

**DIGITAL LENDING AND LOAN PORTFOLIO OF THE LISTED COMMERCIAL
BANKS IN KENYA**

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DECLARATION

This research is my original work and has never been presented for any degree award a public University or learning Institution.

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TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGEMENT	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
OPERATIONAL DEFINITION OF TERMS.....	ix
ABBREVIATIONS AND ACRONYMS	x
ABSTRACT.....	xi
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.1.1 Digital Lending	3
1.1.1 Loan Portfolio	5
1.1.3 Digital Lending and Loan Portfolio	7
1.1.4 Listed Commercial Banks.....	8
1.2 Statement of the Problem	9
1.3 General Objectives	11
1.3.1 Specific Objectives.....	11
1.4 Research Hypothesis	11
1.5 Significance of the Study.....	12
1.6 Scope of the Study.....	12
1.7 Limitation of the Study.....	12
1.8 Organization of the Study.....	13
CHAPTER TWO: LITERATURE REVIEW	14
2.1 Introduction.....	14
2.2 Theoretical Review	14

2.2.1 Bank focused theory	17
2.2.2 Innovation Diffusion Theory	14
2.2.3 Modern Portfolio Theory	16
2.3 Empirical review	18
2.3.1 Digital lending terms and Loan portfolio	18
2.3.2 Digital lending costs and loan portfolio.....	19
2.3.3 Digital lending risk profile and loan portfolio	20
CHAPTER THREE: RESEARCH METHODOLOGY	25
3.1 Introduction.....	25
3.2 Research Design.....	25
3.3 Empirical model.....	25
3.4 Target Population	26
3.5 Sampling Design	26
3.6 Data Collection Instruments	27
3.6.1 Validity of Instruments	28
3.7 Data Analysis Method	28
3.8 Diagnostic Tests.....	28
3.8.1 Multicollinearity.....	28
3.8.2 Normality	29
3.8.3 Heteroscedasticity	29
3.8.4 Test for Autocorrelation	29
3.8.5 Hausman Test.....	30
3.9 Ethical consideration	30

REFERENCES.....45
APPENDIX I. List of listed Commercial Banks50
APPENDIX II: Data collection review guide51
APPENDIX III: Research Budget.....52
APPENDIX IV. Work Flow53

LIST OF TABLES

Table 2.1: Summary of Literature Review	21
Table 3.1 Operationalization and measurement of variables	27

LIST OF FIGURES

Figure 2.1 Conceptual Framework	23
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OPERATIONAL DEFINITION OF TERMS

Bank:	Financial institution that accepts deposits and issue loans.
Digital lending:	Allocation of loans to customers through the mobile and internet platform
Digital lending platforms:	Technological avenues which include smartphones that aid In the provision of credit to people
Mobile Phone:	Communication device where people can access loans from and subsequently make payments to the credits accorded to the customers
Loans:	Credit provided by lending institutions to customers either through the digital platform, over the counter method, among others, depending on the lending firm's rules and regulations.
Loan Portfolio:	Various categories of unsecured credits held and availed by banks and other lending facilities to customers.
Secured Loans:	Loans provided to customers if they can deposit collateral such as title deeds, vehicle logbook, share certificates, among others.
Non-Secured loans:	Loans that are provided to customers without having to place security or collateral in exchange for the credit accorded.
Payday Loans:	Short-term unsecured loan that attracts a high-interest rate.

ABBREVIATIONS AND ACRONYMS

BFIABanking and Financial Institution Act

CBK Central Bank of Kenya

Coop Bank Cooperative Bank of Kenya

CRB Credit Rating Board

Fintech Financial Technology

KCB Kenya Commercial Bank

NACOSTI National Commission for Science, Technology and Innovation

NPL Non-performing loans

VIF Variance Inflation Factor

MPT Modern Portfolio Theory

ABSTRACT

The inception of digital lending led to a rise in the number of credits provided through the mobile avenue. Nonetheless, various concerns have been raised concerning the constituents of the loan portfolio. Loan portfolio is essential in guaranteeing that banks generate maximum returns based on their lending activities. Banks had a high preference for secured loans as far as provision of credits was concerned before the emergence of digital lending. However, recent trends indicate that there has been an increase in the amount of unsecured loans accessed through the digital platform. However, there has been a rise in the number of institutions providing the loans since the onset of mobile lending. Several concerns have been raised including the need to regulate provision of the digital loans to safeguard the banks from making losses and preventing customers from exploitation. Besides, current studies have emphasized the effect of mobile lending on the Kenyan banks' financial performance. Thus, this study aimed at deducing the effect of digital lending on loan portfolio of listed commercial banks with a specific interest on unsecured loans. This study utilized information spanning for seven years that is; 2013-2019. The study's general objective involves analyzing the effect of digital lending on the loan portfolio of the listed commercial banks whereas the specific objectives include identifying the effects of mobile lending duration on loan portfolio of Kenya's commercial banks that are listed, analyzing the effect of digital lending costs on loan portfolio of listed commercial banks and lastly determining the effect of digital lending risk profile on loan portfolio of listed commercial banks. The Bank focused, Innovation diffusion and Modern Portfolio theories were used in this study. The research embraced a descriptive research design. The target population involved listed commercial Banks that embrace digital lending. Also, a census sampling design was used given the relatively smaller number of the target population. The study's target population entailed 10 listed commercial banks. The Central Bank of Kenya, and the listed Commercial Banks were integral in the acquisition of secondary data. A data collection sheet was used in the collection of the secondary data. The study applied descriptive statistics and panel multiple regression analysis to analyze the data. Besides, the data obtained for this study was only be used for study purposes. The findings revealed that the length of digital lending had a favorable but statistically negligible influence on the loan portfolio of listed commercial banks. Also, the findings revealed that that the correlation between digital lending duration and amount of non-secured loans was positive and significant ($r = 0.578$, $P = .000$).

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Financial lending services have primarily been undertaken by institutions such as banks, Saccos, pawnshops, individual lenders among others, nonetheless, banks are one of the leading lenders in the financial market (Karumba&Wafula, 2012). The development of technological innovations has led to changes in the financial lending sector. For instance, there has been an emergence of a new form of credit provision as underlined by digital lending which has embraced technological innovations to tap into the provision of digital products and service to the global digitized market (Wamalwa, Rugiri&Lauler, 2019). Digital lenders compete for the traditionally underserved and down-market customers. Digital lending initially focused on the already developed markets and high-income segments, however, the trend has since changed as digital lenders have opted for the emerging markets across the globe (Accion Insights, 2018).

Across the globe, several nations have adopted digital lending. For example, Statista (2020) highlights that in North America, 8775 fintech firms provide digital lending services. Similarly, Europe has 7385, while Africa and Asia altogether have a total of 4765 fintech firms in both Africa and Asia. For instance, the United States has; the Lending Club, Prosper and SoFi, Britain has British Zopa, while France has Prêt d' Union and China's Alibaba as some of their digital lending firms (Totolo, 2018).

In Africa, digital lending platforms have aided in revolutionizing the lending market as underlined by its increased embracement in nations such as Egypt, South Africa, Nigeria, Kenya, among others (Totolo, 2018). The digital lending platform is used significantly by the younger faction of the population as compared to the older faction. Globally, the leading market players in digital lending include; Tala, Pitchbook, Avant, Braintree, M-Jara, M-Pawa, Kubo, among

others. In Kenya, M-shwari was the first digital lending facility to be launched in the country and Africa at large in the year 2012 (Wamalwa, Rugiri&Lauler, 2019).

Banks primarily aid in Fintech firms' the development given their financial support in cushioning the digital lenders in their lending activities. The CBK report (2015) denotes that several banks have either opted to roll-out digital lending services either as a joint or sole venture. For instance, Kenya Commercial Bank (KCB) has partnered with Mpesa to provide digital lending through KCB-Mpesa. Also, NCBA bank has partnered with Safaricom to provide loans through M-Shwari to provide digital services (Kenya Bankers Association, 2019). Firms such as equity, Absa bank, among others, have ventured into digital lending solely (Wamalwa, Rugiri, &Lauler, 2019). The loan application process through the digital platform starts with registration where a user provides his or her details such as name and identification number (Cortet, Rijks&Nijland, 2016). The registration is accompanied by customer authentication and verification before the loan approval, disbursement, and loan recovery process come into consideration.

