltd</td>
<td>5.80%</td>
<td>1.30%</td>
<td>0.73%</td>
<td>0.22%</td>
<td>-5.93%</td>
<td>-6.29%</td>
</tr>
<tr>
<td>Kenya Commercial Bank Ltd</td>
<td>1.30%</td>
<td>4.20%</td>
<td>4.61%</td>
<td>5.01%</td>
<td>4.94%</td>
<td>3.80%</td>
</tr>
<tr>
<td>Middle East Bank (K) Ltd</td>
<td>4.20%</td>
<td>5.50%</td>
<td>5.93%</td>
<td>0.75%</td>
<td>1.01%</td>
<td>1.26%</td>
</tr>
<tr>
<td>National Bank of Kenya Ltd</td>
<td>5.50%</td>
<td>1.40%</td>
<td>1.28%</td>
<td>-1.34%</td>
<td>0.60%</td>
<td>0.75%</td>
</tr>
<tr>
<td>NIC Bank Ltd</td>
<td>1.40%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>3.99%</td>
<td>2.94%</td>
<td>3.68%</td>
</tr>
<tr>
<td>Oriental Commercial Bank Ltd</td>
<td>1.90%</td>
<td>4.60%</td>
<td>4.44%</td>
<td>0.49%</td>
<td>1.10%</td>
<td>1.22%</td>
</tr>
<tr>
<td>Paramount Universal Bank Ltd</td>
<td>4.60%</td>
<td>2.50%</td>
<td>1.07%</td>
<td>1.60%</td>
<td>1.01%</td>
<td>1.35%</td>
</tr>
<tr>
<td>Prime Bank Ltd</td>
<td>2.50%</td>
<td>1.20%</td>
<td>1.32%</td>
<td>3.99%</td>
<td>2.59%</td>
<td>3.24%</td>
</tr>
<tr>
<td>Sidian Bank Ltd</td>
<td>1.20%</td>
<td>3.80%</td>
<td>4.18%</td>
<td>2.72%</td>
<td>3.55%</td>
<td>4.44%</td>
</tr>
<tr>
<td>Standard Chartered Bank (K) Ltd</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.42%</td>
<td>3.83%</td>
<td>3.33%</td>
<td>4.06%</td>
</tr>
<tr>
<td>Trans-national Bank Ltd</td>
<td>4.70%</td>
<td>2.30%</td>
<td>1.86%</td>
<td>2.39%</td>
<td>0.53%</td>
<td>3.88%</td>
</tr>
<tr>
<td>UBA Kenya Ltd</td>
<td>2.30%</td>
<td>-7.50%</td>
<td>-6.97%</td>
<td>-3.91%</td>
<td>0.21%</td>
<td>3.45%</td>
</tr>
<tr>
<td>Victoria Commercial Bank Ltd</td>
<td>-7.50%</td>
<td>4.30%</td>
<td>3.68%</td>
<td>3.38%</td>
<td>3.27%</td>
<td>3.62%</td>
</tr>
</tbody>
</table>

**Source:** Central Bank of Kenya Website