

**ANTECEDENTS OF TECHNOLOGY ADOPTION AND FINANCIAL INCLUSION
AMONG MICRO ENTERPRISES IN MACHAKOS COUNTY, KENYA**

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**A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND ECONOMICS IN
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PHILOSOPHY DEGREE IN BUSINESS ADMINISTRATION (FINANCE) OF THE
KENYA METHODIST UNIVERSITY**

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DECLARATION

I hereby declare that this Thesis is my original work and it has not been submitted to any other University for academic credit.

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DEDICATION

This thesis is dedicated to my father Willy Mwanja Kavita, My dear wife Damaris Mueni, my children Faith, Felix, Festus and Faustin who are very special to me and have been a great inspiration throughout my academic work.

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LIST OF ACRONYMS

ATB	-	Attitude toward performing the Behavior
BI	-	Behavioral Intention
CBK	-	Central Bank of Kenya
CCK	-	Communication Commission of Kenya
DIT	-	Diffusion Innovations Theory
FI	-	Financial Inclusion
FSTI	-	Financial Services Technology Innovation
IB	-	Internet Banking
ICT	-	Information and Communication Technology
IS	-	Information Systems
MB	-	Mobile Banking
PU	-	Perceived Usefulness
SME	-	Small and Micro enterprises
TAM	-	Technological Acceptance Model
TRA	-	Theory of Reasoned Action
MEs	-	Micro Enterprises

OPERATIONAL DEFINITION OF TERMS

Antecedent Variable- It refers to any variable that explains (or partially explains) a relationship between two variables (X and Y) by its prior impact on the two variables.

Collateral - Collateral refers to security or guarantee for the loan borrowed such as title deed, log book etc.

Convenience – Access and usage of a broad range of affordable, quality financial services and products in an appropriate but simple and dignified manner with the requisite consideration to client protection while using a service.

Financial inclusion- refers to the measure of the number of the financially unreached individual accessing financial products and services

Financial Services Technology Adoption – This is the use of both Mobile and Internet technology to deliver financial services

Internet banking - Refers to the execution of financial transactions such funds as transfer, withdrawals as well as savings via internet and computer networks.

Mobile banking - Refers to the transfer of money using mobile devices such as mobile phones, tablets and laptop computers.

Perceived value - Perceived value of mobile banking service in this study mean the customers' overall perception of its benefits and sacrifices needed to use it. Zeithaml's (1988), definition of perceived value is "the overall assessment on the product or service utility determines by customer's perceptions of what is received and what is given.

Transaction Cost – These are costs associated with information asymmetry and market frictions and they play a central role in influencing key decisions regarding human and physical capital accumulation and occupational choices.

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ABSTRACT

The increased levels of mobile and internet banking has enabled the Micro Enterprises (MEs) to save, undertake transactions and access low cost credit without necessarily having security for their loans. Many micro-enterprises are not included in the mainstream financial system and hence they cannot access credit. However, with the increased level of antecedents of technology adoption (mobile and internet banking), the micro enterprises have not fully adopted this new innovation to increase their levels of financial inclusion. The aim of the study was to examine the antecedents of technology adoption (mobile and internet banking) on financial inclusion among the micro enterprises in Machakos County. The study adopted a descriptive research design since it seeks to build a profile about the relationship between antecedents of technology adoption (mobile and internet banking) to financial inclusion in Kenya. The study was targeting micro enterprises operating in Kenya with a special focus to Machakos County. Purposive sampling technique was used to select the sample for the study. Questionnaire was used for data collection as it was cost effective as opposed to other instruments. Pilot testing involved 60 businesses which were not included in the final sample. To enhance validity in this study, content related validity of the questionnaire was used. On the other hand, reliability was assessed using the test-retest method and was done alongside the pilot study. The researcher selected a pilot group comprising 10% of the sample. The research instruments were tested for reliability using the split half method. This was done by collecting data from 60 respondents. Data was verified and edited for completeness and consistency. Content analysis and descriptive analysis was employed. Regression analysis was applied to establish the relationship between the variables. Regression results showed that convenience and financial inclusion are positively and significantly related ($\beta=0.201$, $p<0.001$). Transaction cost and financial inclusion were also found to positively and significantly related ($\beta=-0.091$, $p<0.002$). Perceived value and financial inclusion are positively and significantly related ($\beta=0.233$, $p<0.001$). Collateral and financial inclusion are positively and significantly related ($\beta =0.154$, $p<0.002$) while technology adoption and financial inclusion are positively and significantly related ($\beta=0.573$, $p<0.001$). The study further found that financial services technology innovation moderates the relationship between transaction cost, perceived value and convenience and financial inclusion of micro enterprises. The study concludes that collateral, transaction cost, convenience, perceived value and technology adoption have a positive and significant relationship with financial inclusion of micro enterprises. It was further established that mobile and internet banking have improved the access to financial services by micro-enterprises. This is seen through improved business growth among the enterprises as they can access low cost credit for business growth. The low cost of credit for the micro-enterprises has improved the level of financial inclusion. It's recommended that owners of micro enterprises should use mobile banking since it makes it easier for them to carry out their businesses operations. According to the study, use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations. The study recommends that owners of micro enterprises should adopt use of internet banking since it does not require a lot of technical knowledge for it is simple to use hence convenient for business owners. The owners of micro-enterprises should use mobile and internet banking to accomplish their banking tasks anytime and anywhere since it is efficient for them.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In order to realize development goals such as the global SDGs and the national development goals as exposed in the Kenya's vision 2030, there is need to formulate and implement appropriate strategies and plans across all sectors of the economy. The financial sector plays an important role in national development because it supports all the other sectors by providing required credit necessary for addressing the developmental agenda which is predominantly poverty reduction through wealth creation (Griffith-Jones, Karwowski, & Dafe, 2014).

Inadequate or lack of access to credit is a big impediment to social economic transformation. This call for in depth examination of what the barriers to financial inclusion of population are and how they can be overcome. Further though entrepreneurship has been cited as a solution to alleviation of poverty there still exist barriers to them realizing full potential (Mugo & Kilonzo, 2017). One of the barriers frequently cited is the inability to access credit or complete lack of credit. Lack of access to credit can imply various issues such as lack of inadequate distribution channels, lack of guarantees, high costs of access and the perceived usefulness of such channels. This notwithstanding, technological advancement in the financial sector can partly address some of the barriers to access of financial services (Alibhai, Bell & Conner, 2017).

The rapid growth in mobile banking and internet banking in Africa has resulted in the achievement of higher financial inclusion and has led to lower cost of financial services to disadvantaged groups in the rural areas. The expansion of mobile and internet banking has

enabled the Micro Enterprises (MEs) to save, undertake transactions and access low cost credit without necessarily having security for their loans. Mobile banking and internet banking provides MEs in developing countries the opportunity to get low cost financial services without necessarily going physically to the bank (Triki & Faye, 2013).

In Kenya most micro enterprises in the rural areas lack access to financial services. The Small and micro enterprises have been excluded from accessing credit, savings, payments, and insurance and even remittance services. For instance according to Murigi (2014), slums has also been affected adversely by the problems related to financial inclusion. MEs in Mukuru slums have been noted to be financing their own operations using informal measures that are not adequate for them to enjoy economies of scale. According to Kamweru(2011), MEs usually do not have the security /collateral for their financing and are unable to catch up with long-term banking processes (Macharia, 2012). Gichuki, Njeru and Tirimba (2014) likewise agree that micro and small enterprises are denied access to credit facilities mainly because of the high repayment costs, stringent collateral requirements, high credit facilities' processing fees and short repayment period. However, with minimal research conducted to determine the impact of financial access on the profitability of tiny and micro enterprises, the impact of this choice continues unknown. The future of financial institutions is to be innovative enough and work towards financial inclusion of the MEs with the main agenda being to check on the rate at which financial services are being delivered to this particular segment of the economy (Mugo & Kilonzo, 2017).

The most recent development in Kenyan financial markets is mobile and internet banking innovation where M-Pesa was launched by Safaricom in 2007, the Vodafone's Kenya affiliate, reaching over 10 million registered customers, or 40 percent of Kenya's adult population, by 2010 (Beck, Maimbo, Faye & Triki, 2015). Registered M-Pesa users can save,

transfer or accept sums of money through their mobile phones and turn their virtual balances into cash at any authorized Safaricom Mpesa agents countrywide. Invention of M-Pesa services didn't serve as a better substitute for the wide range of services offered by commercial banks as witnessed by low level of credit facility for customers. Recent innovations through Mobile and internet banking have begun to close the gap with the opening up of M-Pesa to institutional payments and enabling companies to pay salaries and collect bill payments (Koenig-Lewis, Palmer & Moll, 2010).

There will be need for more innovations to clear the differences in the kind of services offered by mobile and internet banking in Kenya when compared with the existing services offered by formal banks. This study was anchored on three main theories namely, technological acceptance model Davis (1989), theory of reasoned action Ajzen & Fishbein, (1980) and diffusion innovations theory (Rogers, 1995) which shall be discussed in detail in the theoretical literature review.

1.1.1 Antecedents of Financial Services Technology Adoption

What is it that which can inform technology adoption (mobile and internet banking) as a way of increasing financial inclusion? The answer to this question may be in a number of factors that have been seen to constitute to barriers of financial inclusion such as collateral, transaction cost, perceived value and convenience.

Collaterals

Collateral by definition means the security or guarantee for any loan borrowed and acts as an indication enabling a financial institution to weaken or eliminate the adverse selection problem caused by the existence of information asymmetries between the bank and the borrower at the time of the loan decision (Owino & Otieno, 2013). Although bank knows the

credit quality of the customers, the collateral helps to eliminate moral hazard problems once the loan has been granted. The problems of moral hazard faced by the bank in lending could be controlled by having collateral. As stated by Haron, Said, Jayaraman and Ismail (2013) collateral can therefore be seen as an instrument ensuring good behavior on the part of borrowers, given the existence of a credible threat. Hasnah (2012) has found that character/management plays a significant role on the probability of loans approved by credit officers.

Both Formal and informal banking institutions always usually demand a collateral to act as a security on loans which is not the case for accessing credit on the Mobile banking platform (Khole, 2014). This could include and not limited to houses or deed to some immoveable assets. This condition would play a major role in accessing of loans and the situation may be more complicated for some gender like women entrepreneurs, who may not have right of ownership to some property including land and houses. Women's access to finance especially at the micro enterprise level is a major constraint to start and expand businesses (Mira & Kennedy, 2013). According to Papadimitri, Pasiouras and Tasiou (2019), the historical development of mobile and internet banking and the associated culture, of the banking system strengthen the problem of the emphasis on the provision of collateral as a basic condition in lending. Banks have always embraced a risk adverse stance towards small firms, with an accompanying inability to focus on the income generating potential of the investment, when analyzing the likelihood of loan repayment.

Duarte (2011) established that there was a positive relationship between duration and the likelihood of collateral guaranteeing for borrowers with known low credit rating and hence giving support to the hold-up scheme. They also found that if a firm works with multiple banks, it increases the probability of pledging collateral for long term loans while it decreases

the probability of pledging collateral when acquiring short term loans. A higher supply of collateral is expected to increase the supply of bank debt since collateral can ease the informational asymmetries between borrowers and lenders. Increasing the supply of bank debt for a certain firm reduces the probability of creating an excess demand and thus decreases the probability of credit control. Hence, collateral can help solving credit rationing for any specific firm. Karumba and Wafula (2012) consider business collateral as an asset belonging to the borrowing firm, that will be transferred to the lender in the event of default. As such, business collateral does not increase the assets that the borrower would lose in case of default, since the entire borrower's assets are fixed. Personal collateral refers to assets not belonging to the legal entity of the firm but provided by another party or owner of the firm.

Transaction Costs

Transaction costs associated with information asymmetry and market frictions contribute immensely towards influencing key decisions regarding human and physical capital accumulation and occupational choices. The market frictions are important in generating persistent income inequality or poverty traps. As noted by Cingano (2014), in theories stressing capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or physical capital.

In theories stressing entrepreneurship, financial market imperfections determine the extent to which talented but poor individuals can raise external funds to initiate projects. Thus, the evolution of financial development, growth and intergenerational income dynamics are closely related. Finance influences not only the efficiency of resource allocation throughout the economy but also the economic opportunities of individuals from moderately rich or poor households. The use of mobile banking attempts to reduce these market frictions for low

income groups. Information asymmetry is a situation where by the one party has more or better information than the other. Reducing financial market imperfections to expand individual opportunities creates positive but not negative incentive effects. Mobile banking and internet banking is not influenced by these transaction costs (Ajide, 2017).

The reason behind including perceived cost in the framework is because it plays an important role for micro enterprises in determining adoption of ICT in their business. The costs of the service was considered as one of the most vital factors in the decision making process. This is because it determines the ability of the customer to use the service depending on availability of the specified amount and the set budget. Perceived cost is the quantifiable costs of acquiring and use of technology (Koenig-Lewis, Palmer, & Moll, 2010). Referring to Siddik, Sun, Yanjuan and Kabiraj (2014), perceived financial cost is the extent to which a person believes that using mobile banking and internet banking was to cost money. The Micro enterprises were less likely to adopt ICT when its initial set-up cost was high. Siddik et al. (2014) stated that micro enterprises often have difficulty in obtaining financial resources. Any new technology like Information and Communication Technology may be considered too expensive to many micro enterprises because of their lack of financial resources.

Staniewski, Nowacki and Awruk (2016) established that micro enterprises face specific problems in the formulation of their innovation strategies due to their limited resources and range of technological competencies. Mobile and internet banking provide technological services that reduce costs; increase income and increases and the mobility of financial resources. They can help to extend social as well as business networks and they clearly substitute for journeys, brokers, traders and other business intermediaries (Onsomu, 2015). According to Ivatury (2006), mobile banking systems provide good money transfer and payment services to mobile and internet users. There was however the need to ensure that

better marketing and training was involved to help consumers understand what the systems are capable of,, improve policy measures and that the benefits of mobile banking are distributed across all banking and consumer sectors.

Convenience

The Kenya government is aware of the role-played by the mobile and internet innovations as well as the associated technologies in the economic growth and development (Bahrini & Qaffas, 2019). Without leaving out the other stakeholders and development partners, Kenyan government has encouraged the development of communication infrastructure such as communication commission of Kenya (CCK), which is controlling the mobile and internet banking service providers, fixed line service providers, and other stakeholders in provision of the service industry (Research-ICT-Africa, 2004). The government has recognized the need for the growth of micro-enterprises as the foundation blocks of industrial development.. Mobile and internet banking adoption is on the rise and the related technological innovations have drastically enhanced the capabilities of the mobile phones (Bahrini & Qaffas, 2019).

Close to two billion people in the world use mobile phone. As the number of mobile phones, increase there has been a general improvement in the people's lives (International Telecommunication Union [ITU], 2018). Mobile and internet banking adoption and use has a positive and significant influence on economic growth, and this influence may be twice as large in developing economies as in developed economies (ITU, 2018). In Africa, particularly it has been said that, "People in Africa use mobile phones very differently. Most strikingly is the accessibility of mobile as the overall impact of mobile extends well beyond what might be suggested by the number of subscriptions alone" (ITU, 2018). In Kenya there has been an erratic mobile and internet banking subscription by the rural and urban populations. The

number of mobile subscribers in Kenya has risen to 8 million subscribers from 6.5 million subscribers in June 2006, from the country's two operators Safaricom and Airtel against 293,400 fixed lines (CAK, 2018; KNBS, 2017).

Perceived Value

Perceived value of mobile and internet banking service in this study mean the customers' overall discernment of its benefits and sacrifices needed to use it. That is the overall assessment on the product or service utility determines the customer's perceptions of what is received and what is given. In services, it involves the comparison of what one is getting that is benefits and what he has to give up in terms of sacrifices in order to receive the service (Scheepers, 2015).

The benefits include the value desired by the customer while sacrifices include both monetary and non-monetary considerations (Helander & Ulkuniemi, 2011). Sacrifice factors includes what the customers are expected to part with or forego, in exchange for obtaining the service. These may include cost and risk associated with the use of a particular service; in this study, mobile and internet banking services usage. Ease of use is enhanced by the use of some technology and applications that are very easy to operate; such that little technological knowhow is required in using the system. Low effort expectation can be said to be a benefit factor in the adoption of new technology and thus an important factor in explaining the usage of mobile and internet banking. Benefits of e-commerce to micro enterprises will include lower administrative cost, increased internal efficiency, improved relationship with business partners, improved competitiveness, improved quality of information (Rahayu & Day, 2017; Tallud, 2014).

Meroño-Cerdán (2017) ranked perceived benefits as main factors for small firms' Internet adoption. M-banking provides benefits to micro enterprises like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players (UNCTAD, 2001). Therefore; we can conclude that perceived benefits is one of the main factors for e-banking adoption by small firms.

According to a study by Olatunji (2015) it stresses that ICT implementation in the organization which includes micro enterprises has the potential to reduce costs and increase productivity level. According to them micro enterprises might find cost-effectiveness as a motivating factor to use mobile and Internet-commerce for improving communication with trading partners and consumers. Bresnahan and Yin (2017) have given their experts opinion that adoption of information and communication technology includes cheaper and faster communications, better buyer and seller relations, more effective and efficient marketing, product and service development and better access to information and training. Bresnahan and Yin (2017) found a positive impact on ICT usage in business and it was able to improve business performance.

1.1.2 Financial Inclusion

According to Demirgüç-Kunt and Klapper (2013), financial inclusion or broad access to financial services is defined as an absence of price and non-price barriers in the use of financial services. Gardeva and Rhyne (2011) argue that financial services should be accessible to all as this is often seen as the goal of financial inclusion. Financial services provided should also be of quality: quality financial inclusion includes the following traits: affordability, convenience, product-fit, safety, dignity of treatment, and client protection (Demirgüç-Kunt & Klapper, 2013). Financial inclusion involves provision of the full suite of

basic financial services; this refers to group of core financial services that includes basic credit, savings, insurance and payment services (Gardeva & Rhyne, 2011).

Nair (2017) define financial exclusion as to those processes that prevent certain groups and individuals from gaining access to the formal financial system. Ozili (2018) defined financial exclusion as broadly the inability of some societal groups to access the financial system. Financial exclusion is a process that prevents poor and disadvantaged social groups from gaining access to the formal financial systems of their countries (Kimaiyo, 2016). According to Ozili (2018), financial exclusion signifies the lack of access by certain segments of the society to appropriate, low-cost, fair and safe financial products and services from mainstream providers.

Millions of people across the developing world do not have access to banking services. Due to the barriers related to cost, geography and education, these individuals have no way of securely transfer funds, saving money, insurance or accessing credit. The four services serve different needs that the micro enterprises encounters, and ensuring access to this product range is an important objective of financial inclusion. Credit allows consumers to use future income to take care of current liabilities or to capitalize on investment opportunities. Savings provide a safe and secure place where households can store funds and hence discounting their future with some degree of certainty (Tambunlertchai, 2018).

1.1.3 Mobile Banking

Mobile banking refers to the provision of banking services with the help of mobile devices (Njenga, 2017). The spread of information and communication technology has brought about increased innovation in the finance industry. Currently, mobile and internet banking is an integral part of modern finance sector in many countries. In most countries, more than half of

the population already uses mobile and internet banking and the market is still growing (Atman, 2013). Financial service providers offers saving services in a commercially viable way and at the same time, reduce fixed costs and encourage customers to increasing financial inclusion among the micro enterprises.

Mobile and internet banking contributes to financial Inclusion process by providing wide range of markets instruments and enabling access to financial services. Mobile and internet banking as the most common mobile money concept enables users to perform banking transactions such as check of account balance, fund transfers, bill payments through mobile phones. Mobile saving services through M-shwari are an innovative ways of encouraging a culture of saving without requiring minimum account balances and other traditional banking fees (CBK, 2019; Nyaga, 2014).

Mobile and internet credit services have been set up to provide micro loans to Micro Enterprises as an addition to traditional credit and savings groups. Mobile and internet banking is helping mobile operators and the financial industry to work together to deliver affordable financial services that provide safety, security and convenience to micro enterprises. Mobile and internet banking provides an avenue for efficient exchange of goods and services by minimizing transactions time at the point of sale, providing versatility by enabling customers to use a single device for multiple services (Parvez & Chowdhury, 2016).

Transactions are carried out at lower costs and at a much higher accessibility level. Today, mobile and internet subscribers are using mobile and internet banking for transactions and services such as domestic and international remittances, bill payments, payroll deposit, loan receipt and repayment. The flow of money from one party to another using ICT infrastructure connects billions of customers around the world. According to Jack, Suri and Townsend

(2010), mobile and internet banking will enable remittances to increase risk sharing and improve consumption smoothing. Currently, mobile and internet banking will reduce the cost and risk involved in dealing with cash. Mobile airtime also acts as new market instrument where phone companies have allowed individuals to purchase airtime and to send this credit to other users. There is an opportunity for resale of the received airtime by the recipient to a different user for cash, or indeed for goods and services, thus affecting a transfer of purchasing power. Mobile phone companies have seized the opportunity of offering mobile and internet banking services to a population over three (3) billion people in the world who do not have access to financial services (Githii & Mwangi, 2018; Akinwumi, Muturi & Ngumi, 2016).

1.1.4 Internet Banking

Internet banking is defined as an online medium for providing various financial services such as online accessibility of bank account, funds transfer and payment of bills. According to Waiganjo (2018) and Thuku, (2017), internet banking refers to the systems that enable bank clients to get access to their accounts and general information on bank products and services through the use of bank's website, without the intervention or inconvenience of sending letters, faxes, original signatures and telephone confirmations.

The new ICT infrastructure has brought about tremendous growth in the use of e-commerce and hence internet banking has become the main medium of financial, commercial and banking transactions as well as advancement in information and communication technology have become the top concern of any commercial bank. Internet banking has brought total transformation to the banking sector and the entire pattern of doing business for people as well as business organizations (Al-Jabir, 2012).

1.1.5 Mobile Banking and Financial Inclusion in Kenya

The introduction of the mobile and internet banking services have changed the way the financial services industry conducts business, enabling organizations with new business ideas and new ways to offer 24 hour accessibility to their customers. The ability to offer financial transactions over the mobile phone has created new players in the financial services industry, such as mobile phone service providers who offer personalized services. This is evident with the prevalent use of M-pesa, Airtel Money and Orange Money. The real time money transfer over the mobile phones enables individuals in areas with no demand to acquire demand within seconds (CBK, 2019).

Kenya has succeeded in significantly expanding the reach of financial services over the past several years. If mobile money transfer services, savings and credit cooperatives (SACCOs) and micro finance institutions (MFIs) are included, formal financial inclusion increased from 26.4 percent in 2006 to 40.5 percent in 2009 (CBK, 2019). There are several reasons which have contributed to greater level of inclusion; the expanding reach of three major types of financial service providers, the identification of financial inclusion as a national priority (as stated in the Kenya vision 2030 national planning document) and the accessibility brought about by innovative electronic payment systems (CBK, 2019).

All the participants in the banking sector are therefore working hard to ensure they closely partner with the mobile money transfer services not only to maintain the existing customers but also reach the extra customers who would not have been reached if the banks remained complacent (Apiors & Suzuki, 2018). The Safaricom group Ltd, a leading mobile service provider in Kenya in partnership with Commercial Bank of Africa, one of the Kenya registered commercial bank, launched a service called *M-SHWARI* that automatically opens a

bank account for *M-PESA* registered customers and operates fully like a bank account. With such partnership, the society will also gain with more population included in the formal financial sector (Kabbuchok & Coetzee, 2010)

1.2 Statement of the Problem

The Kenya financial sector is still under-developed as compared to other developed economies even with the invention of mobile and internet banking. Financial services including credit, payment of services and savings are currently being offered to Micro enterprises through mobile and internet banking thus increasing financial inclusion. The highest percentage (about 65%) of the Kenyan population resides in the rural areas though only 5% of the rural populations have access to banking facilities. This implies that majority of the micro-enterprises run by the rural population may also be excluded from financial services (CBK, 2019).

In view of the increasing innovations in the financial sector and increase in adoption of mobile and internet banking, it is desirable that these technologies are adopted for purposes of financial inclusion of the rural unbanked population where a number of micro enterprises are setting up. Many of the micro-enterprises operating in rural areas in Kenya remain ‘unbanked’ with majority being excluded in the mainstream financial services due to some factors that have been cited as; inaccessibility, inconvenience and high costs (World Bank, 2015).

In Kenya for instance, internet banking has been ranked as less important than other channels such as mobile banking (World Bank, 2013). The slow adoption of technology in the banking sector has received little attention in the empirical literature. Although mobile and internet banking have been found to contribute to financial inclusion, there is scarce empirical

literature that focuses on the antecedents of financial services technology adoption and their influence on financial inclusion among micro-enterprises. Specifically, it is not clear how the need for collateral, perceived value, transaction cost and convenience influence financial inclusion. There is also very little empirical clarity on how mobile banking and internet banking influence financial inclusion in the Kenyan context and more specifically in Machakos County which is one of the largest rural counties in Kenya. For instance, Akinwumi et al. (2016) looked into the financial incentives and financial innovation adoption in Nigeria. Given the focus on Nigerian banks, the applicability of the findings would offer little value to Kenyan MEs and thus the study presented a contextual gap. Waiganjo (2018) sought to establish the effect of mobile banking investment on financial profitability of banking institutions. The study thus failed to address the problem of financial inclusion in the case of MEs. In addition, Thuku, (2017) analysed the factors affecting access to credit by small and medium enterprises in Kenya. The focus was on Agriculture Sector in Nyeri County with a narrowed scope into the access to financial services. Thus the study did not look at the case with other antecedents such as perceived value, transaction cost as it is in the current study, thereby presenting a conceptual and contextual gap. Consistent with the identified knowledge gaps, the study sought to answer four broad research questions, namely;

RQ₁: What is the relationship between antecedents of financial services technology adoption and financial inclusion?

RQ₂: Are Collaterals, transaction costs, Convenience and perceived value significant antecedents of financial services technology adoption

RQ₃: Does mobile banking and internet banking significantly influence financial inclusion

RQ4: Do antecedents of financial services technology adoption significantly moderate the relationship between financial services technology adoption and financial inclusion

1.3 General Objective

The general objective was to determine the antecedents of financial services technology (mobile and internet banking) adoption and their influence on

Financial inclusion in Kenya.

1.3.1 Specific Objectives

- i. To determine the effect of antecedents of financial services technology adoption on financial inclusion
- ii. To establish the influence of convenience of financial services technology adoption.
- iii. To examine the influence of transaction costs on financial services technology adoption.
- iv. To determine how the perceived value have influence on financial services technology adoption
- v. To establish the influence of collateral requirement on financial services technology adoption.
- vi. To determine the effect of financial services technology adoption will affect financial inclusion.
- vii. To examine the moderating effect of the antecedents of financial services technology adoption on the relationship between financial services technology adoption and financial inclusion

1.3.2 Research Hypothesis

H₁: Antecedents of FSTA have significant influence on financial inclusion

H_{1a}: Convenience has influence on financial inclusion

H_{1b}: Transaction costs have influence on financial inclusion

H_{1c}: Perceived value have influence on financial inclusion

H_{1d}: Collaterals have significant influence on financial inclusion

H_{1a}' : Convenience has influence on FSTA

H_{1b}' : Transaction cost has influence on FSTA

H_{1c}' : Perceived value has influence on FSTA

H_{1d}' : Collaterals have influence on FSTI

H₂: Financial services technology adoption has significant influence on financial inclusion

H_{2a}: Mobile banking has influence on financial inclusion

H_{2b}: Internet banking has influence on financial inclusion

H₃: Antecedents of FSTA have significant moderating effect on the relationship between FSTA and FI.

1.4 Justification of the Study

The adoption of mobile and internet banking to provide financial services in Kenya has become instrumental in integrating those micro enterprises that are unbanked as well as low

income population to the mainstream financial systems. Access to mobile and internet financial services does not only boost the likelihood of the micro enterprises to save, it also has a significant impact on the growth of the enterprises, perhaps due to the convenience and frequency with which financial transactions can be undertaken using a mobile phone.

Mobile and internet banking phenomenon emerged in less than 10 years and its gaining momentum at a scorching pace and needs to be studied so as to be understood by the academic community. The players in the mobile and internet banking are increasing and this sector is getting even more complicated especially with the current financial services technology innovations. There is therefore a need to conduct research in the sector in order to provide a record in terms of growth prospects of financial services technology innovation and its contribution to financial inclusion in the Kenyan context.

This study aimed at examining the antecedents of financial services technology innovation (mobile banking and internet banking) and their influence to financial inclusion in Kenya. This study enabled the researcher to establish if the availability and usage of mobile phones to provide financial services have improved the level of financial inclusion among the micro-enterprises in Kenya. Thus, growing and deepening the scope for mobile phone financial services is an avenue for promoting savings mobilization, especially among the micro-enterprises with constrained access to formal financial services.

1.5 Significance of the Study

This study was of great value to policy makers such as the communication Authority, Central Bank of Kenya and treasury as they would be able to know how well to incorporate the mobile banking services to enhance growth and effectively ensure its full capacity through improved efficiency. The findings of the study would further guide the policy makers in

formulating and implementing policies that will streamline mobile banking services and financial inclusion of the micro-enterprises.

In relation to perceived value, the micro enterprises will be able to obtain an overall quantification of the value perceived by the customer of the purchase made. Customer satisfaction has been found to the operations of a business entity and thus the micro enterprises will find the findings of this study adding value to their knowledge about the perceived value.

Furthermore, the micro-finance institutions are strongly advised by the liquidity preference theory to assess the best alternatives and strategies used in pricing of their loans in order to not scare away the small scale entrepreneurs. This is as a result of the study finding considerable literature that establishes an existing problem that the micro enterprises face with regard to the success to financial services for instance high interest prices on loans, or high collaterals. If the financial conditions are favorable to the micro enterprises then this means that the MEs will be willing to borrow, and able to pay for the financial services.

The government in general will utilize the results of the study to promote financial access in order to realize vision 2030 and even the Big Four Agenda being campaigned for by the government of Kenya. In order to be newly industrialized by 2030 a country needs to deal with the hindrance of growth, this study focused on helping policy makers to formulate policies to promote financial access to the unbanked and under banked low income earners.

To researchers and academicians, the study added value to the body of knowledge in the area of mobile banks and internet banking as well as establishing how it affected financial

inclusion among the micro-enterprises in Kenya. The study also aimed at forming a basis for further research in the same field.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the theoretical background of the study, the empirical review and the conceptual framework. It also presents a summary of the literature.

2.2 Theoretical Background

This study is anchored on three theories which include Technological Acceptance Model (TAM), Theory of Reasoned Action and Diffusion Innovations Theory (DIT). These theories explain the adoption of mobile technology innovation as well as how mobile banking is enhancing financial inclusion among users.

2.2.1 Technological Acceptance Model

Technology Acceptance Model (TAM) is said to be an adaptation of the theory of reasoned action (TRA) to the field of information systems (IS). According to TAM, perceived usefulness and perceived ease of use influences a person's intention to use a system. Perceived usefulness is furthermore viewed as being directly impacted by perceived ease of use. As previously argued, TAM has been simplified by getting rid of attitude construct found in TRA from the current specification (Venkatesh & Davis, 2000; Davis, 1989). It is asserted that attempts to extend TAM have taken on the following three approaches: by introducing factors from related models; by introducing additional or optional belief factors; and by examining antecedents and moderators of perceived usefulness and perceived ease of use. TAM, just like TRA, has strong behavioral elements. This is exemplified by the assumption that when a person forms an intention to act, he or she will be free to act without limitation

(Lai, 2015). However, in practice, constraints such as limited ability, time, environmental or organizational limits, and unconscious habits are bound to limit the freedom to act (Surendran (2012).

Technology Acceptance Model (TAM) was put forth by Davis (1989) and was adapted from the Theory of Reasoned Action (TRA) by Ajzen and Fishbin (1980) which is an information systems theory that models how people come to accept and use technology. This model illustrates how people react after being presented with a new technology and the factors that influence their decision about how and when they will utilize the technology. Perceived Usefulness (PU) was defined by Fred Davis as the degree to which a person believes that using a particular system would enhance his or her job performance. Perceived ease of use (PEOU) was defined as the degree to which a person believes that using a particular system would be free from effort (effortless) (Davis, 1989).

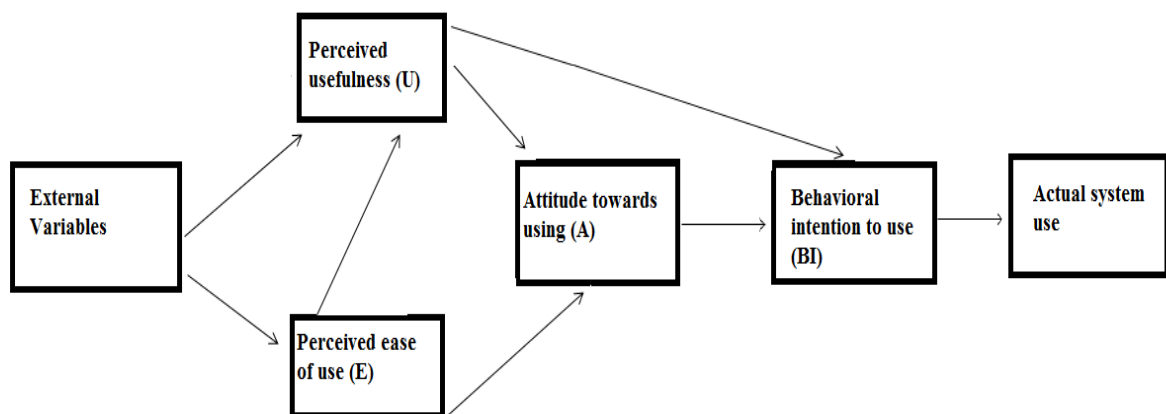


Figure 2.1: Technology Acceptance Model

Source: Davis, (1989)

A study carried out in Egypt on the intention of continuing usage of internet banking by customers employing the technology acceptance model. It showed that perceived ease of use is the major factor that influences the continued use of internet banking. Another study carried out in Thailand on mobile banking was cited by El-Kashir et al (2009) and Izogo and Ogba (2014) which revealed that people only adopt the mobile banking technology only if they perceive the technology as being useful.

Masinge (2010) carried out a study on the factors that influence the adoption of mobile banking services at the bottom of the pyramid (BOP) in South Africa. He put additions of perceived cost, rust and perceived risks as contracts to technology acceptance model. He found that perceived usefulness (PU), perceived ease of use (PEOU), perceived cost and customer's trust had a significance influence on the adoption of m-banking at the BOP while perceive risk (PR) did not have any influence.

Jeong and Yoon (2013) carried out a study on Technology acceptance model. They were investigating consumer acceptance of mobile banking services. They explained relationships that are there between variables like PEOU, perceived usefulness (PU), perceived credibility (PC) and perceived self-efficacy (PSC). They found out that perceived usefulness, perceived credibility, perceived self-efficacy and PEOU had an effect in the adoption of mobile banking. The study showed that PU had more significant effect than the other variables in influencing consumers to adopt mobile banking services.

Daud (2011) used technology acceptance model in analyzing the relationship between variables that influence adoption of mobile banking in Malaysia. The results of this research revealed that the model can be able to predict intentions to adopt mobile banking. The main models that were prioritized were perceived usefulness, perceived credibility and awareness.

The results showed that these models have a high effect on individual intention to adopt and use mobile banking.

Benbasat and Barki (2007) criticized this model saying that it does not serve the original purpose. This however did not hinder researchers from using and supporting this model. Most of the researches actually say it is an excellent model that can be used to explain acceptance of information system. Some researchers like Carter and Belanger (2005) have recommended integration of TAM model with other models like DIT so that it can have a more accurate and deep explanation of the variables.

The TAM model will be highly applicable in the current study. It will enable the researcher to relate perceived ease of use (which is one of the variables under study) and the adoption of mobile and internet banking. In the context of this study, mobile and internet banking is the innovation. It will be interesting to find out the external variables that trigger perceived ease of use of mobile phones and mobile banking and how that perception affects the attitude towards usage of mobile and internet banking services, the intention to use and ultimately the actual use of the services. This theory enables the study to relate perceived ease of use and the adoption of mobile and internet banking among the micro enterprises. In the same light, the challenges faced in the adoption and use of mobile and internet banking services as exemplified by the model are considered in the study.

