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Mobile Based Loan Management Practices and Financial Performance of Commercial Banks in Kenya

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Abstract:
Mobile phone penetration in Kenya has seen immense growth, with over 38.9 Million subscriptions in the second quarter of 2016/2017 up from slightly above 16 Million in 2008. Over 88% of adult Kenyans now have mobile phones, according to CAK. The use of mobile phone technology to offer different financial services by commercial banks in Kenya has impacted on the way these services are offered, as opposed to the traditional brick and Mortar based banking, thus enhancing financial inclusion. The financial sector is aggressively adopting use of Mobile banking. Among the services being offered through this mode is issuance of mobile based loans. However, while there has been increased growth in mobile based loans, no corresponding significant similar growth has been realized in financial sector performance by commercial banks operating in Kenya. The profit margins have not shown significant growth. Provision for bad debts is on the increase, and bad loans are also growing. The purpose of this study was to establish the effect of mobile based loans management practices to the financial performance of commercial banks in Kenya. Specifically, the study sought to establish the effect of mobile based loans credit scoring system on the financial performance of commercial banks in Kenya; to establish the mobile based loans average repayment period and its effect on the financial performance of commercial banks in Kenya; to analyze the effect of mobile loans default patterns on the financial performance of commercial banks Kenya; and to examine the effect of mobile based loans risk profile on the financial performance of commercial bank in Kenya. The study adopted a descriptive research design. The population of interest for this study was the commercial banks in Kenya, who offer mobile loans. The respondents consisted of a sample of 52credit risk and finance managers of the commercial banks in Kenya selected for the study. Primary data was collected using structured questionnaires. The data was analyzed using descriptive and inferential statistics. Tables and graphs were used to summarize responses for further analysis and to facilitate comparison. In relation to the study findings the study concluded that mobile based loan management practices influence the financial performance of the commercial banks. In particular, 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. The study recommended that commercial banks in Kenya should invest more in development of good credit scoring systems; should consider adjusting the mobile based loans average repayment period and also formulate strategies on how to minimize incidences of default.

1. Introduction

1.1. Background of the Study

An organization's performance is often seen in the returns versus risks involved in utilization of resources to generate income. According to Gerhard Schroeck (2002), performance is considered as a top strategic priority for most firms, yet the process of generating good performance and returns is characterized by making of decisions which have a risk factor involved. Most financial organizations' core business is to offer loans, having considered the clients risk factor, desired returns and security over the loans, in case of default.

Financial providers will go to greater lengths to carefully appraise their potential clients, to ensure proper prior appraisal is done, before a loan facility can be advanced. A proper scoring method must be in place, to avoid losses as a result of provisions for bad debts, as a result of poor loan appraisal, according to Baesens, Gestel, Stepanova, and Vanthienen (2003). Especially now when there is tighter regulation in terms of interest rates, financial institutions must ensure there is low default rate, if none so as to maximize returns and bridge the gap as a result of lower rates. Any facility availed to clients must have low risk rates, and almost near zero chance for non-performance.

According to IMF (2009), commercial banks in Sub-Saharan Africa mostly thrive through high returns on assets, and net interest margins. This is also supplemented by non-interest incomes, but interest incomes form the main component of the bank's income streams. When this income gets threatened by any factor, this can greatly reduce the profitability of the firms.

Financial institutions have come up with innovative ways to offer their services and enhance financial inclusion through mobile banking, including use of mobile based loan appraisal and application. Zutt (2010) defines mobile money operations as electronic money accounts that are accessible through mobile phones. Through the functions of mobile money, customers are able to send and receive money, borrow loans and perform other bank activities with their mobile phones, either at home and abroad; anywhere at any time. This is in recognition to the fact that many Kenyans have moved to use of their phones for most of their activities.

A few decades ago, mobile money wallets were non-existence. The initial service for the unbanked became active in 2001; however, it is the tremendous development since 2007 of Kenya's M-pesa platform that has elevated mobile banking to worldwide presence (Janine Aron, 2015). Janine (2015) observed that the outstanding aspect about mobile money is its quick spread in the developing economies, overtaking the previous banking services. The author notes that overtaking happens since new innovations address the challenges resulting from week institutional infrastructure and the cost implications of the conventional banking. Mobile money payments have been slower to gain momentum in developed economies compared to Africa, nonetheless, the services are expected to rapidly expand in the future. Based on Janine study, mobile money system is important in Asia and Latin American.

As indicated by Forbes (2016) report, banks across the World generated tremendous revenues from their operations in 2016. French banks were the most competitive, Credit Agrocole were 11th place while BNP Paribas were 12th position. French bank incomes increased by 30% while UK and also German banks did not perform as well. UK bank incomes fell by 22% and HSBC is presently the only British bank worldwide ranking among top 10. The standpoint for UK banks is considered even more uncertain following the unexpected UK vote to disassociate from the European Union. However, the best capital returns, according to the report, are still found in upcoming markets, where 28% average returns are in Africa, 22% are in central and South America and 16% in the Asian countries, contrasted with 8% from Western of Europe. Zimbabwe banks recoded 42 % expansion in revenues; Tanzanian banks were at 30%.

Slade, Williams and Dwivedi (2013) contend that mobile payments emerged as an answer for a neglected need instead of as a technology-led innovation. He points 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.

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 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 Federal Reserve System Report (2015). 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.

1.1.1. Commercial Banks in Kenya

Kenya's financial sector is relatively developed as compared to others in sub-Saharan of African countries, according to UNECA (1997) report;the financial system is made up of several stock brokerage firms, companies offering insurance, the commercial banks and the non-bank financial institutions.

In Kenya, there are 43 commercial banks, with 25 being locally owned one of which being a mortgage organization, 15 Foreign or over 50% foreign owned, and 3 publicly owned organizations as indicated by Central Bank of Kenya (2017). The locally owned include three banks with significant shareholding by the Government of Kenya and State Corporations. Two of these are under statutory administration, and three are not in operation. These institutions receive deposits from individual members and businesses.

Every commercial bank needs to introduce itself exceptionally to the market in order to have an aggressive edge (Central Bank of Kenya, 2016). For the banks to introduce themselves interestingly, they have to portion and recognize their objective market and discover the blend of variables and technologies which will give them an edge and guarantee their survival in the business.

The role of banks in an economy is vital since they perform monetary policy and facilitate means for payment of products and services in the local and global trade (CBK, 2015). The commercial banks in Kenya are regulated by the CBK. The CBK ensures financial stability of the commercial banks through the support of properly functioning banking and monetary systems (CBK, 2017).

According to Cytonn Report (2017), Kenya's top banks by capital are KCB with Kes. 480 billion, followed by Equity Bank Kenya with Kes. 380 billion, Cooperative bank is ranked third with Kes. 352billion, fourth is Standard Chartered bank with 264 billion and Barclays came fifth with Kes. 264 billion. Other banks Diamond, Stanbic, CBA, I & M and NIC bank follow in the order.

1.1.2. Evolution of Mobile Based Financial Services

As indicated by Van, Hennie, Bratanovic and Brajovic (2009), it's seen that since the 1980s, quick innovations in financial markets and the internationalization of monetary flows have changed the banking outlook in significantly. Innovative advance and deregulation have both given new chances to and increased competitiveness among banks and non-banks to equal measure. In the late 1980s, margins generated from conventional banking operation started to decline and capital adequacy requirements started to increase. Banks have reacted to these emerging challenges aggressively by venturing into new market areas and focusing on prevalent data and information capabilities.

Mobile money industry in 2014 accomplished a significant milestone. As per GSMA's (2014) report, the actual figure of enlisted mobile money accounts internationally developed to achieve just shy of 300 million in year 2014 and active mobile money accounts remained at 103 million. It was accessible in 61% of developing markets. Sub-Saharan Africa led in the where live mobile money services were at 53%. The report likewise shows that 2014 saw a 50% increment in themobile credit services. This was fuelled to some degree by new partnerships amongst MNOs and banks to give mass-market short-term credits, and by microfinance institutions and start-ups focussing on particular portions within the underserved, and was accessible in 20 countries worldwide.

In Kenya, mobile money services came to be in 2007 with the launch of M-Pesa. As per Daniel Runde (2015), M-Pesa was conceived after experts saw that Kenyans were exchanging mobile airtime as an intermediary for money. The experts perceived potential in this idea and encouraged cooperation with Vodafone, which is a telecommunication firm.

Banks considered this as a serious competitor and have developed similar products in partnership with M-Pesa and other mobile service providers. Some of these mobile operators include Orange money and Airtel Money. Around the globe, Tameer Bank and Telenor Pakistan initiated EasyPaisa in 2009, and with 7.4 million clients, by 2015 it was the third biggest mobile money service in the World. Filipinos are also said to have used their cell phones for personal finance, making their country a pioneer in mobile transactions. In Afghanistan, the country' largest communication company Roshan initiated M-Paisa in 2009 in partnership with Vodafone and the Ministry of the Interior to pay police pay salaries using mobile money. Expenses dropped by 10% as phantom payments to non-existent police were eliminated and fraud reduced.

As indicated by Communications Authority of Kenya (2017), the number of mobile money users in Kenya average 31.9 million. M-pesa, Equitel, Airtel Money and Orange money are the main players in the mobile money frontier. Equitel, which is Equity Bank Kenya's mobile banking product processed transactions worth Ksh251.6 Billion in the second quarter of the 2016-2017 fiscal year, a 15 per cent increase from Ksh219.6 billion that was transacted in the quarter before.

Kenya's financial sector has fully embraced technology and use of Mobile Financial transactions, including lending through mobile phone based means.Saving and borrowing using the mobile based systems is one of the most valued banking services. According to Adrian (2015), mobile phone use in Kenya has seen tremendous growth, especially the use of M-banking to access financial services. This preference is due to the good penetration of use of mobile phones in the country.

In Kenya, mobile loans from commercial banks according to Baraka Jefwa (2016) are offered through applications such as KCB's M-Benki mobile platform in collaboration with M-Pesa, M-Coop Cash by Cooperative bank, Standard Chartered mobile banking, Hello money by Barclays Bank and Equitel by Equity Bank Kenya. 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.

1.1.3. Financial Performance Commercial Banks in Kenya

According to Van, Hennie, Bratanovic& Sonja Brajovic (2003), the financial performance of commerce banks is normally measured using the revenue the bank is able to make. Interest income originates from loans and all other credits given by a bank, such as investment, housing, foreign currency loans, working capital, credit cards and overdrafts. In addition, it incorporates interest received on bank's deposits with other financial institutions. Interest income is usually computed on an accrual basis, denoting that a bank computes interest due over the period of time covered by the income statement, respective of whether or not interest has been paid. Accounting policies usually require a loan to be put in a non-accrual status if a customer is overdue by a predefined time period (say, 60 days), or considered to be potentially unable to pay, at which point all previously accrued but unpaid interest should be reversed out of revenue. Van *et al.* (2003) observes that banks must remain profitable by considering the spread and the risk. Profitability is an indicator of a bank's ability to carry risk and/or build its capital. Management must therefore comprehend what type of asset they are investing in, and how it relates to sources of income. Financial institutions mostly report most of their income from the interest on loans.

Golin, Jonathan, Delhaise and Philippe (2013) argue that banks transform the savings of many individual depositors. This forms the core function of banks, intermediation. Banks have to package their offerings in a way that is attractive to both depositors and borrowers. This is because even the depositors expect some returns in their investment, by earning interest on deposits. In exchange to advancing funds to borrowers, banks earn themselves a spread or margin between what it pays to

depositors and what it earns from the borrowers. The banks therefore have to ensure they carry the risk that borrowers may not be able to pay them back, yet the depositors expect when they come to withdraw their money, to get it without a hitch. The banks intermediation roles ensure that since the borrowers and depositors may not be having the expertise or knowledge to pursue each other and to determine the risks involved, banks are therefore justified to be rewarded by the spread thereof.

Commercial banks in Kenya have reported of an upsurge in number of new Mobile loans applications and disbursement. Equity bank reported an increase of number of credits connected by 308%, standing at 4,327,999 up from the previous 1,061,000, from which 3,557,913 advances valued at Kes.20.8 billion were dispensed using Equitel mobile channel. The development in Equitel mobile credit distributions generally alluded to as Eazzy loans, represented 82% of all advance payment contrasted with 18% of over the counter branch advance payment, as indicated by Equity Bank Financial Report (2016). However, loss provision rose from Kes. 1.2 billion in 2015 to Kes. 5.01 billion in 2016, and total interest income only rose from Kes. 32.9 billion to Kes 35.1 billion. Nnet profit for year 2016 declined by 5.9% to Kes. 15.2 billion from Kes. 16.2 billion in 2015.

KCB Group mobile loans applications by end of 2016 were at 80,000 daily, where its M-Pesa loan book was valued at Sh17 billion, a four times growth from the September 2015of Kes4.3 billion, according to KCB Group Report (2017).The bank registered an increase in net income which rose 15% from Kes. 60.2B in 2015 to Kes. 69.4 billion in 2016. It was largely helped by the growth of revenue in mobile banking (83%) and agency banking (95%). According to the report, most KCB Bank loans were processed on Mobile platform, where 53% of customer interactions being also through use of mobile phone. Interest income for the year ended 31 December 2016 rose from Kes. 41.0 billion in 2015 to Kes. 46.4 billion in 2016, which was a 6% increase. However, loan loss provision rose from Kes. 655 Million in 2015 to Kes. 3.7 billion in 2016.