According to Cortina and Schmukler (2018), digital lending has served to raise several questions, whether it is a complimentary or a competing service to the banks. The arguments follow that banks have had to embark on changes in the loan portfolios because of variations in the lending industry. In Kenya, commercial banks have different loan portfolios depending on the policies, rules, and regulations governing the activities of the financial institutions (Ngugi, 2017).

To most of the transition economies, such as Kenya, lending activities have both been complicated and controversial in equal measure (Nzayisenga, 2017). The complication and controversial nature is attributable to the fact that there are complaints from the banks and firms

alike. For instance, the banks complain over losses they have incurred due to debts and the increasing level of NPLs while firms complain over the banks' high standards regarding lending (Kenya Bankers Association, 2019). Commercial banks have had to re-strategize to ensure they cope up well in the wake of increasing technological development in the financial sector. Therefore, there is need to implore the effects of digital lending in the commercial Bank's loan portfolios.

1.1.1 Digital Lending

The digital lending in Kenya has since grown as underscored by the existence of more than twenty lending organizations (Viffa Consult, 2018). The growth of digital lending in Kenya is attributable to several factors such as; lack of paperwork in the borrowing process of digital loans. Also, aspects such as the long-distance between the residential areas and location of banks since banks have spurred the growth of the new form of borrowing (Gubbins&Totolo, 2018). Besides, the digital lending platform operates for 24hours making loan accessibility to become instant at any given time. According to Riasanow et al., (2018), the swift nature of the digital lending process is attractive to the users as it has negated the need to visit banking facilities to process loans.

The digital lending platform has ensured that borrowers do not have to access banks among other credit firms to process a loan as it does not require collateral. Hence; it has made it easier and favorable for the populace to use the lending mechanism in their routine borrowing ordeals (Giulioni, 2015). Banks have joined the increasingly attractive digital lending platform by availing loans to customers through both the mobile phone and internet avenue either by combining with other banks and firms or venturing solely (Dermine, 2017). Moreover, the loan recovery process is digitalized, making it easier for the firms to track the repayment process. The

digital loan provision process is instant in nature implying that it can be configured in diverse yet new that may be integral in diverse situations that can impact an organization or an individual and ensuring customers can repay the loans at their opportune time (Cook & McKay, 2015). This study adopted the following aspects of digital lending; loan term, lending costs as well as risk profile elements.

A loan duration denotes the period that is to be taken to repay a given loan entirely (Accion Insights, 2018). Whereas loan durations vary depending on the amounts accorded to the borrowers, different institutions have diverse mechanisms that determine the repayment period regarding the credits (Ngugi, 2017). The digital platform is vital in ensuring that loans are easily availed to the customers regardless of time and distance from a lending institution (Viffa Consult, 2018). In Kenya, various loan terms duration depend on the firm's policies. For instance, the M-shwari loans have a repayment duration of one month while Absa bank for instance permits a duration for repaying the credits depending on the amount borrowed (Kithinji, 2018). The adoption of loan durations in this study is necessitated by the need to assess the impact that average repayment period has on the digital loans availed.

The lending costs underline the expenses that relate to a credit that has been provided to the customer (Kithinji, 2018). Banks in Kenya own diverse types of assets. However, loans form the primary asset. Besides, interests charged on the loans are vital in determining the value of the credit provided (Totolo, 2018). Digital credits also charge interests at different rates depending on the policies embraced by the various entities. The emergence of digital lending coupled with bank's desire to increase their lending trends has seen them adopt the mobile credit avenue (Kenya Bankers Association, 2019). However, the costs related to the loans are vital in determining the overall value of their portfolio.

Risk profile relate to the prospects that the lending institution is bound to suffer from aspects relating to losses as a result of the provision of digital loans (Viffa Consult, 2018). Besides, it denotes an analysis of a person's ability and willingness to repay a given loan. The non-existence of collateral has impacted the ability to easily determine the repayment prospects of customers significantly as far as digital loans are concerned (Muthiora, 2015). However, determination of a customer's risk profile is integral in analyzing the prospect of a given customer repaying a loan. Therefore, the risk profile reveals the trends relating to digital loan provision and the bad debts that a firm incurs due to the provision of the digital loans.

1.1.1 Loan Portfolio

A loan portfolio refers to a pool of credits that banks, investment firms, or even government agencies own and manage (Muthiora, 2017). Besides, a loan comprises of three essential elements; monetary consideration, interest rate, and loan duration (Oromo, 2015). According to Khole (2014), a loan portfolio's value is dependent on both the interest rates and the quality or likelihood that the principal and the interest rate will be paid. Loan portfolio forms the largest asset of banks and their primary revenue source; hence, it is the main source of risk regarding the soundness and operational safety of banks (Muthiora, 2015). Nonetheless, the interest risk levels relating to lending activities of banks is highly dependent on the composition of the loan portfolio held and other conditions underlined in the loan such as; embedded options, maturity, rate structure among others (Bett, 2017). Thus, the process of managing loan portfolio is vital especially among banks and financial institutions that hold large yet diversified credit portfolios, that may include; illiquid loans.

Unsecured loans relate to credits offered to customers without the provision of an asset or another item in the form of collateral (Di Filippo, Ranaldo&Wrampelmeyer, 2018). According to

CBK report (2015), unsecured loans comprise of; overdraft, personal loans, credit cards, commercial papers as well as financing accorded to SMEs. In the 1990s, providers of unsecured loans such as personal loan targeted individuals in the society especially those with low (Khole, 2014). However, over the years, there has been a change in customers' profile especially regarding taking personal loans; this is underlined by the increasing growth of the unsecured credit as compared to secured loans especially after the implosion in the mortgage market in the year 2008 (World Bank Survey 2012).

A study conducted by Bett (2017) denotes that although banks and other credit providing firms provide several different types of loans to their customers, customers have a high preference for unsecured loans as they are readily available. The provision of unsecured loans is often based on an individual's capacity to pay (Kithinji, 2018). The World Bank survey (2012) outlined that there has been a shift in the banks loan provisions with an increasing focus on unsecured loans since it provides a sound growth strategy. Over the years, banks had a high preference to providing secured loans as compared to unsecured loans due to the security element associated with the credit facilities, a trend that has since changed (World Bank Survey, 2012). The unsecured personal loans represent an attractive gap in the market for various credit providers, and more specifically banks who have opted to actively pursue lending strategies to provision of this product. The increasing option to pursue the strategy is attributable to the obtainable margins in the market currently (Khole, 2014).

Unsecured loans are interesting to the banks given the high interest rates charged on the product. Besides, the small borrowers lack bargaining power regarding the interest rates charged (World Bank Survey, 2012). The lucrative nature of unsecured loans among banks is underscored by the fact that it provides a basis for spreading the risk over several small borrowers as compared to

instances where the organization lends a big corporate entity, which should a default occur, a relatively large amount of money would be at risk (Ngila, 2010).

The provision of loans plays an integral role as the customers view the banks as a source of easy loans for different activities as the loans have different terms and conditions. The emergence of internet lending platforms in Kenya has served to increase competition on the role of the banks regarding the provision of loans (Kenya Bankers Association, 2019). As a result, this study aims at determining the effect of the rising trend in digital lending on loan portfolio held by listed commercial banks in Kenya.

1.1.3 Digital Lending and Loan Portfolio

Digital lending is not a complete substitute to the provision of secured loans since people still have an option of visiting the banking facilities for credits (Totolo, 2018). Nonetheless, the number of people who seek to access credits without providing a given form of collateral has earmarked a rise in the number of digital lending platforms available. Digital loans are prevalent among individuals and small businesses, an attribute that is due to lack of adequate collateral to provide as a means for accessing secured loans (Muthiora, 2015).

Digital lending aspects such as loan durations have served to hinder or increase one's accessibility to this type of credits (Kithinji, 2018). The durations if not properly adhered to leads to an increase in the default patterns. The interest rates charged also increase the repayment amount required by the lenders; hence, it increases the profitability aspect of this form of lending (Central Bank of Kenya, 2015). Previously, unsecured loans such as bank overdrafts were provided based on a customer's overall salaries or a stipulated amount that qualifies a given

individual for the service. Thus, it underlined a suitable avenue for determining the risk prospects regarding provision of unsecured loans.

Banks among other credit lending institutions have delved into digital lending. Among banks, loan portfolio is fundamentally the most important asset as it is the primary source of income (Ngugi, 2017). Hence, loan portfolio management is critical as they address the prospect relating to overall performance and operational existence of banks. Sound management of loan portfolio is important as banks hold pools of credit solely for return maximization (Khole, 2014).

