



## **EFFICIENCY OF MOBILE LED FINANCIAL SERVICES AND ITS EFFECT ON FINANCIAL INCLUSION IN KENYA**

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**Abstract:** Financial inclusion has an impact on economic growth by enabling localized development. While every bank is looking at innovation as a way of enhancing reach to its customers, enhancement of financial inclusion is still elusive. Similarly, mobile phone companies grow their customer base through the ease of access of mobile phones as well as the ability for customers to store their money on their phones. However, despite these facts, millions of adult Kenyans remains unbanked. Several empirical studies have been done locally that are related to financial services and financial inclusion. However, despite the massive inquiry in to the field of financial inclusion and financial services, none of the studies known to the study seeks to establish the effects of efficiency of mobile led financial services on financial inclusion in Kenya. Against this backdrop, the aim of this study was to establish the efficiency of mobile led financial services and its effects on financial inclusion in Kenya. This research problem was studied through the use of a descriptive research design. The target population of this study was the Kenya commercial banks and the mobile financial services providers while the study population was the management staff who deal directly with the day to day operations of the organizations. The study used a sample of 384 managers drawn from the business development, finance and research departments of the 42 sampled banks and the 6 mobile service providers. The study employed a questionnaire to collect primary data. The study generated both qualitative and quantitative data. Quantitative data was coded and entered into Statistical Packages for Social Scientists (SPSS Version 24.0) and analyzed using descriptive statistics. Quantitative data was presented in tables and graphs and explanation were presented in prose. Inferential statistics, including Pearson correlation and regression analyses were also performed to test the hypotheses of the study. The study found that efficiency in mobile led financial services had a significant effect on financial inclusion in Kenya ( $\beta=0.535$ ,  $p\text{-value}=0.000$ ). With the inevitable cross boundaries between banks and mobile operator, further enhanced and supported policies that encourage financial sector deepening should be implemented. These should be complemented with measures to promote the growth and image of banks and mobile operators in a bid to promote the synergy existing between them. Pertaining losses due to fraudulent access of customers' accounts from hacking, there is a need to employ disciplined, qualified and well remunerated ICT staff in the bank and at the level of mobile operator.

**Key Words:** Competition, Efficiency, Financial inclusion, Competitiveness, Mobile Money

### **Introduction**

Financial inclusion is an important development metric globally as one of the factors which can drive widespread economic development by enhancing financial access which increases liquidity in the economy, accelerates the level of economic activity and reduces poverty levels in the country. The introduction of money transfer services in Kenya has seen mobile operators partner with financial institutions to offer wide range of financial products that include payment options, mobile banking,

insurance and saving products. However, the efficiency of service delivered under mobile money platforms may influence the adoption or uptake by customers (Mbogo 2014).

The analysis of efficiency and effectiveness is about the relationships between inputs, outputs and outcomes. There is no efficiency without effectiveness, because it is more important to do well what you have proposed (the effectiveness) than do well something else that was not necessarily concerned (Aduda & Kalunda, 2012). The relationship between efficiency and effectiveness is that of a part to the whole, the effectiveness is a necessary condition to achieving efficiency. Further, profitability ratios are an indicator for the firm's overall efficiency. The ratios of the return on assets (ROA) and the return on owner's equity (ROE) are the most used profitability ratios in the analysis.

Okutoyi (2013) demonstrated the effects of using mobile money in the improvement in information flow between transacting parties allowing efficiency between the trading without travelling. This was noted particularly for users in rural areas where traders would have needed to travel to urban areas to send and receive money. Hence, mobile money usage results in the reduction in transportation cost and consequently increased consumer surplus. Njenga (2014) found that mobile communication networks enable information to move freely, enabling markets to be more efficient thereby unleashing entrepreneurship and consequently leading to financial innovation that allows mobile phones to be used as gateways to financial access by the previously unbanked rural communities. There are also relational benefits that accrue between transacting parties eliminating the need for middlemen, as a result it shrinks information asymmetry and increases the frequency of transactions and redress market inefficiencies. Other studies of M-PESA in low-income areas found that the risk of muggings declined, because cash was less evident. Because it is less visible than cash, mobile money also has consequences for privacy and autonomy (Ndunge & Mutinda, 2012; Ndung'u et al., 2012).

Donovan (2013) looked at M-Pesa in Kenya in an attempting to find the impact it had on human freedom. He concluded that a relationship of networks of social interactions, the need and desire to coordinate financially with friends, relatives and businesses, and progressive desertion of other alternatives like banks and Western Money Union lead to a form of power that acts on all Kenyans both users and non-users of M-Pesa. Mutua and Oyugi (2012) offer that given access, financial services can help poor people forge their own paths out of poverty in two primary ways: First, they enable one to obtain through savings or credit sums of money large enough to invest in income generation and asset creation (for example, through enterprise, housing, education or training which improves one's job market prospects, and so on). Second, they help reduce vulnerability to unexpected events such as accident, illness, theft, or drought. These benefits represent the gains of MMTS to SMEs.

Mbogo (2014) offers that efficient and affordable money transfer and payment services are an important financial service most people require, including those who do not typically use financial or banking services. According to Standard Media (2014), mobile money transfer has turned out to be efficient and affordable and is therefore preferred by many people, Micro enterprise operators are in the Micro and Small Enterprise (MSE) Sector. Vodafone (2014) reports that the extensive coverage of mobile service providers has not only resulted to high rates of convenience, but has made the service effective and reliable as a form to send money with the interface between agents and customers functioning with minimal complaints from customers. This is even so witnessed as the number of agents continues to increase as more sophisticated banking services are added to the mobile money platform such as M-Kesho, M-Shwari and others according to CCK 2011/2012 Report. Literature

review by Jack and Suri (2013) reveals that the mobile money is 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 SMEs in the capital city (Mbogo 2014).