Commercial banks in Kenya classify overdue loans and provides for bad debts accordingly. Equity bank classifies its loans into 5 categories. A loan will be classified normal if has remained un-paid for 0-30 days, watch if un-paid for between 31-90 days, sub-standard if un-paid for 91-180days arrears, doubtful for 181-365 days, and loss for those unpaid by over 365 days. Provision is made for 1% for normal, 3% for sub-standard, 20% for sub-standard and 100% doubtful. A write-off is done for loss category, according to Equity Bank Revised Policy Paper, (2013).

A report by Cytonn Investments (2017) which 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 a 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 - MCo-Op Cash. Standard chartered delivered growth in profitability despite challenging market conditions. Interest income grew by 13 per cent to Kes. 25.6 billion.

1.2. Statement of the Problem

Banking institutions are doing their best to remain afloat in the current changing market where profitability is paramount. Financial performance and especially return from interest income has become important, for it forms more than 50% of total revenue for commercial banks, according to Ruth King, (2015). Therefore, every financial institution must ensure continued growth in terms of returns in loanable funds and risk management lest shareholders and other stakeholders may deem the organization to be risky, and withdraw their investment and which may lead to collapse of the organization.

Having seen a high growth in the number of mobile loans issued after launch of mobile banking platforms by commercial banks, this phenomenal growth has not brought significant increase in financial income. Commercial banks in Kenya on average managed between 5% to 13%, according to AIB Capital Report (2017). Although there has been an increase in interest income of between 5% to 13% as per the analysis of AIB Capital, the general expectation is that this should have been close to the global performance, where banks in Africa average growth in income of 28%. Hence, this study sought to examine the influence of mobile based loans management practices on the financial performance of commercial banks in Kenya.

1.3. General Objective

The general objective of the study was to establish the effect of mobile based loan management practices on the financial performance of commercial banks in Kenya

1.3.1. Specific Objectives
  i.   To establish effect of mobile based loans credit scoring system on the financial performance of commercial banks in Kenya
  ii. To assess the mobile based loans average repayment period and its effect on the financial performance of commercial banks in Kenya
  iii. To analyse the effect of mobile loans default patterns on the financial performance of commercial banks Kenya
  iv. To examine the effect of mobile based loans risk profile on the financial performance of commercial bank in Kenya

1.4. Research Questions

i. How adequate and reliable is the credit scoring system of the commercial banks in Kenya?
ii. What is the average full repayment period of mobile loans as compared to other loans advanced by the commercial banks in Kenya?
iii. What is the default pattern of the mobile loans of the commercial banks in Kenya, and what has been the impact on financial performance?
iv. What are the risks the mobile based loans have brought to the financial performance of commercial banks in Kenya?

1.5. Significance of the Study

This study will assist commercial banks to understand more on the effectiveness of mobile based loan facilities, which is a relatively new method of lending. This will also inform them on the impact of the same on their overall financial performance. Consequently, the commercial banks will be in a position to make informed decision on the viability and sustainability of this method of banking. Commercial banks will be able to gain insight of how to avoid having a high number of future non-performing and un-secured loans, which can pose a risk to the shareholder's income.

1.6. Scope of the Study

This study attempted to understand the impact on interest income and general profitability of commercial banks, from use of mobile based platforms to extend credit facilities to clients. There are 43 commercial banks in Kenya, according to Central Bank of Kenya (2017). The research targeted the commercial banks operating in Kenya and who have embraced mobile banking to offer financial inclusion. The respondent of the study involved the credit officials of the bank, directly involved in managing the loan book, specifically mobile lending loan book. They were selected to represent the different tier groups of the commercial banks in the country.

1.7. Limitations of the Study

The number of commercial banks in the country is high, and their main offices are spread far and apart which made it difficult to access all of them. Reaching the intended respondents to give information was also quite a task. The study thus focused on a sample of some of the commercial banks in Kenya offering mobile loans. The study involved the use of questionnaires which relied on data as provided by respondents. The confidentiality policy of the banks was likely to affect the researcher's aim to reach the respondents. To mitigate this, the researcher produced an introduction letter from the university to the respondents and management in order to avoid suspicion and also to enable the management to disclose as much information as possible concerning the scope of the study. Some respondents lacked motivation to provide data as they were not able to relate how the research assisted them directly or indirectly. The researcher however assured them that the findings of the research will be useful in forming policy recommendation and also to document the practices of the bank.

2. Literature Review

2.1. Introduction

The section reviewed the theoretical foundation and introduction related to the study, empirical review, conceptualization and operationalization. This was done with the fundamental point of enhancing the researcher's comprehension of the study gaps. It discussed the theories to be used for the study, in relation to interest income determination and the concept of lending risk effect from mobile based loans.

2.2. Theoretical Review
The following theories guided the study;

2.2.1. Interest Theory

The Austrian or Agio Theory of Interest or Bohm-Bawerk's Time- Preference Theory, was expounded by John Rae in 1834 and was developed by Bohm Bawerk an Austrian economist, and seeks to explain Interest on the basis of time-preference. According to this theory, Interest is the price of time of /reward for agio, i.e., time preference. It has been argued that man generally prefers present income instead of a future income and consumption. There is an "agio" or premium on current utilization when contrasted with a future one. Individuals incline toward delight in current rather than future merchandise since future fulfillment, when seen from the present, experiences a discount. Interest is this discount which should and must be paid so as to entice people to lend money and thus postponing their present satisfaction to a future date. Therefore, interest is the reward given back for enticing individuals to alter their time-preference to the future instead of the present (Frank Fetter, 1914).

Irving Fisher (1990) Time Preference Theory is the modified theory of Bohm-Bawerk. This theory is based on Bohm-Bawerk's theory of Interest. While explaining this theory, Fisher's time preference theory emphasizes the notion that supply for loans greatly depends on the fact that majority of the people prefer to have a certain sum of money now than at some future time. People will normally put a lower valuation on future goods than present goods. Because of their time preference

for the present than the future, people are said to be eager to spend their income on present consumption. Therefore, when somebody lends to another, he forgoes his present consumption. Organizations can have no net income, notes Fisher. All organizations have some form of income that generally ensures they continue to thrive. Income is a series of events, which determines its enjoyment. Where some process in the event processes is not well taken care of; then income will not be realized.

John Keynes in his (1936) General Theory of Employment, Interest and Money noted that there are two separate aspects influencing the rate of investment, in particular expected return and perceived risks in terms of the "state of confidence"; confidence successfully dominates whether investment will be undertaken or not. In other words, regardless of how alluring the expected return, investment will not be considered unless the likelihood of failure is acceptably low.

This theory becomes important for the study since interest on loans forms the bulk of income for commercial banks. Financial performance focuses on how well commercial banks have been able to leverage on interest income. The mobile loans must be able to earn the commercial banks good income, with minimal cost.

2.2.2. Debt- Deflation Theory

The theory was developed by Fisher in 1933 and suggests that when the debt bubble bursts the following things happens;debt are liquidated which leads to distress selling and contraction of deposit currency, and people repay their bank loans. From the contraction of deposits, there is fall of prices, triggering an even greater reduction in net worthiness of a business. This leads to bankruptcies which results to the organization running losses. This cycle causes complex disturbance for the interest rates and also money value fall. These disturbances highlighted above can be summed up as both external and internal forces affecting state of over-indebtedness existing between, debtors or creditors or both which can result to loan defaults.

This theory is important in trying to understand the effect bad loans have on the profitability of commercial banks. When the debts owed reach alarming rates, this requires banks to make specific provisions for the same. This can sometimes lead to fall in value of the firm, or even lead to the commercial banks closing down their business due to bad debts.

2.2.3. Modern Portfolio Theory

Modern portfolio Theory (MPT) is a theory on how risk-alert investors can construct portfolios to optimize anticipated returns based on a given level of market uncertainties, and recognize that risk is an inherent part of higher returns. According to the theory, it's possible to construct an optimal portfolio offering the maximum possible anticipated return for a given level of risk. This theory was pioneered by Harry Markowitz (1952). A major contribution by MPT is that an investment's risk and return attributes should not be viewed alone, but should be evaluated by how the investment influences the overall portfolio's risk and return. MPT makes the assumption that investors are risk-averse, denoting they prefer a less risky portfolio to a riskier one for a given level of return. This implies that an investor will take on more risk only if he or she is anticipating more returns.

One critic of this theory is that investors have to keep estimating some of the main parameters which are for ancient market information since MPT tries to model risk from the aspect of likelihood of loss occurring, without suggesting why those losses might occur. According to Douglas (2009), the risk measures are only probabilistic, and cannot be said to be structural.

This theory becomes relevant for the study as it seeks to explain the importance of ensuring all the portfolios selected factor in the risk aspect. Commercial banks must balance the way they lend to different categories of people, so as to spread the risk

2.2.4. Loanable Funds Theory

The neo-classical theory of interest or loanable assets hypothesis of interest owes its source to the Swedish market analyst Knut Wicksell (1936). As per this theory, rate of interest is controlled by the interest for and supply of loanable assets. In such manner this theory is more reasonable and more extensive than the traditional theory of interests. According to this theory, interest for loanable fund emerges due to the following three reasons namely investment, accumulating and dissaving. The main source of demand for loanable funds is the demand for investment. Investment refers to the expenditure for the purchase of making of new capital goods including inventories. The price of obtaining such funds for the purpose of these investments depends on the rate of interest. The demand for loanable funds is also made up by those people who want to hoard it as idle cash balances to satisfy their desire for liquidity. The demand for loanable funds, according to Wicksell for hoarding purpose is a decreasing function of the rate of interest. Dissaving's is opposite to an act of savings. This demand comes from the people at that time when they want to spend beyond their current income. Like hoarding it is also a decreasing function of interest rate. The supply of loanable funds is derived from the basic four sources as savings, dishoarding, disinvestment and bank credit.

This theory helps to explain the importance of careful credit scoring, so as to ascertain the use of funds advanced. This will ensure loans are advanced to a worthy cause, which will help ensure proper utilization of the funds; hence repayment will not be a problem.

2.3. Empirical Review

Financial institution's use of mobile based financial services is on the rise in the business world. This section discussed some of the practices affecting this mode of offering, with empirical evidence.

2.3.1. Credit Scoring

Based on Information Solutions (2013), a credit score statistical an alysis is performed by lenders to assess the credit worthiness of potential borrowers. Lenders use credit scoring so as to determine whether to extend credit facilities to customers. An individual's credit score is number ranging between 300 and 850, where 850 is the highest possible credit scoring. Fair Isaac Corporation's credit scoring system (FICO) score, is the most generally used credit scoring system in the financial sector. Banks use credit scoring in risk-based pricing in which the terms of credit, including the loan cost, offered to credit seekers depend mostly with the likelihood of re-imbursement. Generally, the higher the individual's credit score, the more likely he will get favourable terms of credit from the banks.

Liran, Jenkins and Levin (2013) examined the effect of scoring on customer lending. They inferred that entities using credit scoring system to value their loans, diminished altogether the risk of loss. There was an exceptionally solid impact of scoring on productivity. They found out that profits expanded by just about 600 dollars for lesser-risk applicants and by 546 dollars for medium-risk applicants. The study concluded that there was a slight reduction in productivity for high risks per application, mirroring the exchanges in this class had been gainful before the appearance of credit scoring.

Carlos, Barroso and Soares (2002) inferred that credit scoring models assume an increasingly significant role in current financial management. Their usage can build the proficiency and precision of credit giving. Specifically, they may lead to a decline in the risk premium required by financial institutions, prompting less expensive credit. Carlos *et al.* (2002) reasoned that there are a bigger number of things that should be viewed as, aside from simply the typical financial ratios and history, including the business enthusiasm of the operation and the customer's profile.

In their study of credit scoring impact on credit extended advances to small ventures in the US, Robert Glennon and Nigro (2006) inferred that because of computerized credit scoring systems, this yields expanded credit approval rates and furthermore expanded credit defaults for banks. Credit scoring was correlated with increased default rates. Reduced expenses related to computerized small-entity lending systems increases the profitability of the lender, and thus motivate the lender to extend even more uncertain loans. Robert et al. observed that significant lender-borrower distance is also correlated with increased default rates at non-credit scoring institutions, proposing that scoring models may help alleviate the data issues related with geologically inaccessible borrowers.

Credit scoring also involves sharing of information through credit reference bureaus. In his study on effect of credit information sharing and credit scoring in Equity Bank, Polycarp Okumu (2015) found out that Credit information sharing has significant effect on Loan quality and also helps in managing non-performing assets. He concluded that Credit information sharing has nominal effect on the loan volumes, and that individual customer loan interest rate is not a function of the customer's credit history since Loan interest rates charged to customers are largely determined by the Central Bank of Kenya base lending rate & other factors such as cost of funds, Loan mount and availability of Loan security.

Raphael Chemitei (2016) also did a study on credit information sharing. He found out that credit information sharing reduces the portfolio of Non- performing loan with a moderate performance, since lenders will score borrowers based on either the negative or non-negative information obtained. The Study further observed that prudent shared applicant's data improves, among financial institutions, prudent appraisal and subsequent advancement, lowers the banks level of risk, acts as borrower's discipline against defaulting and reduction in borrowing cost. In addition, it was observed a positive relationship of loans found non-performing to total loans, which improved as a result of the introduction of credit information sharing amongst financial institutions.