1.1.4 Listed Commercial Banks

Listed commercial banks relate to the banks that are listed in the securities exchange market. On the other hand, non-listed commercial banks are those that are not listed in the securities market. The essence of relying on listed commercial banks is attributable to the ease of accessing financial statements. In the financial year 2017 and 2018, KCB recorded a growth of 6% and 7% in its net loan held and Group portfolio assets, respectively. Similarly, the Cooperative bank recorded a decline in its loan portfolio from the financial year 2018 by recording a total of 251 billion shillings as compared to 253 billion shillings in the year 2017 (Kenya Bankers Association, 2019).

Cooperative Bank has experienced an increasing trend in its loan portfolio as underlined by 166 Billion in 2014, 205, and 221 billion shillings in the year 2015 and 2016, respectively (Cooperative Bank of Kenya, 2019). Similarly, in the year between 2014 and 2018, the equity bank's loan portfolio grew by 13 per cent. M-Shwari after operating for one-year disbursed loans summing up to Ksh. 7.8 billion (Kaffenberger, Totolo, & Soursourian, 2018). Diamond Trust Bank recorded Ksh. 194,564 Million in loans in the year 2016 while in the year 2017 it

recorded growth as underlined by Ksh. 207,103 million in total loans (Central Bank of Kenya, 2018).

Digital lending has prompted banks to adjust their loan portfolio since they provide money to lending firms. Totolo (2018) asserts that in Kenya more than 27% of adult population has taken digital loans for diverse uses. Besides, the number of credits is highest among the M-Shwari users. At the same time, also, the KCB-Mpesa has managed to have a considerable number of people using the platform for loans (Central Bank of Kenya, 2015). The banks have even penetrated the market since three of the largest banks in Kenya (KCB, Equity, and Coop Bank) have either partnered with Safaricom to provide the digital loan services or have developed an independent virtual mobile network as underlined by the Equity Bank.

Several firms have since emerged to offer digital lending services, which include both the banks and non-banking institutions such as Branch. Further, Muthiora (2015) highlights that the digital loans provided have played an essential role in meeting a type of credit that had never been satisfied by the other lending firms before.

1.2 Statement of the Problem

Lending has and still remains one of the leading services offered by banks. However, banks focused more on provision of secured loans since it offered collateral as a basis of recouping the loaned amount (Accion Insights, 2018). Banks have often engaged in the provision of secured loans, which have formed a relatively large proportion of the loan products available to the customers. Digital lending despite initially having a slow adoption rate in Kenyan market has seen a tremendous growth since its inception as outlined by an increase in the number of people accessing unsecured loans (Gubbins&Totolo, 2018). Loan portfolios are dependent on various

factors such as interest rates as well as the summative value of the interest and principal repayable. The amount of loans held by banks in 2013 was 1,296,452 million (Central Bank of Kenya, 2013), in 2014 was 1,881,024 million. In 2015 and 2016 respectively, the loan portfolio amount was; 2,142,150 and 2,257,489 million respectively (Central Bank of Kenya, 2016). In the year 2017 and 2018, the loan portfolio was 2,268,932 and 2,318,071 million respectively (Central Bank of Kenya, 2018). In 2019, the value of loan portfolio was 2,628,302 million (Central Bank of Kenya, 2019).

Unsecured loans pose several challenges given the relatively increasing trend of unsecured loan defaulters. For instance, the CBK report (2020) underlined that more than 3.2 million people have been listed at the CRB for defaulting loans, a number that showed an increase from 2.7 and 1.8 million people in the year 2019 and 2018 respectively (Central Bank of Kenya, 2020).

The BFIA [Act No. 12/91: Sec 37(3-5)], prohibited banks from giving out unsecured loans lest they have undisputed approval of all the directors. Besides, the CBK should provide approval for the provision of the underscored loans. Nonetheless, CBK changed the clause as it allows banks to provide unsecured loans to customers (Saal, Starnes & Rehmann, 2017). Banks continue to embrace digital lending despite the challenges it poses yet their profitability is critical for their existence. However, unsecured loans have underlying challenges relating to their repayment, recovery and default patterns among others, which have an effect on the overall loan portfolio of banks.

Several studies have been conducted locally regarding digital lending services. For instance, Oromo (2015) conducted a study to determine the nature of the relationship between loans issued by commercial banks and mobile money in Kenya. Further, Ngugi (2017) undertook a study to

determine the effect that practices regarding mobile-based loan management have on Kenya's commercial banks' financial performance. Also, Ndegwa (2014) studied the effects that mobile money has on Kenya's commercial banks' NPL. The studies point at the fact that digital lending and loan portfolio has not been fully exploited. Therefore, this study aims to address the gap through determining the effect of digital lending on loan portfolio of listed commercial banks by considering challenges relating to the loan recovery, the default patterns and duration on the overall composition and performance of unsecured loans as part of the loan portfolio.

1.3 General Objectives

To determine the effect of digital lending on loan portfolio of the listed commercial banks in Kenya.

1.3.1 Specific Objectives

The specific objectives are;

- i. To analyze the effect of digital lending duration on the loan portfolio of listed commercial banks in Kenya.
- ii. To determine the effect of digital lending costs on the loan portfolio of listed commercial banks in Kenya.
- iii. To analyze the effect of digital lending risk profiles on the loan portfolio of listed commercial banks in Kenya.

1.4 Research Hypothesis

H₀₁ Digital lending durations have no significant effect on the loan portfolio of listed commercial banks in Kenya.

H₀₂ Digital lending costs have no significant effect on the loan portfolio of listed commercial banks in Kenya.

H₀₃ Digital lending risk profiles have no significant effect on the loan portfolio of listed commercial banks in Kenya.

1.5 Significance of the Study

The findings will also be integral to banks by providing an insight regarding the efficient and effective utilization of digital lending and the impact it has on the organization's loan portfolio. The knowledge of digital lending and loan portfolios will ensure firms can identify, plan, control, and effectively manage the loan portfolio held by a commercial bank. Similarly, the research findings can assist the government in formulating policies about taxation and other regulations especially in the banking sector. The findings aim to serve as a basis for stimulating researchers into venturing into management practices and further research as far as credit transactions are concerned as well as the risks that relate to portfolio allocation.

1.6 Scope of the Study

This study aims at determining the effect of digital lending on the loan portfolio of listed commercial banks in Nairobi County, Kenya. The study is seeking to assess the impact of the digital credit on the unsecured loans as a component of loan portfolio held by commercial banks in Kenya. The information relating to digital lending and loan portfolio will be within a span of seven years from the year 2013 to 2019.

1.7 Limitation of the Study

Some of the bank's secondary data may not provide a succinct picture of unsecured loans trend over the years under consideration. The researcher will overcome this challenge by contacting

the respective financial institutions using the letter from the school and NACOSTI to access the data.

1.8 Organization of the Study

Chapter one elaborated on the study's background putting into perspective the dependent variable, independent variable, problem statement, scope and objectives. In the study, the background of digital lending has also been discussed. Moreover, chapter one also reveals the reasons why the study was conducted and the related limitations. In chapter two, relate to the studies that were conducted by other authors and the consequently, in-depth discussion of the findings. Chapter three has outlined a summary of the research approach that was embraced. Chapter four relates to the research findings and subsequently a discussion of the results that were obtained. Chapter five gives a summary, conclusion, recommendations and suggestions for further studies.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review based on the purpose of the study "Digital lending and loan portfolio in listed commercial banks in Kenya." The literature review is subdivided into three main subsections which include; theoretical framework, empirical review, conceptual framework and it will be summed up literature review summary.

2.2 Theoretical Review

Mobile lending is pegged on various theories. This section reviews the following theories relating to the study; Bank focused theory, Innovation diffusion theory and Modern portfolio theory.

2.2.1 Innovation Diffusion Theory

E. M. Rodgers developed the innovation diffusion theory in the year 1962. Mahajan and Peterson (1985) underline that innovation is a new idea or practice while innovation diffusion denotes a process where information about an idea is spread over time. According to Nzayisenga (2017), new technology is vital in innovation. However, it is influenced by compatibility, usefulness and complexity of the idea and resources available. Digital lending in Kenya is an innovation that was introduced and subsequently embraced to expand the provision of financial services such as lending by using of mobile phones and the internet. This new technology has increased the transactions undertaken by people regarding taking and repaying loans (Jagtiani & Lemieux, 2017).