### **Statement of the Problem**

Financial inclusion has an impact on economic growth by enabling localized development. As desirable as financial inclusion is, the concept faces unique demand and supply-side challenges that impede its development and consequent impact on a population. While every bank is looking at innovation as a way of enhancing reach to its customers, enhancement of financial inclusion is still elusive. Banks are adopting innovative technologies to enhance financial inclusion like agency banking, introduce systems for payments which can better accommodate small value transfers like Near Field Communication (NFC) and mobile money services. Both local and foreign banks as well as micro finance institutions are placing a focus on the unbanked in order to enhance their customer base. Similarly, mobile phone companies grow their customer base through the ease of access to mobile phones as well as the ability for customers to store their money on their phones. However, despite these facts, millions of adult Kenyans remains unbanked. According to Aker and Mbiti (2013), customers only accept financial services only if they are more efficient.

Mobile led financial services in Kenya are particularly very important. Bansal (2014) noted that, by 2013, 23,018,500 individuals were mobile money users representing a 74% of the adult population. The average value per transaction was \$29.3. Accumulated balance of all mobile account as a percentage of total bank deposits was at 1.2% in the same period. There were 56 million transaction worth 142 billion in that period. Despite these attractive figures, according to United Nation Conference on Trade and Development (UNCTD) (2015), a whopping 35% of Kenyan adult population are totally financially excluded. This figure had reduced as shown by a study in 2009 that indicated that 59% of the adult population in Kenya was found to be either completely excluded or utilizing informal methods. Evidently, these figures have certainly changed over the past few years as the uptake of mobile money has exponentially grown.

UNCTD (2015) noted that financial services play a catalytic role in the efficient allocation of productive resources thereby contributing to trade, investment and economic growth in Kenya. The sector is singled out as one of the key drivers of high growth identified in Kenya's Vision 2030. Therefore, for Kenya to achieve its vision 2030, a lot is needed to close the gap of financially excluded population. Financial inclusion has still been very elusive especially due to the fact that Kenya is a developing country. The rapid uptake of mobile financial services in Kenya has demonstrated the potential of reaching the poor using mobile technology and thereby enhancing financial inclusion. According to World Bank (2012), an estimated 46% of the population lives below the national poverty line. Access to formal financial services has however grown more in the urban areas; between 2012 and 2014, those accessible to formal banking services rose 12% while access in rural areas it increased only from 17.6% to 21.2% in the same period.

With the rapid growth of the mobile phone usage at penetration level of 78.0% (30.7 million subscribers) Bowen, Morara and Mureithi (2014) there is a potential that is yet to be utilized fully to ensure that a significant proportion of the population if not all have access to financial services. Institutions including banks, micro finance institutions, and utility service providers should thus take up that opportunity to align their product and technological investments base towards incorporating

Mobile Money Transfer services in an effort to lock in increased users. As noted above, this opportunity is yet to be tapped as a significant proportion of Kenyan are yet to be financially included.

Several empirical studies have been done locally that are related to financial services and financial inclusion. Fawzia (2009) did a study on the impact of mobile technology on mobile money transfers in Nairobi. Munyi (2011) did a study on responses by commercial banks to the introduction of mobile money transfer. Further, Waihenya (2012) did a study on the effects of agency banking on financial inclusion in Kenya. However, despite the massive inquiry in to the field of financial inclusion and financial services, none of the studies known to the researcher seeks to establish the effects of the efficiency of mobile led financial services on financial inclusion in Kenya. This study sought to establish the efficiency of mobile led financial services and its effects on financial inclusion in Kenya.

The following was the hypothesized relationship between the efficiency of mobile led financial services and financial inclusion in Kenya.

*H<sub>01</sub>: There is no significant relationship between efficiency of mobile financial services and financial inclusion in Kenya.*

### **Theoretical Review**

This section presents theories that are relevant to the study. This study focused on Technology Acceptance Model and Theory of Financial Deepening.

#### **Technology Acceptance Model (TAM)**

TAM is a theoretical model that evaluates the effects of things like system characteristics on user acceptance (Davis, 1989). TAM assumes that a computer user generally acts quite rationally and uses information in a systematic manner to decide whether to adopt, or not to use this technology in the workplace. Davis (1989) identified three major determinants of technology acceptance that relate to cognition and effectiveness and were suggested by previous research studies. He began with the TRA and adapted this as a basis for causal links between perceived usefulness, perceived ease of use, attitude towards using technology and behavioral intention to explain technology adoption.

Relative advantage refers to the degree to which an innovation is perceived as providing more benefits than its predecessor. Relative advantage results in increased efficiency, economic benefits and enhanced status. Past research has found that relative advantage of an innovation is positively related to the rate of adoption (Moore & Benbasat 1991). Research suggests that when user perceives relative advantage or usefulness of a new technology over an old one, they tend to adopt it. In the context of banking sector, benefits such as immediacy, convenience and affordability to customers have been reported (Lin 2011).

TAM model, proposed is primarily intended to foretell users' acceptance of Information Technology and usage in an organizational perspective. By focusing on the attitude explanations of intention to use a specific technology or service, TAM model deals with perceptions as opposed to real usage, suggests while a new technology is presented to the potential adopter, two attitude-affecting factors, Perceived usefulness and perceived ease of use, influence their decision about how and when they will use it Davis (1989). As an extension of TAM, Fishbein and Ajzen (1975) proposed the Theory of Reasoned Action (TRA). The main point of this theory is that human behavior originates from their intentions and behavioral intention (BI) is a kind of cognitive activity which consists of two facets, namely attitude and subjective norm. To sum up, according to TRA both attitude and subjective norm component of individual behavior is determined by salient belief.