2.3.2. Mobile Loans Average Repayment Period

An investigation by the Federal Reserve System (2016) on the use of mobile financial services, which concentrated on the US Financial market, discovered that Mobile telephones have progressively become devices that consumers use for banking, budgeting, payments and shopping. The study revealed that use of mobile banking is continuously rising. Forty-three per cent of all cell phone users who had account in banks were found to have interacted with mobile money banking services for the twelve months preceding the study, up from thirty-nine per cent for year 2014, compared to 33 per cent in 2013. Most bank clients were progressively using their phones for all their banking needs. One of the most common reasons why consumers have adopted the use of mobile banking is convenience (40 per cent).Getting a smartphone is the second most common reason individuals began using mobile payments (20 per cent). Fourteen per cent of clients said the capacity to make mobile payment available to them was the main reason while 7 per cent showed that they started using mobile payments since they became comfortable with the security. Because of simplicity of executing, this has expanded payment of credits, in this way guaranteeing timely repayment.

According to Australian Securities and Investment commission (2017), keeping up with or making extra repayments on a loan ensures loan are repaid on time. One also needs to ensure he gets a good interest rate in the market so as to increase the premium component of the loan. One needs also to check on fees and commission, and if allowed by the loan service provider, one should repay more than the required monthly contribution to reduce the loan amount.

Ndegwa (2014) did an examination on the impact of mobile money on non-performing loans of commercial banks in Kenya. The study employed descriptive research design. The study attempted to clarify the essentialness of Mobile loans to interest rate, GDP growth, inflation, exchange rate and the level of loans non-performing decrease in revenue. The study used descriptive research method, where data was collected from the listed commercial banks in Kenya. The study concluded that there is a negative relationship between mobile money operations and non-performing loans.

Acquah and Addo (2012) deduced in their paper that because of inalienable vulnerability coming about because of unpredicted changes in climate patterns plus marketed associated risks, fishermen were more likely to default in their loan repayment. The paper which analyzed the loan repayment performance of fishermen in Ghana, demonstrated that 70.1% of the fishermen questioned had defaulted in repayment, which was partially attributed to low catch and inflated debts from fishmongers. The study findings indicated that loan repayment increased with fishing revenue, education level, fishing experience, and amount of loan. On the other hand, age and investment made had a negative influence on amount of credit repaid. Further, the study revealed that fishing revenue, credit and amount of investment made were significant determiners of amount of loans repaid and the repayment period.

2.3.3. Default Pattern of Mobile Based Loans

Daniel and Darrel (2015) in their investigation on mobile usage and credit repayment, recommend that monitoring the mobile phone use can be a good way to anticipate default among borrowers without recorded financial histories. In their study which was conducted in the Caribbean country, the findings indicate that the information gathered is important even into the current used screening methods which mostly depend on lesser information gathered for person. The information might serve to complement the current techniques or even serve as a substitute and replace the existing methods. If applied independently, this could allow new methods of lending. Nonetheless, the system could be subject to manipulation by users who are familiar with algorithm, therefore, it is important to use indicators that are less prone to manipulation, so as to minimize the default rates.

Henrietta (2011) in his study on causes of non-repayment of loan in Ghana, concluded that the reason most customers are not ready to repay in time, is because of macroeconomic and bank related factors, for example, high inflation, trade and loan fee, time taken to do payment after application, time of repayment being too short and the credit being deficient to produce enough business. He discovered that SMEs, who mostly constitute the list of borrowers, have restricted time which they need to repay the credit, and since the repayment period is sometimes not enough for business to have stabilized, the SMEs end up defaulting. In addition, various factors including bank employees exploiting SMEs also contribute to default in repayment of credit.

Nakayiza (2013) did a study on the outcome of interest rates tothe 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.

Viswanadham (2015) additionally did an investigation on the determinants of non-performing loans in commercial banks, Tanzania. The study discovered that there is a significant negatives sociation between financial condition and non–performing loans. This, he says implies that a strong performance in the economy leads to decline in non-performing loans. The empirical findings also indicated that the association between non-performing loans and GDP, and that banks which charge moderately high interest rates tend to encounter more non-performing loans. There was significant positive relationship amongst NPLs and loan costs. The study findings further revealed that bank's credit supervision limit had significant effect on the level of NPLs, implying that a good loan supervision limit brings leads to decline in level of non-performing loans and vice versa.

Kenneth Ochung (2013) in his study on factors influencing credit repayment among clients of commercial banks in Kenya, which focused on Barclays Bank offices in Nairobi County, inferred existence of significant association between borrowers' individual components and the loan repayment among clients. This, he concludes is to imply that before giving a loan, lenders ought to inspect the small business' credit rating and search for proof of its capacity to repay the loan. The study concluded that there is significant association between borrowers' personal or individual factors and his credit repayment. As such, financial institutions should monitor and appraise the borrowers and select the ones who are less likely to default.

Florence and Daniel (2014) in their study on factors affecting credit repayment in Kenya's Micro-finance institutions discovered that young people would most probably default on a loan than the old, default cases were low among individuals with after-secondary education when compared with the individuals who had up to secondary education. They further noted that for business credits, those organizations in operation for over 10 years were less inclined to default on repayment when compared with organizations with lesser years of operations. The study added that there are different factors impacting on non-repayment of credit, and which incorporates the inherent qualities of borrowers and their organizations, the attributes of the lending institution and appropriateness of the loan item to the borrower and systematic risk in the form of external factors, such as business, political, and economic environ from which the borrowers does his business.

2.3.4. Risk Profile of Mobile Loans

Use of mobile phones to offer financial services have been on the increase. This is due to a higher number of people having access to mobile phones now, than before. A study done by Fiserv (2016) on banks processing transactions through their systems in the US, demonstrates that the average number of product holdings, including loans, credit cards, certificates of deposit and mortgages immediately increased after consumers' acceptance of use of mobile banking technology. The use mobile based banking use has led to increased transactions and product holding. Mobile bankers made 72% more revenue than branch-only customers as indicated by the study findings. In addition, the study concluded that clients using mobile banking services are less likely to leave their banks.

According to Robert, Mayoka & Miiro (2012), one of the most technological innovations in Uganda and the rest of East African countries in telecommunications sub-sector is the use of mobile Money. The innovation is said to have started in the year 2009, where mobile money was initially perceived as a channel for generating "side income" to supplement revenues of telecom operators. However, mobile money and other mobile payment systems have now become a core business, forming a basis of competition in the industry, and the commercial banks have not been left out of this innovative technology of offering services, concludes Robert *et al.* (2012).

Ngango (2015) studied the impact of electronic banking to commercial banks' performance in Rwanda. The researcher used a descriptive research design, where qualitative and quantitative approach was used. In quantitative approach the researcher employed data in form of numbers collected from employees on e-banking and performance of financial institutions. Qualitative data was used through use of interviews in order to describe the activities and its impact of e banking on performance of financial institutions. The research concluded that due to some inefficiency in the use of the system, there was bound to be failures; network failures, inadequate skills and Security based issues.

Lucy Wanja (2016) did a study on the quality of use of automated platforms to offer financial services. In her study, she concluded that mobile banking and use of automated teller machines is so popular amongst Kenyan bank customers. Though all automated service quality dimensions are important in determining customer loyalty, some dimensions she concluded were found to be more important than others hence they do not have the same priority among different customers. In deciding what automated banking service, a customer wants to use, reliability, accessibility, security and efficiency are key consideration. Personalization and ease of use are also considered but not as much important. She concluded that, when using mobile banking platforms, reliability, security and ease of use had a negative effect on customer loyalty.

Rachael Mutua (2014) in her study on impacts of mobile based banking to the profitability of commercial based banks operating in Kenya inferred that there was a week positive connection between mobile banking and profitability of commercial banks Kenya. This was deduced from the patterns recorded, where average number of clients and monthly cash transfers kept up a positive development rate whereas the performance of the banks financially was influenced by numerous different factors which had significant effects compared with usage of mobile banking. The commercial banks' performance in Kenya she concluded was significantly influenced by macro-economic factors such as after-election skirmishes, fluctuation on foreign exchange rates and inflation among other full scale monetary factors, henceforth no critical financial development.

On the impact of mobile based banking products on the profitability of commercial banks operating in Kenya, findings by Solomon, Rotich, and Anyango (2015) indicated that M-banking products were found to have incredibly expanded the banks income in the last five years. The mobile platform offers an advantageous extra strategy for managing finances without handling physical cash. These have made the banking services more productive and enhanced the performance of the banks financially, concludes Solomon *et al.* (2015).

2.3.5. Financial Performance of Commercial Banks

As demonstrated by Investopedia (2017), financial performance can be said to be a subjectively a measure of how well firms use assets accessible to it in its fundamental strategy for business, to make profit. This term may also be much used when looking at an overall measure of organization's financial prosperity over a given time span, and can be used to compare similar firms over a comparable industry or compare organizations/sectors in different regions. There are variety of ways to measure financial performance, but however to get a good measure, all measures should be taken in all together. Such items as income from operations, other operating revenues or cash flows from the business operations may be used in addition to total turnover. Additionally, investors can scrutinize the financial statements and identify other measures such as margin of growth or reduced obligations.

Caroline Njiru (2014) in her investigation of the impact internet and mobile based banking has with regard to profitability of the commercial based banks operating in Kenya concluded that there has been quite an increment in the mobile banking income and internet banking revenue in commercial banks based in Kenya. This growth in mobile banking and internet banking earnings might be because of increased innovations and expanded use of phones among clients. The study further inferred that there is a positive and significant relationship for profitability and internet banking earnings for commercial banks, and in addition mobile banking revenue. This implies a unit increment in mobile banking income and internet banking earnings prompts a unit increment in expanded income of the commercial banks which prompts increased profits.

Mabwai (2016) in his study on impacts of mobile based banking to the financial performance for commercial based banks found in Kenya inferred that as a bank builds its mobile banking scope and capability, this brings an expanded number

of transactions through the mobile banking platforms and along these lines an enhanced financial performance. The study further concludes that the higher the capital adequacy ratio in a bank, the more it is able to invest in mobile banking activities and thus the better the financial performance, and also that the level of market share had a positive effect on commercial bank's financials.

2.4. Literature Review Summary and Research Gap
   The review of literature on studies done on mobile phone based loans management practices and financial performance have majorly focused on financial gains, non-interest income, efficiency in service delivery and what needs to be done to improve m-banking services. They have not focused specifically on the effect of mobile based loans management practices on financial performance. In addition, credit scoring, which is a major aspect in mobile based loans disbursement has been discussed only in the context of normal loans appraisal, which is arguably different in mobile based loans. Repayment history of mobile based loans has not been discussed, since most studies reviewed have focused on non-mobile based loans. These studies are summarized below;

Author	Focus of the Study	Findings	Knowledge Gaps	Focus on the Current Study
Raphael Ndegwa (2016)	The investigation concentrated with the effect of mobile money on nonperforming loans of commercial Banks based in Kenya.	The study concluded that Mobile money transaction negatively impacts on non-performing loans.	The study focused only on mobile transaction cost, and how they affect people's banking behavior.	Current study focused on the loans aspect to check on how use mobile banking to offer loans has had an effect on interest income of commercial banks in Kenya
Ngango Muteteri Asia (2015)	The paper was on electronic banking and the financial performance for Rwanda Commercial banks	The research concluded that due to some inefficiency in the use of the electronic system, there was bound to be failures; network failures, inadequate skills and Security based issues -banking.	The study only looked at the security, inefficiencies and network related issues of e-banking and how they affect the bank's financial performance.	The study did not focus on the effectiveness of mobile loans issuance aspect of the electronic system, which the current study was aimed at.
Federal Reserve System (2016)	Consumer and Mobile Financial Services	The study majorly focused on the usage of mobile financial services and their adoption in the US market.	Focused on mobile financial penetration.	Failed to look at the risk factors associated with the mobile finance, especially on mobile loans which current study aimed.
Experian Information Solutions (2013)	What is good credit Score.	Sought to explain the use of different methods of credit scoring	Focused on how to get the right credit score using FICO	Focuses on ability to pay, based on the score generated. However, the issue of validating the scores to ensure authenticity and credibility in a mobile based platform is not discussed, which the current study aimed.
Liran *et al.* (2013)	The impact of credit scoring on consumer lending	They concluded that organizations using credit scoring system to price their loans reduced significantly the risk of loss. There was a very strong effect of scoring on profitability.	The study looked at the effect of scoring on bank based loan pricing and to the level of default.	Current study aimed to look at the effectiveness of credit scoring to mobile loans of commercial Banks in Kenya
Carlos *et al.* (2002)	*Qualitative Modeling of Credit Scoring: A Case Study in Banking*	They concluded that there are a larger number of things that need to be considered in credit scoring, apart from just the usual financial ratios and history, including the commercial interest of the operation and the client's profile.	Focused on qualitative aspects of credit scoring	Current study aimed to analyze loans management practices affecting mobile loans of commercial banks in Kenya.
	Effect of Credit	The Study found out that Credit	Study focused on credit	Current study checked