2.2.2 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) is a widely used model from social psychology studies; it is concerned with the determinants of consciously intended behaviors. The theory was developed by Ajzen and Fishbein (1980) the authors suggest that the individual's Behavioral Intention (BI) to perform an action is determined by the individual's Attitude

toward performing the Behavior (ATB) and Subjective Norm (SN). Attitude according to this theory is about beliefs while subjective norms are about expectations. Subjective Norm (SN) is defined by Ajzen and Fishbein (1980) as an individual perception that people who are important to them should or should not perform the behavior in question.

TRA is still widely known as a general model that does not directly state specifically the beliefs that are operative for a certain behavior, it suggest that a person's behavior is determined by the intention to do a certain action. Ajzen and Fishbein (1980) recommended using modal salient beliefs for the population obtained by taking the beliefs most frequently drawn out from a representative sample of the population. The Theory of Reasoned Action was also successfully applied in a reasonable number of times to predict the performance of behavior and intentions. A good example is when TRA was used to predict education in a study by Fredricks and Dossett (1983) which predicted the behavior and intentions of individuals who used different types of technologies.

Theory of reasoned action is a psychological theory that seeks to give an explanation on individual's action that is determined by his or her behavioral intention to perform it. It was developed by Fishbein and Ajzen (1975) and it has its focus on four areas of behavior namely; behavioral attitude, subjective belief norms, intention to use and actual use. The subjective belief norms are what that differentiate the theory of reasoned action from the theory of acceptance model. The normative belief referred to individual's perceptions of the use of internet banking by others (Shih & Fang, 2004).

Pikkarainen, Pikkarainen, Karjaluoto and Pahnla (2004) states that the theory of reasoned action operates with some assumptions. It assumes that consumers behave rationally and consumers gather and analyze information systematically. It was also determined that based

on this rational decision making, consumers would evaluate the risk of that action and decide on their next steps (McNeil, 2012).

The theory of reasoned action was also used to predict the performance of behavior and intentions. One example is when the model was used to predict education in a study by (Fredricks & Dossett 1983)

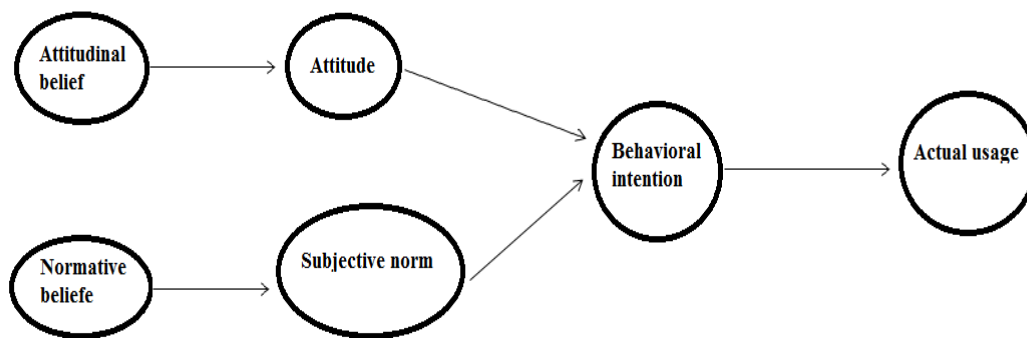


Figure 1.1: Theory of Reasoned Action (TRA)

Source: Fishbein and Ajzen (1975)

This theory explains the behavior of owners of micro enterprises when it comes to choosing mobile and internet banking as a platform; their action is influenced by the ease of use, efficiency and availability of these financial services. This theory will also be useful in the study since it focuses on the attitudinal and normative beliefs of the consumers of these financial services. This means that if the researcher could establish mechanisms on how these attitudes can be dealt with, then the technology adoption (mobile and internet banking) would be on the upward growth.

2.2.3 Diffusion Innovations Theory

According to Rogers (1995) who developed this theory, innovations an idea, act, or instrument that is new to an individual or a group of people while diffusion is a process in which new technology is transferred through certain channels of communication in time among individuals who are targeted to use new Information System. Diffusion Innovations Theory has five innovation characteristics thus relative advantage, compatibility, complexity and observability. These variables may look different and unrelated to each other but in reality have everything to do with each other in the context of Information system, others have argued that Technology Acceptance Model and Diffusion Innovations Theory are only theoretically related to each other. Moore and Benbasat (1991) established that the relative advantage construct Diffusion Innovations Theory is similar to the notion of the PU in Technology Acceptance Model, and the complexity construct in Diffusion Innovations Theory captures the Perceived Usefulness in the technology acceptance model, although the variables sound different. According to Medlin (2001) and Parisot (1995), Rogers' diffusion of innovations theory is the most appropriate theory among all theories for investigating the adoption of technologies in higher education and educational environments.

Rogers (1995) came up with five critical attributes that have a great influence on the rate of adoption. These attributes include relative advantage, compatibility, trialability, complexity and observability. If a financial institution sees the benefits that come with mobile and internet banking, they adopt these innovations provided other factors like availability of the required tools. Adoption of mobile and internet banking is faster in areas and organizations that have internet access and information technology departments than those without.

It might seem like these models are different and unrelated with each other but they are related in the context of information systems. Some researchers have argued that TAM and DIT are only related theoretically. Moore and Benbasat (1991) found out that the relative advantage construct in DIT is similar to the notion of the PU in TAM, and the complexity construct in DIT captures the PEU in the technology acceptance model, although the variables sound different.

The main aim of this theory in the entire research is that the person must perceive the idea, behavior or product as new or innovative, this makes diffusion possible. Diffusion of innovation theory tries to explain and describe ways in which new inventions which in our case is mobile and internet banking are adopted and become successful. Innovations can take a long time before they get adopted and not all inventions get adopted regardless their quality. We can also state that resistance to change may hinder diffusion of innovation although it might not stop the innovation, it will slow it down.

2.2.4 Liquidity Preference Theory

The theory was developed and presented by John Maynard Keynes which presents the liquidity preference theory of interest. Liquidity refers to the availability of liquid assets (cash or near cash assets) to finance a given company. The theory of liquidity preference is concerned with the rational behavior in situations amidst interdependence, that is, the interaction among a group of rational individuals who behave strategically (Keynes, 1937; Tobin, 1958).

The theory was coined in response to the rather primitive pre-Friedman quantity theory of money, which was simply an assumption-laden identity called the equation of exchange: $M V = P Y$. where M is the money supply, V is the Velocity of money, P is the price level and

Y is the real GDP. In the late 50s, Tobin (1958) comes in support of the theory together with Modigliani (1944) by stating that there is an inverse relationship between the demand for money and the price of money that is interest rate. The theory has received proposition and different application from scholars such as Rochon and Vernengo (2001). who applied it in a finance perspective.

To differentiate his idea, the theorist sought to find out the reasons why people would hold money. Previously, the money demand as an asset was assumed to be dependent on the interest foregone by not holding bonds (Keynes, 1937). As per Keynes, money is the most liquid asset whereas liquidity is also attributed to an asset. In the process he came up with three reasons. These are; Transaction motive where he describes economic agents to be in need of money in order to make payments; Precautions motive which happens when people prefer to have liquidity for precautionary purposes/ the unexpected outcomes in future and for Speculative motive where people will hold more bonds than money when interest rates are high for two reasons. The opportunity cost of holding money (which Keynes assumed has zero return) is higher and the expectation is that interest rates will fall, raising the price of bonds Keynes (1937) also resurfaces to boost the principal behind the theory by posing a question as to what is the degree of an individual's liquidity-preference. Where an individual's liquidity-preference is given by a schedule of the amounts of his resources, valued in terms of money or of wage-units, which he will wish to retain in the form of money in different sets of circumstances? (Ogiriki & Andabai, 2014; Keynes, 1937)

This theory has been instrumentally used to show the relationship that exists between financial services technology adoption and financial inclusion. In this case, the theory links

the price in relation to costs of a particular adoption/innovation and informs the financial institutions on effective price levels they can implement in order to ensure inclusivity of the MEs in Machakos County. This is as a result of the study finding considerable literature that establishes an existing problem that the MEs face with regard to the success to financial services for instance high interest prices on loans, or high collaterals. If the financial conditions are favorable to the MEs then this means that the MEs will be willing to borrow, and able to pay for the financial services.

Theoretical Framework

This framework shows the relationship between the theories and financial inclusion.

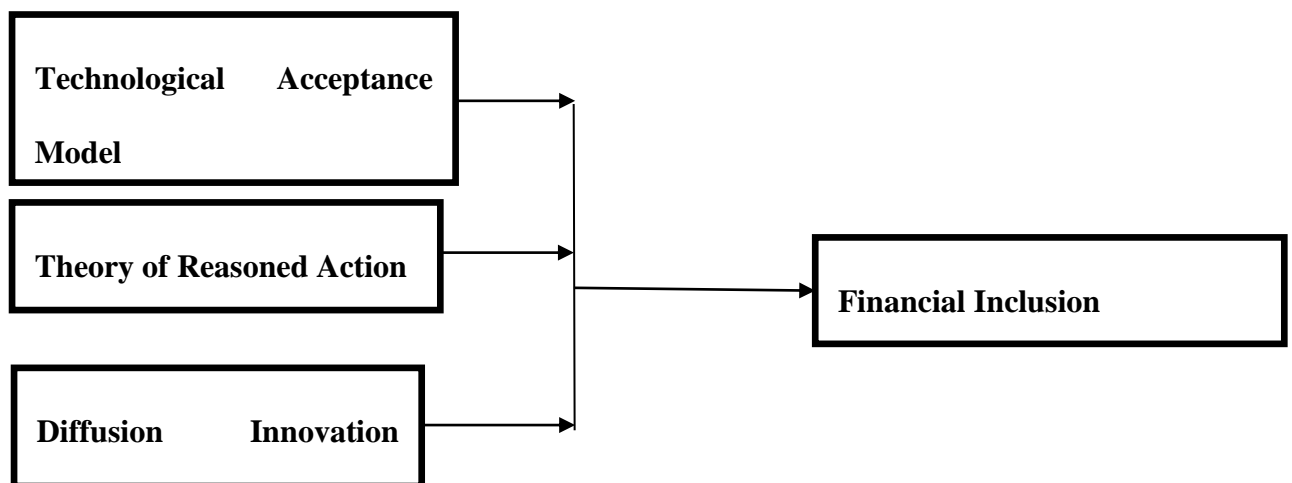


Figure 1.2: Theoretical Framework

2.3 Financial Services Technology Adoption

As per the technology acceptance model, Davis (1989) proposed five elements that influence adoption of innovation and the level of success of the innovation in the target market. Rogers suggested that in order to access the success rates of an innovation, one has to compare an innovation with the five factors in order to find out any likely barrier so that you can come up

with ways to improve on the barrier to make the innovation more adaptable and useful to the potential users which leads to better adoption rates. According to Atambo and Momanyi (2016) adaptability of the financial services technology is a key adoption factor.

According to Ozili (2018), the adaptability to change to financial services technology depends on relative advantage over other already available means, preferences and perception. As such companies or businesses need to establish the factors that influence the adaptability to change of an innovation in order to ensure that they are kept in consideration during the implementation of the innovation so that the adoption of such innovations have better success rates. The challenges that may affect the adoption can also be identified and strategies are put in place to counter them (Dev, 2016).

In a study by Tirok (2012) awareness technology oriented financial services such as online banking was found to be important in determining users' acceptance of online banking. This means that customers consider the amount of information available about internet banking before adopting it. United States Agency for International Development [USAID] (2016) argues that the main hindrances to the adoption of online banking is lack of awareness on what can be done through online banking and the benefits of the same. Shaikh, Zeadally and Exposito (2017) identified information about the product benefits as essential in promoting the product and thus for financial services technology, it is essential for companies to ensure that consumers are aware of their availability and value addition. Jack, Suri and Townsend (2010) similarly note that companies have to invest greatly in marketing and advertising to ensure that potential customers are aware of the services offered in order to build up mass adoption and be willing to adapt to change.

McKinsey (2016) explains that users' experience course involves assurance, choice, awareness, and affirmation before becoming willing to change and adapt to new technology. Njeru (2017) adds that the adoption or rejection of new products or services begins with the potential user becoming aware of the technology and that absence of awareness is key factor that will determine whether a customer will take up digital finance. This means that financial companies must communicate to their prospective customers the benefits of financial services technologies through targeted marketing operations. Woodhouse (2016) advises that this could be achieved through focusing on essential needs and arrangements, the digital value settings, mobility related needs as well as spontaneous needs and decisions.

Customer trust is an important factor that affects the adaptability to change of financial services technologies and its uptake. According to Njeru (2017) trust is a basic belief that an opposite party will carry out its operations honestly. One party is often willing to be vulnerable to the actions of another with an implied risk and dependency on each other. According to Pricewater house Coopers [PwC] (2011), customers may find it problematic to trust digital technology because of system security, service reliability and distrust of service providers. The more customers exhibit confidence in digital technology, they would be more willing to adapt to digital financial services (Bruhn & Love, 2014).

Financial transactions done using non-traditions models entail a greater risk for customers making it a key consideration for the success of digital financial services (Russell, 2017). Within the financial services technology sector, trust can be eminent into two realms; first is trust in the system of delivering services and second is trust in service providers (Alt, Beck & Smits, 2018). Prasad, (2010) measured and defined customers trust for service providers on the basis of ability, integrity and benevolence. This means that systemic trust is vital in encouraging potential clients to use the technological system that is associated with digital

banking. Here, clients' finances security and other personal details are most important since customers have a fear to providing their financial details through the digital platforms.

Perceived usefulness is a key determinant influencing the adoption of financial services technology (Mohan & Potnis, 2015). Consumers will only be willing to adopt and adapt to digital financial services if they are certain that they offer added value as compared to the traditional services.

Through studies by Nyangosi and Arora (2009) perceived usefulness is believed to have a relationship with uptake of information technologies. Kazumine (2010) argues that people will not adopt a technology that will not help them perform their jobs in an easier way. Sulaiman (2016) further argues that this is key in the achievement of tasks not characteristic in the use of financial services technology itself mainly dealing with user aspects of new technology.

Ignacio (2009) defined Perceived ease of use as the extent to which customers believe that using a system will be easy and effortless. Although research on financial services technology system usage have concluded that perceived ease of use is important in predicting adoption, Kashif and Muhammad (2016) found a direct relation between the ease with which a system is perceived to be easy to use and the uptake of the system. Okiro and Ndungu (2013) argue that perceived ease of use influences users' adoption of digital finance directly or indirectly through. This then measures the extent to which targeted users are willing to adapt to change to financial services technology. It therefore deals with motivations based on intrinsic side of technology use especially the process involved in using the given technology. Perceived ease of use affects adoption when characteristics such as navigational use add to the importance of the outcome to which the technology is used (Litondo & Ntale, 2013).

In their study Gomber and Koch (2017) argued that adaptability to change directly and positively affect the adoption of financial technology. The significance of which is supported by studies on self-efficacy done by (Bandura 1982). Bandura defined self-efficacy as opinions of how efficient a user can achieve activities that are required to deal with probable circumstances and postulates that in any situation, behavior would be best expected by taking into account self-efficacy and outcome beliefs- related to the magnitude to which behavior, once well executed, is thought to be connected to value incomes.

Teo, Tan, Ooi, Hew, and Yew (2015) found that it is easier for a user to start using an innovation if the user believes that the innovation will be companionable with their job requirements and the overall worth obtained from using the innovation. Digital banking has been viewed as a channel of the needs of a current banking customer because with the advancement in technology, most banking customers have skills in computer usage and navigation and this escalates the chances of the customer using the internet to carry out their transactions. Similarly, the more digital banking is viewed a tool that helps potential adopters manage their finances better, the more likely it is that an individual with many bank accounts and needs more hands on access to the accounts in a faster and convenient way day or night will be willing and persuaded into adopting digital banking services (Abdi, 1977).

Studies by Malady, Buckley and Tsang (2016) have established that perceived relative advantage of an innovation affects uptake of an innovation. Financial technology services gives bank customers an opportunity to better manage their multiple accounts. The benefits of this kind of banking to the customers are many starting from convenience, time saving to better control of one's finances among others. The many benefits that a bank customer has by using digital banking has the likelihood of persuading the bank customer to adopt these services due to the perceived relative advantage (Abbasi & Weigand, 2017).

Russell (2017) an innovation that is intricate and not user friendly, requires a lot of effort from the end user and this discourages adoption of such an innovation. To increase chances of adoption of such innovations, Potnis (2014) recommends that the potential adopters are given an opportunity to try the innovation on trial basis to first acquaint them with the innovation. This will give them more confidence and more comfort in using the innovation thus increasing the chances of the user adopting the innovation. Shaikh et al. (2017) adds that if customers are able to use an innovation on trial basis, they will be willing to use the technology and be more confident with using these technologies on full time basis.

Ignacio (2009) argue that most people are easily influenced by the opinion, perceptions and attitudes of other people in the society. A study by Hanning and Jensen (2010) exposed that social influences are important during the early stages of an innovation since users have very little information and experience which prevents them from developing attitudes. Tirok (2012) found out that user's friend, family and colleagues are the main groups that have the potential to influence the adoption of an innovation.

Personal innovativeness typically is as a key individual characteristic variable of the adoption and diffusion of the innovation and is related to the users' time of adoption of the new information technology (Schierz, Schilke & Wirtz, 2010). The conceptualization of consumer innovativeness has been used to examine user behavior in the acceptance of new products and services. Innovative individuals will have higher inclinations in developing positive beliefs on new technology especially when the beliefs are developed through merging of information from various media (Woodhouse, 2016). Innovative users alleged lower risk and much open-minded. The conceptualization of consumer innovativeness has been used to explore user behavior in the acceptance of new products and services. Personal innovativeness has strong effect in determining technology acceptance (Ignacio, 2009).

Michelle (2016) found that innovative individuals will have higher tendencies in increasing positive beliefs on new technology particularly when the beliefs are developed through integrating information from various sources. Sulaiman (2016) asserted that innovative users perceived lower risk and much open-minded.

The newly emerged mobile services represent an innovation where both intangible service and an innovative medium of service delivery employing high technology are present. Thus, concepts of innovation and diffusion of innovation are even more complex as technology and service aspects have an effect on the characteristics of mobile services (McKenzie-Mohr 2011). Even if these kind of personal characteristics of a consumer have found to be predictors of adoption, research by Asian Development Bank [ADB], (2016) has demonstrated that it is the perceived attributes, of innovation itself rather than the personal characteristics that are the stronger analysts of the adoption decision.

2.3 Empirical Review

A study conducted by Gomber and Koch (2017) established that adaptability to change directly and positively affect the adoption of financial technology. Gomber and Koch (2017) defined self-efficacy as opinions of how efficient a user can achieve activities that are required to deal with probable circumstances and postulates that in any situation, behavior would be best expected by taking into account self-efficacy and outcome beliefs- related to the magnitude to which behavior, once well executed, is thought to be connected to value incomes.

Kpodar and Andrianaivo (2011) conducted a study to establish the relationship between mobile banking and financial inclusion, their findings revealed a positive correlation between financial inclusion and mobile penetration. They note that mobile phone penetration improves

credit allocation process, leading to broader presence in the financial system. ICT and mobile network services guarantee a better flow of information.

Turok (2012) argue that awareness about technology oriented financial services such as online banking was found to be important in determining users' acceptance of online banking. This means that customers consider the amount of information available about internet banking before adopting it.

In another study by Tan, Ooi, Hew and Yew (2015), it was found that it is easier for a user to start using an innovation if the user believes that the innovation will be companionable with their job requirements and the overall worth obtained from using the innovation. Digital banking has been viewed as a channel of the needs of a current banking customer because with the advancement in technology, most banking customers have skills in computer usage and navigation and this escalates the chances of the customer using the internet to carry out their transactions. Similarly, the more digital banking is viewed a tool that helps potential adopters manage their finances better, the more likely it is that an individual with many bank accounts and needs more hands on access to the accounts in a faster and convenient way day or night will be willing and persuaded into adopting digital banking services (Abdi, 1977).

Studies by Scott and Zachariadis (2017) on financial inclusion and its challenges reported that deficient and wasteful innovation based offices by money related establishments, has constrained the accomplishment of critical extension in budgetary incorporation level. Prasad (2010) examined the relationship between the cashless economy approach and money related incorporation and exposed that shopper/client esteem recommendation, mindfulness, and foundation had a solid noteworthy association with budgetary consideration. He also found

that the plan of action of monetary administration suppliers had an insignificant association with money related incorporation.

Manyika, Lund, Singer, White and Berry (2016) conducted a study to explore the existing relationship between financial development, data correspondence innovation and monetary incorporation, and found that the spread of cellular telephones underpins the impact of money related consideration on monetary development, particularly in nations where portable budgetary administrations grab hold.

A study by Malady et al. (2016) on financial innovation established that perceived relative advantage of an innovation affects uptake of an innovation. Financial technology services give bank customers the opportunity to better manage their multiple accounts. The benefits of this kind of banking to the customers are many starting from convenience, time saving to better control of one's finances among others. The many benefits that a bank customer has by using digital banking had the likelihood of persuading the bank customer to adopt these services due to the perceived relative advantage (Abbasi & Weigand, 2017).

According to a study conducted by Sewanu (2015), it was established that ICT implementation in the organization which includes SMEs has the potential to reduce costs and increase productivity level. According to their findings, small firms might find cost-effectiveness as a motivating factor to use Internet-commerce for improving communication with trading partners and consumers. Sewanu (2015) have given their experts opinion that ICT impacts include cheaper and faster communications, better customer and supplier relations, more effective and efficient marketing, product and service development and better access to information and training.

A study by Serdyukov (2017) found that innovative individuals will have higher tendencies in increasing positive beliefs on new technology particularly when the beliefs are developed through integrating information from various sources. Sulaiman (2016) asserted that innovative users perceived lower risk and much open-minded. The newly emerged mobile services represent an innovation where both intangible service and an innovative medium of service delivery employing high technology are present.

A study carried out in Egypt on the intention of continuing usage of internet banking by customers employing the technology acceptance model. It showed that perceived ease of use is the major factor that influences the continued use of internet banking. Another study carried out in Thailand on mobile banking was cited by Puriwat and Tripopsakul (2017) which revealed that people only adopt the mobile banking technology only if they perceive the technology as being useful.

A study conducted by Masinge (2010) on the factors that influence the adoption of mobile banking services at the bottom of the pyramid (BOP) in South Africa. He put additions of perceived cost, rust and perceived risks as contracts to technology acceptance model. He found that perceived usefulness (PU), perceived ease of use (PEOU), perceived cost and customer's trust had a significance influence on the adoption of m-banking at the BOP while perceive risk (PR) did not have any influence.

A study by Kashif and Muhammad (2016) found a direct relation between the ease with which a system is perceived to be easy to use and the uptake of the system. Okiro and Ndungu (2013) in their study established that perceived ease of use influences users' adoption of digital finance directly or indirectly through. This then measures the extent to which targeted users are willing to adapt to change to financial services technology. It

therefore deals with motivations based on intrinsic side of technology use especially the process involved in using the given technology. Perceived ease of use affects adoption when characteristics such as navigational use add to the importance of the outcome to which the technology is used (Litondo & Ntale, 2013).

Jeong and Yoon (2013) carried out a study on Technology acceptance model. They were investigating consumer acceptance of mobile banking services. They explained relationships that are there between variables like PEOU, perceived usefulness (PU), perceived credibility (PC) and perceived self-efficacy (PSC). They found out that perceived usefulness, perceived credibility, perceived self-efficacy and PEOU had an effect in the adoption of mobile banking. The study showed that PU had more significant effect than the other variables in influencing consumers to adopt mobile banking services.

Studies by Malady et al. (2016) have established that perceived relative advantage of an innovation affects the uptake of an innovation. Financial technology services gives bank customers an opportunity to better manage their multiple accounts. The benefits of this kind of banking to the customers are many starting from convenience, time saving to better control of one's finances among others. The many benefits that a bank customer has by using digital banking have the likelihood of persuading the bank customer to adopt these services due to the perceived relative advantage (Abbasi & Weigand, 2017).

A study by Berger, Espinosa-Vega, Frame and Miller (2011) found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. They also found that if a firm works with multiple banks, it increases the probability of pledging collateral for long

term loans while it decreases the probability of pledging collateral when acquiring short term loans.

Aduda and Kalunda (2012) examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems; mobile banking and agency banking affect access to financial services to the Kenyan population. The study used secondary data on use of financial services. The data collected was analyzed using regression method with the help of SPSS edited for accuracy, uniformity, consistency, completeness and arranged to enable and tabulated. The analysis was presented in frequency and descriptive tables and graphs. The study concluded that financial innovation has a significant positive impact on financial inclusion.

Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya. This means that the rise in ATM transactions, mobile money transactions as well as agency banking in Kenya do have a significant influence of financial inclusion in Kenya. The study recommends that for financial inclusion to be enhanced in Kenya, there is need for policy makers and financial services providers to increase rolling out of these technologies/innovations to enhance financial inclusion. The study also recommends further research on financial inclusion and especially its determinants in developing economies and especially in Kenya (Ngari & Muiruri (2014).

Michelle (2016) conducted a study on the effect of digital finance on financial inclusion in the banking industry in Kenya. According to this study digital financial services consisted of agency banking, mobile banking and internet banking while financial inclusion was proxies

using credit penetration. The Research designed used in the research was descriptive statistics. Target population for this study comprised 44 banking in Kenya, comprising of 43 commercial banks and 1 mortgage financial institution as at 31/12/2015. The study used a sample of 13 banking institutions in Kenya. The sample was purposively selected to represent the 13 banking institutions in Kenya, which offer all the three digital financial services. The research employed secondary data, which was analyzed using regression and correlation analysis. Findings of the study found an insignificant negative relationship between agency banking measured in term of the number of agents, mobile banking measured by the number of mobile banking transactions and internet banking measured in terms internet banking transactions with financial inclusion in the banking industry in Kenya. The study concluded that digital finance doesn't have any correlation on financial inclusion in banking sector in Kenya since banking institutions adopt digital financial services to lower operating cost associated with opening and operating branches to improve their profitability and financial performance and not to foster financial inclusion. The study recommended that to ensure the usage and adoption of digital financial services bank should create more awareness of such services and offer them at lower cost to enhance the usage of digital financial services.

Ngugi (2015) conducted a study on the relationship between mobile banking and financial inclusion in Kenya. The study used secondary data obtained from Central Bank of Kenya and communication authority of Kenya for the period 2006 to 2014. Descriptive research design was adopted by the study. Multiple regression analysis was used to obtain the relationship between financial inclusion and mobile banking services. The significance of the results obtained was determined using analysis of the variance. The study found that mobile money transfer services have positive effect on financial inclusion in Kenya. The study further found that mobile banking services have contributed significantly to deepening financial markets

mostly out of financial products related to mobile money developed. Mobile banking services were also found to have contributed significantly to financial access in Kenya. The study recommended that the Central Bank of Kenya to formulate policies to guide the operations of mobile money services and ensure that mobile operators charge lowest costs, consequently promoting penetration of mobile money services.

Karanja, Mwangi, and Nyakarimi (2014) examined factors that affected access to credit among ladies entrepreneurs in Isiolo town (Kenya). The extent of the examination was chosen from budgetary loaning organizations in Isiolo County and ladies business visionaries focusing on the individuals who are individuals or have accounts in those money related establishments. There are 6 enrolled FIs working inside the Isiolo town which had a sum of 18 administration representatives and 20 enlisted ladies business visionaries. The specialist directed an enumeration on the FIs chiefs and also ladies business people in Isiolo town from the objective populace. To investigate the information, the specialist connected the chi-square testing the theory of the examination.

The examination prescribes that the budgetary foundations ought to set up loaning methods which will pull in ladies business people and oblige them in access of credit. It additionally suggested that the money related foundations ought to empower the utilization of reasonable securities that will guarantee that ladies business people can get to credit. Absence of reasonableness guarantee was one of the difficulties that was featured as impediments to ladies getting to credit. The monetary organizations ought to guarantee that they prepare ladies business people on speculation openings keeping in mind the end goal to build reasons for credit for ladies business visionaries. This will guarantee ladies business visionaries will dependably have a reason to do with credit progressed to them by money related organizations (Karanja, Mwangi, & Nyakarimi, 2014).

Kung'u (2011) conducted a survey in Westlands town, Kenya to examine factors affecting credit access to SMEs. Data was collected using 115 questionnaires. Participants were randomly selected from 6 sectors, namely industrial, technology, electrical, shopping, building and travel. This study found that starts up business (those under 3 years) were faced with credit access, setbacks due to lack of collateral and information. However Kung'u did not test the significance or the relationship of these variables. So Kung'u ignored testing hypothesis, in using a purely descriptive approach, though the study would also have tested whether there was a relationship between collateral security and if it was significant or not. This study, therefore will aim to not only know the factors affecting SMEs in accessing credit, but also will establish the relationship and significance.

Ndirangu and Thairu (2016) conducted a study on effect of technological innovations on financial inclusion initiatives by banks in Nakuru town, Nakuru County. The study examined the effect of agency banking on financial inclusion initiatives by banks in Nakuru County. The study adopted descriptive research design. The target population was commercial banks within Nakuru town. The study used two questionnaires to collect primary data. All 29 bank questionnaires were filled thus 100% response rate. From 140 customer questionnaires only 120 were filled represented by 87.5% response rate. The study found that technological innovations increase sales, they lead to profit increment; they provide better, increase quality of service and assure the survival of the bank. The study concludes that the banks had employed various technological innovations. The study recommends adoption of new technological innovations to provide constant access to certain core services reducing the need to interact with bank staff for many people. The study also recommends that another study be done to investigate the factors influencing technological innovations in the financial institutions and other sectors in Kenya.

Silikhani (2012) conducted a study on factors influencing rural women entrepreneurs to access micro credit services in Sirisia division, Kenya. This study adapted a descriptive survey design as a major method of research where questionnaires were used to collect data from a sample of women entrepreneurs under the study. The instruments of data collection were reliable having been tested through the Test Retest approach. Concerning the validity of the instruments, content validity was applied to ensure that the instruments represented what they were designed to measure. The target population was 488 women entrepreneurs according to locations. A sample of 220 women entrepreneurs was selected through systematic random sampling. Collected data was then analyzed by use of descriptive statistics constituting frequencies and percentages. Previous studies had shown that microfinance institutions played a vital role in the economic development of many developing countries through the provision of a wide range of financial products and services to the rural poor, low-income households and micro and small enterprise.

Silikhani (2012) revealed that access to credit facilities by rural women entrepreneurs was greatly influenced by poor infrastructure, low level of education, inadequate collateral requirements and inappropriate technology. It then concluded that women entrepreneurs needed education and sensitization on business and financial management as well as embracing technology so as to minimize defaulting and exits. The study recommended that the policy makers put into consideration rural road network development and rural electrification so that rural women entrepreneurs enjoy doing businesses in the remote areas where their businesses operate and this will benefit even those outside the division and the society at large. Sensitization on the rights of women on property ownership should be reinforced for them to use valuable assets as security for loans. Rural women entrepreneurs also need technological enlightenment to enable them carry out activities concerning their

businesses without relying on those with the knowhow. This will help them save on time and resources.

Kiere (2015) conducted a study on influence of electronic transactions technologies on performance of Kenya Power Company. This study adopted a case study design which was the most appropriate in the investigation of the influence of electronic transactions technologies on performance of Kenya Power Company. The study used a structured interview guide as primary data collection instrument. The interview guide was administered through personal interviews with senior employees Kenya Power Company. Secondary data was collected by use of desk search techniques from published reports and other relevant documents. Qualitative techniques were used to analyze the qualitative data. The study found that the company has not fully computerized its activities and that there is still need to fully automate Kenya Power Company services. Electronic transactions technologies adoption has brought positive impact on business achievements at Kenya Power Company, in that it has eased working procedures, provided convenience for the customer, it has reduced congestion, boosted staff morale and facilitated decision making at higher levels of management. It can be concluded that management support and leadership is crucial in adoption of electronic transactions technologies as early adoption and creative use of electronic transaction enhance firm performance.

Kiere (2015) recommends that finding the linkage between innovation and firm performance helps a firm understand the importance of electronic transactions technologies. It also recommends that in addressing electronic transaction technologies, organizational focus, is important when assigning the responsibility of electronic transactions. The success requires the coordination of many partners. Government participation is crucial in ensuring a focused industry is visible to reduce or remove avoidable costs of implementing electronic

transactions and internet standards for firms to follow to avoid making Kenya parastatals sector a dumping ground for the outdated technological infrastructures. This study was confined to Kenya Power Company yet the current innovation such as electronic transactions can be applicable to a wide range of institutions. There is need therefore to study adoption and use of ICT by other institutions. Another study can be carried to evaluate whether electronic transactions has helped to bring services close to people especially in rural areas.

Sabana (2014) conducted a study on entrepreneur financial literacy, financial access, transaction costs and performance of micro enterprises in Nairobi City County, Kenya. The study population comprised of all microenterprises in Nairobi County, from which a representative sample of 396 microenterprises was drawn. The main study instrument was a questionnaire which comprised of likert-type scale questions on the main variables of the study. The data was analyzed using both descriptive and inferential statistics. Hypothesis testing was done by use of regression and correlation analysis. The findings of the study indicated that entrepreneur financial literacy had a statistically significant influence on enterprise performance therefore the hypothesis that financial literacy influences enterprise performance was supported. The study also established that financial literacy had a statistically significant influence on financial access therefore the hypothesis that financial literacy influences financial access was supported. The study also revealed that intervening influence of financial access on the relationship between entrepreneur financial literacy and performance microenterprises was statistically significant.

Further, Sabana (2014) revealed that transaction costs had a statistically significant moderating influence on the relationship between entrepreneur financial literacy and performance of microenterprises. Finally, the study established that the joint influence of

entrepreneur financial literacy, financial access, and transaction cost is statistically significant. This implies that the study variables jointly predict enterprise performance.

Hieltjes and Petrova (2013) conducted the impact of financial literacy and transaction costs on bank account uptake and use. The study conducted a randomized controlled trial to examine the impact of (i) a short, context specific financial literacy training, (ii) a marketing/information session and (iii) reducing transaction costs to near zero, on bank account uptake and use. The study found that our financial literacy training and information session had no effect on bank account uptake and use. Reducing transaction costs had an effect on bank account uptake and use. It conclude that, in the short time frame and specific context of our study, a reduction of transaction costs does indeed have an effect in encouraging financial inclusion and savings among the poor.

Micheni, Lule and Muketha (2013) conducted a study on transaction costs and facilitating conditions as indicators of the adoption of mobile money services in Kenya. A survey was conducted to gather data which was coded in SPSS 16. Confirmatory Factor Analysis was used to analyze the data and Structural Equation Modeling using Analysis of Moment Structures was used to validate the research model. The research model included three main components; transaction cost, facilitating conditions and adoption. The model was developed based on a review of technology adoption models. The analysis revealed that facilitating conditions impact positively to the adoption of mobile money services. Results demonstrate that facilitating conditions do influence adoption usage of mobile money services.

Mwangi (2012) conducted a study on perceived link between adoption of technology and efficiency in human resource management: a survey of the civil service in Kenya. The study design was descriptive survey of perceived link between technology and efficiency in human

resource management in the Civil Service in Kenya. The study findings recorded positive results in all the variables related to efficiency in human resource management which included improved communication, sharing information, cost saving, facilitation of culture of transparency, improvement of quality of customer service, enhancement of increased consistency, improved productivity, reduction in lead time taken in recruitment and selection, reduction of operational costs and personalized feedback. On the application of human resource information system in human resource functions, the findings revealed that HRIS was largely adopted in availing online pay slips to employees, management of payroll, creating human resource database for human resource planning, posting job vacancies on the website, managing of personal numbers and use of online payment and salary processing. However, the study reflects key aspects of academic findings and practitioner opinions that the use of human resource information system was being adopted more on administrative ends rather than any sort of analytical or decision support ends. The study findings showed a negative perception on use of HRIS in human resource functions that support decision making including training and development, online job evaluation and administration of performance appraisal systems. The study illuminate a path from which the question of adoption of technology in human resource function can be more completely accessed by future researchers.

Kimutai (2014) conducted a study on the relationship between perceived ease of use, perceived usefulness, behavioral intention to use and acceptance of mobile banking services: the case of commercial banks in Kenya. A descriptive design was adopted to study and analyze the variables. A cross sectional and correlation quantitative analysis was also adopted to evaluate the acceptance of mobile money. The study population consisted of all the 43 Commercial Banks in Kenya. The study sampled 12 commercial banks. The study used

purposive sampling technique to sample 10 users of mobile banking services from each of the 12 Commercial Banks. Data was collected using both primary and secondary methods. Data was analyzed through descriptive and inferential statistics. The study found that most of mobile banking users use their mobile banking for paying bills, cash withdrawal and buy airtime.