According to Cassar (2004), principally Technology Acceptance Model TAM is used to test clients' intent to assent or to refuse the use of a particular technology and in this case cashless payments. TAM was developed by Davis in 1989, and explains the logic used by a customer to accept or decline a certain technology based on "its perceived ease of use" and "its perceived usefulness" (Chibba, 2014). Perceived ease of use is "the level at which a potential consumer of a technology believes a technology or a potential system is effortless" David et al (1989). Perceived usefulness to be the level at which a potential user of a technology perceived the use of the technology will enhance their performance.

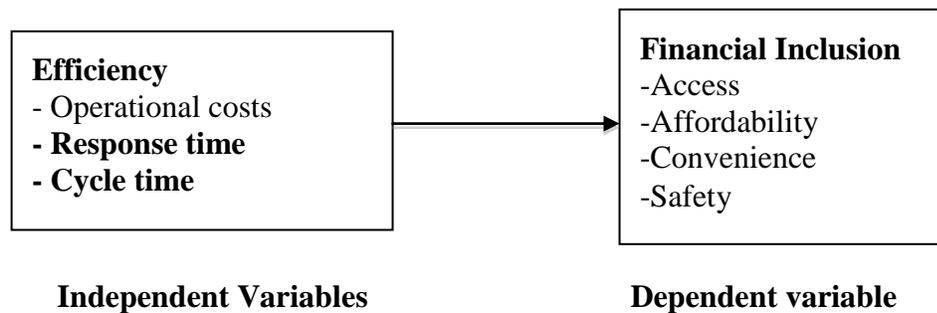
### **Theory of Financial Deepening**

The argument that advocates that financial sector liberalization leads to financial development and eventually to economic growth is based on the theoretical framework and analytical underpinning by McKinnon (1973) and Shaw (1973). The concept of financial deepening is usually employed to explain a state of an atomized financial system, that is, a financial system which is largely free from financial repression. Financial deepening results from the adoption of appropriate real finance policy, namely relating real rates of returns to real stock of finance. Conversely shallow financial system is partly the consequence distortions in the relative process of finance. Financial intermediation of growth allows for financial deepening. Shaw (1973) contends that an increase in the real size of the monetary system will generate opportunities for the profitable operations of other institutions as well, from bill dealers to industrial banks and insurance companies. In its own right, financial depth contributes to growth by improving the productivity of investment. This linkage corroborates further the positive role played by financial liberalization on growth.

It is well established that a vibrant, dynamic, and well-functioning financial sector leads to a host of improved economic outcomes, as surveyed first by Levine (1997a), then by Demirguc Kunt and Levine (2009), there is a vast literature showing the benefits that accrue to countries in which financial development is greater. On the theoretical side, early work by McKinnon (1973) and Goldsmith (1969), among others, highlighted the key role in economic development that could be played by a banking system free of the types of controls on interest rates and quantities that were prevalent at the time. As the literature progressed, it began to recognize that the financial system in general not exclusively banks performed four basic functions essential to economic development and growth: mobilization of savings, allocation of resources to productive uses, facilitating transactions and risk management, and exerting corporate control. Through these functions, a country providing an environment conducive to greater financial development would have higher growth rates, with much of the effect coming through greater productivity rather than a higher overall rate of investment.

### **Conceptual Framework**

The conceptual framework is the scheme of concepts this study used to achieve the set objectives. The researcher conceptualizes that the dependent variable of this study was financial inclusion while the independent variable was efficiency of financial services.



**Figure 1: Conceptual Framework**

### **Effect of Efficiency of Mobile Led Financial Services and Financial Inclusion**

Although the mobile phone balances may seem low, the fact that there are balances proves that there is storage, which can be perceived as acceptance of deposits (Njenga, 2014). This is a significant indication of the high value placed on the convenience associated with the use of the mobile payment services. Omwansa (2014) states that a lost or stolen mobile phone does not mean catastrophe as no one can access an M-Pesa account without a correct personal identification number (PIN). He further explains that in a country where majority of people have no bank accounts, M-Pesa provides both convenience and safety. People walk around with their virtual money knowing they can withdraw cash any time at a minimal fee. In a mobile environment, it is necessary to have perceived security and trust in the vendors and the payment system (Chibba, 2014).

According to the Bill and Melinda Gates Foundation (2014), security and safety of mobile payment transactions is one of the primary concerns for users. They state that safety represents no delay, no transaction in completeness and no private information disclosure during payment transactions. Safaricom Limited (2013) offers that the use of the pin and secret code for the M-Pesa transactions enhances the security and privacy issues. Key requirements for any financial transaction in an electronic environment should include confidentiality, authentication, data integrity and non-repudiation. Other security factors important to the users are anonymity and privacy, which relate to use policies of customers' personal information (Ondiege, 2014).

Ndii (2014) states that accessibility (ability to reach the required services) is one of the main advantages of mobile payment services. Small and micro businesses are among the greatest beneficiaries of using M-Pesa mobile payment. According to Omwansa (2014), the micro-business operators go to the bank less often and spend more time running their businesses. Equally, many unbanked Kenyans can now receive or send money wherever they are in the country. Majority of the micro business operators are familiar with the use of the mobile payment services as they are easy to use and require no formal training before use.

Mwangi and Sichei (2013) add that equally, many unbanked Kenyans can now receive or send money wherever they are in the country. Majority of the micro business operators are familiar with the use of the mobile payment services as they are easy to use and require no formal training before use. With more time in the business, more customers are served leading to increased sales and therefore increased financial inclusion.

Accordingly, Mas and Radcliffe (2014) argue that the rapid deployment of telecommunication infrastructure throughout the developing countries meant that the rural areas were being reached. The mobile operators and their distribution channels were reaching the remote parts of the countries. This meant that more and more places where it was not profitable to build a retail bank, now have access to mobile phone and the operators' distribution networks; thus, making it possible to extend financial services to large segments of the unbanked poor people. The instantaneous transfer that takes place when a consumer purchases the electronic value instills some confidence in the mobile money transaction.