Author	Focus of the Study	Findings	Knowledge Gaps	Focus on the Current Study
Polycarp Okumu (2016)	Information Sharing on Commercial Banks' Loan Portfolio: The Case of Equity Bank	information sharing has significant effect on Loan quality and also helps in managing non-performing assets.	information sharing and loans quality. The study did not focus on incorporation of credit information sharing on credit worthiness score of mobile loans.	on the effectiveness on use of credit information sharing to mobile loans of commercial banks in Kenya.
Raphael Chemitei (2016)	The Effects of Credit Information Sharing on Performance of Non-Deposit Taking Savings and Credit Cooperative Societies in Nairobi County	The study concluded that credit information sharing reduces the portfolio of Non- performing loan with a moderate performance, since lenders will score borrowers based on either the negative or non-negative information obtained.	Focused on credit information sharing and non-performing loans in SACCOs only.	Current study analyzed use of mobile technology to offer loans by commercial banks in Kenya and its effect on risk and financial performance
Daniel & Darrel (2015)	Conduct revealed in mobile phone usage, how it predicts loan repayment	They consider recommended that keeping an eye on cell phone utilization can be a decent technique to anticipate default among borrowers who have no formal or discernible money related histories, utilizing behavioral examples uncovered by cell phone use.	Study focused on normal mobile phone usage patterns for non-financial based aspects and how they can contribute to credit scoring	Current study concentrated on available banking history for mobile based loans as a basis for analyzing payment trends.
Henrietta Pearl (2011)	Reasons for credit nonpayment in commercial banks fromanSmes' perspective.	The study concluded that the reason most clients are not able to repay loans in time, is due to macroeconomic and bank related factors.	The study looked at Macro-economic and bank related factors affecting payment period of loans.	Current study sought to look at other factors likely to affect period taken to repay mobile loans
Nakayiza Stella (2013)	Financing costs and Loans Portfolio Performance of Commercial Banks of Centenary Bank, Entebbe Road Branch Uganda.	The examination discovered that despite the fact that the Bank had attempted to take after systems and controls in regulating credit, there still were customers' defaulting on advance reimbursements and expanding the impact of terrible obligations to bank's execution. This was because of the impact of rising loan costs.	Study mainly focused on effect of interest rates on loans performance	Current study looked at other factors apart from interest rates contributing to default in repayment of mobile loans
N. Viswanadham (2015)	Non-Performing Loans determinants in Commercial Banks, focused on NBC Bank in Dodoma Tanzania.	The investigation discovered that there was critical negative connection between financial condition and non –performing advances.	Focused on the effect of prevailing economic conditions to the number of non-performing loans.	Current study aimed to identify other non-economic and management practices affecting mobile loans of commercial banks in Kenya
Kenneth Ogol (20130	Loan repayment among customers from commercial banks found in Kenya focusing on BBK-Nairobi County Kenya.	Concentrate inferred that presumed that there is a critical connection between singular borrowers' components and the advance reimbursement among clients.	This study focused on individual factors affecting repayment of loans.	Current study looked at the other non-individual factors affecting mobile based loans of commercial banks in Kenya.
Florence & Daniel (2014)	Study on Factors which Influence Loan Repayment in Micro-Finance Institutions based in Kenya.	They discovered that youngsters will probably default on a credit than the old, default cases were low among individuals with post-auxiliary instruction when contrasted with the individuals who had up to optional level of training.	They focused on age and educational factors affecting loan default rate in micro finance institutions.	Current study focused on causes of default on mobile based loans, regardless of level of education.
Fiserv (2016)	Mobile Banking Adoption: Where Is	Their examination demonstrates that the normal number of item property,	The study was on effect of mobile banking to	Current study looked at the adoption of mobile

Author	Focus of the Study	Findings	Knowledge Gaps	Focus on the Current Study
	the Revenue for Financial Institutions?	including advances, authentications of store, charge cards and home loans promptly expanded after customers' reception of versatile managing an account.	the adoption of financial products by financial consumers	based loans and its influence to financial performance of Kenya's commercial banks.
Robert *et al.* (2012)	ICT and Mobile Money Systems and Customer Satisfaction in Uganda.	Concluded that one of the most technological innovations in Uganda and the rest of East African countries in telecommunications sub-sector is the use of mobile Money.	Study focused customer satisfaction on increased use of innovation to offer financial services.	The study did not look at the financial implication on the use of the said technology, which the current study aimed.
Caroline Wanja (2014)	Effect of internet and mobile based banking to the financial performance for Kenya's commercial banks	Study concluded that that there has been tremendous increase in the mobile banking non-interest income and internet banking income in commercial banks in Kenya.	The study focused on non-interest income only.	Current study focused on interest income, among other financial performance variables.
Lucy Wanja (2016)	Automated Banking Services, Service Quality and Customer Loyalty In Kenya.	Study concluded that mobile banking and use of automated teller machines is so popular amongst Kenyan bank customers, and that there are some quality dimensions that are more popular than others.	The study was about quality of mobile and internet banking.	The study did not focus on quality of loans offered in the mobile banking platform which the current study aimed.
Rachael Mutua (2014)	Mobile Banking effect to the Financial Performance of Kenya's Commercial Banks	The investigation inferred that there was a weak and positive connection between mobile based banking in relation to financial performance of Kenya's commercial banks.	The study focused on macro-environmental factors affecting financial performance.	Current study focused on micro factors, like loan application and appraisal process among others.
Solomon Munyoki *et al.* (2015)	Impact of Mobile Banking on the Financial Performance of Banking Institutions in Kenya.	Their examination revealed that Mbanking products were found to have incredibly expanded the banks income over the most recent five years.	The study focused on non-interest income only	Current study focused mainly on effects of mobile loans on financial performance and other factors affecting the financial performance of commercial banks operating in Kenya following the adoption of Mbanking to offer credit.
Caroline Njiru (2014)	Impact of web and mobile money on the profitability of commercial banks in Kenya	Study concluded that that there has been tremendous increase in the mobile banking income and internet banking income in commercial banks in Kenya.	Focused on non-interest based income	Current study concentrated more on mobile loans and their effect to financial performance.
Felix Mabwai (2016)	Impacts of mobile banking to the financial related performance in commercial banks in Kenya	Study concluded that as commercial bank increases its mobile banking coverage, this results in an increased number of transactions through their mobile banking platforms and therefore an improved financial performance.	Study focused only mobile banking in general	Current study concentrated specifically on mobile loans.

Table 1: Summary of Literature Review and Research Gaps

2.5. The Conceptual Framework
This brought out the relationship between Mobile based loans management practices variables (adequacy of the scoring system, average repayment period, repayment history and risk profile) and financial performance. The study therefore sought to determine the influence of the independent variables dynamics to dependent variable as depicted in the diagram below.
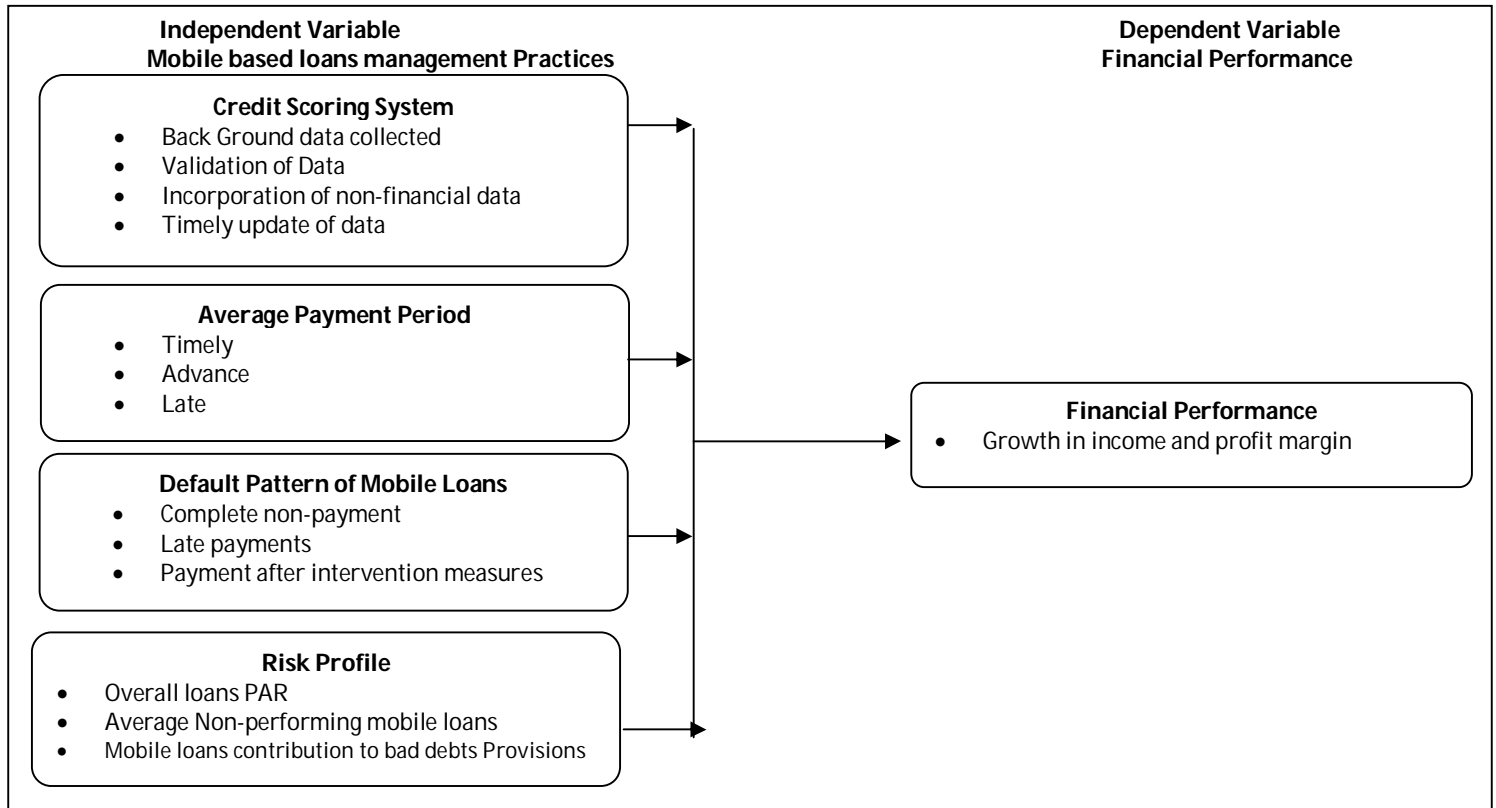
Independent Variable
Mobile based loans management Practices

Dependent Variable
Financial Performance

Credit Scoring System
- Back Ground data collected
- Validation of Data
- Incorporation of non-financial data
- Timely update of data

Average Payment Period
- Timely
- Advance
- Late

Financial Performance
- Growth in income and profit margin

Default Pattern of Mobile Loans
- Complete non-payment
- Late payments
- Payment after intervention measures

Risk Profile
- Overall loans PAR
- Average Non-performing mobile loans
- Mobile loans contribution to bad debts Provisions

Figure 1: The Conceptual Frame work
Source: Researcher (2017)

3. Research Methodology

3.1. Introduction

The chapter set its focus on research methodology adopted by the researcher to implement the study. It described among other things, the research design, the target population, the sample design, collection of data instrument, the validity/reliability of data, data analysis and presentation and other ethical considerations.

3.2. Research Design

The study used descriptive survey design. According to Arvind and Vijay (2013), a descriptive survey is associated with the description of facts of a study. The design was considered appropriate for this study as it will assist in an in-depth investigation of the processes of mobile based loan management, and be able to reveal how this may affect income from the said loans. Quantitative approach was used to analyse the variables that were empirically investigated using statistical techniques such as charts, tables and other useful measurements to prove the cause and effect relationship of the variables under the study.

3.3. Target Population

The target population for the study focused on the 43 Kenya's commercial banks as licensed by the CBK as at May 2017. The respondents were the credit risk and finance official of each of the commercial banks in Kenya selected for the study.

3.4. Sample Design

Kothari (2004) defined sample to mean selected respondents whom can represent the whole population. To ensure adequate gathering of information, stratified sampling design was used to select the sample. The respondents to the study were identified by clustering the commercial banks according to the three main tiers. The Central Bank of Kenya has grouped the banks in Kenya into three tiers. The CBK came up with this classification system as a means of distinguishing different banks according to their market share, asset base and number of customer deposits (CBK, 2017). From the target population of 86, the researcher derived 52respondents, drawn from the different tier groups of commercial banks in Kenya. The ideal sample size of 20-30% of a population is considered acceptable for most research purposes as it provides the ability to generalize a population, according to Cresswell and Sekaran (2003). On the aspect of picking samples by chance, tests of around 30% of a populace can frequently be dependable. Likewise Mugenda and Mugenda (2003) states that in stratified testing where populace inside every strata is known, then if a sample of say 10-30% is gotten, then this is sufficient for information and data gathering and for factual reporting.

Tier Classification	Size (No of Banks)	Target Population	Sample Size	Percentage
Tier 1	6	12	12	100%
Tier 2	14	28	20	71.4%
Tier 3	23	46	20	43.45%
Total	**43**	**86**	**52**	**60.4%**

Table 2: The Sample Size
Source: Researcher (2017)

3.5. Data Collection Procedure

Primary data was gathered using self- administered questionnaires. Kumar (2005) clarifies that a questionnaire is a composed list of inquiries, the responses to which are recorded by the respondents. He further explains that in a questionnaire respondent read the questions, interpret what is expected and then fill up the questionnaires. He additionally shows that the interview approach is more affordable and more confidential. The close ended questions helped provide more structured types of responses which facilitated tangible recommendations. The questionnaire designed in the study comprised of two sections. The first part included the demographic and operational characteristics designed to determine fundamental issues including the demographic characteristics of the respondent while the second part dealt with the study variables.