The rise in mobile lending is attributable to compatibility nature of transactions (Kenya Bankers Association, 2019). Compatibility denotes the ability of things working together without any form of challenge. In mobile lending, the transactions should be undertaken without incurring any form of challenge.

A study undertaken by Kithinji (2018) underlines that people tend to be closer to other people whom they share a given behaviour. Hence, if innovation is relatively non-complex, it will serve to increase its acceptance and people's understanding; in return, an increase in its usage. Innovation diffusion is integral in ensuring that banks embrace strategies that ease transaction among customers. Hence, it permits banks to comprehend the technological changes that the digital lending innovation will bring out with ease (Nzayisenga, 2017).

Innovation diffusion theory helps to determine how firms make decisions and inculcate aspects relating to digital loan duration, costs and risk profile to loan provision. Technological development in fintech sector has ensured increasing levels of financial sector innovation (Jagtiani and Lemieux, 2017). The innovations have ensured the incorporation of diverse aspects before provision of a loan and recovery trends. For instance, Wamalwa, Rugiri and Laufer (2019) assert that the digital system has incorporated a calculator that not only determines the repayment duration but also exerts a roll-over fee in case one defaults to repay within the set time. The innovation in the field of lending guarantees suitable controls are put in place to overcome challenges that may arise regarding provision of loans to customers. For instance, the repayment period and subsequent measure to ensure the loanees are made aware of their impending balances and subsequent measures in instances where they fail to repay the loan promptly.

2.2.2 Modern Portfolio Theory

Harry Markowitz developed the MPT theory in the year 1952 through several research publications and articles before William Sharpe extended and refined it further in the year 1984. This theory advocates for holding assets that are bound to have a lower risk collectively as compared to the risk posed by the individual risks (Murunga, 2018). Thus, this theory underlines that financial lending institutions can construct a portfolio that can generate maximum returns at a given risk level. Therefore, it guarantees a high likelihood that the businesses in the financial sector will remain operational through the generation of profits from a given venture.

A portfolio that has less than perfect positive correlations are vital in guaranteeing that there is a reduction in the level of financial risk exposure to a firm (Francis & Kim, 2013). According to Reilly and Brown (2011), all the assets in a portfolio must be considered since the returns in a given portfolio interact. According to a study conducted by Pfaff (2012), modern portfolio theory is a guideline to rational investors in ensuring optimum returns from portfolio diversification. In MPT, both the portfolio's expected risk and rate of return shows there is need to diversify assets in a bid to reduce the portfolio risk. Thus, it aids in the provision and determining whether there exists mathematical linkage Kenya exists between the determinants of both a preferred and suitable portfolio embraced by investment groups (Reilly & Brown, 2011).

This theory helps in forming a decision regarding non-secured loans as a loan component under consideration in the study that a bank should hold at any given time. Although banks are embracing technology in their activities including emerging aspects such as digital lending, Reilly and Brown (2011), contend that financial lending institutions such as banks should ensure the elements of a loan portfolio guarantee maximum returns. Also, this theory ensures it is easier

to underline the cost components relating to digital lending. The essence of cost is underlined by the need to ensure that the costs incurred do not lead to losses.

2.2.3 Bank focused theory

This theory is integral in decisions regarding the need to adopt non-traditional methods concerning the provision of banking services to both its existing customers as well as emerging markets (Pfaff, 2012). Bank-focused theory argues that there is a need for traditional banks to utilize low-cost delivery channels in providing banking services to customers in the present and future period (Gichuki&Jagongo, 2017). The low-cost delivery channels depicted include both the internet and mobile banking services.

The adoption mobile and internet lending platforms has ensured that customers can undertake transactions at any given time, unlike the traditional banking system where the customers have to make queues. The customers' concerns involve the security of the transactions and their identity, accessibility and reliability of the services as well as the degree of personalization. In return, banks have addressed these issues by providing easy to use banking interface for the customers (Gichuki&Jagongo, 2017).

This theory is integral in denoting the aim of banks with regards to offering their banking services which include managing loan portfolio as well as embracing digital lending mechanisms. Besides, Pfaff (2012) highlights that lending rates serve as a guide to the returns that a credit institution seeks to obtain from their customers. This theory serves to explain the role of digital lending durations as embraced by commercial banks on their loan portfolios. Digital lending duration if not properly determined can lead to losses and subsequent interference of the loan portfolio of banks.

2.3 Empirical review

2.3.1 Digital lending duration and Loan portfolio

Ngugi (November 2017), studied the management practices of mobile loans and their impact on banks' financial performance. The survey used descriptive and inferential research design with 52 financial institutions forming the target population for the study. The survey underlined that credit scoring and the credit repayment period positively influenced the banks' financial performance. This sought to determine the effect of digital lending on loan portfolio of listed commercial banks in Kenya.

Anderson, Reynolds, and Klawitter (2018) undertook a study on Digital Credit Products in India, Kenya, Nigeria, Tanzania, and Uganda. The study highlighted that the emergence of digital lending services has led to the emergence of several firms providing service in different parts of the globe. Despite the increase in the number of MNOs, there is a similarity between the terms of service between the firms in Tanzania, Uganda, India and Kenya. The similarities underlined that there was an increase in the repayment duration for the loans as well as the unsecured nature of the loans offered for a significant fraction of the firms. Moreover, the review denotes that the emergence of internet borrowing has served to reduce the need for borrowers to visit banks regarding issues relating to overdrafts and other forms of cash advances.

Siabei (2019) conducted a study to determine mobile-based lending's influence on microfinance banks' performance within Nairobi county. The study adopted a correlational research design with a scope of one year (2019). The target population for the study involved 13 microfinance institutions. The findings underlined that loan disbursement process through mobile platform positively affects the performance of microfinance banks. Also, the findings highlighted that a

strict loan repayment scheduled and related policies impacted the financial performance of commercial banks negatively in Kenya.

2.3.2 Digital lending costs and loan portfolio

Oromo (2015) studied the relationship between mobile money and loans issued by Kenya's commercial banks. The study embraced a descriptive research design with 43 commercial banks forming the target population. The study disclosed that the transaction value had a significant positive impact on the loans provided by commercial banks in Kenya. Moreover, the study denoted that deposits made as a result of mobile money positive effect on the loans provided by commercial banks.

Murunga (2018) studied the effect that mobile-based lending has on the loans offered by banks, a study that delved on non-Performing loans within Nakuru Town. The study embraced a descriptive research design with commercial banks within Nakuru Town, forming the target population. The findings of the study underlined that banks have prioritized lending through the mobile platform. However, the survey revealed that mobile credits were primarily inconsequential to the commercial banks' NPL. Further, the findings underscored the fact that monitoring and evaluation process had an insignificant effect on the loans provided.

Kithinji (2018) studied the effects that mobile lending has on the quality of the loan portfolio of banks. The study based its objectives on the roles of credit information sharing, economic conditions, bank sizes as well as interest rates with regards to quality of loan portfolio. The results from the survey underlined that the interest rate impacted commercial banks' loan portfolio quality significantly. Also, the findings underlined that increase in; interest rates, credit

information sharing, economic conditions and bank sizes positively impacted the quality of loan portfolio of commercial banks.

2.3.3 Digital lending risk profile and loan portfolio

Ndegwa (2014) studied the effects of mobile money on the non-performing loans of commercial banks in Kenya. The study embraced a descriptive research design with 43 commercial banks forming the target population for the study. The study revealed that mobile money is integral in the banking industry as it has led to a reduction in; transaction costs and inherent risks relating to money handling. Also, the findings showcased the existence of a direct relationship between NPL and interest rates. For instance, a unit increase in interest rate led to a 3.189 units increase in NPL.

Wright et al. (2017) undertook a survey to deduce the experiences of customers concerning digital credit in Kenya. The study revealed that digital lending was highly preferred due to the privacy it accords the users. Also, mobile lending has served to substitute the shop credits, loans from family members as well as money lenders. The study denoted that although a large number of people have opted to use digital lending platforms, there is an increase in the number of defaulters who have led to a rise in NPLs since most customers service multiple loans.