Even when the M-PESA was not designed for the store of value, increasingly sophisticated consumer demand drove the development of new services (Kusa & Ongore, 2013). Safaricom introduced a fully integrated mobile savings system, referred to as M-KESHO, to M-PESA users in Kenya. Until m-kesho was introduced in 2011, the only form of savings on M-PESA was the basic mobile savings. Jack and Suri (2013) reported a significant number of M-PESA users using it to store value. However, Mbiti and Weil (2013), posit that although a significant number of survey respondents indicate that they use their M-PESA accounts as a vehicle for saving, their analysis of aggregate data suggests that the overwhelming use of M-PESA is for transferring money from individual to individual, with extremely little storage of value. The greater part of users cites ease of use and security as the most powerful motivation for saving on MPESA.

### **Operational costs**

The addition of mobile phone technology has improved the efficiency of financial transactions and reduced operational costs, providing more frequent opportunities to open and access member accounts in real time during field officer visits. Mobile led financial services have a number of security requirements that are requisite for the effective and efficient functioning of the systems. These requirements are necessary for making the handling of transactions on mobile led financial services platforms more secure and they include, confidentiality, authentication, integrity and non-repudiation.

If mobile led financial services and other electronic channels become a primary method for conducting day-to-day transactions, branch resources could be transformed to handle more services that are likely to require one-on-one interactions, including managing complex services and cross-selling products. For financial institutions with a focus on serving underserved consumers, an increase in MFS could also present opportunities for banks to use resources more efficiently to better engage underserved consumers through one-on-one interactions that provide information on available products, or on how to use lower-cost channels for everyday transactions. Restructuring branches could provide banks an opportunity to improve efficiency but also better meet the needs of customers and do so in way that blends technology and personal relationships.

### **Response time**

Mobile led financial services eliminates the time as well as space shortcomings from banking operations like, balance inquiry and fund transfer from one account to another account without visiting bank branches. Mobile Banking enhances efficiency, offers access financial and banking services, generates new opportunities for income generation and improving governance and give poor people a voice. It is required for each country which wants to adopt m-banking for increasing economic development and creation of wealth to produce an informed m-banking development strategy for main streaming Mobile Banking services in the productive sectors as a matter of economic survival

(Donovan, 2013). Using mobile technology has therefore been contributing in improving efficiency of banks, and financial inclusion.

The ability to make payments may seem to be a trivial aspect of financial system but has fundamental implications for financial development and inclusion (Klein & Mayer, 2011). A large portion of the population in the developing world still does not have access to any organized and mainstream system of making payments and thus relies solely on inefficient cash-based methods. Fortunately, with the rapid growth in wireless communication, there is now a tool available to begin to solve this problem and increase financial inclusion. Allowing mobile network operators to operate in financial services space is all about enabling a competitive market place in which innovation is rewarded and providing basic financial services to millions of unbanked people efficiently and conveniently is the central agenda.

### **Remittance**

GSMA (2015) asserts that the mobile remittance industry is burgeoning owing to the increased penetration of mobile phones in remote regions and the mushrooming of various remittance service providers, both national and international, for global money transfers. According to the World Bank (2013), remittance flows to developing countries grew from USD 372 billion in 2011 to reach USD 473 billion in 2014, and total worldwide remittance flows reached USD 615 billion in 2014. India and China rank highest as recipients of migrant remittances, to the tune of USD 64 billion and USD 62 billion respectively.

Tajikistan and Lesotho receive remittances that are as high as 31 per cent and 29 per cent of GDP respectively. Various money transfers options (phone to phone, cash to phone, phone to cash, mobile-wallets etc.) can be made conveniently using mobile devices through platforms and applications provided by various banking institutions and money transfer operators worldwide (World Bank, 2013). Various money transfer operators provide services either through a network of agents or partnering with banking institutions depending on the regulations of the central bank and other financial bodies of various nations

According to Okutoyi (2013), M-PESA has been compared against the alternatives and in surveys 96-98% of the respondents consider that the service is quicker, safer, cheaper, and more convenient (Mas & Radcliffe, 2014). Prior to M-PESA deployment, 58% of money was moved by hand, whereas after the implementation of M-PESA, the amount of money sent by hand was reduced to 32%, while M-PESA captured a share of 47% (GSM Association, 2013). Alternative competing methods were formal domestic money transfer, i.e. remittance, through Western Union, Post PostaPay, and MoneyGram, which were also competing against the informal methods, such as delivering money from hand to hand by a friend or e.g. a bus driver (Wambari & Mwaura, 2014).

Siringi (2013) reports that mobile money service allows users/customers to benefit from remittances from either family members or friends living abroad. This alone, assuming all other factors remain constant, will result in improved economic wellbeing as the poor will get a source of income. Opiyo (2014) asserts that interdisciplinary research has focused on the contribution remittances make to economic development. Omwansa (2014) noted that the use of mobile money increased money circulation boosting local consumption for the rural people spurring economic activity. They further assert that the flow of remittances to rural areas increase economic activity by enabling “just-in-time” transfers that make capital available whenever it is needed.

## Financial Inclusion

Honohan (2008) defines financial inclusion as, ‘the process that ensure the ease of access, availability and usage of the formal financial system for all members of an economy’. Broadly, it means access to finance & financial services for all in a fair, transparent and equitable manner at an affordable cost. Munyi (2011) denotes it as a, ‘delivery of financial services at an affordable cost to the vast sections of the disadvantaged and low-income groups including households, enterprises, SMEs, traders. The various financial services include credit, savings, insurance and payments & remittance facilities’. Fawzia (2009) defined it as a, ‘process of bringing the weaker and vulnerable sections of society within the ambit of the organized financial system. It creates conditions for access to timely & adequate credit and other financial services by vulnerable groups, such as weaker sections and low-income groups at affordable cost’.