Variable	Category	Operationalization	Measurement
Credit Scoring System	Independent	The process of generating and validating credit scores before issuing mobile loans truly reflect the client's true profile	Completeness and accuracy of Back Ground data collected Process of Validation of Data collected Incorporation and use of other non-financial data in the scoring process Timely update of data as time moves to reflect changing client's environment
Average Payment Period	Independent	Time taken for client's to fully repay the mobile loans as compared to other types of credit facilities	Do the clients make Timely payments, do they pay on the scheduled date Are there instances of Advance payment where clients pay before maturity? How late do the clients pay
Default Pattern of Mobile Loans	Independent	Emerging trends that can be noted from the new way of lending, as compared to other well documented default patterns of other types of credit facilities	What are the instances of Complete non-payment How is the non-repayment based on number of loans? What are the number of Late payments cases How many cases are there where payment is made after intervention measures What are some of the intervention measures employed
Risk Profile	Independent	Contribution of the loans to bad loans book and the value it contributes to the overall provision for bad debts	The Overall loans PAR of the mobile loans Average Non-performing mobile loans and likelihood of payment Mobile loans contribution to bad debts Provisions
Financial Performance	dependent	.	Growth rate in income after introduction of mobile loans Contribution of mobile loans to interest income after considering any provisions necessary Mobile loans loss provision as compared to overall provision

Table 3: Operationalization and the Variable Measurements
Source: Researcher, 2017

3.6. Validity and Reliability

Prior to undertaking the research, pilot study was conducted by administering sample to 5 different commercial banks that were not part of the study. This assisted the researcher to assess whether the respondents clearly understood the questionnaires and whether the questions asked gave the researcher the data needed for the study. The flaws and biases identified in the instrument were modified for clarity and accuracy. The final questionnaires were then printed so as to be used to collect the data from the respondents.

3.7. Data Analysis and Presentation

Mugenda and Mugenda (2003)indicated that data analysis as the process forbringing outthe order, the structure and the meaning to the huge data gathered. The Collected data was edited, classified, coded and analyzed. This was done using descriptive and inferential statistics which included the mean, frequency, percentages and standard deviation. Data was analyzed using statistical package for social science (SPSS).

3.7.1. Empirical Model

Multiple regression analysis model was used to bring out the relationship between independent variables (Credit scoring, average payment period, default pattern, risk profile for mobile loans and the dependent variable (financial performance of commercial banks in Kenya).

The variable Y defined as $Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + e$

Where: -Y=Financial performance of commercial banks

β_0 = Constant

t= time period

X_1 = Credit score system for bank i at time t

X_2 = Payment period for bank i at time t

X_3 =Default rate pattern for bank i at time t

X4 = Risk profile for bank i at time t

e=Error term of the model.

β, β_2, β_3 andβ_4= the coefficients of independent variables. Tables, graphs and pie charts were used to analyze frequency and percentages, tables were prepared using each of the variable/indicator.

3.8. Ethical Consideration

The researcher used free prior and informed consent (FPIC) in order to guarantee full disclosure of the research objective. Respondents were educated adequately as to the nature and aim of the study. Further, the researcher explained the procedures involved and the benefits to the organizations, any potential risks, and alternatives to participating in this research. Also, the researcher provided the informants with an opportunity to raise any concerns regarding the study. The researcher obtained authorization from the school of business to undertake the research and a consent letter accompanied the questionnaires explaining the aim and significance of the research.

4. Results and Discussions

4.1. Introduction

This section outlined the data analysis, study findings and interpretation. Table and diagrams are used to present the findings. The examined data was aligned as per the objectives of the study.

4.2. Response Rate

The researcher issued 52 questionnaires to the selected respondents. Out of the 52, 49 questionnaires were successfully filled and returned. The returned questionnaires represented a 94.2% response rate as shown on Table 4. This mirrors Mugenda and Mugenda (2003) observation that 50% response rate is adequate for analysis. As such, 94.2% response rate is adequate for the study.

Response	Frequency	Percent
Returned	49	94.2%
Unreturned	3	5.8%
Total	**52**	**100%**

Table 4: Response Rate

4.3. Demographic Characteristics

This section consists information which describes basic characteristics such as gender, type of bank, job description and duration of work.

4.3.1. Gender of the Respondents

The respondents were to indicate their gender. Results in Figure 2 reveal that majority of 55% of the respondents were male while 44% were female. This implies that there is male dominance in the banking sector. However, the number of female employees in the banking sector exceeds the minimum constitutional requirement of 1/3.
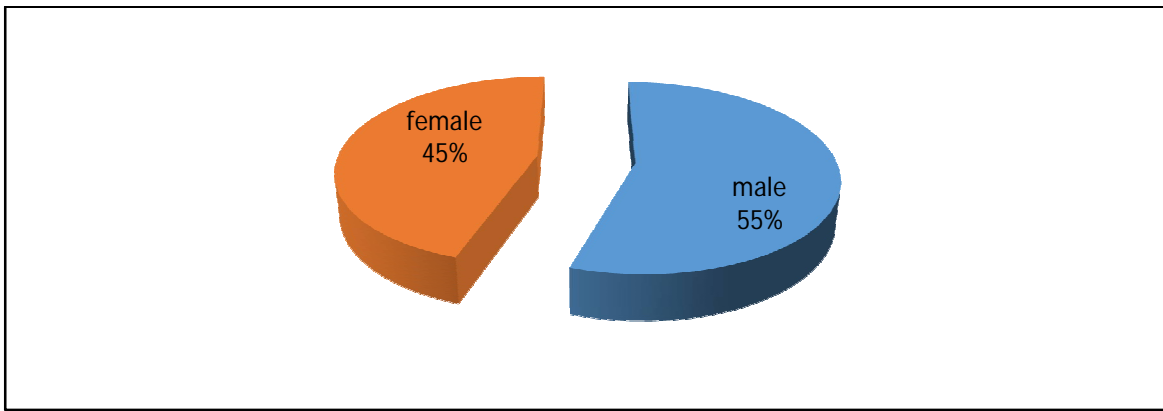
Figure 2: Gender of the Respondents

4.3.2. Type of Tier
The respondents were to indicate the tier in which their banks belong. Results in Figure 3 reveal that 40.8% of the respondents indicated tier 2 and 3 respectively while 18.4% of the respondents indicated tier 1. This implies that majority of the banks belong to tier 2 and 3.
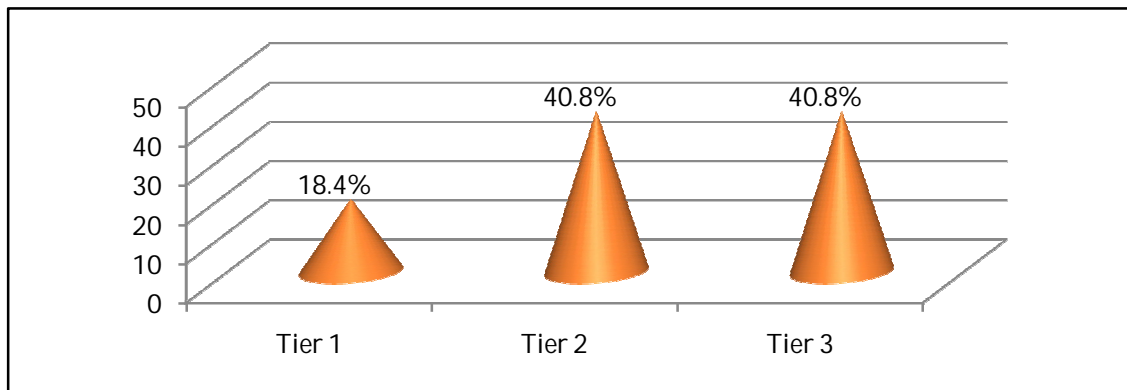
Figure 3: Type of Tier

4.3.3. Job Description Category
The respondents were asked indicate the job description category under which you fall. Results in Figure 4 reveal that 38.8% were credit officers, 32.7% were admin managers while 28.6% were credit managers. This implies that majority of the respondents worked in the credit department.

Figure 4: Job Description Category

4.3.4. Duration of Work
The respondents were asked to indicate the period of time they had worked in the credit department. Results in Figure 5 reveal that majority of 69% of the respondents indicated over 10 years, 25% indicated 6-10 years while 6% indicated 0-5 years. This implies that majority of the respondents had adequate working experience in the credit department.
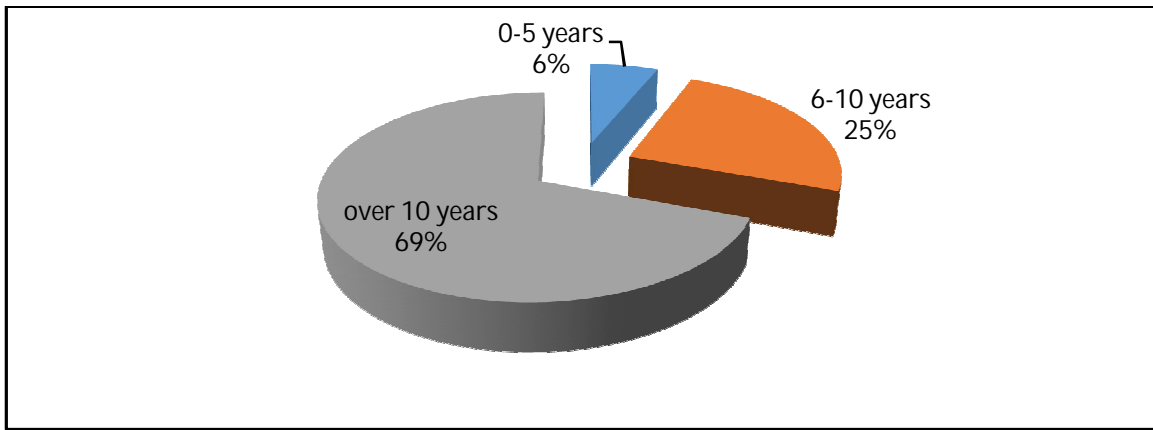
Figure 5: Duration of Work

4.3.5. Mobile loan management Practices

The respondents were asked whether they have ever interacted with mobile loans management practices. Results in Figure 6 reveal that all (100%) the respondents said yes. This implies that all the respondents are familiar with the mobile loans management practices.
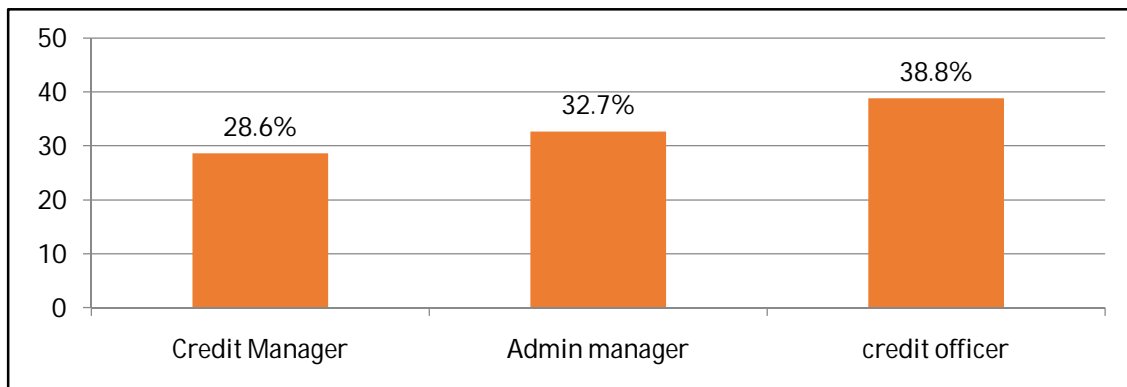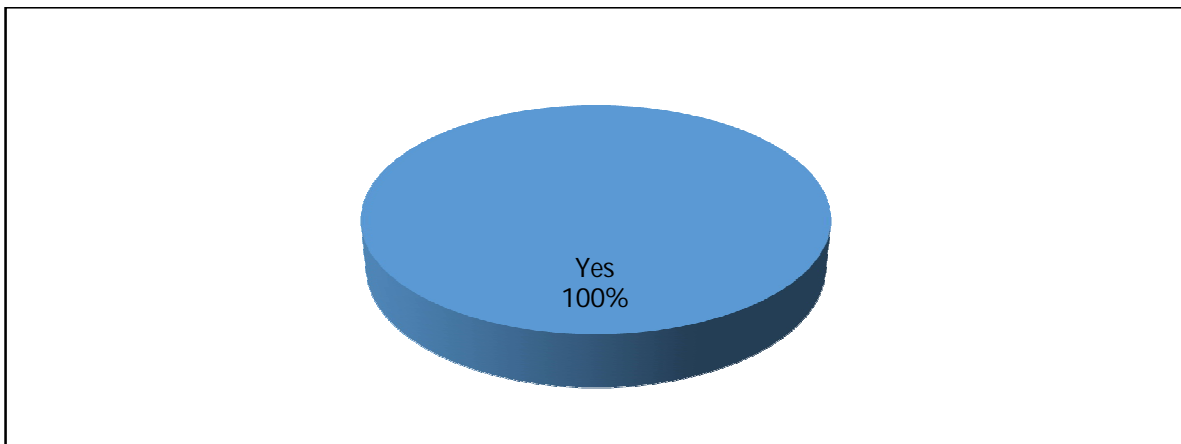