Kimutai (2014) show that mobile banking users think interaction with mobile banking does not require a lot of mental effort and that it is easy to use and learn how to use mobile banking system. The study found that mobile banking services in overall is advantageous, banks are trustworthy and that they would not feel totally safe providing personal privacy information over mobile banking. Evidence shows that transaction fee (bank charges) is expensive to use, mobile banking may not perform well because of network problems and they think mobile banking is expensive. The results also revealed that perceived ease of use, perceived usefulness and behavioral intention to use are positively related to acceptance of mobile money services. The study further found that the more people will perceive mobile money system as easy to use, the more their intention and willingness to use the system will increase. The results indicate that perceived usefulness highly influences the behavioral intention to use mobile money services that is if people perceive a technology as useful their behavioral intention to use increases. The study recommends then system designers and developers should endeavor to achieve user friendliness in a technological system so as to increase the end users' perceived ease of use of the system.

Guyo (2014) conducted a study on effect of technology adoption on operational efficiency of commercial banks in Kenya. This study adopted the descriptive research design based on the key areas of interest. The population of interest in this study comprised of the 43 commercial banks operating in Kenya as at December 2013. The study took a census approach since the

population was not big. In this study emphasis was given to secondary data which was obtained from the financial results filed at Central Bank of Kenya and Annual Banking Survey reports. The data included the actual financial statements data covering the period between 2009 and 2013. The study used both descriptive and inferential statistics in analyzing the data. Analysis was done with the help of Statistical package for social sciences (SPSS version 21).

According to Guyo (2014), descriptive statistics such mean score, frequencies and percentages for each variable was calculated and tabulated using frequency distribution tables and graphs. In order to test the relationship between the variables the inferential tests including the regression analysis was used. Regression analysis was therefore used to determine the relationship between variables in the study. From the regression model, the study found out that there were technology adoption variables influencing the operational efficiency of commercial banks in Kenya, which are ATM cards, debit and credit cards, internet banking and mobile banking. They all influenced it positively. The study found out that the intercept was 0.514 for all years. The four independent variables that were studied (ATM cards, debit and credit cards, internet banking and mobile banking) explain a substantial ATM cards, debit and credit cards, internet banking and mobile banking 70.5% of operational efficiency among commercial banks in Kenya as represented by adjusted R² (0.705). The study established that the coefficient for ATM cards was 0.724, meaning that ATM cards positively and significantly influenced the operational efficiency of commercial banks in Kenya. The study also established that the coefficient for debit and credit cards was 0.368, meaning that debit and credit cards positively but significantly influenced the operational efficiency of commercial banks in Kenya.

Guyo (2014), further revealed that the coefficient for internet banking was 0.405 meaning that internet banking positively and significantly influences the operational efficiency of commercial banks in Kenya. The coefficient for mobile banking was 0.529; this shows that mobile banking significantly and positively influences the operational efficiency of commercial banks in Kenya. The study therefore concludes that technology adoption positively and significantly influences operational efficiency of commercial banks in Kenya.

Chang, Yan and Tseng (2012) conducted a study on perceived convenience in an extended technology acceptance model: mobile technology and English learning for college students. The results revealed that: perceived convenience, perceived ease of use and perceived usefulness were antecedent factors that affected acceptance of English mobile learning; perceived convenience, perceived ease of use and perceived usefulness had a significantly positive effect on attitude toward using; and perceived usefulness and attitude toward using had a significantly positive effect on continuance of intention to use. Overall, the extended TAM in the present study was effective at predicting and explaining the acceptance of English mobile learning. In the past, there were few mobile learning related studies examining the relationships between perceived convenience and other variables in the TAM.

Teo et al. (2015) conducted a study on the effects of convenience and speed in m-payment. The purpose of this paper was to uncover the effects of perceived transaction convenience (PTC) and perceived transaction speed (PTS) on unified theory of acceptance and use of technology (UTAUT) in the context of m-payment. Design/methodology/approach - A predictive analysis approach was used to examine the PTC and PTS using a two-stage partial least square (PLS) and neural network (NN) analyses. Findings - The findings revealed that only effort expectancy (EE) and facilitating conditions (FC) were discovered to

significantly influence BI. More importantly, PTC was found to have positive significant relationship with EE and performance expectancy (PE). Moreover, PTS also supported the positive relationship with BI and EE. Practical implications - The findings of the study provided further insights to mobile payment service providers, online banking industry players, and all decision makers and stakeholders involved.

Musau, Muathe and Mwangi (2017) conducted a study on financial inclusion, bank competitiveness and credit risk of commercial banks in Kenya. Financial inclusion was measured using three dimensions of bank availability, bank accessibility and bank usage, bank competitiveness used (HHI) while credit risk was represented by the non-performing loans ratio. The study was anchored on financial intermediation theory supported by finance growth theory and asymmetry information theory. The target population was all the 43 commercial banks in Kenya. The study used secondary data collected from Central Bank of Kenya annual reports; commercial banks of Kenya published audited financial statements and annual data from Central Bureau of statistics of Kenya for the period of 2007-2015. Data was analyzed using descriptive statistics and panel multiple regression analysis. The results obtained found that bank availability, bank accessibility and bank usage had significant effect on credit risk of commercial banks in Kenya. Bank competitiveness was found to partially mediate the relationship between financial inclusion and credit risk. From the findings the study concluded that financial inclusion has a significant effect on stability of commercial banks in Kenya. The study recommends that commercial banks to formulate policies to ensure they remain stable and competitive while accommodating their activities to ensure financial inclusion, hence forming an all-inclusive and stable financial sector over time.

According to Ackah and Vuvor (2011), SMEs require access to data to have the capacity to recognize potential providers in the market for budgetary items. Thus, SMEs expect data to

use in assessing and investigating the cost of credit. Absence of this data represses business visionary's decision of trustworthy money related supplier. This implies a SME may not know that there are foundations that are financing their tendency and sort of business ideas. One of alternate reasons SMEs require monetary data is that it encourages them assess hazard part connected with getting to a given sort of credit office, or security prerequisites on the same (OECD, 2015). Thusly, when SEMs need access to this data, they are hindered in access to credit, since they are not ready to plan sufficiently on the necessities for getting to the credit office (Niskanen & Niskanen, 2010)

Absence of data is additionally inhibitory since SMEs endeavoring to raise fund need data symmetry, accordingly, can't demonstrate the nature of their speculations to money related organizations (Omondi & Jagongo, 2018). Absence of money related data imply that directors from SMEs can't create monetary refinement that is normally vital while consulting for an advance. In many cases, SME directors are typically item and administration authorities, which a restricted comprehension of how the money related markets does work, making it troublesome for the SMEs to secure financing. As indicated by Charbonneau and Menon (2013) fights that absence of data asymmetry issue is straightforwardly inferable from poor correspondence systems. Similarly, new business new companies will most likely be unable to give great budgetary records that can include belief advertisement validity from those they are looking for data from.

Mutegi, Njeru and Ongesa (2015) directed an investigation on monetary proficiency and its effect on advance reimbursement by little and medium business visionaries. The general target of the investigation was to build up the impacts of EGF's education preparing program on advance reimbursement by SMEs. The particular destinations of the investigation were to build up the degree to which accounting, credit administration and planning abilities impact

advance reimbursement. Led on SMEs in Ngara, Nairobi County, thirty (30) SMEs out of three hundred (300) prepared by value Bank took part in the examination. The information accumulation instrument was a self-managed drop and pick Questionnaire. Discoveries demonstrated that the four aptitudes said here above incredibly decide the capacity of SMEs to reimburse credits. Discoveries of the investigation suggest that SMEs who have next to zero budgetary proficiency preparing ought to enlist in related projects to improve their abilities. There is have to start all the more such projects to achieve numerous SMEs for legitimate credit administration, change of advances reimbursement, appropriate elucidation of money related articulations because of monetary investigation aptitudes and legitimate basic leadership on circumstances and hazard administration.

Tuyisenge, Mugambi and Kemirembe (2015) directed an examination on the part of money related education on advance reimbursement among little and medium business visionaries in Rwanda contextual investigation: Urwego opportunity bank. The motivation behind this examination was to look at the effect of budgetary proficiency on advance reimbursement in Rwanda in light of the fact that past research proposes that numerous individuals do not have what it takes expected to ascertain expected returns or present reduced qualities, which may make them settle on imperfect monetary choice but then money related education abilities empower people to explore the monetary world, settle on educated choices about their cash and limit their odds of being deluded on money related issues.

Tuyisenge, Mugambi and Kemirembe (2015) centered on little and medium business visionaries in Urwego Opportunity Bank. The examination was critical in different approaches to people/bank customers, speculators. Money related education along these lines is viewed as one of the techniques utilized by investors to give learning and aptitudes expected to change disposition and draw in more potential clients of specialist managing an

account. Money related education levels among SMEs are extremely low to manage the complexities of the issue. The nature of money related data accessible for financing foundations is somewhat poor. Credits choices wind up troublesome and security prerequisites and additionally loan fees are high, significantly irritating access to credit. Controlling the Loan Book is similarly troublesome. For sure, banks in Rwanda are progressively confronting non-performing-advances especially from SMEs. The effects on the Rwandan economy right around 90% of all undertakings in Rwanda are smaller scale ventures, as per a current PSF business. The mixes of littler undertakings without access to money to develop their business and banks, which are progressively hesitant to loan to littler customers, hamper genuinely necessary monetary and social advancement.

2.3.1 Financial Services Technology Adoption

According to ADB (2016) Digital Financial Services (DFS) provide crucial money related solutions for enhancing monetary consideration. The report explains that the methodology of DFS has enabled positive effect through initiation of neighborhood economies with expanded business development, cash dissemination and work opportunities. Attaining financial inclusion requires bridging the gap between cash and digital payments (World Bank, 2014). As a result of DFS, households living in poverty often need to collect sums of cash to invest in their micro-enterprises and at the same time maintain precautionary cash to shield from unexpected shocks. This means that once customers are connected to a digital payment system, they are enabled to transfer money instantly and cheaply to family, friends and business collaborate (Shaikh et al., 2017).

Studies by Scott and Zachariadis (2017) on financial inclusion and its challenges reported that deficient and wasteful innovation based offices by money related establishments, has

constrained the accomplishment of critical extension in budgetary incorporation level. Prasad (2010) examined the relationship between the cashless economy approach and money related incorporation and exposed that shopper/client esteem recommendation, mindfulness, and foundation had a solid noteworthy association with budgetary consideration. He also found that the plan of action of monetary administration suppliers had an insignificant association with money related incorporation.

Manyika et al. (2016) explored the relationship between financial development, data correspondence innovation and monetary incorporation, and found that the spread of cellular telephones underpins the impact of money related consideration on monetary development, particularly in nations where portable budgetary administrations grab hold. Since 2010, the G-20 and the World Bank have steered the initiative for increased financial inclusion in developing countries to aid in reduction in poverty levels in developing and emerging economies. Today, the bearing of digital finance and financial inclusion for poverty reduction and economic growth address a number of issues that persist which if addressed can make digital finance work better for individuals, businesses, governments and the economy with benefits to financial services users, digital finance providers, governments and the economy (Malady et al., 2016)

Khan (2011) explains that the benefits of financial services technology and financial inclusion have not adequately saturated vast segments of the population suggesting that there is an existing gap between the availability of finance, its accessibility and use. One area where the disparity is quite pervasive and is receiving increased attention particularly among financial services technology providers is digital financial inclusion, financial data inclusion and digital finance (Scott & Zachariadis, 2017). At the same time, financial services

technology providers can promote economic growth by increasing the volume of financial transactions in the financial system.

According to Ketterer (2017) digital finance can result in greater financial inclusion, expansion of financial services to non-financial sectors, and the expansion of basic services to households. This is possible since nearly 50% of people in the developing world already own a mobile phone (World Bank, 2014). At the same time financial services technologies has the potential of providing affordable, convenient and secure banking service to poor households in developing countries. Improvements in the accessibility and affordability of digital financial services around the world can help millions of poor customers' transition from cash-based transactions to formal digital financial transactions on secured digital platforms (Hanning & Jensen, 2010).

International Finance Corporation [IFC] (2017) reports that the process of technological financial inclusion begins with the assumption that the omitted and underserved population have some sort of formal bank accounts and need digital access to enable them to carry out basic financial transactions remotely. If this population segment can understand and can be persuaded about the intended benefits of digital financial inclusion, then an effective digital financial inclusion program should be delivered responsibly at a cost that is both sustainable to providers and affordable to customers.

Technological financial inclusion promises to help financial institutions to lower costs by reducing queuing and manual paperwork. Financial innovation has enabled a large number of depositors easily switch banks within minutes; forcing banks to provide quality services or risk losing depositors to rival banks (Han & Melecky, 2013). For financial and monetary system regulators, technological financial inclusion also helps to reduce the amount of

physical cash in circulation and is contributory in reducing high inflation levels in developing and poor countries. This means that technology aided financial inclusion can improve the welfare of individuals as well as enable businesses to have a reliable digital platform with which to access funds in their bank accounts to carry out financial transactions. According to Ketterer (2017) the expected benefits of digital financial inclusion can be fully realized if the cost of obtaining a digital transactional platform by poor individuals is negligible or low, where a digital transactional platform refers to mobile phones, personal computers and related devices.

As a result of greater financial inclusion, individuals who were previously financially excluded will be able to invest in education, save and launch businesses, and this contributes to poverty reduction and economic growth (ADB, 2016). This makes an inclusive financial system to be desirable as it will provide opportunities for all people, mainly the poor, to access and move funds, grow capital, and reduce risk. Primarily, financial inclusion provides low-income individuals with the opportunity to save for the future which nurtures stability in personal finance, and a high level of use of bank deposits which contributes to securing a more stable deposit base for banks during times of distress (Prasad, 2010). Gomber and Koch (2017) add that greater financial inclusion can equally provide poor households with opportunities to build savings, make investments and access credit thereby enabling them to handle income shocks over unforeseen emergencies such as illness or loss of employment. At the same time, financial inclusion is known to yield positive effects for financial stability by substantially increasing the number of small savers.

Shaikh et al. (2017) elaborates that low-income groups are relatively immune to fluctuation in economic cycles, and as such, including them in the financial sector will improve the stability of the deposit and loan bases in the financial system. Ellis, Lemma and Rud (2010) add that

the financial institutions which cater to the lower end individuals tend to survive through macro-crises well and this helps sustain local economic activity. Prasad (2010) also observes that the lack of adequate access to credit for small and medium-size enterprises and small-scale entrepreneurs has adversative effects on overall employment growth because these enterprises tend to be more labor-intensive in their operations.

According to Sulaiman (2016) greater levels of financial inclusion through digital financial services can facilitate increased participation by different sectors of the economy in the formal financial system. This is because technology helps to increase the share of the formal financial sector while strengthening the case for the use of interest rate as a key policy tool for macroeconomic stability. This means that financial services technology can be viewed both as a business opportunity and social responsibility when self-help groups and microfinance institutions participate in inclusion programs, as two agents who are important in improving financial inclusion (Ketterer, 2017).

According to Demirgüç-Kunt and Klapper (2013), provided that the excluded population have a mobile phone and affordable internet connectivity, greater supply of digital finance is often predicted to have positive effects for financial inclusion. This implies that there is a positive correlation between the use of digital finance and access to formal financial services. ADB (2016) explains that the positive effects of digital finance for financial inclusion are varied but when applied to the lives of low-income and poor people can improve their access to basic services, and as a result lead to greater financial inclusion in rural areas. Ellis, Lemma and Rud (2010) explain that financial services technology channeled to rural and poor communities can improve access to finance for bank customers in rural and poor communities who cannot conveniently access banks located in the formal sector due to poor transportation networks and long queuing hours in banking halls, and will reduce bank

customers' presence in bank branches and reduce cost because bank would cost-efficiently maintain fewer branches, and the lower costs would have positive effects for bank profitability and financial inclusion in rural and poor communities.

According to Sulaiman (2016) easy-to-use digital finance has the potential of providing a convenient platform for individuals to carry out basic financial transactions including payments for electricity, water supply, money transfer to family and friends etc. The digital finance platforms should therefore be easy-to-use to enable users persuade their peers in the formal and informal sector to take advantage of digital financial services, leading to greater number of individuals using digital finance thereby leading to greater financial inclusion (Khan, 2011).

Duarte (2011) explains that providers of financial services technologies are profit-seeking corporations that use digital finance to maximize their profitability. As such, they can discriminately use a less-aggressive marketing tactic to persuade low-income and poor customers to use new or existing digital platforms or infrastructure if they believe they cannot afford the associated fees. This leads to lower financial inclusion for poor and low-income customers since the net monetary pay-off to digital finance providers is low in low-income and poor customers. According to Gomber and Koch (2017), there is also bias in the provision of financial services technologies because digital finance providers, based on their own internal risk assessment, may choose to withdraw the provision of specific digital finance services to high-risk rural areas or communities. Bruhn and Love (2014) add that educational bias can also be introduced in the provision of digital financial services if the net monetary value of providing digital finance to poor communities is very low. This means that financial services technology providers, based on their profitability assessment, can choose to

focus less on the delivery of digital finance to poor and uneducated communities that do not have the basic financial literacy to use and understand digital finance.

Internet and Mobile Banking

Mobile banking refers to any transaction which involves the transfer of ownership or rights of using good and services, which is initiated and/or completed by use of mobile access to computer-mediated networks with the aid of an electronic device (Mabwai, 2016). Mobile banking also entails providing and availing bank related financial services with the help of mobile telecommunication devices. It is the provision of banking services with the help of mobile devices. Mobile banking has become an integral part of modern banking across the globe. In most countries, more than half of the population is using mobile and internet banking and the number keeps on growing (Atman, 2013). This has improved financial inclusion in most countries.

In countries like Brazil, the banks are expanding their outreach by hiring local correspondents to offer their services. They do this by opening up retail points as cash merchants, banks, telecom companies and other financial service providers can offer savings services in a commercially viable way and by doing this they also reduce fixed costs and encourage customers to use the service more often, therefore providing access to traditional revenue (Atman, 2013).

Mobile and internet banking offer the clients services which benefit them like lower transaction cost, services are brought closer to the client, longer operating hours, shorter lines than in branches, more accessible for illiterates and the poor who often feel intimidated in banking halls. Financial service providers also benefit from increased sales from additional foot-traffic, differentiation from other businesses, reputation from affiliation with well-known

financial institutions, additional revenue from commissions and incentives, increased customer base and market share, increased coverage with low-cost solution in areas with potentially less number and volume transactions, increased revenue from additional investments, interests and fee income and improved indirect branch productivity by reducing congestion (Mbugua & Omagwa, 2017).

In order to remain competitive, the banking sector has had to adapt to the technological changes. Looking for competitive edge in the technological financial service industry has seen the need to differentiate themselves from other financial institutions through introducing new service distribution channels. Traditionally, banks used bureaucratic process of opening accounts which cut out many rural poor people since they could not qualify to own accounts. Competition made banks simplify the process and devise innovative ways of doing so (Alt, Beck & Smits, 2018).

Technology has gone through major changes over the past few years and this has changed the way people do business (Al-Jabir, 2012). Advancement in technology has brought about the evolution of m-banking and online banking in the banking industry which has revolutionized the way in which commercial banks conduct their business. Availability of internet has made financial organizations to be able to provide banking services online and through mobile. It has also made it easier for customers to access financial services and other benefits. This has brought about financial inclusion since people can be able to access financial services anywhere and anytime.

The shift from traditional banking to mobile banking has prompted banks to devise ways of attracting more customers and also retaining the existing customers. Banks are adopting mobile banking as a way of reducing both operational and administrative cost and also coping

with competition. Reduction of costs however can only be realized with an increase in customer adoption (Rahayu & Day, 2017). Advancement in technology in the area of telecommunication and information technology has been revolutionizing ways of doing business in the banking industry. Service delivery in the banking industry has gone through major changes during the past few years. All over the world, the banking industry is becoming turbulent and competitive and this has forced commercial banks to innovate for survival. Banks have been responding to these changes by adopting new strategies which mainly focus on building customer satisfaction by offering better products and services and also minimizing operational costs. Building customer satisfaction has enabled more people embrace banking practices and therefore improving financial inclusion (Di Castri, 2013).

A good banking environment is a major enabler of financial inclusivity (Rahayu & Day, 2017). In order to keep up with technological changes that are happening in the banking industry, it is important for commercial banks and other institutions to embrace mobile banking in order to be able to meet customer demands. Providing financial services through internet has proved to be very efficient and effective in terms of controlling costs by employing automated ways of transacting other than the traditional labor intensive and thus higher productivity and profitability. There has been growth in partnership between financial institutions and other service providers and this has led to an increase in m-banking and financial inclusion as customers can transact and clear utility bills through their mobile phones (Omwansa & Waema, 2014).

Financial Inclusion

According to Demirgüç-Kunt and Klapper (2013), financial inclusion on a broader sense to financial services is an absence of price and non-price barriers in the use of financial services.

In order for financial inclusion to be realized, financial services should be available to all. The financial services offered should meet the following qualities; should be affordable, convenient, product fit, safe, should have dignity of treatment and should be able to protect the clients. Financial inclusion also includes providing full basic financial services like basic credit, savings, insurance and payment services (Ouma, Odongo & Were, 2017).

Financial exclusion on the other hand in the context of the larger picture is the issue of social exclusion of a certain group of people from the mainstream of the society. It has been defined by Kimaiyo(2016) as the processes that serve to prevent certain social groups and individuals from gaining access to the formal financial system. Financial exclusion has been defined by Nair (2017) as inability of some societal groups to access financial services. Financial exclusion is a situation where poor and disadvantaged groups are denied access to formal financial systems. Ozili (2018) says that financial exclusion indicates the lack of access by some societal groups and individuals of fair and safe financial products and services from mainstream providers.

Many people from the developing nations cannot access banking services. This is because they are faced with barriers like cost, geography and education. They have no way of transferring money securely, saving money, insurance or accessing credit (Ouma et al., 2017). In order for the goal of financial inclusion to be realized, these four services need to be made available to every household. Accessibility to credit gives households a chance of using future income to manage current vulnerabilities or to take advantage of investment opportunities. Savings services gives one a chance of a safe and value retaining place where one can store funds and this allows one to tap into “past income” as needed. Insurance on the other hand provides protection against vulnerabilities to shock like death, illness or disability

in the family. Payment services provide a way of carrying out financial transactions without having to be face-to-face (Kobayashi, 2017).

Accessibility of these services has many dimensions. The services should be available when desired, the products need to be tailored to specific needs, the services should be affordable and this includes all non-price costs like having to travel a long distance to a bank branch; and also these services should make business sense, translate into profits for the providers and thus be available on a continuous basis. It is not easy to measure access. Usage is what is used as a proxy, although it can underestimate the number of households that have access because it fails to capture those who currently have access to a financial service but are not using it (Thuku, 2017).

Mobile Banking and Financial Inclusion

Mobile and internet banking contributes to financial inclusion by devising some market instruments and enabling access to financial services. Mobile banking has become the most common mobile money concept since it enables the subscribers to carry out banking transactions like checking of account balance, fund transfers and also bill payments through the mobile phone. It is also possible to save money on your mobile phone and this encourages a culture of saving without requiring minimum account balance and other traditional fees (Kobayashi, 2017).

Kithinji (2017) conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya. A descriptive survey research design was used where all the 42 commercial banks in Kenya were involved. The target population was the registered 42 commercial banks in Kenya as at 31st December 2016. The study used quantitative secondary data from CBK annual reports for 2012 – 2016. In analyzing the quantitative data,

the study used descriptive statistics and regression analysis while qualitative data was analyzed using content analysis. From the findings, it was concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. There was a significant positive change in financial inclusion as proxied by the number of accounts, deposits value, number of outlets and customer base, over the 5-year period.

The most significant digital banking strategy is mobile banking followed by ATM banking, agency banking and online banking respectively. The study recommends that there is need for the management of the commercial banks to collaborate with the telecommunication players to enhance uptake of mobile banking (Dzombo, 2018). The government through relevant ministry needs to continue investing in internet connectivity to increase access to online banking. The bank management should constantly review their agency policies to increase the number of agents for increased financial inclusion. The commercial banks should continue investing on the modern ATMs that allow for diverse banking services hence increasing banking of the unbanked. Having focused on the effect of digital banking strategy on financial inclusion in Kenya a similar study should be done among other financial institutions other than banks for comparison purposes and to allow for generalization of findings. A study should also be conducted on the effect challenges facing the adoption of digital banking strategies among banks in Kenya (Kemal, 2018).

Mobile banking provides credit services where users can access micro loans. Mobile network operators are collaborating with financial service providers to provide affordable financial services that are safe, secure and convenient to millions who were previously left out of the banking industry. This provides an opportunity for efficient exchange of goods and services

by reducing transaction time at the point of sale, providing versatility by enabling customers to use a single device for multiple services (Omwansa & Waema, 2014).

Carrying out transactions with mobile banking is lower in costs and has higher accessibility level. Subscribers are now using mobile banking for services like domestic and international remittances, bill payments, payroll deposit, loan receipt and payment. Mobile banking is also able to facilitate the flow of money from one party to another by utilizing communications infrastructure that already connects billions of customers around the world. Mobile banking increases risk sharing and improve consumption smoothing (Pau, 2013). It reduces the cost and risk inherent in dealing with cash. Mobile airtime is also a new market instrument in which phone companies allow individuals to purchase the airtime and to send it to other users who in turn sell it to local brokers/agents in return for cash, or for goods and services therefore affecting a transfer of purchasing power from the initial sender to the recipient (Omwansa & Waema, 2014).

2.3.2 Collaterals

Collateral refers to security or guarantee for the loan borrowed. Collateral acts as an indication enabling a financial institution to attenuate or eliminate the adverse selection problem caused by the existence of information asymmetries between the bank and the borrower at the time of the loan decision. Although bank knows the credit quality of the customers, the collateral helps to alleviate moral hazard problems once the loan has been granted. Consequently, problem of moral hazard faced by the bank in lending could be restrained by having collateral. As stated by Li & Wong (2018), collateral can therefore be seen as an instrument ensuring good behavior on the part of borrowers, given the existence of

a credible threat. Hasnah (2012) has found that character/management plays a significant role on the probability of loans approved by credit officers.

Formal and informal banking institutions always demand collateral to act as a security on loans which is not the case for accessing credit on the Mobile banking platform. This is often in the form of houses or deed to some immovable assets. This precondition plays a major part in the accessibility of loans and the situation may be more complicated for women entrepreneurs, who may not have right of ownership to expensive property including land and houses. Women's access to finance especially at the small and medium enterprise level is a major constraint to start and expand businesses (Gichuki, Njeru & Tirimba, 2014). According to Mugo and Kilonzo (2017), the historical development and the associated culture, of the banking system underpin the problem of the emphasis on the provision of collateral as a primary condition in lending. Banks have always adopted a risk averse stance towards small firms, with an accompanying inability to focus on the income generating potential of the venture, when analyzing the likelihood of loan repayment.

Charles and Mori (2016) found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. They also found that if a firm works with multiple banks, it increases the probability of pledging collateral for long term loans while it decreases the probability of pledging collateral when acquiring short term loans. Collateral is often considered as part of the supply function for bank debt (Carrolla & McCannb, 2017). A higher availability of collateral is expected to increase the supply of bank debt since collateral can mitigate the informational asymmetries between borrower and lender. Increasing the supply of bank debt for a certain firm decreases the probability of creating an excess demand and thus decreases the probability of credit rationing. Hence, collateral can help solving

credit rationing for any specific firm. Charles and Mori (2016) consider business collateral as an asset belonging to the borrowing firm, that will be transferred to the lender in the event of default. As such, business collateral (or inside collateral) does not increase the assets that the borrower would lose in case of default, since all the borrower's assets are attachable. Personal collateral/guarantee refers to assets not belonging to the legal entity of the firm but provided by an external party or owner/manager of the firm.

Gakuu, Wachira and Kagwiria (2015) conducted a study on influence of collateral requirements on SACCO's credit accessibility in Imenti North Sub-County, Kenya. The general objective of the study was to assess the influence of collateral requirements on credit accessibility of SACCO's in Imenti North Sub-County, Kenya. The target population of the study was 34 registered SACCO's which offers credit and the management employees were the study respondents. Results revealed that collateral requirements have a moderate influence on credit accessibility in SACCO's. Pearson correlations also indicated that collateral requirements have a major positive significance contribution on credit accessibility. It was recommended that SACCO's should therefore possess a wide range of collaterals and also develop a policy which allows the use other forms of collateral other than guarantors and shares only. This will certainly increase access to credit in SACCO's.

Financial presence makes saving easier and enables amassing and diversification of assets while boosting economic activity in the process (Clark, 2017). As economies continue to grow, regions must take crucial steps if it wants to escape the poverty trap, and even more so now as commodity exporters face a downward terms-of-trade trend, deliver more financial services to people and institutions (World Bank, 2014). Yet access to financial services for the poor has been limited due to minimum bank balance requirements, high ledger fees and the distance between poor people's homes and bank outlets hinder their access to financial

services and credit. Furthermore, unaffordable collateral technology raises costs more than anything else, and the financial products available are often not suitable for customers with low and irregular income (Clark, 2017).

Financial institutions have had to bear high costs to provide financial services to the poor. Market segmentation, low technological development, informality, and weak regulation increase the costs of doing business (Bruhn & Love, 2014). In Kenya, and in Africa more generally, markets are heavily segmented according to income, niche, and location, and their sophistication, level of development, and formality or informality reflect that segmentation (Atambo & Momanyi, 2016). High customer-monitoring costs, perceived higher risk, and a lack of transparent information have been almost insurmountable challenges for banks, and microfinance and other specialized institutions have not been able to fill the gap (Manyika et al., 2016).

Lenders can link a customer's individuality to digital transaction data, enabling more effective credit appraisals, and use the payments and document functions for efficient underwriting, processing, distributing and loan collection. India has a large SME funding cavity that is as much about market size as it is about traditional banks' unwillingness to lend except to known borrowers who have adequate collateral. As in some of the developed markets there has been strong growth of non-bank alternative lenders addressing this gap in small firm financing with innovative digital solutions, quicker turnaround, analytics and credit-scoring driven underwriting and cost effective customer acquisition (Malady et al., 2016).

According to Abbasi and Weigand (2017) forms, reengineering, innovative strategies for cooping and better performance of the financial technology sector are unfolding by day,

leading to acquisition of financial innovative devices and products to enhance service delivery and cope with the volume of activities and operations innovation is at the center of global change curve. The Basel accord supported financial intermediation dynamism through strong and competent supervisory structures, appropriate capital adequacy and essential information technological (innovation) content. Many companies in the financial services sector struggle with the collateral requirements for FinTech adoption but still have been quick to implement telecommunication capabilities as electronic service is becoming a viable option for interaction between financial service providers and their customers (Hu, Ding, Li, Chen & Yang, 2019).

Khan (2011) advised that where collateral requirements are linked to capital requirements, crowdfunding allows small businesses to raise money quickly and cheaply from all over the world, often bypassing onerous collateral and credit requirements. Cai (2018) adds that new peer-to-peer systems eliminate intermediaries and speed up payments via instruments such as bitcoin. Lending has therefore dramatically hastened through data-driven algorithms that quickly pre-qualify borrowers based on a handful of data points such as personal credit scores, deposit account data, tax returns, and recent bank statements.

Malady et al. (2016) notes that the regulatory landscape surrounding Fintech products and services will continue to change significantly, as existing laws are interpreted in new ways, and more importantly new laws are enacted, to deal with the unique collateral requirements presented by the financial technology industry. Regulators also struggle to navigate this maze too, for there is always the risk of imposing too many regulations and costs on growing Fintech companies, consequently undermining innovation (Hu et al., 2019).

Prasad (2010) suggests that FinTech applicants might be mandated to hold more than the usual minimum collateral requirements because a startup could be at greater risk of financial losses than a more established business. Khan (2011) outlines two potential scenarios in which an applicant may end up needing to hold additional capital. One details a FinTech using an aggressive loan-pricing strategy to gain market share, in which case it could need extra capital to keep up with the pace of lending. And another points out that a startup may be more likely to evolve its business model as it grows, which would mean the risks it faces might change, requiring additional capital to protect its business.

Minimum capital requirements are already high for a new bank in, financial services technology adoption and this is one of the main reasons so few have successfully established themselves (Mohan & Potnis, 2015). Collateral measures have changed capital requirements for banks, introduced new liquidity and funding measures, and instituted new leverage ratios. Financial institutions that have invested in their technology offerings, either through partnering with a Fintech company or internal technology innovations, will be in a position to be most competitive; they can leverage more and better data to answer customer demands, maximise marketing efforts, easily integrate new services, and be able to satisfy the regulatory requirements (Hu et al., 2019).

While the FinTech license as proposed by Deen-Swarray (2016) removes many regulatory hurdles, it still imposes capital requirements on FinTech companies. But the only justification for capital requirements is to tackle systemic risks. Complying with new regulations whether around ring-fencing or money laundering invariably requires extensive reprogramming or changes to IT systems. This reduces the profitability of many products, forcing financial services companies to look for cost savings. With IT accounting for a significant slice of the

cost base, financial institutions have to rebuild IT infrastructure, sometimes extensively (Demirguc- Kunt & Klapper, 2013).

2.3.3 Transaction Costs

Transaction costs associated with information asymmetry and market frictions play a central role, influencing key decisions regarding human and physical capital accumulation and occupational choices. These market frictions are critical in generating persistent income inequality or poverty traps. According to Demirgüç-Kunt and Klapper (2013) in theories stressing capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or physical capital. In theories stressing entrepreneurship, financial market imperfections determine the extent to which talented but poor individuals can raise external funds to initiate projects. Thus, the evolution of financial development, growth and intergenerational income dynamics are closely intertwined. Finance influences not only the efficiency of resource allocation throughout the economy but also the comparative economic opportunities of individuals from relatively rich or poor households. The use of mobile banking attempts to reduce these market frictions for low income groups. Information asymmetry is a situation where by the one party has more or better information than the other. Reducing financial market imperfections to expand individual opportunities creates positive, not negative, incentive effects. Mobile banking is not influenced these transaction costs (Bachas, Gertler, Higgins & Seira, 2018).

The reason perceived cost is included in the framework is because it plays an important role for SMEs in determining adoption of ICT in their business. The costs of the service is considered as one of the most imperative factors in the decision making process. This is because it determines the customer's ability to use the service depending on availability of

the specified amount and their set budget. Perceived cost is the perceived quantifiable costs of acquisition and use of technology (Koenig-Lewis, Palmer, & Moll, 2010). Referring to Luarn and Lin (2005) definition, perceived financial cost is “the extent to which a person believes that using mobile banking was cost money.” The MEs was less likely to adopt ICT when its initial set-up cost is high. Gachara (2017) stated that small businesses often have difficulty in obtaining financial resources. Any new technology like ICT may be considered too expensive to many MEs because of their lack of financial resources. Gachara (2017) established that MEs face specific problems in the formulation of their innovation strategies due to their limited resources and range of technological competencies. Mobile phones provide technological services that reduce costs; increase income and increases reach-ability and mobility. They can help to extend social and business networks and they clearly substitute for journeys and, for brokers, traders and other business intermediaries. According to Gachara (2017), mobile banking systems are providing good money transfer and payment services to early users. However, there was need to be better marketing and training involved to help consumers understand what the systems are capable of, as well as, improved policy measures to ensure that the benefits of mobile banking is evenly distributed across all banking and consumer sectors.

According to behavioral decision theory, the cost-benefit pattern is significant to both perceived usefulness and ease of use of technology (Mohan & Potnis, 2015). This is because if consumers perceive the cost of mobile money service as acceptable, they will adopt it easier, and then use it. According to Chen & Wang (2007) economic motivations and outcomes are most often the focus of financial services technology but service cost consideration may prevent many people from choosing mobile money service. Furthermore, hardware/software and financial resources are important for users of an information system

(Micheni et al., 2013). Financial cost is likely to directly influence the user's intention to use digital financial services.