Accessibility of financial services by those in remote areas, often rural areas, has been cited as a barrier to financial inclusion. Aker and Mbiti (2013) refer to this as a logistics barrier in that “financial services are not developed in many regions where it is not considered feasible by the service provider”. Mobile banking has been found in this research to be considered as easily accessible. The issue of accessibility of financial services providers has been a cause for concern for the RBZ which has been calling for banks and Microfinance institutions to open outlets in rural areas so that the ‘unbanked’ people could join the main stream economy. Access to mobile banking also brings positive change in income which leads to socio-economic empowerment through increasing saving habits, lessening family violence, raising capabilities to deal with social evils, day to day problems, enhanced asset ownership, creation of employment, improved purchasing power, buying of new clothes, boosting confidence of rural masses, declining income inequality, greater ability to meet unforeseen circumstances, improved standard of living and change in life style. Mobile banking plays a significant role in facilitating inclusion of excluded population.

The ability to use a product is key to its adoption and to this end the Cassar (2004) of the *Centre for Financial Inclusion* stated that “full financial inclusion is a state in which all people who can use them have access to a suite of quality financial services, provided at affordable prices, in a convenient manner, and with dignity for the clients”. The issue of ability to use the system has a direct bearing on adoption of the facility. Mobile banking has the ability to reach the ‘unbanked’ sectors of the economy (Klein and Mayer, 2011), for as long as there is mobile connectivity and the capturing of this market increases the participants in the financial services sector. Financial inclusion refers to the access of affordable financial services by the previously excluded low income and vulnerable groups (Agarwal & Klapper, 2013). Through mobile banking, it provides greater financial intermediation of the economy as a whole or financial deepening which then drives demand. Technology then facilitates distribution of financial resources to previously excluded areas thereby stimulating economic growth. The adoption of m-banking by the ‘unbanked’, who are the majority, according to empirical evidence, will lead to improvement and growth of the financial market in the country. Therefore, it can be inferred that this will lead to economic growth based on the financial deepening hypothesis.

Cost is cited as a barrier to accessing financial services by low income people. Banks levy clients with a variety of charges that include transaction fees on cash withdrawals and deposits, statement and balance enquiry and monthly ledger fees. This has been termed price exclusion (Kimenyi & Ndung’u, 2014). Findings reveal that most people feel m-banking is cheaper than traditional banking systems. One of the reasons that have been cited is the zero-deposit required to maintain a non-bank led m-

banking account which only charges transaction fees. The transaction cost is considered lower than any other alternative. As outlined by Thorsten et al. (2009), the clearest direct benefits of mobile money are greater convenience, faster speed, and lower cost of transferring funds. This becomes apparent when a comparison is made with traditional methods of sending and receiving money such as; through public transport, through friends, or through Posta Pay Services. All these traditional methods outlined have far more risks compared to mobile money systems which are generally cheaper than these alternatives and both the sender and the receiver are given instant information regarding the transaction. The low-income people who traditionally have been relegated to the informal sector can now enjoy the same basket of financial services through mobile banking. The non-bank led mobile system is definitely ideal for the remote areas given that it is easily accessible, cheaper, convenient, a faster means of sending and receiving money. Financial activity is increased in the rural areas and therefore economic growth. According to Levine (2005), Financial Sector Development (FSD), representing financial activity, has direct impact on economic growth and development and ultimately poverty reduction. Honohan (2008) also explained a similar relationship between financial development and economic growth.

### **Research Methodology**

This research problem was studied through the use of a descriptive research design. The main focus of this study was quantitative. However, some qualitative approach were used in order to gain a better understanding and possibly enable a better and more insightful interpretation of the results from the quantitative study. The target population was the 42 commercial banks in Kenya and the 6 mobile financial services providers (Safaricom's M-Pesa, Airtel Money, yuCash, Orange Money, MobiKash and Tangaza Pesa) while the study population was the management staff who deal directly with the day to day operations of the organizations.

This study used stratified random sampling method and the population was stratified into administrative positions. Stratification aims to reduce standard error by providing some control over variance. The sample was developed using proportionate sampling strategy. With proportionate stratification, the sample size of each stratum is proportionated to the population size of the stratum. There were four levels of stratification comprising of Tier One Banks (Large), Tier Two Banks (Medium), Tier Three Banks (Small) and Mobile Service Providers.

According to Borg and Gall (2009), as sample should be in the range of 10% to 30% of the target population. For the purpose of this study an optimum proportion of 30% was selected from each category of the target population to satisfy the requirement of optimality and representativeness. Given the high homogeneity among the respondents in the different strata, the study randomly selected from the target population for inclusion in the study from the Tier One Banks (Large), Tier Two Banks (Medium), Tier Three Banks (Small) and Mobile Service Providers. Additionally, the researcher used random sampling to get the actual respondents in each stratum.

The sample size of the study was at 95% confidence level with a margin of error of 5%. Owing to the anticipated large number of employees, the study employed the Fisher et al. (1983) formula for determining sample sizes in large populations. This is as shown below:

$$n = \frac{Z^2 pq}{d^2}$$

Where n = the required sample size, when the target population is more than 10,000

Z = is standard normal deviate at the required confidence level, 0.05, which gives 1.96

p = is the proportion of the target population estimated to have the characteristics being measured when one is not sure, so one takes middle ground (0.5)

q = 1-p (1 - 0.5 = 0.5)

d is the level of statistical significance, which is a standard set at 0.05

$$\text{Therefore } n = n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2}$$

The study thus reached a sample population of 384 respondents distributed across the strata as elaborated in the sampling frame. To determine the sample size proportionately for each stratum, the study first calculated the percentage proportion for each stratum by dividing the target population for each respective stratum by the total target sample (48) and multiplied the result by 100. The study then multiplied the percentage proportion by the total sample size (384) to get the actual sample size.