Figure 6: Mobile loan management practices

4.3.6. Level of Interaction

The respondents were asked to indicate the level at which they have interacted with the mobile loans management. Results in Figure 7 reveal that 30.6% of the respondents indicated all the above, 24.5% indicated scoring and issuance and follow up respectively while 20.4% indicated performance monitoring. This implies that the respondents have interacted with mobile loans management at various levels.
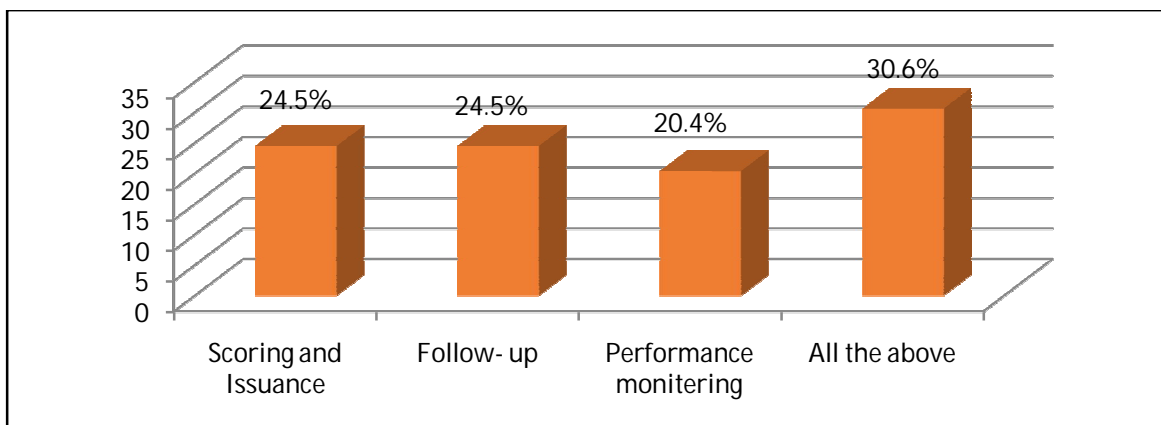
Figure 7: Level of interaction

4.4. Descriptive Statistics

4.4.1. Credit Scoring and Financial Performance of Commercial Banks

The first objective of the study was establishing effect of mobile based loans credit scoring system on the financial performance of commercial banks in Kenya.

The respondents were asked whether their institutions use credit scoring for all mobile loans management. Results in Table 5 reveal that majority (83.7%) of the respondents said yes while 16.3% said no. This implies that majority of the commercial banks use credit scoring for mobile loans management.

Response	Frequency	Percent
No	8	16.3
Yes	41	83.7
Total	**49**	**100**

Table 5: Use of credit scoring

The respondents were further asked to indicate the type of data incorporated in the credit score. Results in Table 6 reveal that majority (61%) of the respondents indicated financial data, 37% indicated personal data while 2% indicated business data. This implies that financial data is the most considered type of data in credit scores.

Response	Frequency	Percent
Finance	30	61.2
Personal	18	36.7
Business	1	2
Total	**49**	**100**

Table 6: Type of data incorporated in credit score

The respondents were asked to give their responses to the questions on credit scoring. The response was rated on a five likert scale as follows: **SA** is strongly agree, **A** is agree, **U** is undecided, **D** is disagree and **SD** is strongly disagree. Results are presented in Table 7.

Majority of 84% (57.1%+26.5%) of the respondents agreed with the statement that there is sufficiency of information gathered for credit scoring, 69% agreed that there is accuracy and completeness of data collected for credit scoring, 82% agreed that accuracy and adequacy of credit scoring information affects the mobile loan performance, 90% agreed that incorporation of other related personal and business/ or work information can greatly influence the adequacy of credit scoring, 86% agreed that the credit scoring information currently being used is enough for use in mobile loans, 90% agreed that credit scoring has assisted in risk management on mobile loans while 88% of the respondents agreed that there is timely update of data used for scoring to reflect any changes.

Using the likert scale, the mean average responses was 1.86 meaning majority of the respondents interviewed were agreeing with majority of the statements on credit scoring; additionally, the responses were varied as shown by a standard deviation of 1.03. The results herein imply that credit scoring influence the financial performance of commercial banks in Kenya.

This study findings support those of Raphael Chemitei (2016), whose study was based on credit information sharing. Chemitei, study found that credit information sharing reduces the portfolio of non-performing loans and hence increases profitability of lending institution. Further, the study observed that prudent shared applicant's data improves, among financial institutions, prudent appraisal and subsequent advancement, lowers the banks level of risk, acts as borrower's discipline against defaulting and reduction in borrowing cost. In addition, it was observed positive relationship of non-performing loans to total loans improved as a result of the introduction of credit information sharing amongst financial institutions.

Further, this study finding concurs with that of Liran, Jenkins and Levin (2013) who examined the effect of scoring on customer lending. They inferred that organizations using credit scoring systems to value their loans reduced altogether the risk of loss. There was an exceptionally incredible impact of scoring on productivity.

Statements	SA	A	U	D	SD	M	S.Dev
There is sufficiency of information gathered for credit scoring	57.10%	26.50%	6.10%	10.20%	0.00%	1.69	0.98
There is accuracy and completeness of data collected for credit scoring	38.80%	30.60%	0.00%	20.40%	10.20%	2.33	1.44
Accuracy and adequacy of credit scoring information affects the mobile loan performance	36.70%	44.90%	8.20%	8.20%	2.00%	1.94	0.99
Incorporation of other related personal and business/ or work information can greatly influence the adequacy of credit scoring	51.00%	38.80%	2.00%	6.10%	2.00%	1.69	0.94
The credit scoring information currently being used is enough for use in mobile loans	34.70%	51.00%	4.10%	10.20%	0.00%	1.90	0.90
Credit scoring has assisted in risk management on mobile loans	49.00%	40.80%	0.00%	8.20%	2.00%	1.73	0.97
There is timely update of data used for scoring to reflect any changes	51.00%	36.70%	4.10%	4.10%	4.10%	1.73	1.02
Average						1.86	1.03

Table 7: Credit Scoring

4.4.2. Mobile Loan Repayment Period and Financial Performance of Commercial Banks

The second objective of the study was toestablish the mobile based loans average repayment period and its effect on the financial performance of commercial banks in Kenya.

The respondents were asked to indicate the repayment period given for mobile loans. Results in Table 8 reveal that majority (59.2%) of the respondents indicated 1 month while 40.8% indicated 2-12 months. This implies that the repayment period for most of the mobile based loans is 1 month.

Response	Frequency	Percent
1 month	29	59.2
2-12 months	20	40.8
Total	**49**	**100**

Table 8: Repayment period given for mobile loans

The respondents were further asked whether customers repay the mobile loans within the given period. Results in Table 9 reveal that majority (65.3%) of the respondents said no while 34.7% said yes. This implies that majority of the borrowers are not able to repay the mobile based loans within the stipulated time.

Response	Frequency	Percent
No	32	65.3
Yes	17	34.7
Total	49	100

Table 9: Repayment within time

The respondents were asked to give their responses to the questions on mobile loan repayment period. The response was rated on a five likert scale as follows: **SA** is strongly agree, **A** is agree, **N** is not sure, **D** is disagree and **SD** is strongly disagree. Results are presented in Table 10.

Majority of 57.2% (28.6%+28.6%) of the respondents disagreed with the statement that mobile loan clients always pay on time, 55% disagreed that mobile loan customers pay before time, 61% agreed that mobile loan customers delay to repay by less than 30 days, 72% agreed that mobile loan customers delay to repay by more than 30 days but not more than 90 days while 63% of the respondents disagreed that mobile loans have lesser risk of not being paid on time than other loans.

Using the likert scale, the mean average of the responses was 3.11 which means that majority of the respondents were agreeing with most of the statements on mobile loan repayment period; additionally, the responses were varied as shown by a standard deviation of 1.05. The results herein imply that mobile based loans repayment period influence the performance of commercial banks in Kenya.

This study findings mirror those by Australian Securities and Investment commission (2017), which observed that keeping up with or making extra repayments on a loan ensures loans are repaid on time. One also needs to ensure he gets a

good interest rate in the market so as to increase the premium component of the loan. One needs also to check on fees and commission, and if allowed by the loan service provider, one should repay more than the required monthly contribution to reduce the loan amount.

Further, the study findings support the findings by Ndegwa (2014) who studied the effect of mobile money on non-performing loans for commercial banks in Kenya. The study concluded that Mobile money transaction negatively impacts on nonperforming loans.

Statement	SA	A	N	D	SD	M	S.Dev
Mobile loan clients always pay on time	4.10%	22.40%	16.30%	28.60%	28.60%	3.55	1.24
Mobile loan customers pay before time	0.00%	20.40%	24.50%	32.70%	22.40%	3.57	1.06
Mobile loan customers delay to repay by less than 30 days	28.60%	32.70%	14.30%	24.50%	0.00%	2.35	1.15
Mobile loan customers delay to repay by more than 30 days but not more than 90 days	12.20%	61.20%	18.40%	8.20%	0.00%	2.22	0.77
Mobile loans have lesser risk of not being paid on time than other loans	0.00%	12.20%	24.50%	30.60%	32.70%	3.84	1.03
Average						3.11	1.05

Table 10: Mobile Loan Repayment Period

4.4.3. Default Pattern of Mobile Loans and Performance of Commercial banks

The third objective of the study was to analyse the effect of mobile loans default patterns on the financial performance of commercial banks Kenya.

The respondents were asked to rate the extent of mobile loan default in their banks. Results in Table 11 reveal that 34.7% of the respondents rated moderate the mobile loan default pattern while 32.7% rated it high and low respectively.

Response	Frequency	Percent
High	16	32.7
Moderate	17	34.7
Low	16	32.7
Total	49	100

Table 11: Mobile loan default pattern rating

The respondents were asked to give their responses to the questions on mobile loan default patterns. The response were rated on a five likert scale as follows: **SA** is strongly agree, **A** is agree, **N** is not sure, **D** is disagree and **SD** is strongly disagree. Results are presented in Table 12.

Majority of 63% (34.7%+28.6%) of the respondents agreed with the statement that there are rare cases of complete non-payment of the mobile loans, 57% agreed that the probability of default is higher for mobile loans compared to other loans. However, 80% of the respondents disagreed that mobile loan repayment is always made after intervention measures. Further, 81% agreed that mobile loan borrowers usually make the payment before the intervention measures while 67% agreed that there is always a tendency of mobile loan borrows to default in their payment.

Using the likert scale, the mean average of the responses was 2.49 which means that majority of the respondents were agreeing with most of the statements on mobile loan default pattern; additionally, the responses were varied as shown by a standard deviation of 1.05. The results herein imply that mobile loan default pattern influences the performance of commercial banks in Kenya.

This study findings agree with those of Nakayiza (2013) who did an investigation on the impact of interest rates on loan portfolio performance in commercial banks, and the study concentrated on Centenary Bank, Entebbe street branch Uganda. The study revealed that despite the fact that the Bank had endeavored to adhere to set procedures and regulations in extending credit, there still were customers' defaulting on credit repayment and increasing the effect of bad debts to performance of the bank. This generated risk in performance of the loan portfolio and influenced its profitability. Further, the study findings indicated that there is lack of effective analysis on the impact of increasing interest rates on loan repayment history and trends.

Statement	SA	A	N	D	SD	M	S.Dev
There are rare cases of complete non-payment of the mobile loans.	34.70%	28.60%	20.40%	12.20%	4.10%	2.22	1.18
The probability of default is higher for mobile loans compared to other loans.	30.60%	26.50%	22.40%	20.40%	0.00%	2.33	1.13
Mobile loan repayment is always made after intervention measures.	4.10%	10.20%	6.10%	32.70%	46.90%	4.08	1.15
Mobile loan borrowers usually make the payment before the intervention measures.	38.80%	42.90%	14.30%	4.10%	0.00%	1.84	0.83
There is always a tendency of mobile loan borrows to default in their payment.	40.80%	26.50%	26.50%	6.10%	0.00%	1.98	0.97
Average						2.49	1.05

Table 12: Mobile loan default pattern

4.4.4. Mobile Loans Risk Profile and Performance of Commercial banks

The fourth objective of the study was to examine the effect of mobile based loans risk profile on the financial performance of commercial bank in Kenya.

The respondents were asked to rate the mobile loans risk profile. Results 4.10 reveal that 49% of the respondents rated high the mobile loans risk profile, 26.5% rated it moderate while 24.5% rated it low. This implies that most of the banks are facing risks from mobile loans advancement.

Response	Frequency	Percent
High	24	49
Moderate	13	26.5
Low	12	24.5
Total	**49**	**100**

Table 13: Mobile loans risk profile rating

The respondents were asked to give their responses to the questions on mobile loans risk profile. The responses were rated on a five likert scale as follows: **SA** is strongly agree, **A** is agree, **N** is not sure, **D** is disagree and **SD** is strongly disagree. Results are presented in Table 14.

Majority of 65% (36.7%+28.6%) of the respondents agreed with the statement that the inefficiency of the bank systems increase mobile loans risk profile, 61% o agreed that the inadequacy of mobile banking skills increases the loans risk profile, 55% agreed that the security of the mobile loans is likely to be comprised, therefore, making it more risk, 69% agreed that the use of mobile loan platforms increases the non-performing loan portfolio while 61% of the respondents agreed that the use of mobile loans contributes to increase in bad debts which place the bank's profitability at risk.

Using the likert scale, the mean average of the responses was 2.26 which means that majority of the respondents were agreeing with most of the statements on mobile loans risk profile; additionally, the responses were varied as shown by a standard deviation of 1.14. The results herein imply that mobile loans risk profile influence the performance of commercial banks in Kenya.