Over the last decade mobile money has risen as an important innovation where individuals, households and businesses conduct financial transactions over mobile phones (Morris & Venkatesh, 2010). According to Donovan (2012), mobile money refers to the provision of financial services through a mobile device. With mobile money, households can move money on their mobile phones without physically visiting the bank or through mobile money agents that are now present even in remote villages. This decreases households travel time and costs. In addition, mobile money is associated with fast and timely transfer of money, hence reduces transaction costs associated with accessing financial services (Jack, Suri & Townsend, 2010)

Kpodar and Andrianaivo (2011) found a positive correlation between financial inclusion and mobile penetration. They note that mobile phone penetration improves credit allocation process, leading to broader presence in the financial system. ICT and mobile network services guarantee a better flow of information. This helps decrease both information asymmetry and transaction costs of providing financial services to the deprived (Donovan 2012; Kpodar & Andrianaivo 2011). This reduction in transaction costs between lenders and creditors is made possible as it ensures timely availability of information (Demirgüç-Kunt et al. 2008). The information flow helps lessen price unpredictability, adding to the positive economic effects of mobile telephony. Financial inclusion is achievable because ICT facilities bridge the infrastructural cavity in delivering financial services to the marginalized (Diniza, Birochi & Pozzebon, 2012). Financial institutions in the formal market mobilize deposits and lend to those who need financial resources. Interest rates are generally relaxed, and determined by market forces. Transaction cost of providing financial services in such

markets is relatively low. Financial institutions in the most economies include commercial and development banks including agricultural and industrial development banks.

Mobile banking and mobile payments have the ability to expand financial services to the unbanked and under-banked by reducing transaction costs and growing the accessibility of financial products and services (Woodhouse, 2016). While financial system regulators can use their legal powers to force financial inclusion on the population, the consequence of such action is that the population may register on a digital finance platform but may not use it to perform basic transactions. This then creates a new problem for digital finance providers that hope to make profit from large volumes of financial transaction via digital FinTech platforms (Shaikh et al., 2017). Furthermore, smart individuals and businesses can suspect that there are ulterior motives behind involuntary inclusion because they know that inclusion should be voluntary. It is still unknown whether forced inclusion will be effective. Assuming forced financial inclusion can be imposed on the 'banked' population by enforcing financial ultimatums, the enforcer will sooner or later realize that ultimatums only works for the population that have formal bank accounts, not for the unbanked population (Khan, 2011).

Financial institutions have always invested in the development of more sophisticated technology capabilities in order to improve payment operations and client service reduce risk, lower costs and establish a competitive advantage (Kim, Huber & Lohmueller, 2015). New technology in particular has both enabled and in turn been powered by a huge invasion of new providers and products, all contending to enter the payments space. This has contributed to an element of unbundling of financial services, with previously comparatively-sheltered business sectors increasingly exposed to growing competition, and with non-banks offering attractive, cost-saving solutions that aim to provide better overall experiences for clients (Abdi, 1977). By leveraging such technology to make cross-border payments immediate,

cost-effective, and completely transparent and risk free from a regulatory perspective, payments will become transformed.

Digital finance has improved access to financial services by under-served groups by reaching remote locations. The promise of digital finance to reach scale, reduce costs and broaden access is unparalleled (Han & Melecky, 2013). Financial services could be provided to more people with greater speed, accountability, and efficiency. It may also be a means of coping with change in the regulatory environment and driving down the costs involved in meeting the corresponding requirements (Kang, Shin, & You, 2013). Innovations from FinTech players may speed up transfers and payments and cut their costs. In the area of cross-border transfers, FinTech companies can provide faster banking services at lower cost as well as be a means of coping with change in the regulatory environment and driving down the costs involved in meeting the matching requirements.

Financial technology has also contributed to creating a new face for the global financial sector and offered many new improvements to solve the problems and obstacles that customers often face in their financial transactions (Ketterer, 2017). With the rapid growth of mobile technology, the financial transaction has continued to be optimized and simplified by using the financial support applications through smartphones. This can assist the customers to minimize the transaction costs as the recipients can receive money instantly without having to wait too long and as save time for the customers. Retail investment is also facing a period of innovation as it does not only focus on investing in high-tech products, but also attempt to minimize the transaction costs for the customers (Litondo & Ntale, 2013).

By utilizing the technology advancement, FinTech has facilitated numerous financial services with better user experience and lower cost (Malady et al., 2016). This financial services

technological sector, despite being recently developed, has instituted its solid ground for building the imminent financial products. Due to their lower fixed costs, improved customer experience, and efficiency improvements, FinTech companies are threatening the banking and investment sphere. FinTech innovations have helped banks deliver enhanced risk assessment, lower fixed asset investment requirements, reduce transaction costs, make operational back offices more efficient and enter new markets. At the same time, banks can help FinTech innovators address their target markets (Russell, 2017).

FinTech has the potential of bringing benefits, including cost reductions and faster provision of financial services by supporting the streamlining of business processes (Demirgüç-Kunt & Klapper, 2013). Nonetheless, digital finance applied to operations of financial service providers raises a number of operational challenges, such as cyber security and ability to overcome division of standards and processes across the industry (Khan, 2011). Moreover, potential idleness of specific front, middle and back-office functions or even of entire market players due to automation via digital financial solutions might have adverse implications in terms of employment in the financial industry, even though new jobs would also be created as part of the financial services technology adoption.

FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs (Ketterer, 2017). However, a certain level of standardization and interoperability will be required before financial service providers would be able to reap the full benefits that outsourcing can deliver. In terms of risks, increased outsourcing may make the monitoring and management of these processes more challenging, with potential sensible and market oversight implications. Transaction costs are a significant barrier to the take-up and use of formal financial services (Prasad, 2010). The reduction in indirect transaction costs could also improve financial inclusion.

2.3.4 Convenience

The Kenya government recognizes the role-played by the mobile phones, and associated technologies in the economic growth and development (Ketterer, 2017). Therefore, together with other stakeholders and development partners, Kenyan government has encouraged the development of communication infrastructure such as communication commission of Kenya (CCK), which is regulating the mobile service providers, fixed line service providers, and other stakeholders in provision of the service industry (CAK, 2018). At the same time, the government has recognized with concern the growth of micro-enterprises as the foundation blocks of development and industrialization. Mobile telephony adoption is on the rise and the related technological innovations have dramatically enhanced the capabilities of the mobile phones (Muriuki, 2014).

About two billion people worldwide are using a mobile phone. As the number of mobile phones, increase there has been a pervasive impact on people's lives. Mobile phones adoption and use has a positive and significant impact on economic growth, and this impact may be twice as large in developing countries as in developed countries (ITU, 2018). In Africa, particularly it has been said that, "People in Africa use mobile phones very differently. Most strikingly is the accessibility of mobile as the overall impact of mobile extends well beyond what might be suggested by the number of subscriptions alone". In Kenya there has been a sporadic mobile phone subscription by the rural and urban populations. The number of mobile subscribers in Kenya has risen to 8 million subscribers from 6.5 million subscribers in June 2006, from the country's two operators Safaricom and Airtel against 293,400 fixed lines (ITU, 2018).

According to Kim et al. (2015) financial services technology has disrupted the financial services industry and is creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide. Kang et al. (2014) note that some banks may view FinTech as a threat but still find ways that they can still stay ahead of the curve by keeping up with the technologies that matter most to modern day consumers. As a result, executives are continuously looking for new ways to improve the customer experience through innovative financial services technologies and digitization. According to Schierz et al. (2010) financial institutions are ahead of the FinTech curve when it comes to enhancing the customer experience, utilizing technologies like artificial intelligence, Smart ATM's and master data management.

Financial services technology has recently been driving significant change across financial sector by facilitating a more secure, efficient and inclusive environment by simply lowering costs associated with these services (Abdi, 1977). As a result, they lower the barriers for a number of individuals to engage them as well as allow new models for data to be evaluated in domains such as credit scoring. Technology in finance thus allows individuals to offer their financial assets and enabling them to engage with other consumers in a range of different arrangements and financial structures. According to Chen & Wang (2007) an environment that is able to achieve such a seamless and efficient workflow would demonstrate to be the perfect facilitator for further innovation. With achievement of greater efficiency, humanity moves forward by pushing the established bounds and conceiving fresh models and instruments, exposing inaccuracies, new inefficiencies, and fallbacks.

According to Wamuyu (2014) convenience in the financial sector materializes if an interface goes beyond the services of transfers, deposits and withdrawals to include investment advice and portfolio management to ensure the most efficient use of the client's time. Morris and

Venkatesh (2010) explain that this is essentially the clients' demands in their desire for greater accessibility and by extension convenience. According to Collins (2009) the margins for efficiency are getting smaller and smaller by the day and costs associated with a second of consumer time and convenience is gaining greater value.

As clients are becoming accustomed to the digital experience offered by companies such as Google, Amazon, Facebook and Apple, they expect the same level of customer experience from their financial services providers (Sanfillippo & Fichman, 2014). This is because Financial Services technology is riding the waves of disruption with improved solutions that can better address customer needs by offering enhanced convenience, accessibility and tailored products. The pursuit of customer centricity has become a major priority and it will help to meet the needs of digital innate clientele. Financial institutions are moving towards non-physical channels by implementing operational solutions and developing new methods to reach, engage and retain customers (Waiganjo, 2018).

According to Potnis (2014) mobile smartphone adoption is among the drivers of changing payments patterns. He argues that mobile-first consumers expect convenience, immediacy and security to be integral to payments. Mohan and Potnis (2015) explain that consumers have a culture of on-demand streaming of digital products and services and as such archaic payment solutions that take days rather than seconds for settlement are considered unacceptable. This motivates both incumbents and newcomers to develop solutions that enable transfer of funds globally in real-time. Sulaiman (2016) agrees that end users also expect a consistent omni-channel experience in banking and payments and this makes digital wallets crucial to streamlining the user experience and allowing reduced friction at the checkout points. At the same time, end users expect all of this to be safe meaning that security and privacy are vital to stimulating support for nascent forms of digital transactions

as well as solutions that leverage biometrics for fast and robust authentication coupled with complication technologies, such as tokenization, are critical components in creating an environment of trust for new payment standards (Han & Melecky, 2013).

Micheni et al. (2013) advice that FinTech companies not only bring concrete solutions to a morphing consumer base but they are empowers customers by providing new financial services that can be delivered with the use of technological applications. The rise of financial services technology allows consumers to connect to information anywhere at all times, and digital financial services can address their needs more conveniently compared to traditional nine-to-five financial advisors (Mohan & Potnis, 2015). This makes it clear that security, convenience and speed will remain as priorities for financial institutions. Many FinTech disruptors have focused on convenience and speed but typically fail to deliver on security. This could be the reason why financial institutions have shifted their perception of FinTech companies from being disruptors to potential partners. FinTech companies have found that they need financial partners as well in order to succeed, as they offer a modern client experience, albeit without the security that consumers expect (USAID, 2016).

When it comes to financial services, the main benefit most financial services technology companies newcomers have over traditional banks and credit unions is convenience (Tirok, 2012). There have always been people willing to pay a higher price for more convenience but still many are shocked to see how much some businesses are paying for a quick loan (Shaikh et al., 2017). Mainstream lenders have are therefore ready to make traditional banking less cumbersome, but that's easier said than done for some borrowers. While large financial institutions have the capital to invest more heavily in technology to compete, it can be a struggle for small to medium sized banks. According to Khan (2011) the speed at which

technology is changing is not something these community banks aren't used to or equipped for.

Customers have sophisticated expectations than ever before and they are expecting companies to leverage all available data to tailor solutions to fit their needs (Demirgüç-Kunt & Klapper, 2013). Customers also have more options. As a result of digitalization of these traditional services, the alternative possibilities are now seemingly endless. According to Litondo and Ntale (2013) for every financial service, there is handful of FinTech companies offering a solution available right at customers' fingertips. The differentiator however, will be cost, convenience and personalized customer service. Fintech companies are filling a need not previously met by traditional financial institutions by offering a more personalized and engaging experience through a wide selection of channels. Being able to provide exceptional customer service not only attracts customers but also builds loyalty (Abdi, 1977). This general sentiment holds factual for all businesses in general.

For financial institutions, financial services technology helps them perform their core business services such as deposits and asset management, loans and financing, fund settlement and remittance (Hanning & Jensen, 2010). On the receiving end of these services, FinTech can assist financial corporate clients manage their expenses and payrolls while aiming to offer convenience to the financial institutions themselves by making their front-end tasks and back office tasks more efficient and sophisticated. Those in the FinTech sector expect FinTech services to create added value impossible with conventional ICT alone, and to make the accompanying financial services more convenient for financial institutions and other users (Schierz et al., 2010).

Financial services technology is changing how people transmit money, both in the form of payments where money is exchanged for something of value and transfers where money is transmitted between individuals or organizations (Manyika et al., 2016). Many financial companies are using new technologies to create faster, cheaper, and more convenient payment and transfer systems. Joshua and Koshy (2011) explain that in the late 1960s, banks introduced self-service ATMs to improve customer convenience and make their tellers more efficient. Businesses get value from online invoice financing models through increased access to funding and convenience. Mobile wallet services offer consumers the convenience of instant transactions, without entering credit card information and pin numbers each time they make an online transaction (Sanfillippo & Fichman, 2014). Some mobile-wallet services remove intermediation costs by creating nonstop relationships with credit card companies, passing along the savings to consumers and merchants.

According to Boyd (2017) in the past, banks competed largely on price, product and scale of the branch network. Banks with large branch networks won customers through convenience and visibility. However today, the main competitive front is convenience coupled with customer experience, which associates those traditional elements with a new emphasis on simplicity and convenience of interactions across a variety of channels, responsiveness to consumer requests and a proactive approach to continuous engagement with customers all aimed at helping consumers to increase their financial well-being (Gomber & Koch, 2017).

The advent of FinTech has changed consumer expectations around the delivery and types of financial services (Ellis, Lemma & Rud, 2010). Consumers now anticipate being able to complete a streamlined loan application online and receive a swift, if not almost immediate reply. They also appear to be embracing novel ways to automatically move money to savings, quickly transfer funds to other people and better manage their finances (Potnis, 2014). As a

result of these trends, banks are now feeling increased pressure to update and diversify their delivery mechanisms to stay competitive, particularly in the consumer and small business lending and payments channels.

Some of the latest innovations offer consumers convenience, speed, and reliability, and provide banks the ability to access and analyze big data quicker and sometimes cheaper than ever before (McKinsey, 2016). Other innovations can address some of the financial system's long-standing challenges, including the ability to facilitate direct payments between buyers and sellers and to direct households' and businesses' savings to their most productive uses, such as building homes, expanding businesses, or obtaining an education. FinTech has the ability to be a disruptive force, creating competitive pressures for banks in terms of speed, convenience, price, and maintaining customers (McKinsey, 2016).

The most important element for financial services technology adoption companies to concentrate on is customers (Russell, 2017). They must find innovative and cost effective ways to acquire and retain customer loyalty in an environment where the barriers to churn are lower. For instance acquiring customer trust and providing a seamless experience by reducing friction in digital transactions. Within payments interoperability between players will improve customer convenience (Sanfillippo & Fichman, 2014). According to Deen-Swarray (2016) consumers overpoweringly prefer their current financial institution to provide them with the new value-added digital services they want. When asked why they prefer their current primary financial provider, the most commonly cited reason consumers give is convenience, expectation of good value and a preference by some consumers to use fewer providers.

The aspects convenience, security and monetization are also appropriate for traditional banks, especially for the digital accounts/online banking offered by banks (Boyd , 2017). A banking ecosystem would be in a situation to fulfill these requirements and could also work with more flexible open, standardized interfaces, allowing the customer to move as freely as possible within the bionetwork and third party providers to link up with the banking infrastructure with a minimum of hassle. Traditional financial institutions now have the opportunity to face up to the challenges of digital structural adjustment in what is not only a self-protective reaction, but also in such a way that they are also perceived as innovative, serious market players eager to take an active part in the remodeling of financial services (Jack, Suri & Townsend, 2010).

2.3.5 Perceived Value

Perceived value of mobile banking service in this study mean the customers' overall perception of it benefits and sacrifices needed to use it. Ling, Fern, Boon, and Huat (2016) definition of perceived value is “the overall assessment on the product or service utility determines by customer's perceptions of what is received and what is given. In services, it involves the comparison of what one is getting that is benefits and what he has to give up in terms of sacrifices in order to receive the service (Thaker, Pitchay, Thaker & Amin, 2019).

The benefits include the value desired by the customer while sacrifices include monetary and non-monetary considerations (Scheepers, 2015). Sacrifice factors denote what the customer is expected to part with or forego, in exchange for obtaining the service. These may include cost and risk associated with the use of a particular service; in this study, mobile banking services usage. Ease of use is enhanced by the use of simple technology and applications that are easy to operate; such that little technical knowledge is required in using the system. Low effort

expectancy can be said to be a benefit factor in the adoption of new technology and thus an important factor in explaining the usage of mobile banking. Benefits e-commerce to SMEs includes lower administrative cost, increased internal efficiency, improved relationship with business partners, improve competitiveness; improve quality of information (Meroño-Cerdán, 2017). Perceived benefits have been ranked as main factors for small firms' Internet adoption. M-banking provides benefits to SMEs like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players (Mbawuni, 2018). Therefore; we can conclude that perceived benefits is one of the main factors for e-banking adoption by small firms.

According to a study by Sewanu (2015) it stresses that ICT implementation in the organization which includes SMEs has the potential to reduce costs and increase productivity level. According to them small firms might find cost-effectiveness as a motivating factor to use Internet-commerce for improving communication with trading partners and consumers. Isaac (2014) have given their experts opinion that ICT impacts include cheaper and faster communications, better customer and supplier relations, more effective and efficient marketing, product and service development and better access to information and training. Isaac (2014) found a positive impact on ICT usage in business and it is able to increase business performance.

2.3.6 Summary of Literature

From the discussion of the theoretical and empirical literature, limited research has been conducted on the relationship between mobile banking and financial inclusion in Kenya. The studies have been undertaken on the factors that influence technology adoption. There is scarce empirical evidence regarding what informs adoption of mobile and internet banking.

Specifically salient aspects of convenience, transaction cost, perceived value and collateral have received minimal attention. For example the moderating effects of convenience, transaction costs, perceived value and collaterals on the relationship between financial services technology adoption and financial inclusion has not been covered in the reviewed studies. Further, the influence of mobile banking and internet banking on financial inclusion has received little attention

2.4 Conceptual Framework

According to Kombo and Tromp (2009), a concept is an abstract or general idea inferred or derived from specific instances. A conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation. Mugenda and Mugenda (2003) and Smith (2004), define a conceptual framework a hypothesized model identifying the model under study and the relationship between the dependent and independent variables. Kothari (2008) defines an independent variable also known as the explanatory variable is the presumed cause of the changes of the dependent variable, while a dependent variable refers to the variable which the researcher wishes to explain. The goal of a conceptual framework is to categorize and describe concepts relevant to the study and map relationships among them. Such a framework would help researchers define the concept, map the research terrain or conceptual scope, systematize relations among concepts, and identify gaps in literature (Creswell, 2003). A diagrammatic representation of the variables in this study is presented in figure 1.3.

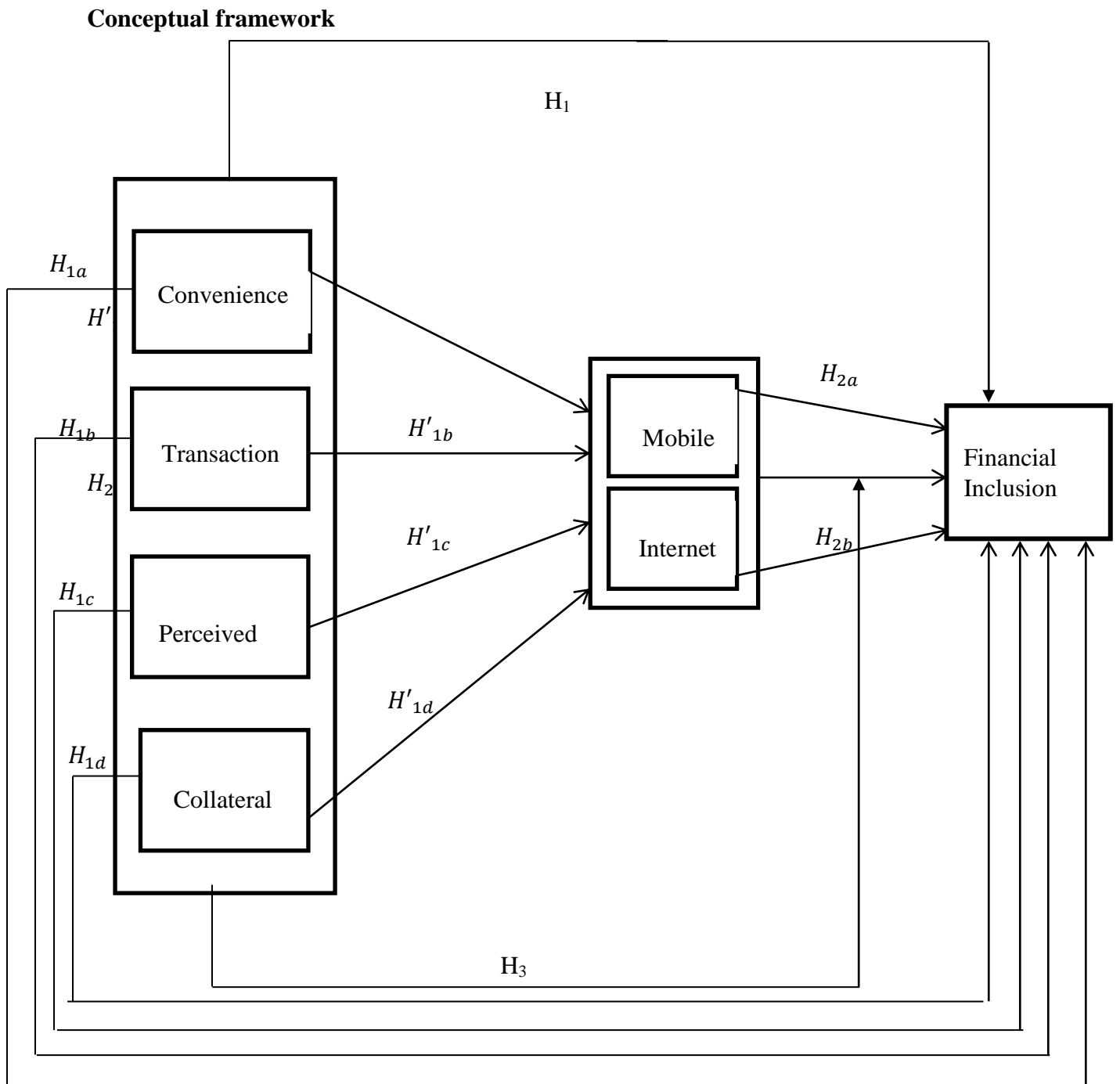


Figure 1.3: Conceptual Framework

Convenience

Some of the indicators of convenience will be; the number of access points to financial services available to micro enterprises, the lengthy of time taken to accomplish banking tasks and Efficiency of transacting with large sums of money

Transaction Cost

The indicators of transaction costs involve; Costs involved in transacting through mobile and internet banking, Transaction fees involved, Costs of sending and receiving money and Affordability levels of the micro enterprises

Perceived Value

Perceived value can be measured; Ease at which mobile transactions can be traced, The ease at which wrong transactions through mobile phones can be reversed, Confidentiality of mobile and internet transactions and Safety of performing mobile transactions

Collaterals

Collaterals can be measured by; Value of collateral required to access financial services, Value of collateral versus the security of the loans and Ability to pay versus collateral requirement

Financial inclusion

Financial inclusion can be measured by; Access to soft loans, potential to repay loans, Affordability of loans, credit without collaterals and timely loans.

Mobile Banking

Mobile Banking can be measured by; mobile banking subscribers, usage of mobile phones, transactions done via the mobile phone.

Internet Banking

Internet Banking can be measured by; internet banking subscribers, usage of internet banking, number of times internet banking is used, transactions done via internet banking.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design, target population, sample size and sample selection. It also discusses the research instruments, pilot study, reliability and validity of instruments, data collection procedure, data analysis techniques and ethical considerations.

3.2 Philosophy of the Study

According to Sudeshna and Datt (2016) research philosophy refers to the approach to understand and write the knowledge that is gained by conducting the research (Smith, 2004). In research philosophy, there are really only two major ways of ‘looking at the world’. One view regards the world as largely objective (there is only one truth or a limited number of universal truths) and measurable in terms of the use of numbers. That is the quantitative and the qualitative paradigms respectively. Methodology is the understanding of reality affects the way we gain knowledge of reality and eventually how we conduct research about reality.

Ontology, on the other hand, is concerned with the nature of reality. To a greater extent than epistemological considerations, this raises questions of the assumptions researchers have about the way the world operates and the commitment held to particular views (Gruber, 1993). Epistemology concerns what constitutes acceptable knowledge in a field of study. The key epistemological question is *can the approach to the study of the social world, including that of management and business, be the same as the approach to studying the natural sciences?*

Epistemology entails Realism, Interpretivism and Positivism. Realism relates to scientific enquiry with the perspective that what the senses show us as reality is the truth: that objects have an existence independent of the human mind. Thus the critical realist's position is that our knowledge of reality is a result of social conditioning (Dobson, 2002).

Interpretivism is an epistemology that advocates that it is necessary for the researcher to understand differences between humans in our role as social actors. This emphasizes the difference between conducting research among people rather than objects such as trucks and computers. Pragmatism argues that the most important determinant of the research philosophy adopted is the research question. Moreover, if the research question does not suggest unambiguously that either a positivist or interpretivist philosophy is adopted this confirms the pragmatist's view that it is perfectly possible to work with both philosophies. Pragmatism notes that mixed methods, (both qualitative and quantitative) are possible, and possibly highly appropriate, within one study (Tashakkori & Teddlie, 1998).

Positivism research philosophy adopts the philosophical stance of the natural scientist, that is by working with an observable social reality and that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists' (Remenyi *et al.*, 1998). That is, positivist researchers are of the opinion that the reality can be observed and viewed in an objective manner (Saunders, Lewis & Thornhill, 2007; Collins, 2009). In these types of studies research findings are usually observable and quantifiable and depend on quantifiable observations that lead to statistical analyses. Positivism is from logically structured empirical review while phenomenological gives attention to qualitative approach through understanding of how a particular phenomenon is perceived (Urus, 2013).

The study was therefore guided by positivism philosophy (which is an epistemological position) whose key ideal is that social world exists externally, and that its properties should be measured through objective methods rather than being inferred subjectively through sensation, reflection and intuition (Tajul, 2013). Positivism philosophy was considered for the study since the researcher sought to empirically establish the relationships between the variables under study, test the hypotheses and generalize the findings. Further, the positivism philosophy was ideal for the study since the researcher followed a scientific processes in hypothesizing fundamental facts and deducing the findings so as to determine whether to accept or reject the stated hypothesis in the study and determine the existing relationship between the variables under study while taking into account the moderating effects.

3.3 Research Design

Research design is a plan that guides the research in the process of collecting, analyzing and interpreting observations; the researcher's blueprint for the methods and instruments used to gather information and to evaluate it, in order to respond to the research questions of the study (Schwartz-Shea & Yanow, 2013). A research design is a roadmap of how one goes about answering the research questions. Almalki (2016) states that a good research designs have a clearly defined purpose, and have consistency between the research questions and the proposed research method.

The study adopted a descriptive research design. According to van Wyk (2012), descriptive research design is proper when the objectives of the researcher aim at examining the characteristics of social or physical phenomena. The study aimed at determining the degree to which the variables are associated and making predictions regarding the occurrence of social or physical phenomena. Descriptive research design therefore is more appropriate for this

particular study because the study seeks to build a profile about the relationship between technology adoption (mobile and internet banking) and financial inclusion in Kenya.

3.4 Target Population

Mohsin (2016) defines population as the total collection of elements which we wish to make some references to. It is also defined as a grouping of people, services, elements, events or things that will need to be investigated. This definition ensures that population of interest is homogeneous. Population studies are more representative because everyone has equal chance to be included in the final sample that is drawn according to (Mohsin, 2016)

The study targeted micro enterprises operating in Machakos County, Kenya. Thus, the population was considered by the study since it comprised of business that were using mobile and internet banking as the main platform to execute about eighty percent of their business transactions. According to Standard Bank Group (2016) - Kenya SME Pilot Psychometric there are 5,000 micro-enterprises in Machakos County. From the targeted population was 600 managers of the MEs operating in Machakos County, the population was divided into strata consisting of the towns that is, Machakos Town, Mavoko, Kathiani, Kangundo, Matungulu, Mwala, Yatta and Masinga (Machakos County Government, 2019).

3.4.1 Inclusion Criteria

The study targeted micro enterprises operating in urban areas of Machakos County, Kenya. This target respondents that were using mobile and internet banking as the main platform to execute about eighty percent of their business transactions were also included.

3.4.2 Exclusion Criteria

Most of the micro enterprises that were in the rural areas operates under the same environment and the capital employed is also small. Another characteristic of the rural population which operates these micro enterprises may be illiterate and also ignorant of the new innovations in the financial sector. These micro enterprises have been excluded from the main stream financial services since most of these services are found in the urban areas.

3.5 Sample Size and Sampling Techniques

Bryman (2016) defines sampling as the process of selecting units (people, organizations) from accessible population so as to fairly generalize results to the target population. From the targeted population was 600 managers of the MEs operating in Machakos County, the population was divided into strata consisting of the towns that is, Machakos Town, Mavoko, Kathiani, Kangundo, Matungulu, Mwala, Yatta and Masinga. The sample population was then proportionally distributed by use of a stratified random sampling technique from each respective stratum (Maligalig & Martinez, 2013). In random sampling all the respondents have equal chances of being selected. The advantage of this method is that it gives a sample size that is representative of the whole population. The sample size was determined according to the Fischer's formula (2003; Yates & Mather, 1963; Fowler, 2013). For populations greater than 10000, the following was calculated:

The Fisher formula is as follows:

$$n = \frac{z^2 p(1-p)}{d^2}$$

Where;

n = sample size

z = the standard normal deviate value for the level of confidence, for instance 95% level of confidence =1.96.

d = margin of error or level of precision at 0.1 for CI at 95%

p = proportion to be estimated, Israel (2009) recommends that if you don't know the value of p then you should assume $p=0.5$.

Substituted as in:

$$n = \frac{(1.96)^2(.50)(.50)}{(0.50)^2}$$
$$= 384$$

However, due to the probability of non-response, an extra 91 (19.16%) was included in order to cater for attrition.

Attrition may introduce the problem of biased responses if the features of population lost to follow-up vary among the randomized organizations. This loss is crucial in terms of bias only if the different trait is correlated with the result measures of the trial. There is, however, no particular amount of loss to follow-up that recognizes attrition-related prejudice as an issue. Rivers (1985) contend that loss to follow-up of 5% or lower is usually of little concern, whereas a loss of 20% or greater means that readers should be concerned about the possibility of bias; losses between 5% and 20% may still be a source of bias. Thus, the study used an attrition of 19% which was within the limit (Thompson *et al.*, 2016; Dumville, Torgerson & Hewitt, 2006).

Table 3.0: Sample Distribution

Sub County	Sample Population	Sample Size
Machakos Town	88	70
Mavoko	85	67
Kathiani	95	75
Kangundo	82	65
Matungulu	77	61
Mwala	58	46
Yatta	57	45
Masinga	58	46
TOTAL	600	475

3.5 Research Instruments

A research instrument was used to gather and record information for assessment, decision making and ultimately understanding. A questionnaire was a typical research instrument which was used to obtain factual information, support observations or assess attitudes and opinions (Mugenda & Mugenda, 2003). This study used questionnaire for data collection as it was cost effective as opposed to other instruments. Through questionnaires a large amount of data was collected at once. The questionnaire was divided into sections as per the research objectives.

The study used both secondary and primary data. The primary data was collected using the self-administered questionnaire and the interview schedule. Upagade and Shende (2012) argue that a questionnaire is a pre-formulated written set of questions to which the respondents record the answers usually within rather closely defined alternatives. Likert scale is an interval scale that specifically uses five anchors of strongly disagree, disagree, neutral, agree and strongly agree. The Likert measures the level of agreement or disagreement. Likert

scale is good in measuring perception, attitude, values and behavior (Upagade & Shende, 2012).

Bryman (2016) states that the questions or statements in a questionnaire in a study are directly related to the research questions. In development of a survey questionnaire, the variables for which information needs to be collected have to be identified followed by their operational definition. According to Newing (2011), questionnaires consist of a series of specific, usually short questions/statements that are either asked verbally by an interviewer, or answered by the respondent on their own (self-administered). A questionnaire with five point Likert scale was preferred since it made it possible to convert responses into quantitative format for ease of data analysis using the SPSS software. The secondary data was obtained from the business records of the micro-enterprises. The records on the level of mobile and internet banking usage was obtained from the communication authority of Kenya and the Central Bank of Kenya.

For the purposes of this research, questionnaires were administered to 475 micro enterprises that were operating within Machakos County. The role of the respondent was to answer the questions in an honest manner on the relationship between antecedents of technology adoption to financial inclusion among the Micro enterprises operating within Machakos County.

3.5.1 Data Collection Procedure

Kombo and Tromp (2009) states that data collection is important in research because it allows for dissemination of accurate information and development of meaningful programmes. For the purposes of data collection, an introductory letter from Kenya Methodist University was mandatory. After presenting the introductory letter to the National

Commission for Science, Technology and Innovation, the researcher was officially permitted to proceed to the field to collect data from all the Micro Enterprises operating within Machakos County.

The researcher had been advised by NACOSTI to report to the County Commissioner and also the County director of education, Machakos County. This procedure was followed to the latter. The researcher further sought permission from the County government to conduct the research and also requested for the data of all micro enterprises operating within the County.

The researcher engaged eight (8) research assistants in the data collection exercise. Before the research assistants embarked on the exercise, some training was conducted for one day which helped in the harmonization of the questionnaire followed by posting them to the various sub counties. For the purposes of testing the level of understanding of the research assistants after the training, they were exposed to a mock data collection exercise in Machakos town and later converged at the training venue to share experiences on what they may have encountered in the field. There was need for a cover letter to accompany each questionnaire indicating the purpose for which the research was being conducted. The letter helped a lot especially where some respondents developed fear of sharing very confidential information about their businesses to strangers.

For the purposes of ascertaining that the research assistants visited every Micro Enterprise, the researcher had requested the respondents to sign and stamp the questionnaires for authenticity. So many respondents proved to be very cooperative to a point of going forth and even sharing their mobile numbers on the questionnaires.

The researcher also contracted a lead contact person in each sub county of the larger Machakos County whose responsibility was to constantly remind the respondents to complete

the questionnaire and also to collect the questionnaires from the respondents. The procedure used for data collection was drop and pick method where respondents would be given time to fill in the questionnaire and then have the researcher collect them later.

3.6 Pilot Testing

Pilot testing is to try out the instrument under the same conditions to be used for the formal administration. This gives the researcher the opportunity to observe the time it takes to complete the instrument, reliability, the influence of environmental conditions, and any problems respondents have with wording or format (Janghorban, Latifnejad Roudsari & Taghipour, 2014).

Pilot testing involves pre-testing the questionnaire to establish whether there are any drawbacks that can be identified, to establish whether there are any irrelevant questions in the questionnaire and to test whether the respondents are comfortable answering some questions. Once the researcher is convinced that this research instrument meets all the requirements, then he can go ahead and now collect data without any fear of getting biased results (Kistin & Silverstein, 2015). In this study pilot testing was conducted among 60 Micro enterprises in Machakos County but this was not included in the final result.

3.6.1 Validity of Data Collection Instruments

Validity describes the extent to which we measure what we purport to measure. The greater the evidence that an instrument is producing valid results, the greater the likelihood that we obtain the information needed for the research (Schonhaut, Armijo, Schönstedt, Alvarez, & Cordero, 2013). Validity is inferred or judged from existing evidence not measured or calculated directly (Pandey & Patnaik, 2014). The researcher tested the validity of the research instruments using both content and constructs validity techniques. The questionnaires were

divided into several sections to ensure that each section assessed information for a specific objective, and also ensured that the questions were also linked to the conceptual framework for the study. Content validity on the other hand was to subject the questionnaires to thorough examination by three independent professors at Kenya Methodist University, School of Business and Economics. Construct validity was tasked with the evaluation of the statements in the questionnaire in order to ensure their relevance, meaningfulness and clarity. The instrument was adjusted appropriately based on the comments of the professors before using it in the process of conducting the actual data collection exercise to enhance content validity.