**Table 1: Sampling Frame I**

Category	Population	Percentage	Sample
Tier one banks	6	(6/48*100)=12.5%	(12.5%*384)=48
Tier two banks	15	(15/48*100)=31.25%	(31.25%*384)=120
Tier three banks	21	(21/48*100)=43.75%	(43.75%*384)=168
Mobile service providers	6	(6/48*100)=12.5%	(12.75%*384)=48
<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>384</b>

To arrive at a desirable sample size per institution, the study further broke down the sample size as elaborated in table 1.

**Table 2: Sampling Frame II**

Category	Population	Sample	Sample per Strata
Tier one banks	6	48	6
Tier two banks	15	120	8
Tier three banks	21	168	8
Mobile service providers	6	48	6
<b>Total</b>	<b>48</b>	<b>384</b>	

The study purposively sampled top managers from the business development, finance and the research departments of each of the 42 commercial banks and the 6 mobile service providers.

Research methodology triangulation was applied because the study used both primary and secondary data methods of data collection so as to improve validity and reliability. The Primary data was collected by use of structured questionnaires that captured the various variables of the study. Face to face interviews were also conducted in order to fill the same questionnaires where respondents were unable to fill questionnaire. The Secondary data was collected through review of published literature such as journal, articles, scholarly materials, published theses and texts and textbooks related to subjects being studied. However, before data collection a pilot test was conducted to examine and improve the validity and reliability of the research instrument.

The study generated both qualitative and quantitative data. Qualitative data for this study was derived from questionnaire and face-to-face interviews. Fitness of purpose was to describe, explain and seek causality between competitiveness of mobile led financial services and its effect on financial inclusion in Kenya. Quantitative data was coded and entered into Statistical Packages for Social Scientists (SPSS Version 24.0) and analyzed using descriptive statistics. This was attained through frequency distributions, means, modes, percentages, and standard deviations, simple and cross tabulations. The study also used inferential statistics to establish effect of the efficiency of mobile led financial services competitiveness and its effects on financial inclusion in Kenya. Specifically, the study used Karl Pearson's coefficient of correlation and linear regression analysis to establish this relationship. For these tests, ANOVA, t-test, and F-test were used.

The linear regression analysis was formulated and performed in the following general regression equation: -

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

Where;

Y = the dependent variable (Financial inclusion)

X<sub>1</sub> = Efficiency

While  $\beta_0$  is a constant, which denotes financial inclusion,  $\beta_1$  are slope coefficients representing the influence of the associated independent variables over the dependent one and  $\varepsilon$  is the standard error term.

## **Research Finding and Discussion**

### **Introduction**

The sample size consisted of 384 purposively sampled top managers from the business development, finance and the research departments of each of the 42 commercial banks and the 6 mobile service providers. To this end, a response rate of 77.3% was achieved with 297 respondents reached out of the 384 targeted. This indicates a high response rate, which is acceptable as commended by De Vos et al. (2011). According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent.

### **Demographic Information**

This section captures both the respondent organizations' demographics including responses by gender of the respondent, managerial position, respondent age, number of years in service and highest education level attained.

**Table 3: Response by Demographic Information**

<b>Gender</b>	<b>Frequency</b>	<b>Percent</b>
Male	192	64.6
Female	105	35.4
<b>Age categories</b>		
Less than 30 Years	87	29.3
31-40 Years	142	47.8
41-50 years	48	16.2
More than 50 Years	20	6.7
<b>Length of service</b>		
Below 5 years	117	39.4
6-10 years	124	41.8
11- 15 years	56	18.8
<b>Highest education level</b>		
College level	31	10.4
University level	193	65.0
Post graduate level	73	24.6

In order to show the gender distribution and parity across the institutions included in the survey, the study sought to determine the respondents' gender. Respondents were thus required to indicate by checking either male or female response categories provided. As presented in Table 3, male respondents (64.6%) registered the majority as compared to their female counterparts (35.4%). It follows then from the findings, that male respondents made the dominant gender. The female gender was however also adequately represented implying that the study findings are reflective of responses by both genders in the study area, hence balanced with regard to gender.

The study deemed age an important demographic characteristic in the present study with a view to establish any pertinent trends in the variables under study as well as to have an overview of the age distribution thereof. Results as illustrated in Table 3 reveal that a majority of respondents (47.8%) fall within the 31 - 40 years age category. This is quite distantly followed by 29.3% affirming to the less than 30 years of age category. Only 16.2% and 6.7% of respondents fell between 41-50 years of age and over 50 years respectively. As such, it can be deduced that age, across the firms surveyed is majorly youthful to middle age, distributed, between 30 and 50 years. A rich diversity in experience was thus established.

With some level of working experience necessary in establishing the study objectives, the study found it appropriate to establish the length of service of the respondents, in years, serving at their respective firms. This would ascertain that responses were already informed by diverse experience owing to respondents' respective lengths of service. The study found that a majority of respondents (41.8%) have worked in the study area for between 6 and 10 years. This was closely followed by those having worked for below 5 years, as indicated by 39.4% of the respondents. While only 18.8% of the respondents have worked for 11 to 15 years. The results present a rather skewed distribution across the years representing the length of work experience. With a majority of respondents having worked for at least 6 years, responses can be deemed as informed by adequate experience in the study area.

Respondents were also asked to indicate their highest levels of education. This would serve to show the academic qualification among respondents in their respective positions, as well as a general overview of education levels among respondents in their respective study areas. From the findings, a majority of respondents (65.0%) of respondents indicated having attained University level, followed by 24.6% having attained either a Postgraduate, degree while only 10.4% had attained College level of education. Overall, the study area can be said to comprise of staff from relatively high levels of education. This was expected as the targeted sample, being in managerial position are expected to consist of professionals from relatively high levels of education.

### **Descriptive Statistics**

The study investigated the efficiency of mobile led financial services and their effect on financial inclusion in Kenya. The descriptive statistics thereof are hereby presented in form of means and standard deviations.