This study finding is similar to that of Rachael Mutua (2014) whose study focused on impacts of mobile banking on profitability of commercial banks in Kenya. Her findings revealed that there was a week positive relationship between mobile banking and profitability of commercial banks Kenya. This was ascribed to the patterns recorded, where the quantity of clients and monthly transactions kept up a positive development rate while financial performance of banks was influenced by numerous different factors which had significant effects compared with the appropriation of mobile banking. The commercial banks' performance in Kenya she concluded was significantly influenced by macro-economic factors such as post-election violence, foreign exchange rates and inflation among other full scale monetary factors, henceforth no critical financial development.

Statements	SA	A	N	D	SD	M	S.Dev
The inefficiency of the bank systems increase mobile loan risk profile	36.70%	28.60%	20.40%	14.30%	0.00%	2.12	1.07
The inadequacy of mobile banking skills increases the loan risk profile.	30.60%	30.60%	18.40%	20.40%	0.00%	2.29	1.12
The security of the mobile loans is likely to be comprised, therefore, making it more risky.	36.70%	18.40%	18.40%	22.40%	4.10%	2.39	1.30
The use of mobile loan platforms increases the non-performing loan portfolio	30.60%	38.80%	10.20%	18.40%	2.00%	2.22	1.14
The use of mobile loans contributes to increase in bad debts which place the bank's profitability at risk.	28.60%	32.70%	22.40%	16.30%	0.00%	2.27	1.06
Average						2.26	1.14

Table 14: Mobile loans risk profile

4.4.5. Performance of Commercial Banks

The respondents were asked to indicate whether mobile based loan management practices influence the performance of commercial banks in Kenya. Results in Table 15 reveal that majority of 84% of the respondents indicated yes while 16% indicated no. This implies that majority of the respondents felt that mobile based loan management practices play a significant role in the performance of commercial banks.

Response	Frequency	Percent
No	8	16.3
Yes	41	83.7
Total	**49**	**100**

Table 15: Influence of mobile based loan management practices on performance

The respondents were asked to give their responses to the questions on performance of commercial banks. The responses were rated on a five likert scale as follows: **SA** is strongly agree, **A** is agree, **N** is not sure, **D** is disagree and **SD** is strongly disagree. Results are presented in Table 16.

Majority of 69% (46.9%+22.4%) of the respondents agreed with the statement that the advancement of mobile based loans to customers has led to increased profitability of the commercial banks, 63% agreed that the use of credit scoring systems has increased the revenue generated from mobile loans by the commercial banks, 57% agreed that the presence of well-defined repayment mobile loan periods has boosted commercial banks income, since there are minimum cases of default, 55% agreed that the commercial banks have put measures in place to ensure that there are minimum default patterns while 61% of the respondents agreed that 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.

Using the likert scale, the mean average of the responses was 2.24 which means that majority of the respondents were agreeing with most of the statements on financial performance; additionally, the responses were varied as shown by a standard deviation of 1.10. The results herein imply that mobile based loans management practices influence the performance of commercial banks in Kenya.

The findings of this study support those of Caroline Njiru (2014) who investigated the impact of internet and mobile banking on profitability of commercial banks in Kenya. The study revealed that there has been colossal increment in the mobile banking income and internet banking revenue in commercial banks in Kenya. This expansion in mobile banking and internet banking earnings might be because of increased innovation and increased use of mobile phones among clients This implies a unit increment in mobile banking income and internet banking earnings prompts a unit increment in income of the commercial banks which prompts increased profits.

Further, the study findings mirror those of Mabwai (2016) who examined the impacts of mobile banking on the financial performance of commercial banks in Kenya and inferred that as a bank builds its mobile banking scope, this results to an increased number of transactions through their mobile banking platforms and along these lines an enhanced financial performance.

Statements	SA	A	N	D	SD	M	S.Dev
The advancement of mobile based loans to customers has led to increased profitability of the commercial banks	46.90%	22.40%	16.30%	14.30%	0.00%	1.98	1.11
The use of credit scoring systems has increased the revenue generated from mobile loans by the commercial banks.	30.60%	32.70%	18.40%	18.40%	0.00%	2.24	1.09
The presence of well-defined repayment mobile loan periods has boosted commercial banks income, since there are minimum cases of default.	30.60%	26.50%	26.50%	16.30%	0.00%	2.29	1.08
The commercial banks have put measures in place to ensure that there are minimum default patterns.	20.40%	34.70%	18.40%	26.50%	0.00%	2.51	1.10
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.	34.70%	26.50%	22.40%	16.30%	0.00%	2.20	1.10
Average						**2.24**	**1.10**

Table 16: Performance of Commercial banks

4.5. Inferential Statistics

4.5.1. Correlation Analysis

The Table 17 below presents the results of the correlation analysis. The results show that credit scoring and financial performance of commercial banks are positively and significant associated (r=0.764, p=0.000). The table further indicates that repayment period and financial performance of commercial banks are positively and significant associated (r=0.642, p=0.000). Additionally, results showed that mobile loans default patterns were negatively and significantly associated to the financial performance of commercial banks (r=-0.800, p=0.000). Further, results showed that mobile loans risk profile were negatively and significantly associated to the financial performance of commercial banks (r=-0.733, p=0.000).

		Financial Performance	Credit Scoring	Repayment Period	Default Patterns	Risk Profile
Financial Performance	Pearson Correlation	1.000				
	Sig. (2-tailed)					
Credit Scoring	Pearson Correlation	0.764**	1.000			
	Sig. (2-tailed)	0.000				
Repayment Period	Pearson Correlation	0.642**	0.857**	1.000		
	Sig. (2-tailed)	0.000	0.000			
Default Patterns	Pearson Correlation	-0.800**	-0.708**	-0.654**	1.0000	
	Sig. (2-tailed)	0.000	0.000	0.000		
Risk Profile	Pearson Correlation	-0.733**	-.719**	-0.816**	0.579**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
** Correlation is significant at the 0.01 level (2-tailed).						

Table 17: Correlation Matrix

4.5.2. Regression Analysis

The results presented in Table 18 present the fitness of model used of the regression model in explaining the study phenomena. Credit scoring, repayment period, default patterns and risk profile were found to be satisfactory variables in explaining financial performance of commercial banks. This is supported by coefficient of determination also known as the R square of 81.7%. This means that credit scoring, repayment period, default patterns and risk profile explain 81.7% of the variations in the dependent variable which is financial performance of commercial banks. This results further means that the model applied to link the relationship of the variables was satisfactory.

Indicator	Coefficient
R	0.904
R Square	0.817

Table 18: Model Fitness

Table 19 provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant. Further, the results imply that the independent variables are good predictors of financial performance of commercial banks. This was supported by an F statistic of 49.099 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level.

Indicator	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.690	4	2.423	49.099	0.000
Residual	2.171	44	0.049		
Total	11.861	48			

Table 19: Analysis of Variance

Regression of coefficients results in Table 20 shows that there is a positive and significant relationship between mobile based loans credit scoring, mobile based loan repayment period and financial performance of commercial banks as supported by beta coefficients of 0.696 and 0.507respectively. These results show that an increase in one unit of mobile based loans credit scoring and mobile based loan repayment period would result to an increase in financial performance of commercial banks in Kenya.

Further, results show that there is a negative and significant relationship between mobile based default patterns; mobile based loans risk profile and financial performance of commercial banks as supported by beta coefficients of -0.642 and -0.502 respectively. These results show that an increase in one unit of mobile based default patterns and mobile based loans risk profile would result to a decrease in financial performance of commercial banks in Kenya.

Variable	B	Std. Error	T	Sig.
(Constant)	5.259	0.7	7.518	0.000
Mobile based loans credit Scoring	0.696	0.193	3.605	0.001
Mobile based loan repayment period	0.507	0.143	3.545	0.001
Mobile based loans default patterns	-0.642	0.119	-5.379	0.000
Mobile based loans risk profile	-0.502	0.106	-4.74	0.000

Table 20: Regression of Coefficients

The multiple linear regression model is as shown below.

$Y = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + e$

Where: -Y=Financial Performance of commercial banks

β_0 = Constant

t= time period

X_1 = Credit score system for bank i at time t

X_2 = Payment period for bank i at time t

X_3 = Default rate pattern for bank i at time t

X4 =Risk profile for bank i at time t

e=Error term of the model.

β_1, β_2 and $\beta_3, \beta_4,$ = Beta coefficients

β_0 = Beta coefficients

Thus, the optimal model for the study is;

Financial Performance of Commercial Banks = 5.259+ 0.696Mobile Based Loans Credit Scoring + 0.507Mobile Based Loans Repayment Period-0.642Mobile Based Loans Default Patterns-0.502Mobile Based Loans Risk Profile.

4.6. Summary of the Findings

The regression results revealed that credit scoring has a positive and significant influence on financial performance of commercial banks. The coefficient value of 0.696 units implied that when credit scoring increases by one unit, the financial performance of commercial banks increases by 0.696 units. Further, when repayment period increases by one unit, the financial performance of commercial banks increases by 0.507 units. In addition, when default patterns increase by one unit, the financial performance of commercial banks decreases by 0.642 units. Finally, when risk profile increases by one unit, the financial performance of commercial banks decreases by 0.502 units.

The overall regression results imply that credit scoring best explains financial performance of commercial banks in Kenya, followed by default patterns, then repayment period while risk profile least explains the financial performance of commercial banks.

5. Summary of Findings, Conclusions and Recommendations

5.1. Introduction

This chapter deals with the summary of the findings, the conclusion and recommendations. This was done in line with the objectives of the study. Areas of further research were suggested and limitations of the study were taken into account.

5.2. Summary of Findings

This section summarizes the findings that were obtained in chapter four.

5.2.1. Mobile Based Loans Credit Scoring

The first objective of the study was to establish the effect of mobile based loans credit scoring system on the financial performance of commercial banks in Kenya. Majority of the respondents noted that there is sufficiency of information gathered for credit scoring, there is accuracy and completeness of data collected for credit scoring and accuracy and adequacy of credit scoring information affects the mobile loan performance. Further, results revealed that incorporation of other related personal and business/ or work information can greatly influence the adequacy of credit scoring, the credit scoring information currently being used is enough for use in mobile loans, credit scoring has assisted in risk management on mobile loans and there is timely update of data used for scoring to reflect any changes.

The correlation results revealed that mobile based loan credit scoring had a positive and significant association with the financial performance of commercial banks in Kenya. This was supported by a correlation coefficient (r) of 0.764 and a p value of 0.000. The correlation value of 0.764 indicates that the association between mobile based loan credit scoring and financial performance is strong and positive while the p value (0.000) indicates that the association is statistically significant.

Further, the regression analysis results revealed that mobile based loan credit scoring have a positive and significant relationship with the financial performance of commercial banks in Kenya. This was supported by a beta coefficient of 0.696and a p value of 0.000. This means that an increase in credit scoring by 1 unit would result to an increase in the financial performance of commercial banks by 0.696 units.

These findings are consistent with those of Liran, Jenkins and Levin (2013) who studied the impact of scoring on consumer lending. They concluded that organizations using credit scoring system to price their loans reduced significantly the risk of loss. There was a very strong effect of scoring on profitability

5.2.2. Mobile Based Loans Repayment Period

The second objective of the study was toestablish the mobile based loans average repayment period and its effect on the financial performance of commercial banks in Kenya. Majority of the respondents disagreed that mobile loan clients always pay on time, mobile loan customers pay before time and mobile loans have lesser risk of not being paid on time than other loans. Further, the respondents noted that mobile loan customers delay to repay by less than 30 days, but not more than 90 days.

The correlation results revealed that mobile based loan repayment period had a positive and significant association with the financial performance of commercial banks in Kenya. This was supported by a correlation coefficient (r) of 0.642 and a p value of 0.000. The correlation value of 0.642 indicates that the association between mobile based loan repayment period and financial performance is strong and positive while the p value (0.000) indicates that the association is statistically significant.

Further, the regression analysis results revealed that mobile based loan repayment period have a positive and significant relationship with the financial performance of commercial banks in Kenya. This was supported by a beta coefficient of 0.507and a p value of 0.000. This means that an increase in mobile loan repayment period by 1 unit would result to an increase in the financial performance of commercial banks by 0.507 units.

These findings agree with those of Ndegwa (2014) who did a study on the effect of mobile money on non-performing loans of commercial banks in Kenya. The study concluded that Mobile money transaction negatively impacts on non-performing loans.

5.2.3. Mobile Based Loans Default Patterns

The third objective of the study was to analyse the effect of mobile loans default patterns on the financial performance of commercial banks Kenya. The respondents noted that there are rare cases of complete non-payment of the mobile loans, the probability of default is higher for mobile loans compared to other loans, mobile loan borrowers usually make the payment before the intervention measures and there is always a tendency of mobile loan borrows to default in their payment. However, the respondents disagreed that mobile loan repayment is always made after intervention measures.

The correlation results revealed that mobile based loan default patterns had a negative and significant association with the financial performance of commercial banks in Kenya. This was supported by a correlation coefficient (r) of -0.800 and a p value of 0.000. The correlation value of -0.800 indicates that the association between mobile based loan default patterns and financial performance is strong and negative while the p value (0.000) indicates that the association is statistically significant.

Further, the regression analysis results revealed that mobile based loan default patterns have a negative and significant relationship with the financial performance of commercial banks in Kenya. This was supported by a beta coefficient of -0.642and a p value of 0.000. This means that an increase in mobile loan default pattern by 1 unit would result to a decrease in the financial performance of commercial banks by 0.642 units.