Gathergood, Guttman-Kenney and Hunt, (2019) conducted a survey to determine the effect that payday loans has on the United Kingdom borrowers. The survey highlights that a large number of people who use payday loans often borrow from other multiple sources. The researchers underline that the UK market has a large number of internet lenders, an aspect that has led to a decline in the number of people who access payday loans. An increase in digital loans and the

interest charged has played a significant role in increasing the customers' credit unworthiness and subsequent increase in non-performing loans.

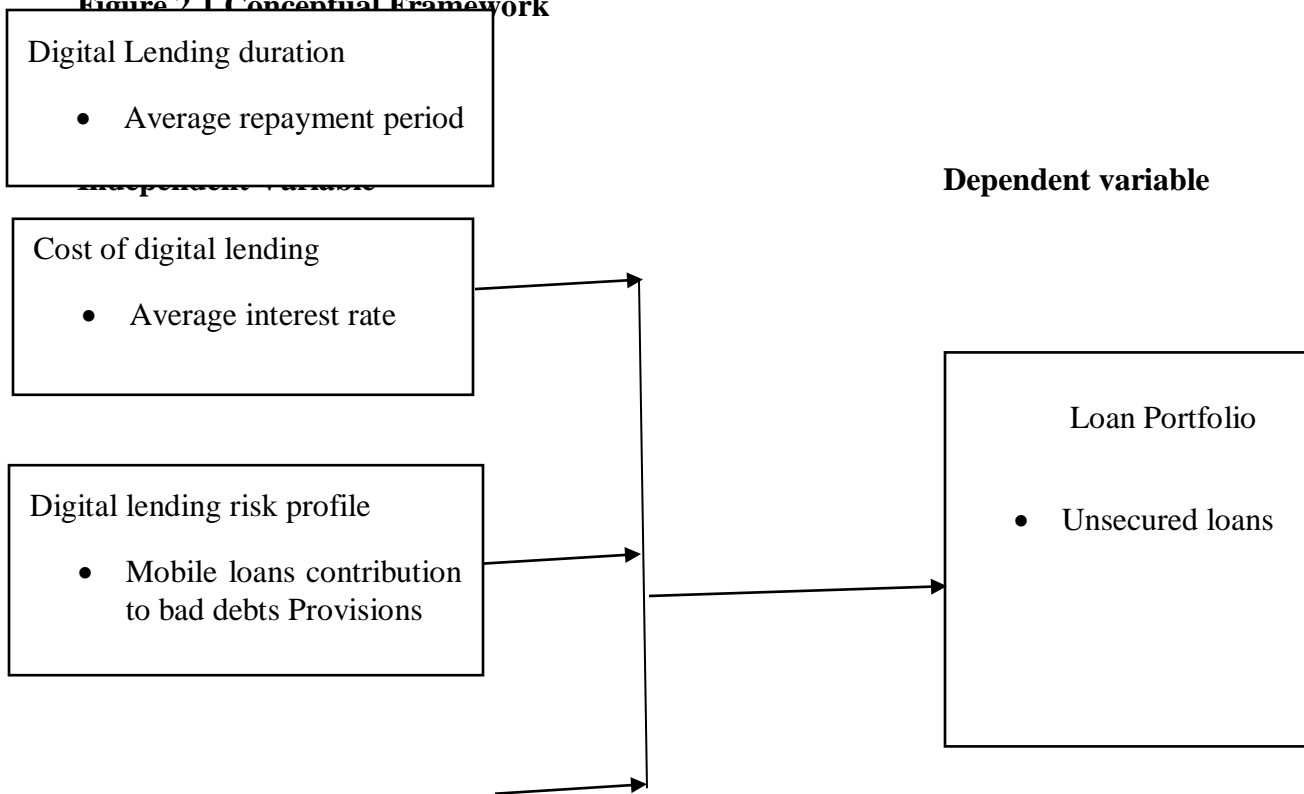
Table 2.1: Summary of Literature Review

Author	Study's focus	Findings	Knowledge Gaps	How the study filled the Gaps
Anderson, Reynolds and Klawitter, (2018)	Review of Digital Credit Products' review in Uganda, Kenya, Tanzania, India and Nigeria.	The emergence of internet borrowing increased the value of non-performing loans in banks.	The study did not consider the impact of internet borrowing on other aspects of a loan portfolio such as unsecured loan.	This study focused on the impact of internet lending and non-secured loans.
Gathergood, Guttman-Kenney and Hunt, (2019).	Payday loans and its subsequent impact borrowers.	An increase in the number of digital loans taken by consumers has played a significant role in increasing the customers' credit unworthiness	The study did not address the relationship between digital lending and other elements of a loan portfolio, such as unsecured loans.	This study delved on the relationship between digital lending and secured and non-secured loans.
Kithinji (2018)	Effects of mobile lending on the quality of the loan portfolio of banks	An increase in interest rates, credit information sharing, and bank sizes positively impact the quality of commercial banks' loan portfolio.	The study considered non-performing loans significantly. Besides, it had a time scope of between 2008 and 2017.	This study focused on unsecured loans with a time scope of between 2014 and 2019
Murunga (2018)	mobile-based lending and its effect on commercial banks' loans	Mobile credits were primarily inconsequential to the commercial banks' NPLs	The study embraced a smaller target sample as underlined by Nakuru town	This study considered listed commercial banks in the nation.

Ndegwa (2014)	The effect that mobile money has on Kenya's commercial banks' NPL.	For every unit increase in interest rate, NPL increased by 3.189 units.	The study considered non-performing loans.	This study considered the unsecured loans.
Ngugi (2017)	Management practices for Mobile Based Loan and its impact on the financial performance of the Commercial Banks in Kenya	Credit scoring and the credit repayment period positively influenced the financial performance of banks in Kenya	The study did not consider aspects of the loan portfolio as it focused on financial performance.	The study considered unsecured elements of the loan portfolio.
Oromo (2015)	Relationship between mobile money and loans issued by commercial banks in Kenya	The transaction value had a positive yet significant impact on the loans provided by commercial banks in Kenya	The time scope for the study was from 2007 to 2014.	This study considered data relating to the period from 2013 and 2019 financial years.
Siabei (2019)	The influence that mobile-based lending has on the performance of microfinance banks' Nairobi County	Loan disbursement and loan appraisal process through the mobile platform positively affects micro-finance banks' performance.	The study considered microfinance banks within Nairobi County.	This study considered listed commercial banks in Kenya.
Wright, Bersudskaya, Wachira, Nanjero and Wachira (2017).	The customer experiences regarding digital credit especially when the credit is due.	Growth in digital lending has led to a rise in NPL's value as most customers service multiple loans.	The study considered NPLs only in the dependent variable.	This study considered unsecured loans as part of the dependent variable.

Source; Researcher, (2020).

Figure 2.1 Conceptual Framework



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on highlighting the research methodology that was embraced in the study. The chapter includes the research design, the study population, data collection methods, instruments and data analysis sections.

3.2 Research Design

A research design denotes a blueprint that is essential for conducting a survey since it ensures that maximum control is embraced over the factors that are likely to interfere with the validity of the results under consideration (Polit & Hungler, 1999). This study embraced a descriptive research design.

The design choice is attributable to the fact that it aids in describing the phenomena under consideration in the study. Also, it involves gathering data without manipulating the information provided (Polit & Hungler, 1999). A descriptive research design is vital in expounding relationship that exists between a study's dependent and independent variables. The independent variables stem from digital lending, and they include; digital lending risk profiles, digital lending costs and the repayment period. The dependent variables relate to the loan portfolio which is represented by; unsecured loans.

3.3 Empirical model

This study incorporated an empirical model that considers the three elements of the loan portfolio under consideration. The regression model include;

$$Y_{it} = B_0 + B_1X_{1it} + B_2X_{2it} + B_3X_{3it} + \epsilon_{it}$$

Where:

Y- Unsecured loans

B₀- Constant

t = time

X₁- digital loan duration for bank i at time t.

X₂- cost of digital lending for bank i at time t.

X₃= Digital lending risk profile for bank i at a given time t.

i= banks considered in the study.

ε = error term.

B₁, B₂, B₃ are the coefficients of variables X₁, X₂ and X₃ respectively.

3.4 Target Population

A population denotes a group of objects or individuals or even events that have similar observable characteristics (Mugenda & Mugenda, 2003). This definition, therefore, underlines that the population of interest should be homogenous. The study's target population comprised of ten listed commercial banks in Kenya which related to the study's scope.