3.6.2 Reliability of Data Collection Instrument

Reliability refers to the measure of consistency of concept. A measuring instrument is reliable if it provides consistent results (Cronbach, 1951; Mugenda & Mugenda, 2003). Reliability establishes whether the instrument is stable, dependable, repeatable, and consistent and regular. The study used Cronbach's alpha to test the reliability of the measures in the questionnaire. Using inter-item correlation matrix as a guide, items that did not strongly contribute to alpha, those that were too similar, and those whose content were not critical, were eliminated. Ekelund and Hebert (2013) assert that Cronbach's alpha has the most utility for multi-item scales at the interval level of measurement, requires only a single administration and provides a unique, quantitative estimate of the internal consistency of a scale. To test the reliability of the questionnaire, the study used Cronbach alpha for separate domains of the questionnaire rather than the entire questionnaire.

Mugenda and Mugenda (2003) argue that the size of a sample used for reliability testing would vary depending on time, costs and practicality. He further asserts that the sample size would tend to be 5- 10 per cent of the main survey. The respondents in a reliability pilot test

do not have to be statistically selected when testing the validity and reliability of the instruments (Ekelund & Hebert, 2013). The instrument was piloted in 60 micro enterprises in Machakos County which was not included in the final sample for the study. Reliability of the instrument calculated using Cronbach's coefficient Alpha was calculated for either even and uneven items based on the order of number of arrangements of the items in the questionnaire. Miller (2013) states that reliability should be at least 0.70 or higher thus if the coefficient Alpha of 0.70 is obtained then the instrument is accepted otherwise it is reviewed to attain accepted standard i.e. ≥ 0.70 .

3.6.3 Reliability and Validity Results

The validity and reliability results were obtained after the pilot testing and the results are as follows;

Reliability Results. Reliability analysis was done to evaluate survey constructs. Reliability analysis was evaluated using Cronbach's alpha. Sekaran and Bougie (2016) argued that coefficient greater than or equal to 0.7 is acceptable for basic research. Bagozzi (1994) explains that reliability can be seen from two sides: reliability (the extent of accuracy) and unreliability (the extent of inaccuracy). The most common reliability coefficient is Cronbach's alpha which estimates internal consistency by determining how all items on a test relate to all other items and to the total test- internal coherence of data. The reliability is expressed as a coefficient between 0 and 1.00. The higher the coefficient, the more reliable is the test. Data collection instruments reliability results are presented in Table 3.1:

Table 3.1: Reliability results

Variable	Cronbach's Alpha	Comment
Convenience	0.852	Reliable
Transaction Costs	0.928	Reliable
Perceived value	0.791	Reliable
Collateral	0.735	Reliable
technology innovation	0.843	Reliable
Financial Inclusion	0.954	Reliable

The results on table 3.1 indicated that convenience, transaction costs, perceived value, collaterals, technology innovation and financial inclusion had a Cronbach's alpha of 0.852, 0.928, 0.791, 0.735, 0.843 and 0.954 respectively. All variables depicted that the value of Cronbach's Alpha were above value of 0.7 thus the study variables were reliable. This represented high level of reliability.

Validity Test Results. The test for validity was performed using Kaiser-Meyer Olkin (KMO). Interpretive adjectives for the KMO Measure of Sampling Adequacy are as follows: 0.90 as marvelous, 0.80's as meritorious, 0.70's as middling, 0.60's as mediocre, 0.50's as miserable, and below 0.50 as unacceptable. The value of the KMO Measure of Sampling Adequacy for convenience was 0.801 as indicated in table 3.2, which would be labeled as 'meritorious'. The significance of the KMO coefficient was evaluated using a chi square test and a critical probability value (p value) of 0.05. The validity test results are presented in Table 3.2

Table 3.2: Summary of Kaiser-Meyer-Olkin Measure

		Convenience	Transaction Cost	Perceived Value	Collaterals	Technology Adoption
KMO Measure of adequacy		0.801	0.765	0.811	0.797	0.8
Bartlett's Test of Sphericity	Approx. Chi-Square Df	78.304	102.304	120.9	89.741	76.9
	Sig.	0.001	0.001	0.001	0.001	0.001

A chi square coefficient of 78.304 and a p value of 0.000 imply that the coefficient is significant. This further implies that there was a significant correlation between the statements measuring convenience and financial inclusion.

Transaction Cost. The value of the KMO Measure of Sampling Adequacy for transaction cost was 0.765 as indicated in table 3.2, which would be labeled as ‘middling’. The significance of the KMO coefficient was evaluated using a chi square test and a critical probability value (p value) of 0.05. A chi square coefficient of 102.304 and a p value of 0.000 imply that the coefficient is significant. This further implies that there was a significant correlation between the statements measuring transaction cost and financial inclusion.

Perceived value. The value of the KMO Measure of Sampling Adequacy for perceived value was 0.811 as indicated in table 3.2, which would be labeled as ‘meritorious’. The significance of the KMO coefficient was evaluated using a chi square test and a critical probability value (p value) of 0.05. A chi square coefficient of 120.90 and a p value of 0.000 imply that the coefficient is significant. This further implies that there was a significant correlation between the statements measuring perceived value and financial inclusion.

Measure for Collaterals. The value of the KMO Measure of Sampling Adequacy for collaterals was 0.797 as indicated in table 3.2 which would be labeled as ‘middling’. The

significance of the KMO coefficient was evaluated using a chi square test and a critical probability value (p value) of 0.05. A chi square coefficient of 89.741 and a p value of 0.000 imply that the coefficient is significant. This further implies that there was a significant correlation between the statements measuring collaterals and financial inclusion.

Measure of Technology Adoption. The value of the KMO Measure of Sampling Adequacy for technology adoption was 0.800 as indicated in table 3.2 which would be labeled as ‘meritorious’. The significance of the KMO coefficient was evaluated using a chi square test and a critical probability value (p value) of 0.05. A chi square coefficient of 76.90 and a p value of 0.000 imply that the coefficient is significant. This further implies that there was a significant correlation between the statements measuring technology adoption and financial inclusion.

3.7 Data Collection

Data collected involved a process of engaging into an activity of gathering information for the purpose of drawing a conclusion based on the research findings. The results of the data collected enabled the researcher to make recommendations on what needed to be done on that specific area of study.

3.7.1 Sources of Data

This study used both primary and secondary data. Primary data was being collected using questionnaires which were administered to the sampled respondents. The data on the number of mobile subscribers registered on mobile and internet banking and number of mobile banking agents was collected from communication authority of Kenya. The data on the number of Mpesa customers using *Mshwari* services and the number of transactions done via mobile and internet banking was obtained from Safaricom.

3.7.2 Data Collection Methods

There are several statistical data collection methods which include; Interviews, Questionnaires and Surveys, Observations, Focus Groups, Ethnographies, Oral History. For the purposes of this study interviews, Questionnaires, surveys and even observations was used to collect data

A questionnaire was the research instrument which was used to obtain factual information, support observations or assess attitudes and opinions. This study used questionnaire for data collection as it was cost effective as opposed to other instruments. Through questionnaires a large amount of data was collected at once. The questionnaire was divided into sections as per the research objectives. Each section comprised of both structured and unstructured questions.

Schonhaut et al. (2013) stated that the questions or statements in a questionnaire were directly related to the research questions. In development of a survey questionnaire, the variables for which information needed to be collected had to be identified followed by their operational definition. Newing (2011) states that questionnaires consist of a series of specific, usually short questions/statements that are either asked verbally by an interviewer, or answered by the respondent on their own.. A questionnaire with a five point Likert scale was preferred as it made it possible to convert responses into quantitative format for ease of data analysis using the SPSS software. On the other hand, a key informant interview guide was used to gather qualitative data. The secondary data was obtained from the business records of the micro-enterprises operating in Machakos County. The records on the level of mobile and internet banking usage was obtained from the communication authority and Central Bank of Kenya.

3.7.3: Data Analysis and Reporting

Data analysis would aim at accomplishing the research objectives and to providing answers to reach questions. The method chosen for data analysis depends on the nature and scales of measurement of the variables in question (Ali & Bhaskar, 2016). The collected data was examined for completeness. The data was then proof read for cleaning up and then analyzed using the Statistical Package for Social Sciences (SPSS Version 20).

Descriptive statistics namely; means, standard deviation and frequency distribution were calculated from the collected data. Data presentation was done by use of frequency distribution tables, bar graphs and pie charts. The multivariate regression analysis was used to study the relationship between the antecedents of mobile and internet banking and the financial inclusion in Machakos County. The model was presented below as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y is the financial inclusion of Micro enterprises

X₁= Convenience

X₂= Transaction Costs

X₃ = Perceived Value

X₄ = Collaterals

β₀ is a constant

β₁, β₂, β₃, β₄ are regression coefficients of antecedents of financial inclusion

ε is the error term which captures all other variables that were not measured by the model

3.8 Diagnostic tests

The analytical approach taken to analyze data was based on the specific assumptions about the kind of data being analyzed. Specifically, the multiple linear regression models using ordinary least squares were adopted in the study. However before it was used, the assumption that underpins this analytical model was tested. These included linearity, multicollinearity, normality and homoscedasticity

3.8.1 Linearity Tests

These tests aim at examining the linearity and additivity of the relationship between dependent and independent variables. The expected value of dependent variable (Financial inclusion) was a straight-line function of each independent variable (antecedents of FSTI), holding the others fixed. The slope of that line did not depend on the values of the other variables and the effects of different independent variables on the expected value of the dependent variable were additive.

3.8.2 Multicollinearity

Multicollinearity is a common problem when estimating linear or generalized linear models. Multicollinearity occurs when independent variables in the regression model are highly inter-correlated; its presence can adversely affect your regression results.

Here, variance inflation factor (VIF) will be used. If VIF is greater than 5 but less than 10 this indicates moderate multicollinearity. If it is greater than or equal to 10 this indicates high multicollinearity. Multicollinearity will be tested by examining tolerance and the Variance Inflation Factor (VIF). Tolerance is a measure of collinearity reported by most statistical programs such as SPSS; the variable's tolerance is $1-R^2$. A small tolerance value will indicate

that the variable under consideration is almost a perfect linear combination of the independent variables already in the equation and that it should not be added to the regression equation. All variables involved in the linear relationship will have a small tolerance. The Variance Inflation Factor (VIF) on the other hand was used to measure the impact of collinearity among the variables in a regression model. The Variance Inflation Factor (VIF) is $1/\text{Tolerance}$, it is always greater than or equal to 1. There is no formal VIF value for determining presence of multicollinearity. Values of VIF that will exceed 10 will be regarded as indicating multicollinearity. The Variance Inflation Factor was calculated using the SPSS software (Taylor, 1990; Schober, Boer & Schwarte, 2018).

3.8.3 Normality Assumption

The assumption of normality was the supposition that the underlying random variable of interest was distributed normally, or approximately so. Intuitively, normality may be understood as the result of the sum of a large number of independent random events. The assumption of normality was often not about the variables under study, but about the error, which was estimated by the residuals. In linear regression model $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$; there is no assumption that Y is normally distributed; only that ε is (Ghasemi & Zahediasl, 2012)

3.8.4 Homoscedasticity

The assumption of homoscedasticity is very critical in linear regression models. Homoscedasticity describes a situation in which the error term is the same across all values of the independent variables. Heteroskedasticity which is the opposite of homoscedasticity is usually present when the size of the error term differs across values of an independent variable. Homoscedasticity and heteroskedasticity are inversely related such that when the

assumption of homoscedasticity is violated to some degree, heteroskedasticity increases (Breusch-Pagan/Godfrey test (1979))

The problem that heteroskedasticity presents for regression models is simple. The Ordinary Least Squares (OLS) regression seeks to minimize residuals and in turn produce the smallest possible standard errors. The problem with heteroskedasticity is that the standard errors are biased which may lead to incorrect conclusions about the significance of the regression coefficients. Here squared residuals were used i.e. a plot of squared residuals vs any IV were made. Visual inspection of this plot confirmed homoscedasticity or heteroscedasticity (Murteira, Ramalho & Ramalho, 2014)

3.8.5 Pre-Requisite Tests

The study performed tests on statistical assumptions for regression analysis and statistic used. This included test of sampling adequacy, normality, linearity, independence, and homogeneity and multi-linearity. When the assumptions of the linear regression model are correct, ordinary least squares (OLS) provides efficient and unbiased estimates of the parameters (Kaiser, 1974).

Normality Test. Normality of data was tested by use of Shapiro-Wilk test. This test for normality was developed by Shapiro and Wilk (1965). It has been found to be the most powerful test in most situations (Saunders et al, 2007). The test is not calculated when a frequency variable is specified. It is mostly used for evaluating the assumption of univariate normality by taking the observed cumulative distribution of scores and comparing them to the theoretical cumulative distribution for a normally distributed variable. The null and alternative hypotheses were stated as follows:

H₀: The data is not normally distributed

H1: The data is normally distributed

The rule is that if the p-value is greater than 0.05, H0 is not rejected, if the p-value is less than 0.05, H0 is rejected and H1 is accepted. Here two tests for normality are run. For dataset small than 2000 elements, we use the Shapiro-Wilk test, otherwise, the Kolmogorov-Smirnov test is used. In our case, since we have only 475 elements, the Shapiro-Wilk test is used.

Table 3.3: Shapiro Wilk Test and Kolmogorov-Smirnova

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Convenience	0.179	475	0.149	0.895	475	0.157
Transaction cost	0.22	475	0.128	0.865	475	0.118
Perceived value	0.15	475	0.200	0.95	475	0.464
Collateral	0.198	475	0.175	0.92	475	0.149
Technology adoption	0.246	475	0.107	0.812	475	0.003
Financial inclusion	0.354	475	0.230	0.719	475	0.123

The results revealed that convenience had a p value of 0.157 and thus the data was normally distributed. In addition, transaction cost had a p value of 0.118 and thus the data on transaction cost was normally distributed. The table also showed that perceived value had a p value of 0.464 and thus the data on perceived value was normally distributed. Collateral had a p value of 0.149 and thus the data on collateral was normally distributed. The table also showed that technology adoption had a p value of 0.003 and thus the data on technology adoption was not normally distributed. In addition, financial inclusion had a p value of 0.123 and thus the data on financial was normally distributed.

Heteroscedasticity test. The presence of cross-sectional data raises the concern of presence of heteroscedasticity. The CLRM assumes that the error term is homoscedastic i.e. it has constant variance. If the error variance is not constant, then there is heteroscedasticity in the data. The study tested for heteroscedasticity. The result below shows the heteroscedasticity results.

Table 3.4: Heteroscedasticity test

	B	Std. Error	T	Sig.
(Constant)	0.505	0.161	3.134	0.002
Convenience	0.022	0.026	0.87	0.385
transaction cost	-0.025	0.017	-1.451	0.147
Perceived value	-0.008	0.03	-0.263	0.793
Collateral	0.128	0.025	5.212	0.000
Technology adoption	-0.192	0.027	-7.086	0.000

The results above indicated that the p value of convenience, transaction cost and perceived value was above 0.05 thus there was no problem of heteroscedasticity. However collateral and technology adoption variables had a p value above 0.05 thus implying presence of heteroscedasticity.

3.8.5.3 Multicollinearity Test

Multicollinearity is exhibited if one or more independent variables can be expressed in terms of the other independent variables. That would imply that the predictors are not truly independent of each other as assumed by fitting the OLS model. The fitted OLS model assumed that the independent variables do not exhibit multicollinearity. Mugenda and Mugenda (2003), posit that multicollinearity can occur in multiple regression models in

which some of the independent variables are significantly correlated among themselves. Multicollinearity is a situation that occurs when the independent variables are highly correlated (Martz, 2013). In their study, Mutunga, Minja & Gachanja (2014) tested for multicollinearity using the VIFs and tolerance.

Table 3.5: Multicollinearity

	Tolerance	VIF
Convenience	.836	1.211
Transaction Costs	.819	1.145
Perceived Value	.952	1.059
Collateral	.800	1.113
Financial Inclusion	.896	1.137

The fitted model was tested for multicollinearity as shown in table 4.10. If a predictor has a tolerance of less than 0.2, it implies that the predictor shares more than 80% of its variance with another predictor in the model. To confirm that there was non-multicollinearity in the model, all the independent variables were shown to have tolerances of values above 0.2 and VIFs of below 5.0.

3.9 Data Analysis

According to Ali and Bhaskar (2016), data analysis refers to the application of reasoning to understand the data that has been gathered with the aim of determining consistent patterns and summarizing the relevant details revealed in the investigation. Data processing involves translating the answers on a questionnaire into a form that can be manipulated to produce statistics. This involves coding, editing, data entry, and monitoring the whole data processing

procedure. To determine the patterns revealed in the data collected regarding the selected variables, data analysis will be guided by the aims and objectives of the research and the measurement of the data collected (Ali & Bhaskar, 2016).

After successful data collection exercise, the obtained data was verified and edited for completeness and consistency. A content analysis and descriptive analysis was employed. Tables and other geographical presentations as appropriate were used to present the data collected for ease of understanding and analysis. Inferential statistics regression was applied to establish the relationship between technological innovation and Financial Inclusion in Machakos County, Kenya.

Descriptive Analysis

Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire population or a sample of it. Descriptive statistics are broken down into measures of central tendency and measures of variability, or spread. Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.

Both means and standard deviations were calculated and interpreted. Since the data was collected on a scale of 1 to 5 where 1= strongly disagree, 2= Disagree, 3= Neutral, 4= Agree and 5 = strongly disagree. A mean of 3.6 and above was interpreted as agreement while those less than 3.0 indicated disagreement

Correlation Analysis. Correlation analysis is a method of statistical evaluation used to study the strength of a relationship between two, numerically measured, continuous variables (e.g. height and weight). In general, correlation tends to be used when there is no identified

response variable. It measures the strength (qualitatively) and direction of the linear relationship between two or more variables. The Pearson correlation coefficient measures the strength of the linear association between two variables. Correlation analysis is used to test the strength of the relationship between pairs of variables using correlation coefficients.

Regression Analysis. In statistical modeling, regression analysis is a set of statistical processes for estimating the relationships among variables. Regression analysis was used to examine the influence of antecedents of Financial Services Technology adoption on Financial Inclusion.

Moderated Regression

This kind of analysis was used to examine the influence of antecedents on the relationship between financial Services Technology innovation and the financial inclusion. The analytical steps that were used are as follows;

Model 1: $Y = \alpha_0 + \alpha_1 X_{TA} + \epsilon$, X_{TA} = Financial Innovation

Model 2: $Y = \beta_0 + \beta_1 X_{TA} + \beta_2 X_{AC} + \epsilon$, X_{AC} = Composite means of all antecedents

Model 3: $Y = \gamma_0 + \gamma_1 X_{TA} + \gamma_2 X_{AC} + \gamma_3 (X_{TA} \cdot X_{AC}) + \epsilon$

All the regressions were based on the composite means of all the variables.

Frequency Distributions

Frequency analysis is a descriptive statistical method that shows the number of occurrences of each response chosen by the respondents. When using frequency analysis, SPSS Statistics

can also calculate the mean, median and mode to help users analyze the results and draw conclusions

3.9.1 Statistical Measurement and analysis of data

Table 3.6 gives a summary of the statistical measurement of variables under study by stating the model to be used in the measurement of those variables, the number of indicators and also the scale of measurement.

Table 3.6: Statistical Measurement and analysis of data

Variable	Level of measurement	Number of indicators	Scale
Convenience	Ordinal	5	Five point Likert
Collateral	Ordinal	5	Five Point Likert
Perceived value	Ordinal	5	Five Point Likert
Transaction Costs	Ordinal	5	Five point Likert
Mobile Banking	Ordinal	5	Five point Likert
Internet Banking	Ordinal	5	Five Point Likert
Financial Inclusion	Ordinal	5	Five Point Likert

3.9.2 Hypothesis Testing

The researcher tested the hypothesis to determine whether there was significant relationship among the variables using regression results. When the calculated p-value is less associated with the correlation coefficient r between a pair of variables is less than 0.05, then the null hypothesis is rejected and alternative hypothesis accepted since there is a significant association between the variables calculated. If the calculated p-value is greater than 0.05,

then the null hypothesis is accepted since there is significant relationship between the variables.

The researcher must constantly confront his or her own opinions and prejudices with the data (Kothari, 2008). To overcome biasness the researcher recorded detailed field notes. Data was also reviewed by the supervisor and helped the researcher explore his preferences for certain kinds of evidence, interpretations and explanations. The researcher was also able to locate blind spots and omissions with an aim of making the process of research more public.

Table 3.8: Hypothesis Testing

Hypothesis	Test	Statistics	Decision Rule
H ₁ , H ₂ , H ₃	Regression analysis	t, F statistic	P < 0.05
H _{1a} , H _{1b} , H _{1c} , H _{1d}	Correlation analysis	R ² P < 0.05	
H' _{1a} , H' _{1b} , H' _{1c} , H' _{1d}	Correlation analysis	R ² P < 0.05	
H _{2a} , H _{2b}	Correlation analysis	R ² P < 0.05	

3.10 Ethical Considerations

Ethics relates to the study of right and wrong conduct Dooley (2007). In order to ensure maximum considerations of ethical factors during the study both the respondents and relevant authorities were fully briefed on the study. Thus permission was obtained from the relevant authorities before the start of the study. There was a procedure of sampling the micro enterprises where the researcher got an introduction letter from Kenya Methodist University which was presented to all the parties concerned to assure them that the data that was being collected from their micro enterprises was purely for academic purposes. The researcher went ahead and applied for a research permit from the National Commission for Science and Technology (NACOSTI) and later presented these two letters to Machakos County headquarters where he was furnished with a list of all the registered micro enterprises in all

the eight (8) sub counties of Machakos County. This was an ethical practice in line with the Science and technology act chapter 250 laws of Kenya. In addition, respondents were informed in writing and assured that strict confidentiality would be observed during the study. To demonstrate this, respondents were not required to indicate personal identification details when responding to the questionnaires.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter presents the findings after analysis of data gathered and analyzed using the research methodology set out in the study. The findings and discussions are about the antecedents of mobile banking and internet banking for financial inclusion among micro-enterprises. The research findings are corroborated with the empirical and theoretical literature review on chapter two. At the end of each variable, the findings are briefly discussed and inferences drawn. Descriptive statistics, regression and correlation analysis and analysis of variance (ANOVA) are presented for each variable together with the fitting of a model.

4.2 Response Characteristics

This section presents personal information of the respondents who participated in the research study. The study sought to establish brief background information about the respondents. They were asked to state their gender, age, level of education and work experience.

4.2.1 Response Rate

The data was collected from 475 micro enterprises in Machakos County that use mobile and internet banking in their daily business operations. A total of Six hundred questionnaires were distributed out of which 475 were completely filled and returned reflecting a response rate of 79%. This agrees with Maxfield and Babbie (2009) who asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Based on these

assertion 79% response rate was satisfactory to make conclusions for the study and is adequate for generalization. Table 4.1 below presents a summary of the response rate.

Table 4.7: Summary of the Response Rates

Questionnaires	Respondents
Questionnaires distributed	600
Questionnaires returned	475
Response rate	79%

4.2.2 Demographic distribution of responses

Gender Distribution. The study required the respondents to indicate their gender. Figure 4.7 presents the distribution of the respondents by their gender.

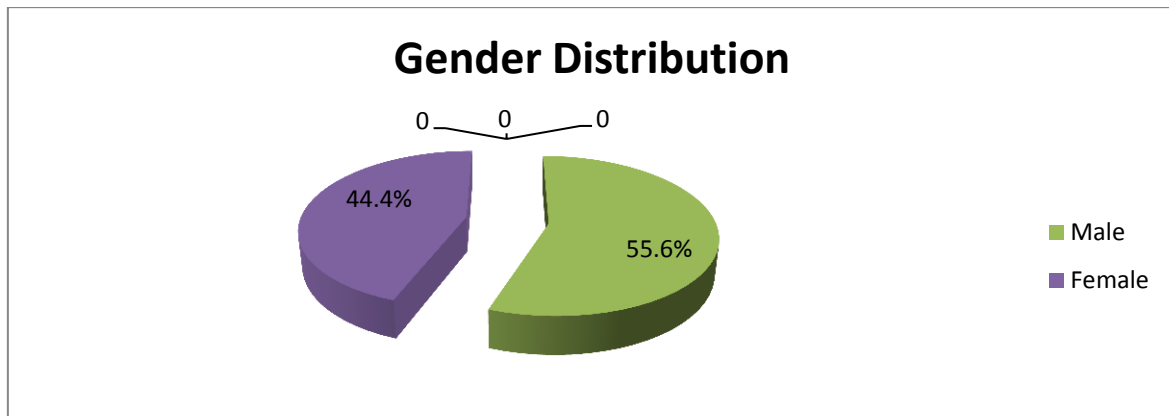


Figure 4.1: Gender Distribution of Respondents

From the findings, the study established that, majority of the respondents as shown by 55.6% were males whereas 44.4% of the respondents were females. This is an indication that both genders were involved in this research and thus the findings of this study did not suffer from gender biasness.

Age Distribution of the Respondents. The age distribution was important in the study to investigate the distribution of age among the respondents. Table 4.8 presents the distribution of the respondents by age.

Table 4.8: Age Distribution

Age Distribution	F	%
Below 25 years	160	33.7
25-35 Years	142	29.9
36-50 Years	82	17.3
51-60Years	81	17.1
Over 61 Years	10	2.1
Total	475	100%

From the table majority of the respondents (33.7%) were below the age of 25 years, 29.9% were aged between 25-35 years, and 17.3% were aged between 36-50 years while only 2.1% were age above 61. The findings imply that there were a high proportion of respondents who were young and tech savvy individuals with vast knowledge and experience on the use of mobile and internet banking and therefore the researcher obtained accurate and reliable information for the study.

Highest Level of Education. The researcher required respondents to indicate their levels of education. The categories included O level, College Diploma, Bachelor’s Degree and Post-Graduate Degree. Table 4.9 presents the distribution of the levels of education. The level of education was pertinent in explaining how easy it was for the respondents to comprehend the concept of mobile and internet banking for financial inclusion.

Table 4.9: Distribution of Respondents by Level of Education

Highest Level of Education	F	%
O level	83	17.5
College Diploma	223	46.9
Bachelor's Degree	130	27.4
Post-Graduate Degree	39	8.2
Total	475	100%

From the results presented 46.9% were Diploma holders, 27.4 % of the respondents were holders of Bachelor's degrees, while 8.2 % had post-graduate degrees. The findings show that the participants had adequate level of education, which was important in helping to appreciate internet banking, mobile banking and financial inclusion.

Number of Years the business has been operating. The researcher sought to establish the number of years the micro-enterprises had been in business, the results are shown in figure 4.2.

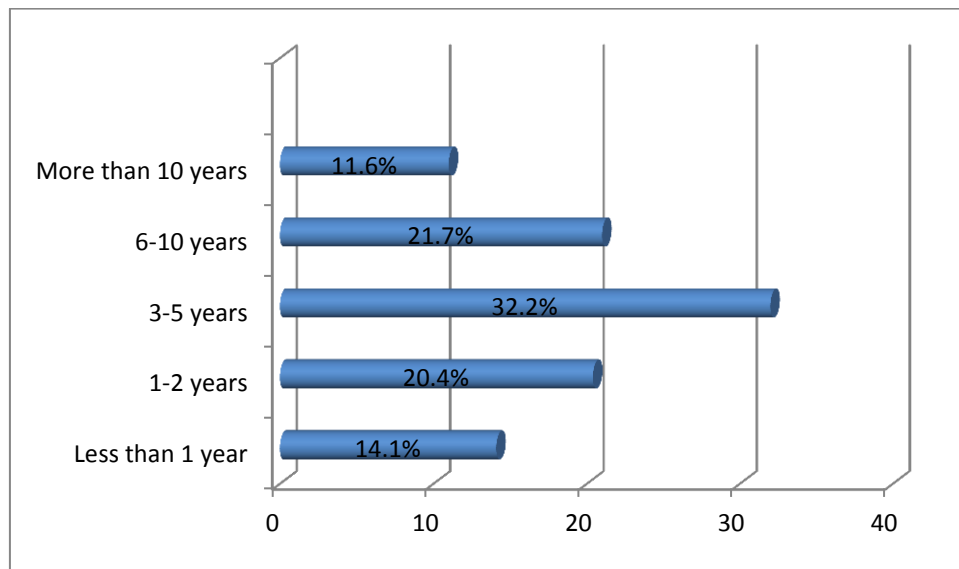


Figure 4.2: Years of Operation

Based on the data, a greater proportion of the micro-enterprises (32.2%) had been in operation for 3-5 years, 21.7% had in operation for 6-10 years, 20.4% had operated for 1-2 years, and 14.1% had operated for less than one year while 11.6% had operated for more than 10 years. The findings imply that the business had adequate experience in the use of internet and mobile banking and therefore the researcher obtained accurate and relevant information for the study.

Mobile and internet banking services. The respondents were required to indicate whether their business subscribed to mobile and internet banking services. Results are presented in Figure 4.3

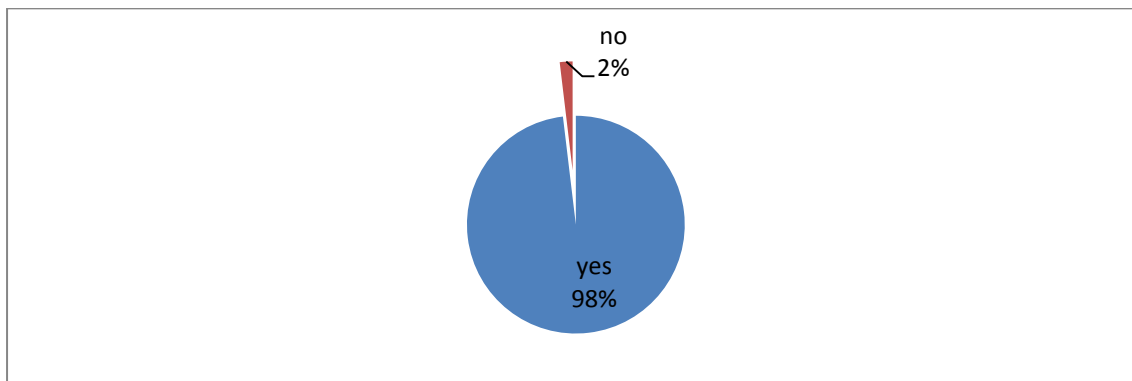


Figure 4.3: Business subscription to mobile and internet banking services

From figure 4.3, 98% of the respondents indicated that their micro enterprises had subscribed to mobile and internet banking services while only 2% that had not subscribed to mobile and internet banking services. The findings imply that the researcher targeted the right micro-enterprises for the study.

Use of mobile and internet banking services. The respondents who indicated yes were asked to indicate what they use mobile banking services for. The results of the findings are presented in Figure 4.4

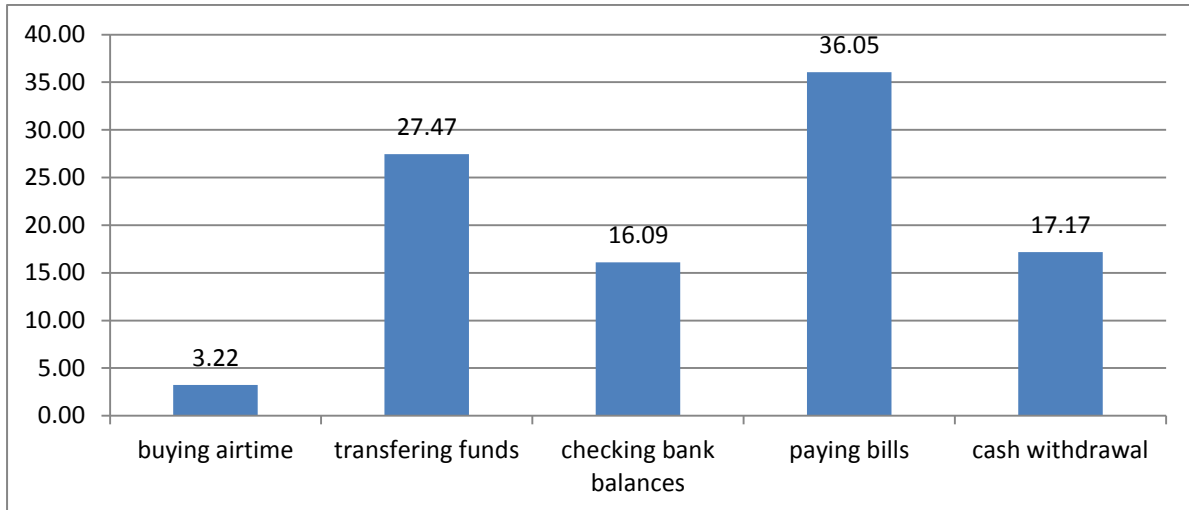


Figure 4.4: Use of mobile and internet banking services

The results show that majority of the respondents (36.05%) indicated that their micro enterprises used mobile and internet banking services to pay bills, 27.47% used mobile and internet banking services to transfer funds, 17.17% used mobile and internet banking services to withdraw cash, 16.09% used mobile and internet banking services to checking bank balances while only 3.22% used mobile and internet banking services to buy air time.

Frequency of use m-banking services. The researcher required respondents to indicate the frequency of use of m-banking services. Results are presented in Figure 1.8.

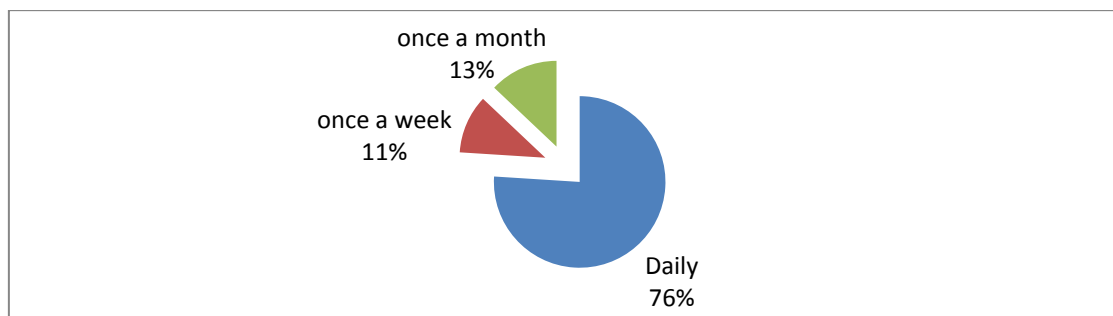


Figure 4.4: Frequency of use m-banking services

The figure 1.8 show that majority of the respondents (76%) indicated that they used m-banking services daily, 13% indicated that they used the m-banking once a month while only 11% used the m-banking services once a week. The findings imply that the micro-enterprises appreciated mobile and internet banking and therefore the researcher obtained accurate and reliable data from the respondents.

Criteria for mobile banking. The respondents were asked to indicate the most important criteria for considering mobile and internet banking. The findings of the study are presented in Table 4.10.

Table 4.10: Criteria for mobile banking

	Frequency	Percent
Convenience	236	49.7
trust in bank	47	9.9
Security	141	29.7
Risk	21	4.4
Cost	20	4.2
service provider compatibility	10	2.1
Total	475	100

The results indicate that the majority of the respondents (49.7%) indicated that the most important criteria for considering mobile banking is convenience, 29.7% indicated security, 4.4% indicated risk, 4.2% indicated cost, 2.1% indicated service provider compatibility.

Amount of money transacted on m-banking

It was necessary that respondents indicate the amount of money they transact via the mobile and internet banking platform monthly for the business.

Table 4.11: Amount of money transacted

Amount in Kshs.	F	%
Less than Kshs. 5,000	44	9.3
Kshs. 5,000-10,000	67	14.1
Kshs. 10,001-15,000	79	16.6
Kshs. 15,001-20,000	122	25.7
Kshs. 20,001-25,000	66	13.9
Above Kshs. 25,000	97	20.4
Total	475	100%

Based on the data presented in Table 4.11., a greater proportion (25.7%) of the respondents transferred Kshs.15,001-20,000 per month, 16.6% transferred Kshs.10,001 – 15,000, 14.4% transferred Kshs. 5,000-10,000, 20.4% transferred above Kshs. 25,000 while only 8.4% transferred less than Kshs. 5,000 per month.

Subscribed to Mobile and Internet banking services

The respondents were asked to indicate whether they have subscribed to mobile and internet banking services. Results are presented in figure 1.9.