### **Effect of Efficiency on Financial Inclusion in Kenya**

The study sought to assess the effect of efficiency on financial inclusion in Kenya. To this end, respondents were asked to respond to pertinent statements posed by indicating the level at which they agreed with the same, as applied in their respective cases. Responses were given on a five-point Likert scale (where 1= Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree). The mean scores of 0 to 2.5 have been taken to represent statements dissented upon by a majority of respondents while mean scores of between 2.6 to 5.0 have been taken to represent statements agreed upon by a majority of respondents. The strengths in disagreement or agreement is represented by the respective strengths of the mean scores, descending for disagreement and ascending for agreement. Table 4.11 below presents the findings.

**Table 4: Efficiency on Financial Inclusion in Kenya**

	<b>Mean</b>	<b>Std. Dev</b>
Banks can realize operational efficiencies by adopting an integrated channel strategy that includes mobile banking	4.4714	.6875
Mobile led financial services can lead to closure of poorly performing branches and increase operating efficiencies by shifting the focus of branch employees from transactions to more advisory-type services	4.3267	.5029
The addition of mobile phone technology has improved the efficiency of financial transactions and reduced operational costs	4.2936	.8415
Mobile phone technology has provided more frequent opportunities to open and access member accounts in real time during field officer visits	4.3906	.6916
The lower costs and efficiencies associated with mobile transactions could change the economics of serving the underserved	4.3445	.7050
Restructuring branches could provide banks an opportunity to improve efficiency	4.3743	.6224
Using mobile technology has been contributing in improving efficiency of banks, and financial inclusion.	4.2045	.7795

A majority of respondents highly agrees that banks can realize operational efficiencies by adopting an integrated channel strategy that includes mobile banking (4.4714); mobile phone technology has provided more frequent opportunities to open and access member accounts in real time during field officer visits (4.3906); restructuring branches could provide banks an opportunity to improve efficiency (4.3743); the lower costs and efficiencies associated with mobile transactions could change the economics of serving the underserved (4.3445); mobile led financial services can lead to closure of poorly performing branches and increase operating efficiencies by shifting the focus of branch employees from transactions to more advisory-type services (4.3267); the addition of mobile phone technology has improved the efficiency of financial transactions and reduced operational costs (4.2936); and that using mobile technology has been contributing in improving efficiency of banks, and financial inclusion (4.2045).

### Financial Inclusion of Mobile Led Financial Services in Kenya

The study sought to establish the extent of financial inclusion attributable to the competitiveness of mobile led financial services in Kenya. To this end, respondents were asked to respond to pertinent statements posed by indicating the level at which they agreed with the same, as applied in their respective cases. Responses were given on a five-point Likert scale (where 1= Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree). The mean scores of 0 to 2.5 have been taken to represent statements dissented upon by a majority of respondents while mean scores of between 2.6 to 5.0 have been taken to represent statements agreed upon by a majority of respondents. The strengths in disagreement or agreement is represented by the respective strengths of the mean scores, descending for disagreement and ascending for agreement.

**Table 5: Financial Inclusion of Mobile Led Financial Services in Kenya**

	Mean	Std. Dev
Through competitiveness of mobile led financial services people in rural areas can now access mobile banking services	4.3771	.8337
Competitiveness of mobile led financial services has led to increase saving habits	4.0269	.3272
Competitiveness of mobile led financial services has led to enhanced asset ownership	4.0202	.8275
Competitiveness of mobile led financial services has led to improved purchasing power	4.0741	.6601
Competitiveness of mobile led financial services has led to declined income inequality	4.0067	.3302
Mobile banking has the ability to reach the 'unbanked' sectors of the economy	4.2088	.7548
Most people have taken up M-banking because it is cheaper than traditional banking systems	4.1650	.8731
Most people have taken up M-banking because of the zero-deposit required to maintain a non-bank led M-banking account which only charges transaction fees	4.4714	.7755
Most people have taken up M-banking because the transaction cost is considered lower than any other alternative	4.3569	.6725
The clearest direct benefits of mobile money are greater convenience, faster speed, and lower cost of transferring funds	4.4680	.6410

As presented in Table 5, a majority of respondents highly agrees that most people have taken up M-banking because of the zero deposit required to maintain a non-bank led M-banking account which only charges transaction fees (4.4714); the clearest direct benefits of mobile money is greater convenience, faster speed, and lower cost of transferring funds (4.4680); through competitiveness of mobile led financial services people in rural areas can now access mobile banking services (4.3771); most people have taken up M-banking because the transaction cost is considered lower than any other alternative (4.3569); mobile banking has the ability to reach the ‘unbanked’ sectors of the economy (4.2088); and that most people have taken up M-banking because it is cheaper than traditional banking systems (4.1650).

### Inferential Statistics

The study also set out to test the null hypotheses “there is no significant relationship between efficiency of mobile led financial services and financial inclusion in Kenya ( $H_{01}$ )”. To test these hypotheses, the study performed inferential analysis, consisting of both Pearson Correlation and Regression Analyses.

### Pearson Correlation Analysis

Maina et al. (2016) argued Karl Pearson Correlation Coefficient is the most widely used method of measuring the degree of relationship between variables. This ranges from -1 to +1, where -1 indicates a perfect negative correlation, 0 no correlation and +1 a perfect positive correlation. This assists a researcher in determining the magnitude and direction of the relationship between variables.

**Table 4.3: Pearson Correlation Matrix**

	Financial Inclusion	Efficiency
Financial Inclusion	1	
Efficiency	.708** (.002)	1

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

The results show that efficiency in mobile led financial services is strongly and positively correlated with financial inclusion at correlation coefficient of 0.708 respectively. Efficiency in mobile led financial services was found to have a statistically significant association with the dependent variable at 0.01 level of confidence.

### Regression Analysis

The coefficient of multiple determinants denoted by  $R^2$ , is a measure of proportion of the variation of the regress and explained by the corresponding explanatory variables. The value of  $R^2$  lies between zero and unity  $0 \leq R^2 \leq 1$ . A value of unity implies that 100% of the variations of Y have been explained by the explanatory variables.