3.5 Sampling Design

According to Kothari (2004), a sample refers to selected respondents who are representative of the entire population. This study embraced a census sampling where all the listed commercial

banks were considered. The essence of using a census sampling was attributable to the fact that the target population is relatively small as underlined by ten listed commercial banks.

3.6 Data Collection Instruments

The study used quantitative secondary data relating to the listed commercial banks. The secondary data were obtained from the NSE, CBK, and from the specific commercial banks' financial statements. Information such as the amount of unsecured loans which was recorded but not availed to the public was obtained by visiting the specific banks. A data review guide attached in appendices II and III was used to collect the data. The data collection procedure involved scrutinizing the financial statements to record appropriate data for this study.

Table 3.1 Operationalization and measurement of variables

Variable	Type	Operationalization	Measurement	Hypothesized direction
Digital lending duration	Independent	The underlined duration where a customer can repay the loan without penalties being imposed.	Average repayment period	None
Cost of digital lending	Independent	The charges that accompanying the principal amount provided through digital lending.	Average interest rate	None
Digital lending risk profile	Independent	Number of unpaid loans that have exceeded the repayment period outlined	Mobile lending duration to bad debts	None
Unsecured Loans	Dependent	The total value of recorded unsecured loans by banks in a given financial year.	Total value of unsecured loans	None

Source; Researcher, (2020).

3.6.1 Validity of Instruments

Mohajan (2017) asserts that validity is the ability of the research instrument ability to correctly measure the intended variables. The annual financial statements of the listed commercial banks used in this study are prepared according to the IFRS and IAS. Besides, they adhere to the CBK and Banking Act guidelines.

3.6.2 Data Collection Procedure

The authorization letter from Graduate School, Kenyatta University was be appliedand it aided in data collection. The researcher also applied for a NACOSTI letter. The data was obtained from the annual financial reports published by the CBK and information maintained by the banks.

3.7 Data Analysis Method

Mugenda and Mugenda (2003)assert data analysis ensures that the collected data has both order and meaning. This study embraced an SPSS version 22 software for its data analysis. This study also used panel regression analysis since it takes into consideration the impact of time on the independent variables. Tests sought toensure the model assumptions regarding the classical linear regression are not violated (Wooldridge, 2012). The tests include; multicollinearity, normality, heteroscedasticity,autocorrelation and the Hausman test.

3.8 Diagnostic Tests

3.8.1 Multicollinearity

Daoud (2017) asserts that multicollinearity exists where independent variables are highly correlated. Thus, it prevents adequate analysis of the impact of independent variables on dependent variables. The VIF test was embraced to examine if multicollinearity existed; where,

if the factor is greater than 10, the multicollinearity was be determined (Daoud, 2017). In the event of the existence of multicollinearity in the study, removal of the highly correlated predictors from the model served as a remedy.

3.8.2 Normality

This test was conducted to ascertain that the data followed the Gaussian distribution since it is a fundamental assumption in statistics (Das & Rahimtullah, 2016). Undertaking the test enabled a subsequent successful analysis to be undertaken accurately. This study adopted the Jacque-Bera test for normality. A significant considerable value of the Jacque-Bera statistic resulted in rejection of the normality assumption (Das & Rahimtullah, 2016). In case of normality, the researcher would use a more conservative p-value (.01 instead of .05) to conduct the significance tests and confidence intervals.

3.8.3 Heteroscedasticity

Gajewski (2015) alludes that heteroscedasticity arises in instances where the where the error terms have a non-constant variance (Gajewski, 2015). In testing for heteroscedasticity, this research would embrace the Godfrey test. The study's null hypothesis would highlight whether the error variance is homoscedastic. If heteroscedasticity is present in the study, the researcher would use the OLS estimator to estimate the model's parameters.

3.8.4 Test for Autocorrelation

According to Wooldridge (2012), autocorrelation arises from the prospect that there exist random errors that are both independently distributed and identical. Validity of the inferential analysis is affected by autocorrelation. Thus, autocorrelation is integral in determining the most suitable statistical techniques to embrace and ways of improving the estimator's precision

(Wooldridge, 2012). The Woodridge test for autocorrelation would be employed to determine the serial correlation in this research. The null hypothesis would underline there is serial autocorrelation while the alternative denote otherwise. The Cochrane-Orcutt solution was bound to used as a remedy for autocorrelation in case it existed in the study.

3.8.5 Hausman Test

In this research, the Hausman test would determine the need to employ a random-effects model. If there is no existence of correlation, the research would apply the random-effects model (Wooldridge, 2012). However, if there exists a correlation, the study would adopt a fixed-effects model. Positivity in the Hausman test exist positively in the study would be rectified using the absolute value of the test statistic to ensure it does not alter the null distribution of the variables.

3.9 Ethical consideration

Ethics as the philosophical reflections on a person's morals, customs, habits, among other attributes (Barr et al., 2011). This research would maintain a high level of integrity, quality, as well as transparency while undertaking the study. The data that would be collected for the study would not be used for other activities apart from determining the objectives of the study.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter deals with the analysis of data and discussion of the research findings. The data was gathered from the CBK annual supervisory reports for the years 2014 through 2020. The findings entail descriptive analysis, diagnostic tests, correlation analysis results, Hausman test, and random-effect regression model result.

4.2 Response Rate

The study gathered secondary data on ten Kenyan commercial banks that are publicly traded. For a period of seven years, secondary data was acquired from the NSE, CBK, and individual commercial banks' financial statements (2014-2020). All the data from 10 commercial banks for the period of seven years was obtained. Therefore, the study reported 100% response rate.

4.2 Descriptive Analysis

This section provides results on descriptive statistics for the study variables. Descriptive analysis is a type of data analysis that helps to describe, represent, or summarize data points constructively so that a model can be made that satisfies any data conditions (Zook & Pearce, 2018). Descriptive statistics aided in describing the main characteristics of the study's data. They provide simple summaries of samples and actions. The specific descriptive statistics used in this study include means, minimum, maximum and standard deviation. Descriptive analysis results are shown in Table 4.1.

Table 4.1: Summary of Descriptive Statistics

	Non-secured loans	Digital lending duration	Digital lending costs	Digital lending risk profiles
Mean	55048.76	35.28571	1.16	5218.821
Std. Dev.	30182.08	12.12512	0.148714	3643.854
Maximum	163451.1	60	1.4	20043
Minimum	18203.1	15	0.9	359.7
Observations	70	70	70	70

Source: Research data (2021)

The findings reveal that the listed banks average annual amount of non-secured loans for the period from 2014-2020 was Kes 55, 048.76 M. The minimum value was Kes 18203.1 M and the maximum value was 163451.1 M. The average digital lending duration for the listed banks was 35 days, with the minimum duration being 15 days and maximum duration being 60 days. According to Ngugi (2017) credit repayment period positively influence the banks' financial performance.

The average annual digital lending cost for the listed banks was 116%, with the minimum cost being 90% days and maximum cost being 140%. According to Kithinji (2018) an increase in interest rates positively impacted the quality of commercial banks' loan portfolio.

The average annual contribution of mobile loans to bad debt provisions for the listed banks was Kes 5,218.821 M. The minimum value was Kes 359.7 M and the maximum value was 20,043M. According to Gathergood, Guttman-Kenney and Hunt, (2019) an increase in interest charged increase the customers' credit unworthiness and subsequent increase in non-performing loans.