These findings concur with those of Henrietta (2011) who investigated the causes of non-repayment of credit facilities in Ghana. The study concluded that the reason most clients are not able to repay in time, is due to macroeconomic and bank related factors such as high inflation, exchange and interest rate, time taken to do disbursement after application, time of repayments being too short and the credit being inadequate to generate enough business. He found out that SMEs, who mostly form the bulk of borrowers, have limited time within which they have to repay the credit, and because this time frame is too short sometimes the investment has not started yielding results thereby making the SMEs to default.

5.2.4. Mobile Based Loans Risk Profile

The fourth objective of the study was to examine the effect of mobile based loans risk profile on the financial performance of commercial bank in Kenya. The respondents agreed that the inefficiency of the bank systems increase mobile loans risk profile, inadequacy of mobile banking skills increases the loans risk profile, security of the mobile loans is likely to be comprised, therefore, making it more risk, use of mobile loan platforms increases the non-performing loan portfolio and use of mobile loans contributes to increase in bad debts which place the bank's profitability at risk

The correlation results revealed that mobile based loan risk profile had a negative and significant association with the financial performance of commercial banks in Kenya. This was supported by a correlation coefficient (r) of -0.733 and a p value of 0.000. The correlation value of -0.733 indicates that the association between mobile based loan risk profile and financial performance is strong and negative while the p value (0.000) indicates that the association is statistically significant.

Further, the regression analysis results revealed that mobile based loan risk profilehad a negative and significant relationship with the financial performance of commercial banks in Kenya. This was supported by a beta coefficient of -0.502and a p value of 0.000. This means that an increase in mobile loan risk profile by 1 unit would result to a decrease in the financial performance of commercial banks by 0.502 units.

These findings are consistent with those of Ngango (2015) who studied the effect of Electronic Banking on performance of commercial banks in Rwanda. The research concluded that due to some inefficiency in the use of the system, there was bound to be failures; network failures, inadequate skills and Security based issues.

5.3. Conclusion

From the study findings, the study concluded that mobile based loan management practices influence the financial performance of commercial banks. In particular, the study concluded that credit scoring and repayment period had a significantly positive influence on financial performance of commercial banks. 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.

5.4. Recommendations

The study recommended that commercial banks in Kenya should invest more in development of credit scoring systems. The new systems should incorporate more customer data including personal and business details. This will significantly reduce cases of mobile loan default and risks, which will translate to increase in financial performance of commercial banks in Kenya.

Further, the study recommends that commercial banks should consider adjusting the mobile based loans average repayment period. If customers are given adequate time to repay the loans, then, they are not likely to default. However, the repayment period should be reasonable to ensure that banks don't suffer liquidity problems. The ability of the commercial banks to recover a large percentage of the mobile loans will result to better financial performance.

In addition, the study recommended that commercial banks should formulate strategies on how to minimize incidences of default. For example, the banks should use credit scoring systems to determine the credit worthiness of potential

borrowers. Further, the banks should ease the mobile loan transaction processes. Reduced default patterns will result to increase financial performance of commercial banks in Kenya.

Finally, the study recommended the need for commercial banks to upgrade and constantly monitor their mobile based loans security systems. Also, the banks should source for skilled personnel to handle the mobile systems. This move will significantly reduce the risks associated with mobile based systems.

5.5. Areas of Further Studies

The study recommends that a study focusing on other digital and modern technological products and offerings that influence the financial performance of commercial banks so as to allow for a whole some outlook of the influence of these modern technologies to the financial sector. This would imply that apart from adoption of mobile based loan management practices they would consider other factors and thus ensure improved financial performance. The study also recommends that a similar study should be conducted focusing on other financial institutions such as micro-finance institutions and insurance companies in a bid to establish whether mobile based loan management practices influence their financial performance.

6. Acknowledgement

7. Operational Definition of Terms

- Mobile Banking-This is a service which is given by a bank or other money related establishment, and enables its clients to conduct monetary exchanges remotely utilizing a mobile device, for example, a cell phone or tablet. Exchanges done through mobile banking can incorporate getting account adjusts, arrangements for exchanges, electronic bill installments, money exchange amongst client's and acquiring credits which is also referred to as mobile based loans.
- Management Practices – This involves application, appraisal, disbursement and repayment of loans through the use of a mobile phone application.
- Loans – Involves the act of giving money, property or other material items to another individual, organization or entity with end-result of future repayment of the whole including a premium and related costs. A credit facility may be for a specific, one time whole or can be available as an open-completed credit expansion up to a foreordained limit or a rooftop entirety. Advances can be secured or unsecured.
- Interest income- interest income alludes to income earned for loaning cash. It is processed   by   increasing   the   chief sum by the loan fee for the period the cash is to be loaned. Interest income incorporates interest on short term loans, punishment intrigue, and commissions for advance course of action and different commissions computed on a period premise or by reference to the sum given.
- Mobile Phone- is a communication cell phone that can make and receive calls over a radio recurrence interface while the client is moving inside a telephone utility range. In numerous nations, cell phones are also utilized to give portable mobile money wallet functions, which may incorporate the capacity to exchange money installments by secure instant message, and furthermore offer business and buyer advances.
- Credit Scoring- A credit score assessment is a factual number that portrays an individual's financial soundness. Banks utilize a credit score assessment to assess the likelihood that a person reimburses his obligations. Organizations create a credit score rating for every individual with an identity number or social security number utilizing information from the individual's past record of loan repayment and other measures.
- Financial Performance-is the measure of a company's performance in monetary terms. Some of the measurement parameters for financial performance include return on assets, income, return on equity and profit margin.

8. Abbreviations and Acronyms

- BNP: Banque Nationale de Paris (National Bank of Paris)
- FICO: Fair Isaac Corporation's credit scoring type of a system
- GDP: Gross Domestic Product
- GSMA: Global System Mobile Association
- HSB: Hongkong and Shanghai Banking Corporation
- IMF: International Monetary Fund
- M-banking: Mobile Banking
- MFI: Micro Finance Institution
- MNOs: Mobile Network Operators
- MPT: Modern Portfolio Theory
- MTN: Mobile Telephone Operator
- NPLs: Non-Performing Loans
- PAR: Portfolio at Risk

> ➤ SMS: Short Messaging Service
> ➤ US: United States of America

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APPENDIX I: SPECIMEN LETTER TO RESPONDENTS

Dear Sir/ Madam,

REF: INTRODUCTORY LETTER

I am a student at Kenyatta University, pursuing a MBA degree. I am doing a research on Mobile Based Loan Management practices and Financial Performance of Commercial banks in Kenya.

I request you kindly answer the questionnaire as truthfully and comprehensively as possible. The information gathered will be used for academics purposes only.

Your response will be highly appreciated.

Thank you.

Yours Faithfully,
Joseph Ngugi

APPENDIX II: QUESTIONNAIRE

Section A – General Information

Please tick one of the following below:
1. What is your gender?   Male ☐   Female ☐
2. Kindly indicate the tier in which your bank belongs
   a)Tier 1   ☐
   b) Tier 2   ☐
   c) Tier 3   ☐
3. Kindly indicate the job description category under which you fall.
a) Credit Manager   ☐
b) Credit Admin   ☐
c) Credit Officer   ☐
d) Other Role (Explain role) ....
4. How long have you worked in this department?
   (i)   0-5 years   ☐
   (ii)   6-10 years   ☐
   (iii)   Over 10 years ☐
5. Have you ever interacted with mobile loans management practices?
                                    Yes ☐   No   ☐
6. At what level have you interacted with the mobile loans management?
   a) Scoring and Issuance   ☐
   b) Follow-up   ☐
   c) Performance monitoring   ☐
   d) All the above   ☐
   e) None of the above   ☐

Section B: Credit Scoring System Use in Mobile Loans Management

7. a) Does the bank use credit scoring for all mobile loans management?
Yes ☐   No ☐   Don't know   ☐
b) Explain the type of system used (Name and description) ....
c) What type of data is incorporated in the score?
i) Financial   ☐
ii) Personal   ☐
iii) Business   ☐
iv) Others Specify

....

d) Please indicate your response to the questions below where **SA** is strongly agree, **A** is agree, **U** is undecided, **D** is disagree and **SD** is strongly disagree.

	Effectiveness of Credit Scoring system	SA	A	U	D	SD
1	There is sufficiency of information gathered for credit scoring					
2.	There is accuracy and completeness of data collected for credit scoring					
3.	Accuracy and adequacy of credit scoring information affects the mobile loan performance					
4.	Incorporation of other related personal and business/ or work information can greatly influence the adequacy of credit scoring					
5.	The credit scoring information currently being used is enough for use in mobile loans					
6.	Credit scoring has assisted in risk management on mobile loans					
7	There is timely update of data used for scoring to reflect any changes					

e) Comment on mobile loans and how they affect credit ratings of clients, and any improvement necessary in credit scoring for mobile loans

....

Section C: Average Payment Period of Mobile Based Loans

8. a) what is the repayment period given for mobile loans?
    i)   1 month   ☐
    ii) 2- 12 Months
                        ☐
    iii) Over 1 year
                        ☐

b) From the period given, do customers repay within time
    i) Yes ☐   ii) No ☐   iii) Some (specify average) ....

c) To what extent do you agree with the following statements? **SA** is strongly agree, **A** is   agree, **N** is not sure, **DA** is disagree and **SDA** is strongly disagree.

Statement	SA	A	N	DA	SDA
Mobile loan clients always pay on time					
Mobile loan customers pay before time					
Mobile loan customers delay to repay by less than 30 days					
Mobile loan customers delay to repay by more than 30 days but not more than 90 days					
Mobile loans are have lesser risk of not being paid on time than other loans					

d) Comment on the overall time taken to repay Mobile loans as compared to other types of loans

....

e) Comment on lateness in paying of mobile loans and the factors contributing to this

....

Section D: Default Pattern of Mobile Loans

9. a)Please rate the extent of mobile loan default in your bank.
    i) High   ☐
    ii) Moderate ☐
    iii). Low   ☐

b) To what extent do you agree with the following statements? **SA** is strongly agree, **A** is   agree, **N** is not sure, **DA** is disagree and **SDA** is strongly disagree.

Statement	SA	A	N	DA	SDA
There are rare cases of complete non-payment of the mobile loans.					
The probability of default is higher for mobile loans compared to other loans.					
Mobile loan repayment is always made after intervention measures.					
Mobile loan borrowers usually make the payment before the intervention measures.					
There is always a tendency of mobile loan borrows to default in their payment.					

c) Comment on some of the intervention measures employed to manage cases of default

....

....

Section E: Mobile Loans Risk profile

10. a). How would you rate the mobile loans risk profile?

i) High

ii) Moderate

iii). Low

b. To what extent do you agree with the following statements? **SA** is strongly agree, **A** is   agree, **N** is not sure, **DA** is disagree and **SDA** is strongly disagree.

Statement	SA	A	N	DA	SDA
The inefficiency of the bank systems increase mobile loan risk profile					
The inadequacy of mobile banking skills increases the loan risk profile.					
The security of the mobile loans is likely to be comprised, therefore, making it more risky.					
The use of mobile loan platforms increases the non-performing loan portfolio					
The use of mobile loans contributes to increase in bad debts which place the bank's profitability at risk.					

c). Comment on causes for non-performing loan and their likelihood of being recovered...

Section F: Financial Performance

11. a). Do mobile based loan management practices influence the performance of commercial banks in Kenya?

i. Yes   ii. No

b). To what extent do you agree with the following statements? **SA** is strongly agree, **A** is   agree, **N** is not sure, **DA** is disagree and **SDA** is strongly disagree.

Statement	SA	A	N	DA	SDA
The advancement of mobile banking loans to customers has led to increased profitability of the commercial banks					
The use of credit scoring systems has increased the revenue generated from mobile loans by the commercial banks.					
The presence of well-defined repayment mobile loan periods has boosted commercial banks income, since there are minimum cases of default.					
The commercial banks have put measures in place to ensure that there are minimum default patterns.					
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.					

b) Comment on contribution of mobile loans to growth of income ....

....

Thank you

APPENDIX III: COMMERCIAL BANKS IN KENYA

Tier 1:

1. Co-operative Bank of Kenya
2. Kenya Commercial Bank(KCB)
3. Equity Bank
4. Barclays Bank
5. Commercial Bank of Africa(CBA)
6. Standard Chartered Bank

Tier 2:

1. I&M Bank
2. NIC Bank
3. Diamond Trust Bank
4. Bank of Africa
5. Housing Finance
6. Ecobank
7. Prime Bank
8. Bank of Baroda
9. CFC Stanbic Bank
10. Citibank
11. Guaranty Trust Bank
12. National Bank
13. Bank of India
14. Family Bank

Tier 3:

1. Jamii Bora Bank
2. ABC Bank
3. Credit Bank
4. Paramount Universal
5. Consolidated and Development Bank
6. Fidelity Bank
7. Equatorial Commercial Bank
8. Giro Bank
9. Guardian Bank
10. Middle East Bank
11. Oriental Commercial Bank
12. Paramount Universal Bank
13. Trans-National Bank
14. Victoria Bank
15. First Community Bank
16. Habib A.G Zurich Bank
17. Habib Bank
18. Gulf Africa
19. Sidian Bank
20. UBA Bank
21. Consolidated Bank
22. Development Bank
23. United Bank for Africa