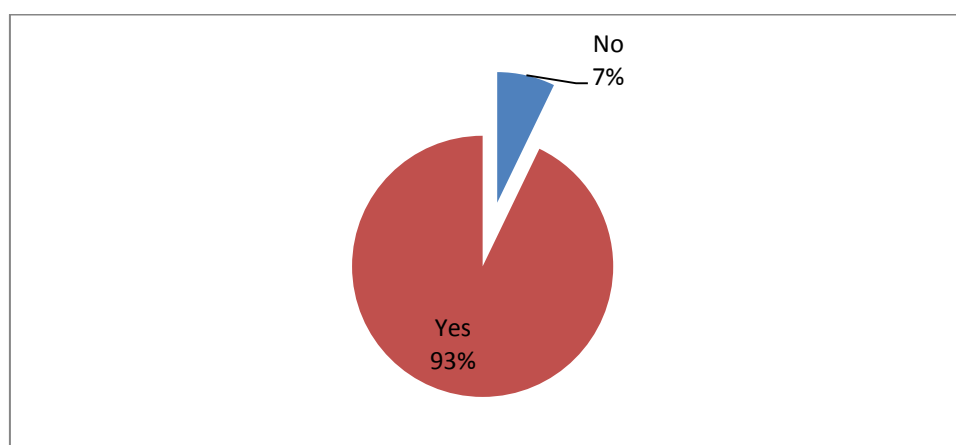


Figure 4.5: Mobile and Internet banking services

The results revealed that majority of the respondents stated that their micro enterprises had subscribed to internet banking services while only 7% who had not subscribed to internet banking services.

Use of Mobile and Internet banking services

There was need for the respondents to indicate how they use mobile and internet banking services. Results are presented in figure 2.0.

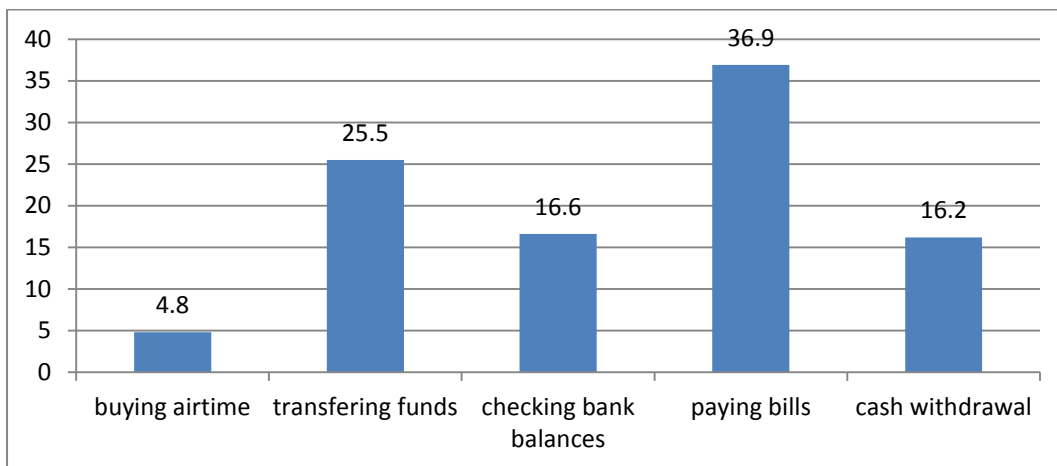


Figure 2.0: Use of Internet banking services

The results show that 36.9% use internet banking services to pay bills, 25.5% use internet banking services to transfer funds, 16.6% internet banking services to check bank balances, 16.2% use internet banking services to withdraw cash while only 4.8% who use internet banking services to buy airtime

Frequency of use Internet banking services. Frequency of use of internet banking services was an important parameter to be measured in this study. Results are presented in Figure 2.1.

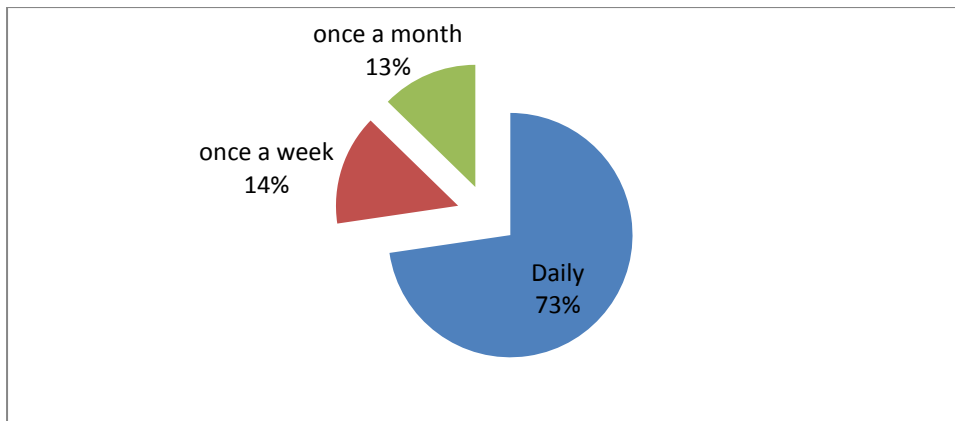


Figure 2.1: Frequency of use Internet banking services

From the results 73% indicated that they used m-banking services daily, 13% indicated that they used the m-banking once a week while only 13% used the m-banking services once a month. The findings imply that the micro-enterprises appreciated internet banking and therefore the researcher obtained accurate and reliable data from the respondents.

Criteria for Internet banking

The criteria for considering internet banking were tested and the results presented in Table 4.12.

Table 4.12: Criteria for Internet banking

	Frequency	Percent
Convenience	34	7.2
Trust in bank	32	6.7
Security	54	11.4
Risk	213	44.8
Cost	142	29.9
Total	475	100

Majority of the respondents (44.8%) indicated that the most important criteria for considering internet banking is risk, 29.9% indicated cost, 11.4% indicated security, and 7.2% indicated convenience while only 6.7% indicated trust in bank.

Amount of money transacted on internet banking. The micro enterprises were required to indicate the amount of money they transact via the internet banking platform monthly. Results were presented in Table 4.13.

Table 4.13: Amount of money transacted on internet banking

	Frequency	Percent
less than 5,000	8	1.7
5,000-10,000	17	3.6
10,001-15,000	27	5.7
15,001-20,000	299	62.9
20,001-25,000	124	26.1
Total	475	100

As indicated in Table 4.13, majority of the respondents (62.9%) indicated that their microfinance transact Ksh 15,001 to 20,000 monthly, 26.1% indicated that their microfinance transact Ksh 20,001 to 25,000 monthly, 5.7% indicated that their microfinance transact Ksh 10,001 to 20,000 monthly, 3.6% indicated that their microfinance transact Ksh 5,001 to 10,000 monthly while only 1.7% who indicated that their microfinance transact less than Ksh 5000 monthly.

4.3 Perception of Mobile and Internet Banking by Micro-enterprises

Quantitative analysis provides a means of describing and explaining a phenomenon through a numerical system (Maxfield & Babbie, 2009). The analysis is not based on subjective interpretation but on the objective analysis of the numerical findings derived from observations. The analysis in this study began by descriptive statistics, which helped to show or summarize data in a meaningful way, which allows a simpler interpretation of data. There are normally two general types of statistics that are used to describe data. These include measures of central tendency and measures of spread. A measure of central tendency describes the central position of a frequency distribution for a group of data for example the

mode, median and mean. On the other hand, a measure of spread is a way of summarizing data to describe how the scores are spread out. To describe this, we use range, absolute deviation, variance and standard deviation.

4.3.1 Convenience of mobile and internet banking

The purpose of the study was to determine the extent to which respondents agreed with factors relating to the convenience of mobile and internet banking in micro-enterprises. The response was rated on a scale of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree.

Table 4.14: Convenience of mobile and internet banking

Statement	Mean	Standard Deviation
It is easy to undertake business transaction through mobile banking	4.08	0.78
It is easy to undertake business transaction through internet banking	3.74	1.24
It is secure for micro-enterprise owners to move around with large amounts of money	4.27	0.81
It is efficient for owners of micro-enterprises to use mobile banking to accomplish their banking tasks anytime and anywhere	4.11	0.75
It is efficient for owners of micro-enterprises to use Internet banking to accomplish their banking tasks anytime and anywhere	4.34	0.73
The use of mobile banking makes it easier for owners of micro-enterprises to carry out their businesses operations	3.90	1.20
The use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations	3.96	1.09
Interaction with mobile banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners	3.83	1.16
Interaction with Internet banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners	3.84	1.14
Average	4.01	0.99

From the Table 4.14 majority of the respondents agreed with the statement that is easy to undertake business transactions through mobile banking (M=4.08; SD=0.78). The results further revealed that majority of the respondents agreed with the statement that is easy to undertake business transactions through internet banking (M=3.74, SD=1.24). In addition, majority of the respondents were neutral on the statement that it is secure for micro-enterprise owners to move around with large amounts of money (M=4.27, SD=0.81). In addition, majority of the respondents were agreed with the statement that it is efficient for owners of micro-enterprises to use mobile banking to accomplish their banking tasks anytime and anywhere (M=4.34, SD=0.73). These findings were consistent with those of Sanfillippo and Fichman (2014) who indicated that as clients are becoming accustomed to the digital experience offered by companies such as Google, Amazon, Facebook and Apple, they expect the same level of customer experience from their financial services providers. The findings further revealed that the respondents agreed with the statement that use of mobile banking makes it easier for owners of micro-enterprises to carry out their businesses operations (M=3.90, SD=1.2). These findings agreed with that of Wamuyu (2014) who argued that Mobile banking platform helps entrepreneurs to carry out their businesses easily. In addition, majority of the respondents agreed with the statement that use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations (M=3.96,SD=1.09). These findings agreed with that of Potnis (2014) who argued that small firms might find it easy to carry business operations with internet commerce. The result show that majority of the respondents agreed with the statement that interaction with mobile banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners (M=3.83;SD=1.16). These findings agreed with that of Waiganjo (2018) who found that ease of use is enhanced by the use of simple technology and applications that are easy to operate; such that little technical knowledge is required in using

the system. In addition, results revealed that interaction with internet banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners (M=3.84;SD=1.14).

4.3.2 Transactions Costs in micro-enterprises

The study was to determine the extent to which respondents agreed with factors relating to transaction costs in micro-enterprises. The response was rated on a scale of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. The findings are presented on table 4.15

Table 4.15: Transaction Costs

	Mean	Standard Deviation
It is expensive for micro-enterprises to buy own a mobile phone to facilitate mobile banking transactions	2.24	1.31
It is expensive for micro enterprises to facilitate internet banking transactions	2.39	1.17
M-banking transaction fee is expensive while executing business transactions	3.66	1.14
Internet banking transaction fee is expensive while executing business transactions	3.55	1.05
The costs of undertaking business transaction via the mobile banking platform in affordable to micro-enterprises	3.69	1.13
The costs of undertaking business transaction via the internet banking platform in affordable to micro-enterprises	3.95	1.00
Mobile service providers have affordable cost of sending or receiving money.	3.78	1.10
Internet service providers have affordable cost of sending or receiving money.	3.83	1.06
M-banking is affordable to the customers of the micro-enterprises	3.73	1.12
Internet banking is affordable to the customers of the micro-enterprises	3.93	1.08
Average	3.48	1.12

Based on the findings presented on table 4.15, majority of the respondents disagreed with the statement that it is expensive for micro-enterprises to buy own a mobile phone to facilitate mobile banking transactions (M=2.24; SD=1.31). The results also showed that majority of the respondents disagreed with the statement that it is expensive for micro enterprises to facilitate internet banking transactions (M=2.39; SD=1.17). The results also showed that majority of the respondents agreed with the statement that M-banking transaction fee is expensive while executing business transactions (M=3.66; SD=1.14). The results showed that majority of the respondents agreed with the statement that internet banking transaction fee is expensive while executing business transactions (M=3.55; SD=1.05).

The results showed that majority of the respondents strongly agreed to the statement that the costs of undertaking business transaction via the mobile banking platform in affordable to micro-enterprises (M=4.55; SD=0.934). The respondents agreed with the statement that the costs of undertaking business transaction via the internet banking platform in affordable to micro-enterprises (M=3.95; SD=1). The results showed that majority of the respondents agreed with the statement that mobile service providers have affordable cost of sending or receiving money (M=3.78; SD=1.1). Majority of the respondents agreed with the statement that internet service providers have affordable cost of sending or receiving money (M=3.83; SD=1.06). Further respondents agreed with the statement that M-banking is affordable to the customers of the micro-enterprises (M=3.73; SD=1.12). The results revealed that majority of the respondents agreed with the statement that internet banking is affordable to the customers of the micro-enterprises (M=3.93; SD=1.08).

These findings are consistent with those of Demirgüç-Kunt and Klapper (2013) who stressed that capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or physical capital. Thus, reducing financial market

imperfections to expand individual opportunities creates positive, not negative, incentive effects. Mobile banking is not influenced these transaction costs (Bachas et al., 2018). They were further consistent with behavioral decision theory, which states that the cost-benefit pattern is significant to both perceived usefulness and ease of use of technology (Mohan & Potnis, 2015). This is because if consumers perceive the cost of mobile money service as acceptable, they will adopt it easier, and then use it. Furthermore, hardware/software and financial resources are important for users of an information system (Micheni et al., 2013). Financial cost is likely to directly influence the user's intention to use digital financial services. The findings are also in line with the findings by Jack, Suri and Townsend (2010) that revealed a great reduction in transaction costs and entrepreneur's ability to conduct financial transactions over the phone without having to travel to banks.

4.3.3 Perceived value of mobile and internet banking in micro-enterprises

The respondents were required to indicate the extent to which perceived value and financial inclusion among micro-enterprises were related. The response was rated on a scale of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. The findings were presented on table 4.16.

Table 4.16: Perceived Value and Financial Inclusion

Statement	Mean	Standard Deviation
Improved security when sending large sums of money using mobile banking has increased its usage among micro-enterprises	3.74	1.24
Improved security when sending large sums of money using internet banking has increased its usage among micro-enterprises	3.13	1.77
Owners of micro-enterprises feel safe in carrying out mobile banking	3.98	0.80
Owners of micro enterprises feel safe in carrying out internet banking	4.05	0.75
Mobile banking transactions are confidential for micro-enterprises	4.29	0.70
Internet banking transactions are confidential for micro-enterprises	4.05	0.96
All customers served by micro-enterprises can undertake mobile banking transactions	4.13	0.77
All customers served by micro-enterprises can undertake internet banking transactions	4.13	0.70
Owners of micro-enterprises can reverse mobile banking transactions incase transaction errors occur.	4.03	1.01
With mobile banking, transactions are easily traceable in micro-enterprises	3.96	1.00
With Internet banking, transactions are easily traceable in micro-enterprises	4.05	0.96
Average	3.96	0.97

The results indicated that majority of the respondents agreed with the statement that improved security when sending large sums of money using mobile banking has increased its usage among micro-enterprises (M=3.74, SD=1.24). In addition, the results further showed that majority of the respondents were neutral with the statement that improved security when sending large sums of money using internet banking has increased its usage among micro-enterprises (M=3.13,SD=1.77). It was also clear that majority of the respondents agreed with the statement that owners of micro-enterprises feel safe in carrying out mobile banking (M=3.98, SD=0.80).

The results revealed that many of the respondents agreed with the statement that owners of micro-enterprises feel safe in carrying out internet banking (M=4.05, SD=0.75). The results also showed that majority of the respondents agreed with the statement that mobile banking

transactions are confidential for micro-enterprises (M=4.29, SD=0.70) while they were neutral on the statement that all customers served by micro-enterprises can undertake mobile banking transactions (M=4.13, SD=0.77).

The results also showed that majority of the respondents agreed with the statement that internet banking transactions are confidential for micro-enterprises (M=4.13, SD=0.70). The results revealed that majority of the respondents agreed with the statement that owners of micro-enterprises can reverse mobile banking transactions incase transaction errors occur (M=4.03, SD=1.01).The results revealed that majority of the respondents agreed with the statement that with mobile banking, transactions are easily traceable in micro-enterprises (M=3.96, SD=1.00).The results show that majority of the respondents agreed with the statement that with Internet banking, transactions are easily traceable in micro-enterprises (M=4.05; SD=0.96). These findings were found to agree with those of Mbawuni (2018) who indicated that perceived benefits have been ranked as main factors for small firms' Internet adoption. M-banking provides benefits to SMEs like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players. The findings also were consistent with Sewanu (2015) who stresses that ICT implementation in the organization which includes SMEs has the potential to reduce costs and increase productivity level. In addition according to Isaac (2014) ICT usage has a positive impact on business performance.

4.3.4 Collateral requirement

There was a need to determine the extent to which respondents agreed with factors relating to collateral and financial inclusion among micro-enterprises. The response was rated on a scale

of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. The findings are presented on table 4.17.

Table 4.17: Collateral and Financial Inclusion

	Mean	Standard Deviation
Mainstream financial institutions insist on the provision of collateral by micro enterprises	4.09	0.70
While addressing the likelihood of loan repayment, mobile banking providers adopt a risk averse stance towards micro enterprises	4.35	3.77
The requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace mobile banking	3.89	0.91
The requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace internet banking	3.68	1.06
It is easy to provide collateral for a loan in the mainstream financial institutions	3.73	1.17
The security required for bank loans is affordable to my enterprises	4.02	0.85
Average	3.96	1.41

Based on the findings, the respondents agreed to the statement that mainstream financial institutions insist on the provision of collateral by micro enterprises (M=4.09; SD=0.7). In addition, majority of the respondents agreed with the statement that while addressing the likelihood of loan repayment, mobile banking providers adopt a risk averse stance towards micro enterprises (M=4.35; SD=3.77). The results show that majority of the respondents agreed with the statement that the requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace mobile banking (M=3.89; SD=0.91).

The respondents strongly agreed with the statement that the requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace internet banking (M=3.68;SD= 1.06). However, the respondents

agreed with the statement that it is easy to provide collateral for a loan in the mainstream financial institution (M=3.73;SD=1.17).The results show that majority of the respondents agreed with the statement that the security required for bank loans is affordable to micro enterprises (M=4.02;SD=0.85).These findings agreed with that of Charles and Mori (2016) found a positive relationship between duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. The results were also consistent with that of Gakuu, Wachira and Kagwiria (2015) who found that inability of SMEs to provide collateral and other information needed by banks such as audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans.

4.3.5 Technology Adoption in micro-enterprises

The researcher wanted to determine the extent to which respondents agree with factors relating to technology adoption and financial inclusion among micro-enterprises. The response was rated on a scale of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. The findings are presented on table 4.18.

Table 4.18: Technology Adoption and Financial Inclusion

	Mean	Std. Deviation
It would take a lot of time to learn how to use m-banking services	3.97	0.82
It would take a lot of time to learn how to use internet banking services	3.64	1.24
I am proficient in the use of m-banking transaction processes between me, and my suppliers.	4.11	0.88
I am proficient on use of internet banking transaction processes between me and my customers.	4.05	0.83
Business owners have the knowledge needed to use the mobile banking technology	3.99	1.00
Business owners have the knowledge needed to use the Internet banking technology	3.92	1.00
Average	3.95	0.96

The respondents agreed with the statements that it would take a lot of time to learn how to use m-banking services ($M=3.97$; $SD =0.82$). They further agreed with the statement that it would take a lot of time to learn how to use internet banking services ($M=3.64$; $SD=1.24$). The respondents strongly agreed with the statement that there is proficient in the use of m-banking transaction processes between them and their suppliers ($M=4.11$; $SD=0.88$). There was strong agreement with the statement that there are proficient on use of internet banking transaction processes between me and my customers ($M=4.05$; $SD=0.83$).

In addition the respondent further agreed with the statement that the business owners have the knowledge needed to use the mobile banking technology ($M=3.99$; $SD=1.00$). In addition the respondent further agreed with the statement that the business owners have the knowledge needed to use the internet banking technology ($M=3.92$; $SD=1.00$). These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya.

The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

These findings were also consistent with those of Scott and Zachariadis (2017) who reported that deficient and wasteful innovation based offices by money related establishments, has constrained the accomplishment of critical extension in budgetary incorporation level. In addition, Manyika et al. (2016) acknowledged that the spread of cellular telephones underpins the impact of money related consideration on monetary development, particularly in nations where portable budgetary administrations grab hold. The findings also corroborated those of Ketterer (2017) who stated that digital finance can result in greater financial inclusion, expansion of financial services to non-financial sectors, and the expansion of basic services to households. This is possible since nearly 50% of people in the developing world already own a mobile phone (World Bank, 2014).

4.3.6 Financial Inclusion of micro-enterprises

The aim of the study was to determine the extent to which respondents agree with factors relating to mobile and internet banking as well as financial inclusion among micro-enterprises. The response was rated on a scale of 1-5 on which: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree. The findings are presented on Table 4.22.

Table 4.19: Financial Inclusion

	Mean	Std. Deviation
Our enterprises that have collateral have been able to obtain soft loans through the M-banking platform	3.94	1.05
Mainstream financial service providers are focusing more on the potential to repay loan rather than on collateral security in our business	3.97	1.09
Mobile banking platform provide credit to micro enterprises that cannot afford collaterals	3.88	1.10
We are able to access credit in a timely manner through M-banking	3.96	1.12
We are able to obtain credit through internet banking	3.81	1.13
We would still be without financial services if there was no mobile banking	3.93	1.16
We would still be without financial services if there was no internet banking	3.87	1.13
Average	3.92	1.11

From Table 4.19, the results revealed that majority of the respondents strongly agreed to the statements enterprises that have collateral have been able to obtain soft loans through the M-banking platform (M=3.94; SD=1.05). Majority of the respondents strongly agreed to the statements that mainstream financial service providers are focusing more on the potential to repay loan rather than on collateral security in our business (M=3.97; SD=1.09). The respondents strongly agreed to the statements that mobile banking platform provide credit to micro enterprises that cannot afford collaterals (M=3.88; SD=1.10).

The results showed that majority of the respondents strongly agreed to the statements that they are able to access credit in a timely manner through M-banking (M=3.81; SD=1.13). The respondent also agreed with that they would still be without financial services if there was no mobile banking (M=3.93; SD=1.16). There was a revelation that majority of the respondents

agreed to the statement that they are able to obtain credit through internet banking ($M=3.87;SD=1.13$). The findings agree with those of Schierz et al. (2010) which revealed that mobile and internet technology usage has become part of users' daily life and therefore mobile and internet banking is amazingly becoming the services being used, this has increased the level of financial inclusion among groups that had been unable to access financial services from the formal financial institutions. The study by Schierz et al. (2010) indicated significant effects of mobile and internet banking on financial inclusion.

4.4 Strength of the relationship between variables

Stevens (2009) and Keith (2006) states that Pearson's correlation is used when one is working with two quantitative variables in a population to establish the magnitude and direction of the relationship. The possible research hypotheses are that the variables will show a positive linear relationship, a negative linear relationship, or no linear relationship at all. These authors argue that Pearson's correlation coefficients indicate the extent of interdependence between two variables. The Pearson correlation coefficient, r , can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable (Stevens, 2009). A value less than 0 indicates a negative association; that is, as the value of one variable increases, the value of the other variable decreases. In this study the Pearson correlation coefficient, r , was used to show the degree and significance of the relationship between variables.

4.5 Overall Correlation between study variables

Table 4.20 gives the results of overall correlation between the study variables. The results of each variable have been explained under its own subheading.

Table 4.20. Full correlation of antecedents and financial inclusion

		FI	CV	TC	PV	CL	IB	MB	FS TI
Financial inclusion (FI)	Pearson Correlation	1							
	Sig. (2-tailed)								
Convenience (CV)	Pearson Correlation	.415**	1						
	Sig. (2-tailed)	<0.001							
Transaction cost(TC)	Pearson Correlation	.279**	0.085	1					
	Sig. (2-tailed)	<0.001	<0.001						
Perceived value(PV)	Pearson Correlation	.420**	.253**	.208**	1				
	Sig. (2-tailed)	<0.001	<0.001	<0.001					
Collateral(CL)	Pearson Correlation	.466**	.235**	.280**	.435**	1			
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001				
Internet banking(IB)	Pearson Correlation	.246**	.190**	0.031	.171**	.196**	1		
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001			
Mobile banking(MB)	Pearson Correlation	.602**	.306**	.194**	.364**	.340**	.331**	1	
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Technology Adoption (FSTI)	Pearson Correlation	.640**	.321**	.180**	.341**	.348**	.430**	.874**	1
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	

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

4.5.1 Correlation between Collateral and Financial Inclusion

This researcher wanted to establish whether there was any form of correlation between collateral and financial inclusion. The findings are summarized in Table 4.28. There was a positive correlation coefficient of .466 (or 46.60%) that existed between collateral and financial inclusion. These findings agreed with that of Jiménez, Lopez and Saurina (2013) found a positive relationship between duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. The results were also consistent with that of Ackah and Vuvor (2011), who found that inability of SMEs to provide collateral and other information needed by banks such as audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans.

4.5.2 Correlation between Transaction costs and Financial Inclusion

There was a negative Pearson correlation of $-.279$ (or 27.90%) between transaction cost and financial inclusion of micro-enterprises. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs.

4.5.3 Correlation between Convenience and Financial Inclusion

The researcher established whether there was any form of correlation between convenience and Financial Inclusion of micro enterprises in Kenya. The correlation results are found in Table 4.20.

From the table above, it can be observed that there was a positive Pearson correlation of .415 (or 41.5%) between convenience and financial inclusion. These findings agreed with that of Kim et al. (2015) who argued that financial services technology has disrupted the financial services industry and are creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide

4.5.4 Correlation between perceived value and Financial Inclusion

There was an objective of examining whether there was any form of correlation between perceived value and financial inclusion in Kenya (see results in Table 4.28). From the results, a positive correlation coefficient of .420 (or 42.0%) existed between perceived value and financial inclusion. These findings agreed with that of Mehrtens, Cragg and Mills (2001) who ranked perceived benefits as main factors for small firms' Internet adoption. M-banking provides benefits to SMEs like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players. Therefore; we can conclude that perceived benefits is one of the main factors for e-banking adoption by small firms.

4.5.5 Correlation between technology adoption and Financial Inclusion

From the Table 4.28, a positive correlation coefficient of .640 (or 64.0%) existed between technology adoption and financial inclusion. These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by

Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

4.5.6 Correlation between Internet banking and Financial Inclusion

This study sought was to establish whether there was any form of correlation between internet banking and financial inclusion in Kenya. From Table 4.28 the results revealed that there was a positive and significant correlation between internet banking and financial inclusion ($r=0.246$, $p=0.000$). These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya.

4.5.7 Correlation between Mobile banking and Financial Inclusion

The results further revealed that there was a positive and significant correlation between mobile banking and financial inclusion ($r=0.602$, $p=0.000$). These findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new

products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

4.6 Influence of Antecedents of mobile and internet banking on financial inclusion

At the inferential stage of analysis, the researcher sought to explore the nature of relationship between the antecedents of mobile banking and financial inclusion of micro-enterprises. Statistical techniques were adopted to determine the relationship between the independent variables and the dependent variable. The analysis adopted for inferential analysis involved parametric estimations that require the variables used to be measured on a continuous scale. The indicators were measured on an ordinal categorical scale and the descriptive analysis used non-parametric techniques to measure central tendency.

4. 6.1 Collateral and Financial Inclusion of micro-enterprises

The study conducted a regression analysis between Collateral and Financial Inclusion among micro-enterprises in Kenya. The results were presented in Table 4.21.

Table 4.21: Model Summary of regression between Collateral and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.466a	0.218	0.216	0.55183

Dependent Variable: Financial inclusion

This Model Summary Table presents an R^2 result of .218 or 21.8%, meaning that the independent variable, collateral alone can explain up to 21.8% of the total variability in the dependent variable, Financial Inclusion of micro-enterprises in Kenya. The remaining 79.2% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model.

ANOVA for regression between Collateral and Financial Inclusion

An ANOVA test was performed for the influence of collateral on financial inclusion and the results obtained are presented in Table 4.22.

Table 4.22: ANOVA for regression between Collateral and Financial Inclusion

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	40.052	1	40.052	131.527	<0.001
Residual	144.035	473	0.305		
Total	184.087	474			

From the ANOVA Table 4.30 the model is statistically significant as the p-value is less than .05. The values of $F(1, 473) = 78.425$, $P < 0.05$, shows that collateral statistically and significantly predicts the financial inclusion (i.e., the regression model is a good fit of the data) and that collateral significantly influence the financial inclusion of micro-enterprises in Kenya. This means that alternative hypothesis that collateral has a statistically significant influence on financial inclusion is accepted. These findings agreed with that of Jiménez et al. (2013) found a positive relationship between duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. These findings agreed with that of Ackah and Vuvor (2011) who found that inability of SMEs to provide collateral and other information needed by banks such as

audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans.

To complement the ANOVA findings on correlation between collateral and financial inclusion of micro-enterprises presented in Table 4.23, Pearson’s correlation coefficients were also generated. The results of the Pearson’s correlation are presented in Table 4.23. These results show that regulatory framework contributes a statistically significant value (p-value = .001) of the regression model.

Table 4.23: Coefficients of regression between Collateral and Financial Inclusion

	β	Std. Error	t	Sig.
(Constant)	1.568	0.171	9.191	<0.001
Collateral	0.511	0.045	11.469	<0.001

Dependent Variable: Financial inclusion

Optimal Model

$$\text{Financial inclusion} = 1.568 + 0.511 \text{ Collateral} + \varepsilon$$

From the coefficient Table 4.23, correlation between collateral and financial inclusion in Kenya contributes a statistically significant value (p-value<0 .001) of .511. The study sought to establish the influence of collateral as a function of financial inclusion among micro-enterprises in Kenya.

The multiple regression analysis results indicate that collateral has a positive statistically significant predicts the financial inclusion; $p < 0.05$ ($p < 0.001$). This means that an increase in mean index of collateral increases financial inclusion by a positive unit mean index value of

.351 per cent. Hence, collateral significantly influences the financial inclusion of micro-enterprises. These findings support the study by Gangata and Matavire (2013) on challenges faced by micro-enterprises in accessing finance from financial institutions, the study findings established that very few micro-enterprises succeed in accessing credit facilities from formal financial institutions, the main reason being failure to meet lending requirements, chief among them being provision of collateral security. However, with internet and mobile banking, micro-enterprises can now access credit without the need of having collateral. A study conducted by Ackah and Vuvor (2011) on the challenges facing micro-enterprises in accessing credit also revealed that the inability of SMEs to provide collateral and other information needed by banks such as audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans.

4.6.2 Transaction costs and Financial Inclusion

The regression analysis between transaction cost and financial inclusion among micro-enterprises in Kenya was done on the data and the results presented in Table 4.24.

Table 4.24: Model Summary of transaction costs and financial inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.279a	0.078	0.076	0.59907

Dependent Variable: Financial inclusion

From Table 4.24 presents an R^2 result of .078 or 7.8%, meaning that the independent variable, transaction cost alone can explain up to 7.8% of the total variability in the dependent variable, Financial Inclusion of micro-enterprises in Kenya. The remaining 92.2%

of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. Similarly an ANOVA test was performed on the influence of transaction costs and the results obtained are presented in Table 4.33 ANOVA result was obtained as presented in Table 4.24

Table 4.24: ANOVA for Transaction costs and Financial Inclusion

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	14.333	1	14.333	39.938	P<0.001
Residual	169.754	473	0.359		
Total	184.087	474			

ANOVA for Transaction costs and Financial Inclusion

From the ANOVA Table 4.24 the model is statistically significant as the p-value is less than .05. The values of $F(1, 473) = 39.938$, $p < 0.05$, shows that transaction costs statistically and significantly predicts financial inclusion of micro-enterprises (i.e., the regression model is a good fit of the data) and that transaction costs significantly influence the financial inclusion of micro-enterprises. This means that alternative hypothesis that transaction costs influence financial inclusion of micro-enterprises is accepted. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. The findings further agrees with that of Kim et al. (2015) who argued that financial services technology has disrupted the financial services industry and is creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide

Table 4.25: Coefficients of Transaction costs and Financial Inclusion

	β	Std. Error	t	Sig.
(Constant)	4.310	0.131	32.982	<0.001
Transaction cost	-0.242	0.038	-6.32	<0.001

Dependent Variable: Financial inclusion

Optimal Model

$$\text{Financial inclusion} = 4.310 - 0.242 \text{ Transaction Cost} + \epsilon$$

To complement the ANOVA findings on Transaction costs and Financial Inclusion of micro-enterprises in Kenya presented in Table 4.34, Pearson's correlation coefficients were also generated. The results of the Pearson's correlation are presented in Table 4.34. These results show that transaction costs contributes a statistically significant value (p-value<0.001) of -.242 to the regression model. The value of transaction cost is statistically significant (t=-6.32, p<.05). From the coefficient Table 4.34, Transaction costs and Financial Inclusion of micro-enterprises in Kenya contributes a statistically significant value (p-value< .001) of -.068.

The multiple regression analysis results indicate that transaction cost has a negative statistically significant predicts financial inclusion; $p < 0.05$ ($p < 0.001$) i.e. an increase in mean index of transaction cost increases the financial inclusion of micro-enterprises by a negative unit mean index value of -6.8% per cent. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. The findings further agrees with that of Kim et al. (2015) who argued that financial services technology has disrupted the financial services industry and is creating opportunities by providing

accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide

4.6.3 Convenience and Financial Inclusion

Table 4.26: Model Summary for Convenience and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.415a	0.172	0.171	0.56755

Dependent Variable: Financial inclusion

The study carried out a regression analysis between convenience and financial inclusion of micro-enterprises in Kenya. The findings were presented in Table 4.35. This Model Summary Table presents an R² result of 17.2 or 17.20%, meaning that the independent variable, convenience alone can explain up to 17.2% of the total variability in the dependent variable, financial inclusion of micro-enterprises. The remaining 73.80% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. The study findings show that convenience is an important factor that influences financial inclusion of micro-enterprises. These findings agreed with that of Kim et al. (2015) who argued that financial services technology has disrupted the financial services industry and are creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide

Table 4.27: ANOVA for convenience and financial inclusion

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	31.728	1	31.728	98.501	< 0.001
Residual	152.359	473	0.322		
Total	184.087	474			

An ANOVA test was performed on the variable, convenience and the results obtained are presented in Table 4.28. From the ANOVA Table, the model is statistically significant as the p-value is less than .05. The values of $F(1, 473) = 98.501$, $p < 0.05$, shows that convenience statistically and significant predicts financial inclusion (i.e., the regression model is a good fit of the data) and that convenience significantly influence the financial inclusion of micro-enterprises. This means that alternative hypothesis that convenience has a statistically significant influence on the financial inclusion of micro-enterprises is accepted.

Table 4.28: Coefficients for Convenience and Financial Inclusion

	β	Std. Error	t	Sig.
(Constant)	1.405	0.213	6.594	<0.001
convenience	0.516	0.052	9.925	<0.001

Dependent Variable: Financial inclusion

Optimal Model

$$\text{Financial inclusion} = 1.405 + 0.516 \text{ Convenience} + \varepsilon$$

To complement the ANOVA findings convenience and financial inclusion presented in Table 4.28, Person's correlation coefficients were also generated. The results of the person's correlation are presented in table 4.28. These results show that convenience contributes a statistically significant value (p-value <0 .001) of .516 to the regression model. The value of convenience is statistically significant (t=9.925 p<0.05). From the coefficient Table 4.28, convenience and financial inclusion contribute a statistically significant value (p-value<0 .001) of .341.

There is an increase in mean index of convenience increases the financial inclusion of micro-enterprises by a positive unit mean index value of 0.516. The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in Africa.

4.6.4 Perceived Value and Financial Inclusion

Regression analysis between Perceived Value and Financial Inclusion of micro-enterprises was done and the findings were presented in Table 4.29.

Table 4.29: Model Summary for Perceived Value and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.420a	0.176	0.174	0.5663

Dependent Variable: Financial inclusion

From the summary Table 4.29 presents an R^2 result of .176, meaning that the independent variable, perceived value alone can explain up to 17.6% of the total variability in the dependent variable, financial inclusion of micro-enterprises. The remaining 82.4% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. The study findings imply that perceived value of internet banking is an important factor influencing the financial inclusion of micro-enterprises. The findings support the study by Mbogo (2010) which established that micro-enterprises in Kenya have adopted the use of the mobile and internet banking as a way of transacting their

business because of the relative perceived value of the mobile and internet banking services. Customers can deposit and withdraw cash to/from their accounts by exchanging cash for electronic value at a network of retail stores (often referred to as agents). Once money is on the virtual account, the phone becomes a mobile wallet. Micro enterprises view payment through MMT as an easier form of cash delivery to their suppliers and business partners, a system which is relatively affordable, personal and can be used anywhere and at any time (Anurag, Tyagi & Raddi, 2009).