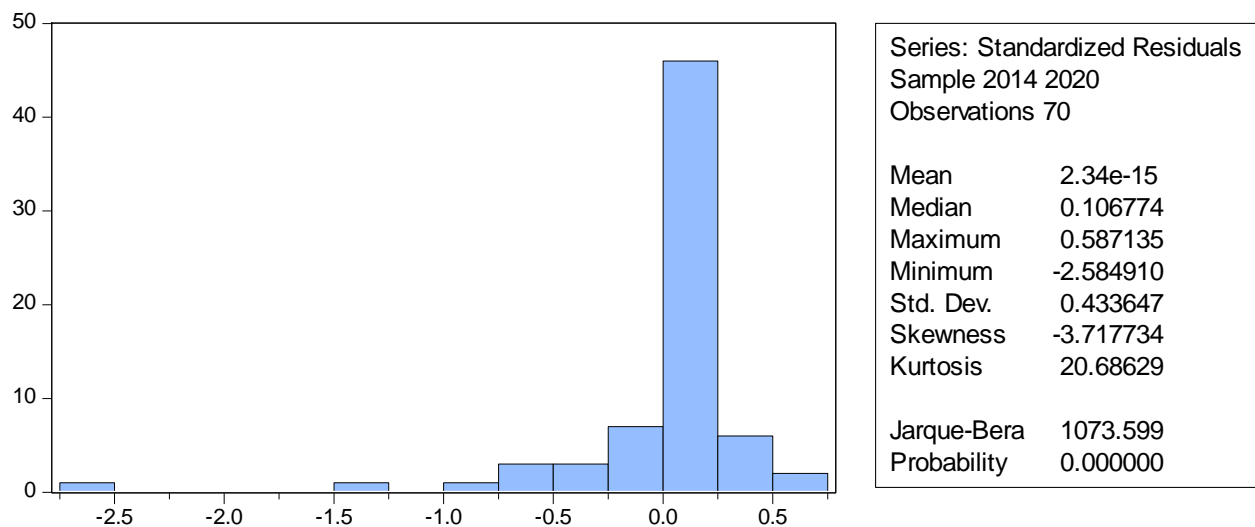
4.3 Diagnostic Tests

This section contains the results of diagnostic tests. Regression diagnostics is used to evaluate the model's assumptions and to test whether the observations have an unacceptable large effect on the analysis (Pesaran, 2021). The purpose of running the tests is to ensure that the data series is not biased, which would result to wrong estimations. The tests include multicollinearity, normality, heteroscedasticity, and auto-correlation tests.

4.3.1 Normality Test

For normalcy, the Jacque-Bera test was used in this study. Results are illustrated in Figure 4.1.

Figure 4.1: Normality Test using Jacque-Bera



Source: Research data (2021)

The results indicate a probability value of $0.000 < 0.05$, thus rejecting the null hypothesis of normal distribution. This meant that the data was not spread normally. To address the challenge, the data was converted into natural logarithm.

4.3.2 Multicollinearity Test

The VIF test was used to ascertain that multicollinearity existed; where, if the factor is greater than 10, the multicollinearity would be determined (Daoud, 2017).

Table 4.2: Multicollinearity Test

Independent Variables	Tolerance	VIF
Average repayment Period	0.624	1.601
Average Interest rate	0.55	1.817
Mobile loans contribution to bad debts	0.498	2.008

Source: Research data (2021)

Table 4.2 shows that the VIF values were less than 10, indicating lack of multicollinearity among the independent variables.

4.3.3 Heteroscedasticity Test

In testing for heteroscedasticity, this research used Breusch-Pagan-Godfrey test. Results are indicated in Table 4.3

Table 4.3: Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.60291	Prob. F(3,66)	0.6154
Obs*R-squared	1.86718	Prob. Chi-Square (3)	0.6004
Scaled explained SS	16.3385	Prob. Chi-Square (3)	0.001

Source: Research data (2021)

Results reveal a probability value of $0.6154 > 0.05$, leading to the acceptance of the null hypothesis given that the data did not suffer from heteroscedasticity. Hence, this implied that the data did not suffer from elements relating to heteroscedasticity problems.

4.3.4 Autocorrelation Test

The autocorrelation testing was based on Breusch-Godfrey Serial Correlation LM Test as outlined in table 4.4.

Table 4.4: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	15.07867	Prob. F (2,64)	0.0579
Obs*R-squared	22.42006	Prob. Chi-Square (2)	0.0653

Source: Research data (2021)

Results reveal a probability value of $0.6154 > 0.05$, therefore the null hypothesis indicating that the data did not exude elements relating to heteroscedasticity was accepted. Thus, heteroscedasticity problem was not experienced in the data.

4.4 Correlation Analysis Results

This section presents the correlation analysis results. Correlation analysis refers to a statistical approach for used determining the degree and direction of a linear connection between two constructs. A high correlation underlines the existence of a strong relationship between the study's two variables, while a low correlation denotes that the variables are weakly related (Schober, Boer & Schwarte, 2018). Results on the correlation between digital lending and loan portfolio are provided in Table 4.5.

Table 4.5: Digital lending and loan portfolio; Correlations

	Non-secured loan	Digital lending duration	Digital lending costs	Digital lending risk profiles
Non-secured loan	1			
Digital lending duration	0.57831	1		

	.000			
Digital lending costs	-0.6215	-0.5205	1	
	.000	0		
Digital lending risk profiles	-0.6373	-0.5834	0.64708	1
	.000	.000	.000	

Source: Research data (2021)

The results reveal that the correlation between digital lending duration and amount of non-secured loans was positive and significant ($r = 0.578$, $P = .000 < .05$). This denoted that digital lending duration moves in the same direction with amount of non-secured loans. In other words, an increase in digital lending duration is accompanied by an increase in amount of non-secured loans. These findings corroborated Ngugi (2017) establishment that credit repayment period positively influenced the banks' financial performance.

Results also indicate that digital lending costs ($r = -0.622$, $P = .000 < .05$) had a negative and significant correlation with amount of non-secured loans. This suggested that digital lending costs moves in the opposite direction with amount of non-secured loans. This implied that an increase in digital lending costs would be accompanied by a decline in the amount of non-secured loans. The findings contradicted Kithinji (2018) conclusion that increase in interest rates positively impacted the quality of loan portfolio of commercial banks.

The findings further reveal that digital lending risk profiles ($r = -0.6373$, $P = .000 < .05$) had a negative and significant correlation with amount of non-secured loans. This suggested that digital lending risk profiles moves in the opposite direction with amount of non-secured loans. Therefore, an increase in lending risk profiles would be accompanied by a decline in the amount of non-secured loans. According to Gathergood, Guttman-Kenney and Hunt, (2019) an increase

in interest charged has played a significant role in increasing the customers' credit unworthiness and subsequent increase in non-performing loans.

4.4 Hausman Test

This section provides Hausman test results. Hausman test detects endogenous regression (predictor variable) in the regression model. Hausman test (Sheitanova, 2015) determined the appropriateness of the fixed or random effect model. The Hausman test primarily tests whether the apparent error (u_i) is related to the regressor. If the p value is greater than 0.05, the null hypothesis (consistent random effects model) is accepted. If the p-value is less than 0.05, the null hypothesis is rejected, indicating that the fixed effects model is more consistent. The Hausman Test results are as shown in Table 4.6.

Table 4.6: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.92419	3	0.5883

Source: Research data (2021)

Table 4.6 shows a probability value of $0.5883 > 0.05$, this indicates that the null hypothesis is accepted (Random Effect Model is consistent). In other words, it implies that the unique errors (u_i) are unrelated to the regressors and, as a result, the random effects model was preferable. The random effect model was therefore considered to be more consistent and suitable for this study. The following section shows the random effect regression model.

4.6 Random-effect Regression Model

The regression findings based on the random-effect model are presented in this section. When the heterogeneity is consistent across time and not linked with independent variables, random effect models can help compensate for unobserved heterogeneity (Kalhori & Mohhammadzadeh,

2017). A random-effect regression model assessed digital lending's effect on loan portfolios of Kenya's listed commercial banks. The results are presented in Table 4.7.

Table 4.7: Digital lending and loan portfolio; Random-effect model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Digital lending duration	2.19158	1.65416	1.32489	0.1898
Digital lending costs	-1.88	0.49041	-3.8335	0.0003
Digital lending risk profiles	-0.0871	0.08616	-1.0114	0.3155
C	13.4449	0.83404	16.1203	0.000
R-squared	0.27622			
Adjusted R-squared	0.24332			
F-statistic	8.39578			
Prob(F-statistic)	0.000083			

Source: Research data (2021)

The statistical model was as follow:

$$\text{Loan portfolio} = 13.4449 - 1.88 \text{Digital lending costs}$$

The regression results in Table 4.7 show R squared and adjusted R squared values of 0.276 and 0.243, respectively. As a result, the modified coefficient of multiple determination, which offers the explanatory power of the created statistical model, is 0.243. This means that the three characteristics of digital lending (digital lending duration, digital lending costs, and digital lending risk profiles) account for 24.3 percent of changes in the loan portfolio of Kenya's listed commercial banks. The finding correlated with Kithinji (2018) who contends that although interest rates are integral in the determination of the quality of a loan portfolio, there are various

factors that impact mobile lending. Ngugi (2017) highlights that digital lending is impacted by other factors such as credit information sharing among others.