**Table 7: Goodness of Fit Model**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.625	0.3906	0.3252	1.24285

a. Predictors: (Constant), Efficiency

The r-squared for the relationship between efficiency of mobile led financial services and financial inclusion was 0.3906, which implies that efficiency of mobile led financial services explains 39.06% of financial inclusion in Kenya, while 60.94% is explained by other factors not included in the model.

**Table 8: Analysis of Variance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	402.892	1	402.892	874.640	0.000
	Residual	135.888	295	0.46063729		
	Total	538.78	296			

a. Predictors: (Constant), Efficiency

b. Dependent Variable: Financial Inclusion

The overall ANOVA indicate F-value of the overall regression model was 874.640,  $df = (1, 296)$  at  $p < 0.05$  and the significance value of the model was 0.000. These findings show that the model is a good fit for the data and the hence can be used in predicting the influence of efficiency of mobile led financial service on financial inclusion in Kenya.

**Table 9: Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.8712	0.084		10.371	0.000
	Efficiency	0.535	0.167	0.521	3.204	0.000

The established optimal model is thus:

$$Y = 0.8712 + (0.535) X_1$$

Where:

Y = Financial Inclusion;

$X_1$  = Efficiency

A unit change in efficiency would lead to a 0.535 increase in financial inclusion in Kenya. The relationship is statistically significant at a P value of .000 ( $<0.05$ ). The study thus fails to accept the first null hypothesis that states that there is no significant relationship between efficiency and financial inclusion in Kenya ( $H_0$ ) and concludes that there is exists a positive and significant relationship between efficiency and financial inclusion in Kenya.

## **Discussion of the Findings**

The study then sought to assess the effect of efficiency on financial inclusion in Kenya. Efficiency was in this regard found to have a positive and significant effect on financial inclusion in Kenya. The finding is of the implication that the lower costs and efficiencies associated with mobile transactions could change the economics of serving the underserved and that mobile led financial services can lead to closure of poorly performing branches and increase operating efficiencies by shifting the focus of branch employees from transactions to more advisory-type services. It can also be deduced in this regard that the addition of mobile phone technology has improved the efficiency of financial transactions and reduced operational costs; and that using mobile technology has been contributing in improving efficiency of banks, and financial inclusion. As such, banks can realize operational efficiencies by adopting an integrated channel strategy that includes mobile banking and that restructuring branches could provide banks an opportunity to improve efficiency. Mobile phone technology also has the potential to provide more frequent opportunities to open and access member accounts for banks, in real time during field officer visits.

The finding is in agreement with Okutoyi (2013) who demonstrated the effects of using mobile money in the improvement in information flow between transacting parties allowing efficiency between the trading without travelling. This was noted particularly for users in rural areas where traders would have needed to travel to urban areas to send and receive money. Hence, mobile money usage results in the reduction in transportation cost and consequently increased consumer surplus. The finding also agrees with Njenga (2014) found that mobile communication networks enable information to move freely, enabling markets to be more efficient thereby unleashing entrepreneurship and consequently leading to financial innovation that allows mobile phones to be used as gateways to financial access by the previously unbanked rural communities. There are also relational benefits that accrue between transacting parties eliminating the need for middlemen, as a result it shrinks information asymmetry and increases the frequency of transactions and redress market inefficiencies. Other studies of M-PESA in low-income areas found that the risk of muggings declined, because cash was less evident. Because it is less visible than cash, mobile money also has consequences for privacy and autonomy (Ndunge & Mutinda, 2012; Ndung'u et al., 2012).

## **Conclusions**

It is also concluded in the study that efficiency was in this regard found to have a positive and significant effect on financial inclusion in Kenya. The finding is of the implication that the lower costs and efficiencies associated with mobile transactions could change the economics of serving the underserved and that mobile led financial services can lead to closure of poorly performing branches and increase operating efficiencies by shifting the focus of branch employees from transactions to more advisory-type services. It can also be deduced in this regard that the addition of mobile phone technology has improved the efficiency of financial transactions and reduced operational costs; and that using mobile technology has been contributing in improving efficiency of banks, and financial inclusion. As such, banks can realize operational efficiencies by adopting an integrated channel strategy that includes mobile banking and that restructuring branches could provide banks an opportunity to improve efficiency. Mobile phone technology also has the potential to provide more frequent opportunities to open and access member accounts for banks, in real time during field officer visits.

## Recommendations

Many of the characteristics that make mobile money so promising—its scale and impact, its varied uses, and the novelty of its role—are also reasons why achieving these hopes is so difficult. While exciting, the success of a few mobile money deployments should not shelter the fact that those examples remain the exception, not the rule. With this caution in mind, governments, donors, and industry have good reason to support the creation of vibrant mobile money services that include the world's poor in financial markets and allow them to manage and use their own money. Although far from the only mechanism, mobile is certainly one of the most powerful means by which to realize this promise.

With the inevitable cross boundaries between banks and mobile operator, further enhanced and supported policies that encourage financial sector deepening should be implemented. These should be complemented with measures to promote the growth and image of banks and mobile operators in a bid to promote the synergy existing between them. Pertaining losses due to fraudulent access of customers' accounts from hacking, there is a need to employ disciplined, qualified and well remunerated ICT staff in the bank and at the level of mobile operator.

## Suggestion for Further Research

There is need for further research to be undertaken for similar study but for a longer duration of time to evaluate the long-term relationship. Further, a research gap was identified in the bank-integrated mobile savings model, which needs to be filled by conducting a research to establish an attractive package that can provide for consumers beyond what basic mobile savings systems already offer. Also, another area of future study would be in line to examining the extent which mobile-led financial services providers pull away business/services that would ordinarily be transacted in a formal financial service provider and the benefits, challenges, risks etc. that would accrue if the limits are not clearly defined.

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