An ANOVA test was performed on the variable, perceived value and the results obtained are presented in Table 4.30.

Table 4.30: ANOVA for Perceived Value and Financial Inclusion

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	32.401	1	32.401	101.035	< 0.001
Residual	151.686	473	0.321		
Total	184.087	474			

The model is statistically significant as the p-value is less than .05. The values of $F(1, 473) = 101.035$, $p < 0.05$, shows that perceived value statistically and significant predicts the financial inclusion of micro-enterprises (i.e., the regression model is a good fit of the data) and that perceived value significantly influence the financial inclusion of micro-enterprises. This means that alternative hypothesis that perceived value has a statistically significant influence on financial inclusion of micro-enterprises is accepted. The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and

criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in Africa.

To complement the ANOVA findings on Perceived Value and Financial Inclusion presented in Table 4.31, Pearson’s correlation coefficients were also generated.

Table 4.31: Coefficients of Perceived Value and Financial Inclusion

	β	Std. Error	t	Sig.
(Constant)	1.227	0.228	5.384	<0.001
Perceived	0.567	0.056	10.052	<0.001

Dependent Variable: Financial inclusion

Optimal Model

$$\text{Financial inclusion} = 1.227 + 0.567 \text{ Perceived Value} + \varepsilon$$

These results show that perceived value contributes a statistically significant value (p-value<0.001) of .567 to the regression model. The value of perceived value is statistically significant (t=10.052, p<0.05). From the coefficient Table 4.40 Perceived Value and Financial Inclusion contributes a statistically significant value (p-value = .001) of .567.

That is an increase in mean index of financial inclusion increases the financial inclusion of micro-enterprises by a positive unit mean index value of 0.567. The findings support the study Mbogo (2010) which established that micro-enterprises in Kenya have adopted the use of the mobile and internet banking as a way of transacting their business because of the relative perceived value of the mobile and internet banking services. Customers can deposit and withdraw cash to/from their accounts by exchanging cash for electronic value at a network of retail stores (often referred to as agents). Once money is on the virtual account, the phone becomes a mobile wallet. Micro enterprises view payment through MMT as an

easier form of cash delivery to their suppliers and business partners, a system which is relatively affordable, personal and can be used anywhere and at any time (Anurag et al., 2009).

4.6.5 Technology adoption and Financial Inclusion

Table 4.32: Model of Fitness for technology adoption and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.640a	0.409	0.408	0.47941

Dependent Variable: Financial inclusion

The results in table 4.32 presented the fitness of model of regression model used in explaining the study phenomena. Technology adoption was found to be satisfactory in financial inclusion. This was supported by coefficient of determination i.e. the R square of 40.9%. This shows that technology adoption explain 40.9% of the financial. The results meant that the model applied to link the relationship. The remaining 59.1% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model.

Table 4.33: ANOVA for technology adoption and Financial Inclusion

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	75.378	1	75.378	327.973	< 0.001
Residual	108.710	473	0.230		
Total	184.087	474			

Table 4.33 provided the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. Further, the results implied that a

technology adoption is a good predictor of financial inclusion. This was supported by an F statistic of 327.973 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level. These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

Table 4.34: Regression of Coefficient for technology adoption and Financial Inclusion

	β	Std. Error	t	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

Optimal Model

$$\text{Financial inclusion} = 0.824 + 0.801 \text{ FSTA} + \varepsilon$$

Regression of coefficients results in table 4.34 revealed that technology adoption and financial inclusion are positively and significantly related ($t=18.110$, $p<0.001$). These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

4.6.6 Internet Banking and Financial Inclusion

Table 4.35: Model of Fitness for Internet Banking and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.246a	0.061	0.059	0.60463

Dependent Variable: Financial inclusion

The results in table 4.35 presented the fitness of model of regression model used in explaining the study phenomena. Internet banking was found to have a satisfactory effect on financial inclusion. This was supported by coefficient of determination i.e. the R square of 6.1%. This shows that internet banking explain 6.1% of the financial. The results meant that

the model applied to link the relationship. The remaining 93.9% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model.

Table 4.36: ANOVA for internet banking

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.168	1	11.168	30.549	< 0.001
Residual	172.919	473	0.366		
Total	184.087	474			

Table 4.36 provided the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. Further, the results implied that a internet banking is a good predictor of financial inclusion. This was supported by an F statistic of 30.549 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level.

Table 4.37: Regression of Coefficient for internet banking

	β	Std. Error	t	Sig.
(Constant)	2.276	0.224	10.175	<0.001
Internet banking	0.304	0.055	5.527	<0.001

Optimal Model

$$\text{Financial inclusion} = 2.276 + 0.304 \text{ Internet Banking} + \varepsilon$$

Regression of coefficients results in table 4.46 revealed that internet banking and financial inclusion are positively and significantly related ($t=5.527$, $p<0.001$). These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability

but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya.

4.6.6 Mobile Banking and Financial Inclusion

Table 4.38: Model of Fitness for Mobile Banking and Financial Inclusion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.602a	0.363	0.362	0.49792

The results in table 4.38 presented the fitness of model of regression model used in explaining the study phenomena. Mobile banking was found to have a satisfactory effect on financial inclusion. This was supported by coefficient of determination i.e. the R square of 36.3%. This shows that internet banking explain 36.3% of the financial. The results meant that the model applied to link the relationship. The remaining 63.7% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model.

Table 4.39: ANOVA for Mobile Banking

	Sum of Squares	df	Mean Square	F	Sig.
Regression	66.819	1	66.819	269.511	<0.001
Residual	117.269	473	0.248		
Total	184.087	474			

Table 4.39 provided the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. Further, the results implied that mobile banking is a good predictor of financial inclusion. This was supported by an F statistic of 269.511 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level.

Table 4.40: Regression of Coefficient for Mobile banking

	B	Std. Error	t	Sig.
(Constant)	0.878	0.162	5.436	<0.001
Mobile banking	0.722	0.044	16.417	<0.001

Optimal Model

$$\text{Financial inclusion} = 0.878 + 0.7222 \text{ Mobile Banking} + \varepsilon$$

Regression of coefficients results in Table 4.40 revealed that mobile banking and financial inclusion are positively and significantly related ($t=16.417$, $p<0.001$). The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

4.6.7 Antecedents of FSTA and Financial Inclusion

Table 4.41: Model of Fitness for Antecedents of FSTA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.608a	0.369	0.364	0.57265

The results in table 4.41 presented the fitness of model of regression model used in explaining the study phenomena. Antecedents of FSTA were found to have a satisfactory effect on financial inclusion. This was supported by coefficient of determination i.e. the R square of 36.9%. This shows that antecedents of FSTA explain 36.9% of the financial. The

results meant that the model applied to link the relationship. The remaining 63.1% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model.

Table 4.41: ANOVA for Antecedents of FSTA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	28.976	1	28.976	88.36	< 0.001
Residual	155.111	473	0.328		
Total	184.087	474			

Table 4.41 provided the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. Further, the results implied that antecedents of FSTA are good predictors of financial inclusion. This was supported by an F statistic of 88.36 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level.

Table 4.41: Regression of Coefficient for Antecedents of FSTA

	β	Std. Error	t	Sig.
(Constant)	0.275	0.344	0.8	0.424
Antecedents FSTA	0.849	0.09	9.4	<0.001

Regression of coefficients results in Table 4.52 revealed that antecedents of FSTA and financial inclusion are positively and significantly related (t=9.4, p<0.001).

Optimal Model

$$\text{Financial inclusion} = 0.275 + 0.849 \text{ Antecedents of FSTA} + \varepsilon$$

4.6.8 Mediating role of technology innovation

The study sought to establish whether the mediator (technology adoption) had any effect of financial inclusion.

Table 4.42: Model summary before mediation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.608a	0.369	0.364	0.49705

Dependent Variable: Financial inclusion

The results in table 4.42 presented the fitness of model of regression model used in explaining the study phenomena. Collateral, transaction cost, convenience and perceived value were found to be satisfactory in financial inclusion. This was supported by coefficient of determination i.e. the R square of 36.9%. These shows that collateral, transaction cost, convenience and perceived value explain 36.9% of the financial. The results meant that the model applied to link the relationship.

Table 4.43: ANOVA before mediation

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	67.970	4	16.992	68.779	< 0.001
Residual	116.117	470	0.247		
Total	184.087	474			

Table 4.43 provided the results on the analysis of the variance (ANOVA). The results indicated that the model was statistically significant. Further, the results implied that collateral, transaction cost, convenience and perceived value are good predictors of financial

inclusion. This was supported by an F statistic of 68.779 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level.

Table 4.44: Regression of Coefficient before mediation

	B	Std. Error	t	Sig.
(Constant)	0.222	0.302	0.733	0.464
Convenience	0.359	0.048	7.549	<0.001
Transaction cost	-0.118	0.033	-3.555	<0.001
Perceived value	0.269	0.056	4.795	<0.001
Collateral	0.300	0.046	6.513	<0.001

Dependent Variable: Financial inclusion

Regression of coefficients results in table 4.44 revealed that convenience and financial inclusion are positively and significantly related ($t=7.549$, $p<0.001$). The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in Africa. The results also revealed that transaction cost and financial inclusion are positively and significantly related ($t = -3.555$, $p<0.001$). These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. The findings further agrees with that of Kim et al. (2015) who argued that financial services technology has disrupted the financial services industry and is creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide. The results also revealed that perceived value and financial

inclusion are positively and significantly related ($t=-4.795$, $p=0.009$). The findings support the study Mbogo (2010) which established that micro-enterprises in Kenya have adopted the use of the mobile and internet banking as a way of transacting their business because of the relative perceived value of the mobile and internet banking services. Customers can deposit and withdraw cash to/from their accounts by exchanging cash for electronic value at a network of retail stores (often referred to as agents). Once money is on the virtual account, the phone becomes a mobile wallet. Micro enterprises view payment through MMT as an easier form of cash delivery to their suppliers and business partners, a system which is relatively affordable, personal and can be used anywhere and at any time (Anurag et al., 2009). In addition, the results showed that collateral and financial inclusion are positively and significantly related ($t=6.513$, $p=0.009$). These findings agreed with that of Jiménez et al. (2013) found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. The results were also consistent with that of Ackah and Vuvor (2011) who found that inability of SMEs to provide collateral and other information needed by banks such as audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans.

4.6.9 Mediating effect of technology innovation on the relationship between collateral and financial inclusion

The Baron and Kenny approach on testing for mediation was employed for the purpose of testing this hypothesis.

Step One: The influence of collateral and financial inclusion

Table 4.45: Regression Analysis for collateral and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	1.568	0.171	9.191	P<0.001
Collateral	0.511	0.045	11.469	P<0.001

Dependent Variable: Financial inclusion

The results in Table 4.45 show that the effect of collateral on financial inclusion is significant ($t=11.469$, $p<0.05$) implying that 11.469 of a unit change in financial inclusion is attributed to one unit change in collateral. The first mediation condition which states that the independent variable should be significantly related to the dependent variable in the absence of the mediating variable is thus satisfied.

Step Two: The influence of collateral and technology adoption

Table 4.46: Regression Analysis for collateral and technology adoption

	β	Std. Error	t	Sig.
(Constant)	2.190	0.144	15.164	<0.001
Collateral	0.305	0.038	8.084	<0.001

Dependent Variable: technology adoption

The second step as presented in Table 4.46 indicates that the influence of collateral on technology adoption is significant ($t=8.084$, $p<0.05$) thus satisfying the second condition which states that the independent variable should be significantly related to the mediator variable.

Step Three: The influence of technology adoption and financial inclusion

Table 4.47: Regression Analysis for technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

The third step as presented in Table 4.47 revealed that the influence of technology adoption and financial inclusion was significant ($t=18.110$, $p<0.05$) thus satisfying the third condition which states that the mediator variable should be significantly related to the dependent variable.

Step Four: The influence of collateral, technology adoption and financial inclusion

Table 4.48: Regression Analysis for collateral, technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.078	0.170	0.461	0.645
Collateral	0.304	0.039	7.804	<0.001
Technology adoption	0.680	0.044	15.299	<0.001

Dependent Variable: Financial inclusion

The fourth step as presented in Table 4.48 revealed that the influence of the independent variable (collateral) on the dependent variable (financial inclusion) was significant in the presence of the mediating variable, technology adoption ($t=7.804$, $p<0.05$) and thus does not

satisfy the fourth condition which states that the effect of the independent variable on the dependent variable should be insignificant in the presence of the mediating variable.

The mediation test thus did not satisfy the four conditions and therefore it can be concluded that technology innovation does not mediate the relationship between collateral and financial inclusion among micro enterprises.

4.6.10 Mediating effect of technology innovation on the relationship between transaction cost and financial inclusion

The Baron and Kenny approach on testing for mediation was employed for the purpose of testing this hypothesis. For mediation to be confirmed, four conditions should be fulfilled:

1. The independent variable is significantly related to the dependent variable in the absence of the mediating variable.
2. The independent variable is significantly related to the mediator variable.
3. The mediator variable is significantly related to the dependent variable.
4. When controlling for the effect of the mediating variable on the dependent variable, the effect of the independent variable on the dependent variable is not significant in the presence of the mediating variable.

Step One: The influence of transaction cost and financial inclusion

Table 4.49: Regression Analysis for transaction cost and financial inclusion

	B	Std. Error	t	Sig.
(Constant)	4.310	0.131	32.982	<0.001
Transaction cost	-0.242	0.038	-6.320	<0.001

Dependent Variable: Financial inclusion

The results in Table 4.49 show that the effect of transaction cost on financial inclusion is significant ($t=-6.320$, $p<0.05$) implying that 6.320 of a unit change in financial inclusion is attributed to one unit change in transaction cost. The first mediation condition which states that the independent variable should be significantly related to the dependent variable in the absence of the mediating variable is thus satisfied.

Step Two: The influence of transaction cost and technology adoption

Table 4.49: Regression Analysis for transaction cost and technology adoption

	B	Std. Error	t	Sig.
(Constant)	3.761	0.107	35.156	<0.001
Transaction Cost	-0.124	0.031	-3.973	<0.001

Dependent Variable: technology adoption

The second step as presented in Table 4.49 indicates that the influence of transaction cost on technology adoption is significant ($t=-3.973$, $p<0.05$) thus satisfying the second condition which states that the independent variable should be significantly related to the mediator variable.

Step Three: The influence of technology adoption and financial inclusion

Table 4.49: Regression Analysis for technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

The third step as presented in Table 4.49 revealed that the influence of technology adoption and financial inclusion was significant ($t=18.110$, $p<0.05$) thus satisfying the third condition which states that the mediator variable should be significantly related to the dependent variable.

Step Four: The influence of transaction cost, technology adoption and financial inclusion

Table 4.49: Regression Analysis for transaction cost, technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	1.442	0.194	7.423	<0.001
Transaction	-0.147	0.03	-4.829	<0.001
Technology adoption	0.763	0.044	17.363	<0.001

Dependent Variable: Financial inclusion

The fourth step as presented in Table 4.49 revealed that the influence of the independent variable (transaction cost) on the dependent variable (financial inclusion) was significant in the presence of the mediating variable, technology adoption ($t=-4.829$, $p<0.05$) and thus did not satisfy the fourth condition which states that the effect of the independent variable on the dependent variable should be insignificant in the presence of the mediating variable.

The mediation test thus did not satisfy the four conditions and therefore it can be concluded that technology innovation does not mediate the relationship between transaction cost and financial inclusion among micro enterprises.

4.6.11 Mediating effect of technology innovation on the relationship between convenience and financial inclusion

The Baron and Kenny approach on testing for mediation was employed for the purpose of testing this hypothesis. For mediation to be confirmed, four conditions should be fulfilled:

1. The independent variable is significantly related to the dependent variable in the absence of the mediating variable.
2. The independent variable is significantly related to the mediator variable.
3. The mediator variable is significantly related to the dependent variable.
4. When controlling for the effect of the mediating variable on the dependent variable, the effect of the independent variable on the dependent variable is not significant in the presence of the mediating variable.

Step One: The influence of convenience and financial inclusion

Table 4.50: Regression Analysis for convenience and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	1.405	0.213	6.594	<0.001
convenience	0.516	0.052	9.925	<0.001

Dependent Variable: Financial inclusion

The results in Table 4.50 shows that the effect of convenience on financial inclusion is significant ($t = 9.925$, $p < 0.05$) implying that 9.925 of a unit change in financial inclusion is attributed to one unit change in convenience. The first mediation condition which states that

the independent variable should be significantly related to the dependent variable in the absence of the mediating variable is thus satisfied.

Step Two: The influence of convenience and technology adoption

Table 4.51: Regression Analysis for convenience and technology adoption

	β	Std. Error	T	Sig.
(Constant)	2.051	0.177	11.572	<0.001
Convenience	0.318	0.043	7.359	<0.001

Dependent Variable: technology adoption

The second step as presented in Table 4.51 indicates that the influence of convenience on technology adoption is significant ($t=7.359$, $p<0.05$) thus satisfying the second condition which states that the independent variable should be significantly related to the mediator variable.

Step Three: The influence of technology adoption and financial inclusion

Table 4.52: Regression Analysis for technology adoption and financial inclusion

	β	Std. Error	T	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

The third step as presented in Table 4.52 revealed that the influence of technology adoption and financial inclusion was significant ($t=18.110$, $p<0.05$) thus satisfying the third condition

which states that the mediator variable should be significantly related to the dependent variable.

Step Four: The influence of convenience, technology adoption and financial inclusion

Table 4.53: Regression Analysis for transaction cost, technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	-0.045	0.195	-0.231	0.817
convenience	0.291	0.044	6.548	<0.001
Technology adoption	0.707	0.045	15.799	<0.001

Dependent Variable: Financial inclusion

The fourth step as presented in Table 4.53 revealed that the influence of the independent variable (convenience) on the dependent variable (financial inclusion) was significant in the presence of the mediating variable, technology adoption ($t=15.799$, $p<0.05$) and thus satisfying the fourth condition which states that the effect of the independent variable on the dependent variable should be significant in the presence of the mediating variable.

The mediation test thus satisfies the four conditions and therefore it can be concluded that technology innovation does not mediate the relationship between convenience and financial inclusion among micro enterprises.

4.6.12 Mediating effect of technology adoption on the relationship between perceived value and financial inclusion

The Baron and Kenny approach on testing for mediation was employed for the purpose of testing this hypothesis. For mediation to be confirmed, four conditions should be fulfilled:

1. The independent variable is significantly related to the dependent variable in the absence of the mediating variable.
2. The independent variable is significantly related to the mediator variable.
3. The mediator variable is significantly related to the dependent variable.
4. When controlling for the effect of the mediating variable on the dependent variable, the effect of the independent variable on the dependent variable is not significant in the presence of the mediating variable.

Step One: The influence of perceived value and financial inclusion

Table 4.54: Regression Analysis for perceived value and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	1.227	0.228	5.384	<0.001
Perceived value	0.567	0.056	10.052	<0.001

Dependent Variable: Financial inclusion

The results in Table 4.54 shows that the effect of perceived value on financial inclusion is significant ($t = 10.052$, $p < 0.05$) implying that 10.052 of a unit change in financial inclusion is attributed to one unit change in perceived value. The first mediation condition which states

that the independent variable should be significantly related to the dependent variable in the absence of the mediating variable is thus satisfied.

Step Two: The influence of convenience and technology adoption

Table 4.55: Regression Analysis for perceived value and technology adoption

	β	Std. Error	t	Sig.
(Constant)	1.867	0.189	9.900	<0.001
Perceived value	0.368	0.047	7.890	<0.001

Dependent Variable: technology adoption

The second step as presented in Table 4.55 indicates that the influence of perceived value on technology adoption is significant ($t=7.890$, $p<0.05$) thus satisfying the second condition which states that the independent variable should be significantly related to the mediator variable.

Step Three: The influence of technology adoption and financial inclusion

Table 4.56: Regression Analysis for technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

The third step as presented in Table 4.56 revealed that the influence of technology adoption and financial inclusion was significant ($t=18.110$, $p<0.05$) thus satisfying the third condition

which states that the mediator variable should be significantly related to the dependent variable.

Step Four: The influence of convenience, technology adoption and financial inclusion

Table 4.57: Regression Analysis for perceived value, technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	-0.087	0.204	-0.425	0.671
Perceived Value	0.308	0.049	6.304	<0.001
Technology Adoption	0.704	0.045	15.558	<0.001

Dependent Variable: Financial inclusion

The fourth step as presented in Table 4.57 revealed that the influence of the independent variable (perceived value) on the dependent variable (financial inclusion) was significant in the presence of the mediating variable, technology adoption ($t=6.304$, $p<0.05$) and thus does not satisfy the fourth condition which states that the effect of the independent variable on the dependent variable should significant in the presence of the mediating variable.

The mediation test thus satisfies the four conditions and therefore it can be concluded that technology innovation does not mediate the relationship between perceived value and financial inclusion among micro enterprises.

4.6.13 Mediating effect of technology adoption on the relationship between Antecedents of FSTA and financial inclusion

The Baron and Kenny approach on testing for mediation was employed for the purpose of testing this hypothesis. For mediation to be confirmed, four conditions should be fulfilled:

1. The independent variable is significantly related to the dependent variable in the absence of the mediating variable.
2. The independent variable is significantly related to the mediator variable.
3. The mediator variable is significantly related to the dependent variable.
4. When controlling for the effect of the mediating variable on the dependent variable, the effect of the independent variable on the dependent variable is not significant in the presence of the mediating variable.

Step One: The influence of Antecedents of FSTA and financial inclusion

Table 4.58: Regression Analysis for Antecedents of FSTA and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.275	0.344	0.8	0.424
Antecedents FSTA	0.849	0.09	9.4	<0.001

Dependent Variable: Financial inclusion

The results in Table 4.58 shows that the effect of antecedents of FSTA on financial inclusion is significant ($t = 9.4$, $p < 0.05$) implying that 9.4 of a unit change in financial inclusion is attributed to one unit change in antecedents of FSTA. The first mediation condition which states that the independent variable should be significantly related to the dependent variable in the absence of the mediating variable is thus satisfied.

Step Two: The influence of antecedents of FSTA and technology adoption

Table 4.59: Regression Analysis for antecedents of FSTA and technology adoption

	β	Std. Error	t	Sig.
(Constant)	1.108	0.281	3.937	<0.001
Antecedents FSTA	0.588	0.074	7.973	<0.001

Dependent Variable: technology adoption

The second step as presented in Table 4.59 indicates that the influence of antecedents of FSTA on technology adoption is significant ($t=7.973$, $p<0.05$) thus satisfying the second condition which states that the independent variable should be significantly related to the mediator variable.

Step Three: The influence of technology adoption and financial inclusion

Table 4.60: Regression Analysis for technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	0.824	0.150	5.509	<0.001
Technology Adoption	0.801	0.044	18.110	<0.001

Dependent Variable: Financial inclusion

The third step as presented in Table 4.60 revealed that the influence of technology adoption and financial inclusion was significant ($t=18.110$, $p<0.05$) thus satisfying the third condition which states that the mediator variable should be significantly related to the dependent variable.

Step Four: The influence of antecedents of FSTA, FSTA and financial inclusion

Table 4.61: Regression Analysis for perceived value, technology adoption and financial inclusion

	β	Std. Error	t	Sig.
(Constant)	-0.516	0.284	-1.816	0.070
Antecedents of FSTA	0.428	0.078	5.481	<0.001
FSTA	0.715	0.046	15.631	<0.001

Dependent Variable: Financial inclusion

The fourth step as presented in Table 4.61 revealed that the influence of the independent variable (antecedents of FSTA) on the dependent variable (financial inclusion) was significant in the presence of the mediating variable, FSTA ($t=5.481$, $p<0.05$) and thus does not satisfy the fourth condition which states that the effect of the independent variable on the dependent variable should be significant in the presence of the mediating variable.

The mediation test thus satisfies the four conditions and therefore it can be concluded that technology innovation does not mediate the relationship between antecedents of FSTA and financial inclusion among micro enterprises.

4.6.14 Regression after mediation

Table 4.62: Model summary after mediation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731a	0.534	0.529	0.42774

Dependent Variable: Financial inclusion

The results in table 4.62 presented the fitness of model of regression model used in explaining the study phenomena. Collateral, transaction cost, convenience, perceived value and technology adoption were found to be satisfactory in financial inclusion. This was supported by coefficient of determination i.e. the R square of 53.4%. This shows that Collateral, transaction cost, convenience, perceived value and technology adoption explain 53.4% of the financial. The results meant that the model applied to link the relationship. After mediation, R^2 improved from 36.9% to 53.4%

Table 4.63: ANOVA after mediation

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	98.277	5	19.655	107.427	< 0.001
Residual	85.811	469	0.183		
Total	184.087	474			

Dependent Variable: Financial inclusion

Table 4.63 provided the results on the analysis of the variance (ANOVA). The results indicated that the model after mediation was statistically significant. Further, the results implied that collateral, transaction cost, convenience and perceived value are good predictors of financial inclusion. This was supported by an F statistic of 107.427 and the reported p value (<0.001) which was less than the conventional probability of 0.05 significance level. In addition the F statistic improved from 68.779 to 107.427 after mediation.

Table 4.64: Regression of Coefficient after mediation

	β	Std. Error	t	Sig.
(Constant)	-0.437	0.265	-1.647	0.100
Collateral	0.201	0.04	4.983	<0.001
convenience	0.233	0.042	5.534	<0.001
transaction cost	-0.091	0.029	-3.192	<0.002
perceived value	0.154	0.049	3.142	<0.002
Technology	0.573	0.045	12.87	<0.001

Dependent Variable: Financial inclusion

Regression of coefficients results in table 4.64 revealed that convenience and financial inclusion are positively and significantly related ($t=5.534$, $p<0.001$). The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in the Africa. The results also revealed that transaction cost and financial inclusion are positively and significantly related ($t=-3.192$, $p<0.002$). These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs.

The results also revealed that perceived value and financial inclusion are positively and significantly related ($t=3.142$, $p<0.001$). The findings support the study Mbogo (2010) which

established that micro-enterprises in Kenya have adopted the use of the mobile and internet banking as a way of transacting their business because of the relative perceived value of mobile and internet banking services. Customers can deposit and withdraw cash to/from their accounts by exchanging cash for electronic value at a network of retail stores (often referred to as agents). Once money is on the virtual account, the phone becomes a mobile wallet.

Micro enterprises view payment through MMT as an easier form of cash delivery to their suppliers and business partners, a system which is relatively affordable, personal and can be used anywhere and at any time (Anurag et al., 2009). In addition, the results showed that collateral and financial inclusion are positively and significantly related ($t=4.983$, $p=0.002$). These findings support the study by Gangata and Matavire (2013) on challenges faced by micro-enterprises in accessing finance from financial institutions, the study findings established that very few micro-enterprises succeed in accessing credit facilities from formal financial institutions, the main reason being failure to meet lending requirements, chief among them being provision of collateral security. In addition, the results showed that technology adoption and financial inclusion are positively and significantly related ($t=0.573$, $p<0.001$).

These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya. The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which

increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya.

4.6.15 Moderating Effect of Antecedents of FSTA on Financial Inclusion

Table 4.65: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654a	0.427	0.426	0.47218

The results revealed that the R squared improved from 40.9% to 42.7% after moderation with antecedents of FSTA. This implies that antecedents of FSTA moderate the relationship between FSTA and financial inclusion.

Table 4.66: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	78.63	1	78.63	352.67	< 0.001
Residual	105.458	473	0.223		
Total	184.087	474			

The results revealed that the overall model after moderation with antecedents of FSTA was significant. In addition the F statistic improved from 327.973 to 352.67. This further confirms that antecedents of FSTA moderate the relationship between FSTA and financial inclusion.

Table 4.67: Regression of Coefficients

Model	β	Std. Error	t	Sig.	
1 (Constant)		1.302	0.119	10.927	<0.001
X.M		0.172	0.009	18.780	<0.001

a Dependent Variable: Financial inclusion

$$Y = 1.302 + 0.172X.M + \epsilon$$

Where Y is financial inclusion, X is FSTA; M is Antecedents of FSTA while ϵ is the error term

4.7 Discussion of the Findings

This section gives a summary of findings for each variable under study. It will also compare the findings with the previous studies done under the same area and try to establish whether there is any similarity in the findings without forgetting the fact that these studies have been done under different environments.

4.7.1 Convenience

This study sought to establish whether there was any form of correlation between collateral and financial inclusion. The findings indicated that use of mobile banking makes it easier for owners of micro-enterprises to carry out their businesses operations. In addition that use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations. The results further revealed that mobile banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners. In addition, results revealed that Interaction with Internet banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners.

The results also indicated that it is easy to undertake business transactions through mobile banking. In addition, it is secure for micro-enterprise owners to move around with large amounts of money. In addition it is efficient for owners of micro-enterprises to use mobile banking to accomplish their banking tasks anytime and anywhere. In addition it is efficient for owners of micro-enterprises to use Internet banking to accomplish their banking tasks anytime and anywhere.

The findings indicated a positive correlation coefficient of .415 (or 41.5%) existed between collateral and financial inclusion. Further, a regression analysis between convenience and financial inclusion of micro-enterprises in Kenya. An R^2 result of .172 or 17.20% was obtained meaning that the independent variable, convenience alone can explain up to 17.2% of the total variability in the dependent variable, financial inclusion of micro-enterprises. The remaining 73.80% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. The study findings showed that convenience is an important factor that influences financial inclusion of micro-enterprises. From hypothesis testing the study found that convenience have a significant effect on financial inclusion of micro-enterprises. In addition conveniences have a significant effect on financial services technology innovation of micro-enterprises.

These findings were consistent with those of Wamuyu (2014) who indicated that convenience in the financial sector materializes if an interface goes beyond the services of transfers, deposits and withdrawals to include investment advice and portfolio management to ensure the most efficient use of the client's time. As clients are becoming accustomed to the digital experience offered by companies such as Google, Amazon, Facebook and Apple, they expect the same level of customer experience from their financial services providers (Sanfillippo & Fichman, 2014). The findings likewise corroborate those of Potnis (2014) who argues that mobile-first consumers expect convenience, immediacy and security to be integral to payments. Mohan and Potnis (2015) explain that consumers have a culture of on-demand streaming of digital products and services and as such archaic payment solutions that take days rather than seconds for settlement are considered unacceptable. Financial institutions are moving towards non-physical channels by implementing operational solutions and developing new methods to reach, engage and retain customers (Waiganjo, 2018).

4.7.2 Collateral

Based on the findings, mainstream financial institutions insist on the provision of collateral by micro enterprises. In addition the study found that while addressing the likelihood of loan repayment, mobile banking providers adopt a risk averse stance towards micro enterprises. The results also revealed that requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace mobile banking. The results also showed that mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace internet banking. However the study found that it is not easy to provide collateral for a loan in the mainstream financial institutions. The results also showed that security required for bank loans is not affordable to most enterprises.

A correlation analysis was conducted between collateral and financial inclusion. The findings showed a positive correlation coefficient of .466 (or 46.60%) existed between collateral and financial inclusion. Further, a regression analysis between the two variables was done, the model obtained showed that collateral affects the financial inclusion of micro-enterprises, that is, an increase in mean index of collateral increases the financial inclusion of micro-enterprises in Kenya by a positive unit mean index value of 0.351. The regression analysis results indicated that collateral has a positive statistically significant predicts the financial inclusion; $p < 0.05$ ($P=0.001$) i.e. an increase in mean index of collateral increases financial inclusion by a positive unit mean index value of .511 per cent. Hence, collateral significantly influences the financial inclusion of micro-enterprises.

Model Summary presented an R^2 result of .218 or 21.8%, meaning that the independent variable, collateral alone can explain up to 21.8% of the total variability in the dependent

variable, Financial Inclusion of micro-enterprises in Kenya. The remaining 79.2% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. From hypothesis testing the study found that collateral have a significant effect on financial inclusion of micro-enterprises. In addition collateral have a significant effect on financial services technology innovation of micro-enterprises.

These findings were consistent with Charles and Mori (2016) who found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. They also found that if a firm works with multiple banks, it increases the probability of pledging collateral for long term loans while it decreases the probability of pledging collateral when acquiring short term loans. The findings likewise agreed with Gakuu, Wachira and Kagwiria (2015) who revealed that collateral requirements have a moderate influence on credit accessibility in SACCO's. This reduces the profitability of many products, forcing financial services companies to look for cost savings. With IT accounting for a significant slice of the cost base, financial institutions have to rebuild IT infrastructure, sometimes extensively (Demirgüç-Kunt & Klapper, 2013).

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services companies to look for cost savings. With IT accounting for a significant slice of the cost base, financial institutions have to rebuild IT infrastructure, sometimes extensively (Demirgüç-Kunt & Klapper, 2013).

4.7.3 Transaction Costs

Correlation analysis was conducted between transaction cost and financial inclusion of micro-enterprises. The findings revealed that there was a negative Pearson correlation of -0.279 (or -27.90%) between transaction costs and financial inclusion implying that an increase in transaction costs reduces the level of financial inclusion among the micro-enterprises. A regression analysis was further conducted and the regression model showed that transaction cost negatively affects the financial inclusion of micro-enterprises, that is, an increase in mean index of transaction cost decreases the financial inclusion of micro-enterprises by a negative unit mean index value of -0.242 . The multiple regression analysis results indicate that transaction cost has a positive statistically significant predicts financial inclusion; $p < 0.05$ ($P=0.001$) i.e. an increase in mean index of transaction cost increases the financial inclusion of micro-enterprises by a negative unit mean index value of -24.2% per cent.

This model summary presented an R^2 result of 7.8 or 7.8% , meaning that the independent variable, transaction cost alone can explain up to 7.8% of the total variability in the dependent variable, Financial Inclusion of micro-enterprises in Kenya. The remaining 92.2% of the variation in the dependent variable is unexplained by this one predictor model but by other factors not included in the model. From hypothesis testing the study found that transaction costs have a significant effect on financial inclusion of micro-enterprises. In addition transaction costs have a significant effect on financial services technology innovation of micro-enterprises.

These findings are consistent with those of Demirgüç-Kunt and Klapper (2013) who stressed that capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or physical capital. Thus, reducing financial market imperfections to expand individual opportunities creates positive, not negative, incentive effects. Mobile banking is not influenced these transaction costs (Bachas et al., 2018). They were further consistent with behavioral decision theory, which states that the cost-benefit pattern is significant to both perceived usefulness and ease of use of technology (Mohan & Potnis, 2015). This is because if consumers perceive the cost of mobile money service as acceptable, they will adopt it easier, and then use it. Furthermore, hardware/software and financial resources are important for users of an information system (Micheni et al., 2013). Financial cost is likely to directly influence the user's intention to use digital financial services. The findings are also in line with the findings by Jack, Suri and Townsend (2010) that revealed a great reduction in transaction costs and entrepreneur's ability to conduct financial transactions over the phone without having to travel to banks.

4.7.4 Perceived Value

The results revealed that improved security when sending large sums of money using mobile banking has increased its usage among micro-enterprises. In addition, the results further showed that improved security when sending large sums of money using internet banking has increased its usage among micro-enterprises. The results revealed that majority of the respondents agreed with the statement that owners of micro-enterprises can reverse mobile banking transactions in case transaction errors occur. The results revealed that mobile banking; transactions are easily traceable in micro-enterprises. The results also revealed that internet banking; transactions are easily traceable in micro-enterprises

A correlation analysis between perceived value and financial inclusion of micro-enterprises was conducted. The findings revealed a positive correlation coefficient of .311 (or 31.10%) existed between perceived value and financial inclusion of micro-enterprises. A regression analysis between Perceived Value and Financial Inclusion of micro-enterprises was further carried out. The model indicated an R-Square result of .098, meaning that the independent variable, perceived value alone can explain up to 9.8% of the total variability in the dependent variable, financial inclusion of micro-enterprises. The remaining 80.2% of the variation in the dependent variable was unexplained by this one predictor model but by other factors not included in the model. The study findings imply that perceived value of internet banking is an important factor influencing the financial inclusion of micro-enterprises. From hypothesis testing the study found that perceived value have a significant effect on financial inclusion of micro-enterprises. In addition perceived value have a significant effect on financial services technology innovation of micro-enterprises.