The results also show that the created statistical model had a strong fit for the observed set of data, with an F-statistic of 8.396 and a reported p value of 0.000083, which was less than .05 at the 95 percent level of confidence. These statistical findings indicated that the explanatory power of digital lending on loan portfolio was completely coincidental.

The findings also show that if the dimensions of digital lending remain constant at zero, the loan portfolio of publicly traded commercial banks would be at 13.445. Given that this beta coefficient has a p-value of .000, the value of the y intercept is statistically significant, demonstrating that other factors other than digital lending components also explain variation in the loan portfolio of listed commercial banks.

4.6.1 Effect of digital lending duration on the loan portfolio of listed commercial banks in Kenya

The study sought to analyze the effect of digital lending duration on the loan portfolio of listed commercial banks in Kenya. The output of regression analysis revealed that digital lending duration had a positive though statistically insignificant effect on loan portfolio ($\beta = 2.19158$, $p = 0.1898$) at 5% level of significance. The implication is that increasing digital lending duration would increase the loan portfolio of listed commercial banks though minimally. Based on the findings ($p = 0.1898 > .05$), the null hypothesis (H_0) that digital lending durations have no significant effect on the loan portfolio of listed commercial banks in Kenya was not rejected. This suggested that digital lending duration insignificantly affect loan portfolio of listed commercial banks in Kenya.

The conclusions of the study agreed with those of Ngugi (2017), who indicated that credit repayment time favorably improved the financial performance of banks. Additionally, Siabei (2019) revealed that a strict loan repayment schedule impacted the financial performance of commercial banks negatively. This emphasized the significance of having a flexible loan payback timeline.

4.6.2 Effect of digital lending costs on the loan portfolio of listed commercial banks in Kenya

The study sought to determine the effect of digital lending costs on the loan portfolio of listed commercial banks in Kenya. At the 5% level of significance, the results of the regression analysis revealed that digital lending expenses had a negative and statistically significant influence on loan portfolio ($= -1.88, p=0.0003$). The upshot is that raising digital lending expenses by one unit results in a 1.88 unit decline in the loan portfolio of listed commercial banks. Based on the findings ($p=0.0003<.05$), the null hypothesis (H_0) that digital lending costs have no significant effect on the loan portfolio of listed commercial banks in Kenya was rejected. This confirmed that digital lending costs significantly affect loan portfolio of listed commercial banks in Kenya.

The study findings contradicted Oromo's (2015) claim that transaction value has a favorable and considerable impact on loans given by Kenyan commercial banks. Further, Kithinji (2018) concluded that increase in interest rates positively impacted the quality of loan portfolio of commercial banks.

4.6.3 Effect of digital lending risk profiles on the loan portfolio of listed commercial banks in Kenya

The study sought to analyze the effect of digital lending risk profiles on the loan portfolio of listed commercial banks in Kenya. The output of regression analysis revealed that digital lending risk profiles had a negative though statistically insignificant effect on loan portfolio ($\beta = -0.0871$, $p = 0.3155$) at 5% level of significance. The consequence is that growing digital lending risk profiles would result in a minor decline in loan portfolios of publicly traded commercial banks. Based on the findings ($p = 0.3155 > 0.05$), the null hypothesis (H_0) that digital lending risk profiles have no significant effect on the loan portfolio of listed commercial banks in Kenya was not rejected. This suggested that digital lending risk profiles affect loan portfolio of listed commercial banks in Kenya.

The study's findings agreed with Ndegwa's (2014) discovery of a direct association between interest rates and NPLs. This suggested that increase in risk profile negatively affected the quality of loan portfolio. The results also correlated with the findings of Gathergood, Guttman-Kenney and Hunt, (2019) who noted that an increase in interest charged has played a significant role in increasing the customers' credit unworthiness and subsequent increase in non-performing loans.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter contains a summary of the study, a conclusion based on the findings, recommendations for policy and practice, and proposals for further research. The presentation was conducted based on study's objectives. The study intended to ascertain the impact of digital lending on the loan portfolios of Kenya's listed commercial banks.

5.2 Summary of Key Findings

The study's first goal was to examine the impact of digital lending duration on the loan portfolios of Kenya's publicly traded commercial banks. According to the regression results, the length of digital lending had a favorable but statistically negligible influence on the loan portfolio of listed commercial banks. Based on these data, the null hypothesis (H01) that digital lending durations have no substantial influence on the loan portfolios of Kenya's publicly traded commercial banks was not rejected.

The study's second goal was to examine the impact of digital lending costs on the loan portfolios of Kenya's publicly traded commercial banks. According to the results of the regression study, digital lending expenses had a negative and statistically significant impact on the loan portfolios of publicly traded commercial banks. Based on these findings, the null hypothesis (H02) that digital lending costs have no substantial influence on the loan portfolios of Kenya's publicly traded commercial banks was rejected.

The study's third goal related to examining the impact of digital lending risk profiles on the loan portfolios of Kenyan listed commercial banks. According to the regression results, digital lending risk profiles had a negative but statistically negligible effect on the loan portfolios of listed commercial banks. Based on these data, the null hypothesis (H03) that digital lending risk profiles have no substantial effect on the loan portfolios of Kenya's publicly traded commercial banks was not rejected.

5.3 Conclusion

According to the findings of the regression study, the length of digital lending has a favorable but small effect on loan portfolio. As a result, the study's conclusion is that digital lending duration has a beneficial, albeit minimal contribution to the loan portfolio of Kenya's listed commercial banks. According to the results of the regression study, digital lending charges have a negative and considerable impact on the loan portfolio. Hence, the conclusion of the study is that digital lending costs have a negative contribution to loan portfolio of listed commercial banks in Kenya. Finally, regression analysis results confirmed that digital lending risk profiles have a negative though insignificant effect on loan portfolio. Thus, the conclusion of the study is that digital lending risk profiles have a negative though minimal contribution to loan portfolio of listed commercial banks in Kenya.

5.4 Recommendations

The study underlined that digital lending duration positively affects loan portfolio. The management of commercial banks should consider revising the digital lending duration to accommodate more customers, who would wish to borrow but are unable to make the repayment within the current lending duration. The management of the banks should also create a platform where customers can express or channel their views relating to digital lending duration. The management can then review the suggestions and make necessary policy adjustments.

The study also established that digital lending costs negatively affects loan portfolio. The management of commercial banks should ensure that policies relating to digital lending costs are reviewed with an objective of revising the charges downwards. This will enable more people to access online credit at affordable rates, and at the same time boost the loan portfolio.

The findings also revealed that digital lending risk profiles negatively affect the listed commercial banks' loan portfolio. The management of commercial banks should ensure that policies relating to digital lending risk profiles are properly reviewed to mitigate against risks emanating from default cases. The management of commercial banks should introduce strategies such as extension of repayment period and waiving of interest rates with an aim of encouraging defaulters to make the outstanding loan.

5.5 Suggestions for Further Study

The focus of the study related to the impact of digital lending on the loan portfolios of Kenya's publicly traded commercial banks. Future scholars should attempt duplicating this work in other segments, such as SACCOs to assist in the validation of the study's inferences. It has also been noted that the three dimensions of digital lending only explained twenty four percent of the

disparities in loan portfolio; hence, connoting that there are various factors that may lead to changes in the listed commercial banks' loan portfolio. Finally, future researchers should look into the impact of other variables, such as government laws, on the relationship between digital lending and loan portfolio.

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APPENDICES

APPENDIX I. List of listed Commercial Banks

Kenya Commercial Bank

Equity Bank

Cooperative Bank

NCBA Bank

ABSA Bank

Diamond Trust Bank

Standard Chartered Bank

I&M Bank

CFC Stanbic bank

National Bank of Kenya

APPENDIX II: Data collection review guide

Year	Non-secured loans	Average repayment Period	Average Interest rate	Mobile loans contribution to bad debts
2013				
2014				
2015				
2016				
2017				
2018				

2019				
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APPENDIX III: Research Budget

No	Description	Amount (Ksh.)
1	Proposal Typesetting and printing 50 pages @ Ksh.15	1000/=
2	Stationery	5000/=
3	Travelling expenses	15000/=
4	Data analysis (software hire)	8000/=
5	Typing and Report binding	7000/=
6	Communication expenses	2000/=
7	Laptop	50000
8	Contingencies	10000

Total		103000/=
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APPENDIX IV. Work Flow

Activity	November	December	January
Seeking NACOSTI Letter			
Data Collection			
Data Analysis			
Data Presentation			