These findings were found to agree with those of Mbawuni (2018) who indicated that perceived benefits have been ranked as main factors for small firms' Internet adoption. M-banking provides benefits to SMEs like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players. The findings also were consistent with Sewanu (2015) who stresses that ICT implementation in the organization which includes SMEs has the potential to reduce costs and increase productivity level. In addition according to Isaac (2014) ICT usage has a positive impact on business performance.

4.7.5 Technology adoption

Based on the findings, there is proficiency in the use of m-banking transaction processes between them and their suppliers. In addition, use of m-banking transaction processes between me and my customers. The study also found that business owners have the knowledge needed to use the mobile banking technology. However, the study also found that it would not take a lot of time to learn how to use m-banking services. In addition, it would not take a lot of time to learn how to use internet banking services.

From correlation results, positive correlation coefficient of .307 (or 30.70%) existed between technology adoption and financial inclusion. From regression results, technology adoption was found to be satisfactory in financial inclusion. This was supported by coefficient of determination i.e. the R square of 9.4%. This shows that technological capabilities explain 9.4% of the financial inclusion. In addition, technology adoption and financial inclusion are positively and significantly related ($B=0.494$, $p=0.001$). In addition, the results revealed that technology adoption mediates the relationship between transaction cost, convenience, perceived value and financial inclusion. However, technology adoption did not mediate the relationship between collateral and financial inclusion. From hypothesis testing the study found that financial services technology innovation have a significant effect on financial inclusion of micro-enterprises.

These findings were consistent with those of Scott and Zachariadis (2017) who reported that deficient and wasteful innovation based offices by money related establishments, has constrained the accomplishment of critical extension in budgetary incorporation level. In addition, Manyika et al. (2016) acknowledged that the spread of cellular telephones underpins the impact of money related consideration on monetary development, particularly in nations

where portable budgetary administrations grab hold. The findings also corroborated those of Ketterer (2017) who stated that digital finance can result in greater financial inclusion, expansion of financial services to non-financial sectors, and the expansion of basic services to households. This is possible since nearly 50% of people in the developing world already own a mobile phone (World Bank, 2014).

4.8 Hypotheses Testing

According to ANOVA Tables presented the study performed individual tests of all independent variables to determine which regression coefficient may be zero and which one may not. The conclusion was based on the basis of p-value where if the alternative hypothesis of the p-value was rejected then the overall model was insignificant and if alternative hypothesis was not rejected the overall model was significant. In other words if the p-value was less than 0.05 then the researcher concluded that the overall model was significant and has good predictors of the dependent variable and that the results were not based on chance. If the p-value was greater than 0.05 then the model was not significant and could not be used to explain the variations in the dependent variable. This indicated that there was a significant correlation (relationship) between the independent variable and dependent variable.

4.8.1 Hypothesis testing of Antecedents of FSTA and Financial Inclusion of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.52, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is no significant relationship between antecedents of FSTA and financial inclusion of micro-enterprises. Results in Table 4.51 above show that further

revealed that $t_{cal} (9.4) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between antecedents of FSTA and financial inclusion of micro-enterprises. Therefore the study concluded that antecedents of FSTA influence financial inclusion of micro-enterprises. Consequently,

H₁: There is significant relationship between antecedents of FSTI and financial inclusion of micro-enterprises

4.8.2 Hypothesis testing of convenience and Financial Inclusion of micro-enterprises

From the results of multiple linear regression in table 4.37, above. The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is no significant relationship between convenience and financial inclusion of micro-enterprises. Results in Table 4.37 above show that the p-value was $0.001 < 0.05$. The results in table 4.37 further revealed that $t_{cal} (9.925) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between convenience and financial inclusion of micro-enterprises. Therefore the study concluded that convenience influence financial inclusion of micro-enterprises. The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in Africa. These findings agreed with that of Kim et al. (2015) who argued that financial services

technology has disrupted the financial services industry and is creating opportunities by providing accessibility, new ways to transact, and more convenient retail banking experience for consumers worldwide. It follows that;

H_{1a}: There is significant relationship between convenience and financial inclusion of micro-enterprises

4.8.3 Hypothesis testing of Transaction Cost and Financial Inclusion of micro-enterprises

The results in table 4.34, above indicated the acceptance rule was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is no significant relationship between transaction cost and financial inclusion of micro-enterprises. Results in Table 4.34 above show that the p-value was $0.015 < 0.05$. The results in table 4.34 further revealed that $t_{cal} (6.32) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between transaction cost and financial inclusion of micro-enterprises. Therefore the study concluded that transaction cost influence financial inclusion of micro-enterprises. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. These findings agreed with that of (Ketterer, 2017) who found that FinTech applications in financial services have the ability to multiply outsourcing opportunities, further helping to reduce transaction costs. Therefore;

H_{1b}: There is significant relationship between transaction costs and financial inclusion of micro-enterprises

4.8.4 Hypothesis testing of Perceived value and Financial Inclusion of micro-enterprises

The null hypothesis was that there is significant relationship between perceived value and financial inclusion of micro-enterprises. The above results in Table 4.40 above show that the p-value was $0.001 < 0.05$. The results in table 4.40 further revealed that $t_{cal} (10.052) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between perceived value and financial inclusion of micro-enterprises. Therefore the study concluded that perceived value influence financial inclusion of micro-enterprises. The findings support the literature by Jack, Suri and Townsend (2010), Wishart et al. (2006) and Mbogo (2010) which indicate that the mobile and internet money is convenient, faster, cheaper, more reliable, and safer. The benefits of cashless transaction including less opportunity for fraudulent and criminal activities, and mobile money technology have increased adoption rates among micro-enterprises in the Africa.

The findings support the study Mbogo (2010) which established that micro-enterprises in Kenya have adopted the use of the mobile and internet banking as a way of transacting their business because of the relative perceived value of the mobile and internet banking services. Customers can deposit and withdraw cash to/from their accounts by exchanging cash for electronic value at a network of retail stores (often referred to as agents). Once money is on the virtual account, the phone becomes a mobile wallet. Micro enterprises view payment through MMT as an easier form of cash delivery to their suppliers and business partners, a system which is relatively affordable, personal and can be used anywhere and at any time (Anurag et al., 2009). Hence;

H_{1c}: There is significant relationship between perceived value and financial inclusion of micro-enterprises

4.8.5 Hypothesis testing of Collateral and Financial Inclusion of micro-enterprises

In the study, the null hypothesis was that there is no significant relationship between collateral and financial inclusion of micro-enterprises. Results in Table 4.31 above show that the p-value was $0.001 < 0.05$. The results in table 4.31 further revealed that $t_{cal} (131.527) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between collateral and financial inclusion of micro-enterprises.

Therefore the study concluded that collateral influence financial inclusion of micro-enterprises. These findings agreed with that of Jiménez et al. (2013) found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. The results were also consistent with that of Ackah and Vuvor (2011) who found that inability of SMEs to provide collateral and other information needed by banks such as audited financial statement coupled with the high cost of loan in terms of high interest rates has it extremely difficult for micro-enterprises to access bank loans. Consequently;

H_{1d}: There is significant relationship between collateral and financial inclusion of micro-enterprises

4.8.6 Hypothesis testing of convenience and financial services technology adoption of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.64, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between convenience and financial services technology innovation of micro-enterprises. Results in Table 4.54 above show that the p-value was $0.000 < 0.05$. The results in table 4.54 further revealed that $t_{cal} (9.925) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between convenience and financial services technology innovation of micro-enterprises. Therefore the study concluded that convenience influence financial services technology innovation of micro-enterprises. These findings agreed with that of Han and Melecky (2013) who argued that financial innovation has enabled a large number of depositors easily switch banks within minutes forcing banks to provide quality services or risk losing depositors to rival banks. Hence;

H'_{1a}: There is significant relationship between convenience and financial services technology innovation of micro-enterprises

4.8.7 Hypothesis testing of Transaction cost and Financial services technology adoption of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.60, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between transaction cost and financial services technology innovation of micro-enterprises. Results in Table 4.51 above show that the p-value was $0.01 < 0.05$. The results in table 4.51 further revealed that $t_{cal} (6.32) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between transaction cost and financial services technology innovation of micro-enterprises. Therefore the study concluded that transaction cost influence financial services technology innovation of micro-enterprises. These findings agreed with that of Lymer and Tallberg (1997) who argued that small firms might find cost-effectiveness as a motivating factor to use Internet-commerce for improving communication with trading partners and consumers. It therefore follows that;

H'1b: There is significant relationship between transaction cost and financial services technology innovation of micro-enterprises

4.8.8 Hypothesis testing of perceived value and financial services technology adoption of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.68, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between perceived value and financial services technology innovation of micro-enterprises. Results in Table 4.58 above show that the p-value was $0.001 < 0.05$. The results in table 4.58 further revealed that $t_{cal} (10.052) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between perceived value and financial services technology innovation of micro-enterprises. Therefore the study concluded

that perceived value influence financial services technology innovation of micro-enterprises. These findings agreed with that of Malady et al. (2016) who argued that financial innovation established that perceived relative advantage of an innovation affects uptake of an innovation.

It follows that:-

H'1c: There is significant relationship between perceived value and financial services technology innovation of micro-enterprises

4.8.9 Hypothesis testing of Collateral and Financial services technology adoption of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.56, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between collateral and financial services technology innovation of micro-enterprises. Results in Table 4.47 above show that the p-value was $0.000 < 0.05$. The results in table 4.47 further revealed that $t_{cal} (11.469) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between collateral and financial services technology innovation of micro-enterprises. Therefore the study concluded that collateral influence financial services technology innovation of micro-enterprises. Therefore;

H'1d: There is significant relationship between collateral and financial services technology innovation of micro-enterprises

4.8.10 Hypothesis testing of financial services technology adoption and Financial Inclusion of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.43, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between financial services technology innovation and financial inclusion of micro-enterprises. Results in Table 4.43 above show that the p-value was $0.000 < 0.05$. The results in table 4.43 further revealed that $t_{cal} (18.11) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between financial services technology innovation and financial inclusion of micro-enterprises. These findings agreed with that of Kithinji (2017) who conducted a study on effects of digital banking strategy on financial inclusion among commercial banks in Kenya who concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbaked people in Kenya.

The digital banking strategies had a significant effect on financial inclusion among commercial banks in Kenya. The findings were also supported by Aduda and Kalunda (2012) who examined empirically the link between financial innovations and financial inclusion by assessing the effect of increasing financial innovations in Kenya on financial inclusion, the extent to which increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study concluded that financial innovation has a significant positive impact on

financial inclusion. Access to ATMs, mobile money innovations and mobile banking has significant effects on financial inclusion in Kenya. It therefore follows that;

H₂: There is significant relationship between financial services technology innovation and financial inclusion of micro-enterprises

4.8.11 Hypothesis testing of Mobile Banking and Financial Inclusion of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.49, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H₀₁ is not rejected but if it's less than 0.05, the H₀₁ fails to be accepted.

The null hypothesis was that there is significant relationship between mobile banking and financial inclusion of micro-enterprises. Results in Table 4.49 above show that further revealed that $t_{cal} (16.417) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between mobile banking and financial inclusion of micro-enterprises. Therefore the study concluded that mobile banking influence financial inclusion of micro-enterprises. Consequently,

H_{2a}: There is significant relationship between mobile banking and financial inclusion of micro-enterprises

4.8.12 Hypothesis testing of Internet Banking and Financial Inclusion of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.46, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is significant relationship between internet banking and financial inclusion of micro-enterprises. Results in Table 4.49 above show that further revealed that $t_{cal} (5.527) > t_{critical} (1.96)$ and thus the null hypothesis was rejected. This indicated that the null hypothesis was rejected hence there is a significant relationship between mobile banking and financial inclusion of micro-enterprises. Therefore the study concluded that internet banking influence financial inclusion of micro-enterprises. Consequently,

H_{2a}: There is significant relationship between internet banking and financial inclusion of micro-enterprises

4.8.13 Hypothesis testing of moderating effect of antecedents of FSTA on the relationship between FSTA and Financial Inclusion of micro-enterprises

The hypothesis was tested by using multiple linear regression (table 4.80, above). The acceptance/rejection criteria was that, if the p value is greater than 0.05, the H_{01} is not rejected but if it's less than 0.05, the H_{01} fails to be accepted.

The null hypothesis was that there is moderating effect of antecedents of FSTA on the relationship between FSTA and Financial Inclusion of micro-enterprises. Results revealed that the overall model after moderation was significant ($p < 0.05$). Therefore we reject the null

hypothesis which states that antecedents of FSTA do not moderate the relationship between FSTA and Financial Inclusion of micro-enterprises. Therefore the study concluded that antecedents of FSTA moderate the relationship between FSTA and Financial Inclusion of micro-enterprises. It then follows that;

H₃: There is no moderating effect of antecedents of FSTA on the relationship between FSTA and Financial Inclusion of micro-enterprises.

Table 4.68– Summary of Hypotheses Testing

Hypothesis	Coefficient P-Values	Conclusion
H ₁ : There is significant relationship between antecedents of financial services technology innovation and financial inclusion of micro enterprises	P=0.001<0.05	Accept H₁
H _{1a} : There is significant relationship between convenience and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{1a}
H _{1b} : There is significant relationship between transaction costs and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{1b}
H _{1c} : There is significant relationship between perceived value and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{1c}
H _{1d} : There is significant relationship between collateral and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{1d}
H' _{1a} : There is significant relationship between convenience and financial services technology innovation of micro-enterprises	P=0.001<0.05	Accept H'_{1a}
H' _{1b} : There is significant relationship between transaction cost and financial services technology innovation of micro-enterprises	P=0.001<0.05	Accept H'_{1b}
H' _{1c} : There is significant relationship between perceived value and financial services technology innovation of micro-enterprises	P=0.001<0.05	Accept H'_{1c}
H' _{1d} : There is significant relationship between collateral and financial services technology innovation of micro-enterprises	P=0.001<0.05	Accept H'_{1d}
H ₂ : There is significant relationship between financial services technology innovation and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H₂
H _{2a} : There is significant relationship between mobile banking and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{2a}
H _{2b} : There is significant relationship between internet banking and financial inclusion of micro-enterprises	P=0.001<0.05	Accept H_{2b}
H ₃ : Antecedents of FSTA moderated the relationship between FSTA and financial inclusion of micro-enterprises	P=0.001>0.05	Accept H₃

4.9 Empirical Research Model

The results revealed that convenience had the highest impact on financial inclusion in presence of a mediator (technology adoption). This is because a unit change in convenience would result to increase in financial inclusion by 0.233 units. This was followed by perceived value where because a unit changes in collateral would results to increase in financial inclusion by 0.201 units in presence of a moderator (technology adoption). This is because technology adoption did not mediate the relationship between collateral and financial inclusion. Transaction had negative impact on financial inclusion where a unit change in transaction cost would results to decrease in financial inclusion by 0.091 units in presence of a moderator (technology adoption).

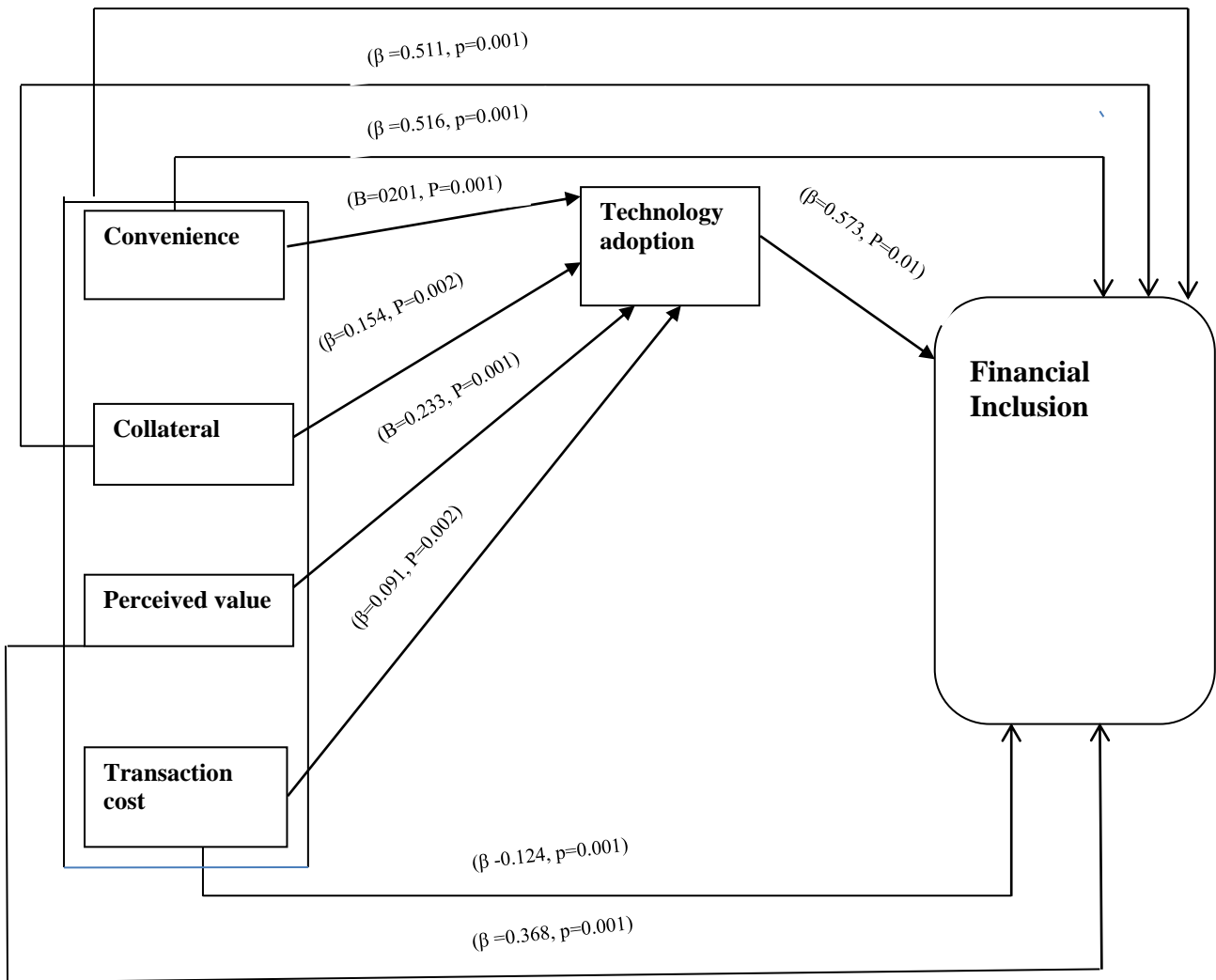


Figure 2.2: Revised Conceptual Framework

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions, recommendations and suggested areas of future research.

5.2 Summary

The study examined the antecedents of financial services technology adoption (mobile banking and internet banking) and their influence to financial inclusion in Machakos County, Kenya. It was guided by the following specific objectives: To establish the influence of convenience on financial services technology adoption in Machakos County; To examine the influence of transaction costs on financial services technology adoption; To assess how the perceived value have influence on financial services technology adoption; To determine how financial services technology adoption will affect financial inclusion in Kenya; To examine the effect of perceived value to financial services technology adoption and to establish how collateral requirement influence on financial services technology adoption. To achieve the research objectives, a survey was conducted in Machakos County in which primary data was collected by means of self-administered questionnaires from microenterprises that have adopted mobile and internet banking in their daily operations.

Regression results revealed that convenience and financial inclusion are positively and significantly related ($\beta=0.201$, $p<0.001$). These findings imply that an increase in one unit related to convenience results in an increase in financial inclusion by 20.1%. These findings were consistent with those of Wamuyu (2014) who indicated that convenience in the

financial sector materializes if an interface goes beyond the services of transfers, deposits and withdrawals to include investment advice and portfolio management to ensure the most efficient use of the client's time. As clients are becoming accustomed to the digital experience offered by companies such as Google, Amazon, Facebook and Apple, they expect the same level of customer experience from their financial services providers (Sanfillippo & Fichman, 2014). The findings likewise corroborate those of Potnis (2014) who argues that mobile-first consumers expect convenience, immediacy and security to be integral to payments. Mohan and Potnis (2015) explain that consumers have a culture of on-demand streaming of digital products and services and as such archaic payment solutions that take days rather than seconds for settlement are considered unacceptable. Financial institutions are moving towards non-physical channels by implementing operational solutions and developing new methods to reach, engage and retain customers (Waiganjo, 2018).

The results also revealed that transaction cost and financial inclusion are positively and significantly related ($\beta=-0.091$ $p<0.002$). This is an implication that an increase in one unit related to the transaction cost results in a decrease in the financial inclusion by 9.1%. These findings are consistent with those of Demirgüç-Kunt and Klapper (2013) who stressed that capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or physical capital. Thus, reducing financial market imperfections to expand individual opportunities creates positive, not negative, incentive effects. Mobile banking is not influenced these transaction costs (Bachas et al., 2018). They were further consistent with behavioral decision theory, which states that the cost-benefit pattern is significant to both perceived usefulness and ease of use of technology (Mohan & Potnis, 2015). This is because if consumers perceive the cost of mobile money service as acceptable, they will adopt it easier, and then use it. Furthermore, hardware/software and

financial resources are important for users of an information system (Micheni et al., 2013). Financial cost is likely to directly influence the user's intention to use digital financial services.

The results also revealed that perceived value and financial inclusion are positively and significantly related ($\beta=0.233$, $p<0.001$). This is an indication that an increase in one unit of perceived value, results in an improvement in financial inclusion by 23.3%. These findings were found to agree with those of Mbawuni (2018) who indicated that perceived benefits have been ranked as main factors for small firms' Internet adoption. M-banking provides benefits to SMEs like 24/7 access to bank account, fund transfer and bill payment. M-banking also widens scope of financing from both local and global players. The findings also were consistent with Sewanu (2015) who stresses that ICT implementation in the organization which includes SMEs has the potential to reduce costs and increase productivity level. In addition according to Isaac (2014) ICT usage has a positive impact on business performance.

In addition, the results showed that collateral and financial inclusion are positively and significantly related ($\beta =0.154$, $p<0.002$). This implies that an increase in one unit related to collateral will result in an improvement in the financial inclusion by 15.4%. However, according to the study, it is not easy to provide collateral for a loan in the mainstream financial institutions since the security required for bank loans is not affordable to most enterprises. These findings were consistent with Charles and Mori (2016) who found a positive relationship between relationship duration and the likelihood of collateral pledging for borrowers with known low credit quality, giving support to the hold-up proposition. They also found that if a firm works with multiple banks, it increases the probability of pledging collateral for long term loans while it decreases the probability of pledging collateral when acquiring short term loans. The findings likewise agreed with Gakuu, Wachira and Kagwiria

(2015) who revealed that collateral requirements have a moderate influence on credit accessibility in SACCO's. This reduces the profitability of many products, forcing financial services companies to look for cost savings. With IT accounting for a significant slice of the cost base, financial institutions have to rebuild IT infrastructure, sometimes extensively (Demirgüç-Kunt & Klapper, 2013).

In addition, the results showed that technology adoption and financial inclusion are positively and significantly related ($\beta=0.573$, $p<0.001$). This is an implication that an increase in one unit related to technology adoption results in the improvement in financial inclusion by 57.3%. These findings were consistent with those of Scott and Zachariadis (2017) who reported that deficient and wasteful innovation based offices by money related establishments, has constrained the accomplishment of critical extension in budgetary incorporation level. In addition, Manyika et al. (2016) acknowledged that the spread of cellular telephones underpins the impact of money related consideration on monetary development, particularly in nations where portable budgetary administrations grab hold. The findings also corroborated those of Ketterer (2017) who stated that digital finance can result in greater financial inclusion, expansion of financial services to non-financial sectors, and the expansion of basic services to households. This is possible since nearly 50% of people in the developing world already own a mobile phone (World Bank, 2014).

The study further found that financial services technology innovation does not moderate the relationship between transaction cost, perceived value and convenience and financial inclusion of micro enterprises. Findings also indicated that the use of mobile banking had a tremendous effect on access to financial services by the micro enterprises and that mobile banking had also improved the access to credit by the enterprises. Further, the use of mobile banking had improved the efficiency of financial services provided by micro-enterprises.

5.3 Conclusions

Based on the findings, the study concluded that collateral have a positive and significant effect on financial inclusion. In addition, mobile and internet banking have improved the access to financial services by micro-enterprises. This is seen through improved business growth among the enterprises as they can access low cost credit for business growth. The low cost of credit for the micro-enterprises has improved the level of financial inclusion.

In addition, transaction cost has a negative and significant effect on financial inclusion. The use of mobile and internet banking has reduced transaction costs for enterprises hence high levels of profitability. For instance, most enterprises can check their financial statements using mobile devices without having to travel physically to the banking halls.

In addition, convenience has a negative and significant effect on financial inclusion. Finally, mobile and internet banking have enhanced convenience for micro-enterprises. This is seen through improved efficiency of operations by the micro-enterprises. It is also seen through the high levels of customers' awareness of the mobile and banking services and the level of usage. Customers are increasingly trusting the use of mobile and internet banking to conduct transactions and micro-enterprises now better understand the needs of the customers.

In addition, perceived value has a positive and significant effect on financial inclusion. In addition, improved security when sending large sums of money using mobile banking and internet banking have increased its usage among micro-enterprises. Owners of micro-enterprises can also reverse mobile banking transactions incase transaction errors occur. The study also concluded that transactions are easily traceable in micro-enterprises.

The study also concluded that mobile banking have a positive and significant effect on financial inclusion. In addition, internet banking has a positive and significant effect on

financial inclusion. The study also concluded that technology adoption have a positive and significant effect on financial inclusion. In addition, the study concluded that technology adoption mediates the relationship between transaction cost, convenience, perceived value and financial inclusion. However, technology adoption did not mediate the relationship between collateral and financial inclusion.

5.4 Recommendations

Based on the findings of the study, the following recommendations can be made. First, the level of usage of mobile and internet banking should be increased by micro-enterprises. This means customers should have more freedom and frequency in paying for the goods and services provided by micro-enterprises through mobile and internet banking. Though tremendous improvement has been achieved, a lot has to be done regarding the number of transactions transacted through the mobile and internet platforms are still low.

The study recommended that owners of micro enterprises should use mobile banking since it makes it easier for them to carry out their businesses operations. In addition use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations. In addition, the study recommends that owners of micro enterprises should adopt use of internet banking since it does not require a lot of technical knowledge since it is simple to use hence convenient for business owners.

In addition owners of micro-enterprises should use mobile banking to accomplish their banking tasks anytime and anywhere since it is efficient for them. In addition it is efficient for owners of micro-enterprises to use Internet banking to accomplish their banking tasks anytime and anywhere.

In addition, the adoption of mobile and internet banking by micro-enterprises can still be improved. Most customers of the micro-enterprise currently prefer using mobile devices to pay for goods and services as opposed to the traditional payments procedures. Further, all products and services that can be paid through mobile and internet banking should be encouraged by micro-enterprises. The study looks into the need for effective strategies that the government and policy makers can adopt and roll out in order to address the negative impact that exists in the Kenyan context with regard to the cost of mobile banking. Thus the study recommends that the government should take the instances of fraud and corruption cases very serious especially at the county levels in order to safeguard the interests of the Small scale producers and entrepreneurs.

5.5 Suggested Areas for Future Research

There is a need to answer the question of whether the findings of this research can be generalized in Kenya and outside Kenya. There are many businesses in Kenya and across the borders that use mobile banking. This study only focused on micro-enterprises in Machakos County and therefore the findings cannot be generalized to other well established business as well as in other areas.

The study has not answered the question of whether mobile banking causes improved access to financial services, improved usage of financial services and improved quality of financial services. A study can be conducted to examine whether mobile banking has a direct relationship with financial inclusion. The study can be repeated with aid of secondary data. Since secondary data is recorded with a higher level of objectivity, the results found can provide strong and objective support to the findings that are based on primary data. It is the recommendation here that such a study can be repeated using secondary data.

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APPENDICES

APPENDIX 1: RESEARCH QUESTIONNAIRE

Instructions to respondents

The purpose for this questionnaire is to collect data on antecedents of mobile and internet banking for financial inclusion among micro enterprises in Machakos County.

Please fill in the questions by checking in (✓) the correct answer.

Please answer all questions to the best of your ability; there are no correct or right answers, just provide your considered response.

The data collected through this questionnaire will be used only for the purpose of the study.

SECTION ONE: BACKGROUND INFORMATION OF THE RESPONDENTS

i. What is your age bracket?

25 years and below

26 - 35 years

36 - 45 years

46 - 55 years

56 years and above

ii. What is your gender?

Male

Female

iii. What is your highest level of level of education?

O-Level

College Diploma

Bachelor's Degree

Post Graduate Degree

Other (Specify).....

iv. For how long has the business been operating?

Less than 1 year

1-2 years

3-5 years

6-10 years

More than 10 years

v. What nature of business is the micro enterprise engaged in?

.....
.....

SECTION 2A: USAGE OF MOBILE BANKING

1. Has the business subscribed to **mobile banking** services?

Yes No

If yes, what do you use **mobile banking** for?

Buying airtime

Transferring funds

Checking bank balances

Paying bills

Cash withdrawal

Other (specify).....

2. How often do you use **m-banking** services?

Daily Once a week Once a Month

Other (Specify).....

3. Select the criteria that is very important to you in considering **mobile banking**

Convenience

Trust in bank

Security

Risk

Cost

Service provider compatibility

4. On average how much money (in Kenya Shillings) do you transact via the **mobile banking** platform monthly for the business?

Less than 5,000

5,000-10,000

10,001-15,000

15,001-20,000

20,001-25,000

Above 25,000

SECTION 2B: USAGE OF INTERNET BANKING

5. Has the business subscribed to **Internet banking** services?

Yes No

If Yes, what do you use **Internet banking** for?

Buying airtime

Transferring funds

Checking bank balances

Paying bills

Cash withdrawal

Other (specify).....

6. How often do you use **Internet banking** services?

Daily Once a week Once a Month

Other (Specify).....

7. Select the criteria that is very important to you in considering **Internet banking**

Convenience

Trust in bank

Security

Risk

Cost

Service provider compatibility

8. On average how much money (in Kenya Shillings) do you transact via the **Internet banking** platform monthly for the business?

Less than 5,000

5,000-10,000

10,001-15,000

15,001-20,000

20,001-25,000

Above 25,000

SECTION THREE

A] CONVINIENCE

9. The following are statements relating to convenience. Please indicate the extent of agreement or disagreement with each statement. Key: 1=Strongly Disagree, 2= Disagree; 3=Neutral; 4= Agree; 5= Strongly Agree. Use the keys provided to tick.

Statement	1	2	3	4	5
It is easy to undertake business transaction through mobile banking					
It is easy to undertake business transaction through internet banking					
It is secure for micro-enterprise owners to move around with large amounts of money					
It is efficient for owners of micro-enterprises to use mobile banking to accomplish their banking tasks anytime and anywhere					
It is efficient for owners of micro-enterprises to use Internet banking to accomplish their banking tasks anytime and anywhere					
The use of mobile banking makes it easier for owners of micro-enterprises to carry out their businesses operations					
The use of internet banking makes it easier for owners of micro-enterprises to carry out their businesses operations					
Interaction with mobile banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners					
Interaction with Internet banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners					

Statement	1	2	3	4	5
It is easy to undertake business transaction through mobile banking					
It is easy to undertake business transaction through internet banking					
It is secure for micro-enterprise owners to move around with large amounts of money					
It is efficient for owners of micro-enterprises to use mobile banking to accomplish their banking tasks anytime and anywhere					
It is efficient for owners of micro-enterprises to use Internet banking to accomplish their banking tasks anytime and anywhere					
The use of mobile banking makes it easier for owners of micro-enterprises to carry out their businesses operations					
The use of <u>internet banking</u> makes it easier for owners of micro-enterprises to carry out their businesses operations					
Interaction with mobile banking does not require a lot of technical knowledge since it is simple to use hence convenient for business owners					
Interaction with <u>Internet banking</u> does not require a lot of technical knowledge since it is simple to use hence convenient for business owners					

BJ TRANSACTION COSTS

10. The following are statements relating to transactions costs. Please indicate the extent of agreement or disagreement with each statement. Key: 1=Strongly Disagree, 2= Disagree; 3=Neutral; 4= Agree; 5= Strongly Agree. Use the keys provided to tick.

Statement	1	2	3	4	5
It is expensive for micro-enterprises to buy own a mobile phone to facilitate mobile banking transactions					
It is expensive for micro enterprises to facilitate internet banking transactions					
M-banking transaction fee is expensive while executing business transactions					
Internet banking transaction fee is expensive while executing business transactions					
The costs of undertaking business transaction via the mobile banking platform in affordable to micro-enterprises					
The costs of undertaking business transaction via the internet banking platform in affordable to micro-enterprises					
Mobile service providers have affordable cost of sending or receiving money.					
Internet service providers have affordable cost of sending or receiving money.					
M-banking is affordable to the customers of the micro-enterprises					
Internet banking is affordable to the customers of the micro-enterprises					

CJ PERCEIVED VALUE

11. The following are statements relating to perceived value. Please indicate the extent of agreement or disagreement with each statement. Key: 1=Strongly Disagree, 2=Disagree; 3=Neutral; 4= Agree; 5= Strongly Agree. Use the keys provided to tick

	Statement	1	2	3	4	5
	Improved security when sending large sums of money using mobile banking has increased its usage among micro-enterprises					
	Improved security when sending large sums of money using internet banking has increased its usage among micro-enterprises					
	Owners of micro-enterprises feel safe in carrying out mobile banking					
	Owners of micro enterprises feel safe in carrying out internet banking					
b.	Mobile banking transactions are confidential for micro-enterprises					
	Internet banking transactions are confidential for micro-enterprises					
c.	All customers served by micro-enterprises can undertake mobile banking transactions					
	All customers served by micro-enterprises can undertake internet banking transactions					
d.	Owners of micro-enterprises can reverse mobile banking transactions incase transaction errors occur.					

e.	With mobile banking , transactions are easily traceable in micro-enterprises					
e.	With Internet banking , transactions are easily traceable in micro-enterprises					

D) COLLATERAL

12. The following are statements relating to collateral. Please indicate the extent of agreement or disagreement with each statement. Key: 1=Strongly Disagree, 2= Disagree; 3=Neutral; 4= Agree; 5= Strongly Agree. Use the keys provided to tick

Statement	1	2	3	4	5
Mainstream financial institutions insist on the provision of collateral by micro enterprises					
While addressing the likelihood of loan repayment, mobile banking providers adopt a risk averse stance towards micro enterprises					
The requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace mobile banking					
The requirement by mainstream financial institutions that micro enterprises provide security for loans have pushed the enterprises to embrace internet banking					
It is easy to provide collateral for a loan in the mainstream financial institutions					
The security required for bank loans is affordable to my enterprises					

E] TECHNOLOGY ADOPTION

13. For how long has the business adopted the **mobile banking** technology?

Less than 1 year

1-3 years

4-6years

More than 6 years

14. For how long has the business adopted the **internet banking** technology?

Less than 1 year

1-3 years

4-6years

More than 6 years

15. The following are statements relating to technology adoption. Please indicate the extent of agreement or disagreement with each statement. Key: 1=Strongly Disagree, 2= Disagree; 3=Neutral; 4= Agree; 5= Strongly Agree. Use the keys provided to tick

	Statement	1	2	3	4	5
	It would take a lot of time to learn how to use m-banking services					
	It would take a lot of time to learn how to use internet banking services					

I am proficient in the use of m-banking transaction processes between me, and my suppliers.					
I am proficient on use of m-banking transaction processes between me and my customers.					
Business owners have the knowledge needed to use the mobile banking technology					
Business owners have the knowledge needed to use the Internet banking technology					

F. FINANCIAL INCLUSION

Statement	1	2	3	4	5
Our enterprises that have collateral have been able to obtain soft loans through the M-banking platform					
Mainstream financial service providers are focusing more on the potential to repay loan rather than on collateral security in our business					
Mobile banking platform provide credit to micro enterprises that cannot afford collaterals					
We are able to access credit without collaterals					
We are able to access credit in a timely manner through M-banking					
We are able to obtain credit through internet banking					

	We would still be without financial services if there was no mobile banking					
	We would still be without financial services if there was no internet banking					