UNIVERSITY OF GHANA

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THE IMPACT OF MOBILE MONEY ON FINANCIAL INCLUSION IN GHANA

BY

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DECLARATION

This work is original work and has not been submitted for a degree in this or any other University. All references used in the work have been acknowledged.

I bear sole responsibility for any shortcomings.

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the university.

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PROF. K. A. OSEI **DATE**

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(SUPERVISOR)

DEDICATION

This research is dedicated to Almighty God and my entire family for the love and support throughout the entire MPHIL program, and especially during the research work.

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ABSTRACT

Gradually, Ghanaians have accepted mobile money as one of the best means of internal remittances. The increase in mobile phone usage coupled with the ease with which telecommunication network subscribers can register for certain services like mobile money, have made it a household name in Ghana. Mobile money has enabled Ghanaians to transfer funds, pay bills, and sometimes school fees, anytime and anywhere, regardless of the subscriber's level of education. Arguably, mobile money has become one of the surest, if not the surest, payment system in Ghana. With almost 27 million Ghanaians (90% of the country's population) being served (Bank of Ghana, 2016) on mobile telecommunication technology in Ghana, and only about 58 percent of Ghanaians being banked, it is vital to examine the extent to which mobile money service influences financial inclusion. This study examined the impact of mobile money payment system on financial inclusion in Ghana using a sample from 16,772 enumerated households in Ghana from the GLSS R6. The paper used Logistic Regression Forced entry method to test the predictive ability of the variables in the model. The study found that mobile money subscribers have a higher likelihood of opening a bank account. This is because of the prevailing system that enables clients of both financial institutions and mobile money service providers to withdraw, deposit and make payments via either of them, at any given point in time. The study found that mobile money payment system, however, impacts on the possibility of households requesting for overdraft. It was also observed that the usage of mobile money service does not influence financial institutions' decision to grant loans to mobile money subscribers upon request. In conclusion, this study shows that mobile money is used not only for savings but also influences loan requests, and this evolution of mobile money expands in more mature markets. It has been observed that Ghanaians, over the years, are increasingly becoming more financially inclusive. This study therefore

recommends that mobile Money Network Operators (MNOs) and banks should pursue more synergistic operating models that facilitate information and experience sharing, in order to develop a wider range of bank services that can be extended to mobile money users.

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CHAPTER ONE

INTRODUCTION

This chapter presents the background of the study, the problem statement, the objectives of the study, the research questions and the significance of the study. It also discusses the scope, limitations and chapter organization of the study.

1.1 Background to the Study

Theories and empirical evidence have inspired the assumption that financial inclusion induces positive economic growth and development. Scholarly literature and research works have shown that financial inclusion has positively impacted economies that have embraced it (Onaolapo 2015; Babajide et al., 2015; Sharma, 2016; Gourene and Mendy, 2017; Kim et al., 2018).

Mbutor and Uba (2013) viewed financial inclusion as strategies aimed at increasing the number of people with accounts in banks and other formal financial institutions - savings, current and credit. It also pursues the promotion of the use of formal payment media, including cheques, ATM cards, internet payments, mobile payments and others by the populace. Beck et al. (2006) referred to financial inclusion as banking sector outreach that allows the access and usage of banking services by households and firms. The various dimensions to 'Access' in banking services, as postulated by Claessens (2006), include availability of financial services, cost of access and range, type and quality of financial services offered. The study explained that 'Access' is not synonymous to use, since most economic agents may decline to use accessible financial service, either for socio-economic reasons, or because opportunity costs are too high, hence exempt themselves, making them financially excluded (Beck et al., 2006).

As financial inclusion implies increasing the coverage of the formal financial system, it may be expected to contribute to the development of a financial system. This is achieved by ensuring the ease of access, availability, and usage of formal financial systems for all members of an economy (Shankar, 2013; Sarma, 2008). Visco (2007) viewed financial inclusion as a form of financial deepening because of its role in increasing the size of a financial system, growing diversification of firms' and households' portfolios and developing the financial markets.

Financial inclusion has numerous benefits for economic development. Studies have revealed that communities with access to savings' instruments experience improved savings, productive investments, as well as consumption and female empowerment (Aportela, 1998; Ashraf, Karlan, & Yin, 2010). It also helps in poverty reduction, lessening the level of income inequality and improving private investment (Allen, Demirgüç-Kunt, Klapper, & Martinez Peria, 2012; Beck, Demirguc-Kunt, & Peria, 2007). Financial inclusion improves the facilitation of remittances and eases the relocation of funds from overseas (Demirgüç-Kunt, Córdova, Pería, & Woodruff, 2011).

Again, financial inclusion also enables effective distribution of productive resources, implicitly advances the daily running of finances, and guarantees a complete financial structure that can help to diminish the progress of unauthorised avenues of accessing credit which time and again have tended to be manipulative (Sarma, 2012).

Over the years, there has been widespread adoption of technology in almost every sphere of life. This has led to the emergence of numerous systems used for paying and receiving of cash and non-cash items in Ghana. The use of mobile phones in transacting business in Ghana and the world cannot be overemphasised. As a result of the ever increasingly widespread use of mobile phones among consumers, mostly in emerging markets, mobile

money (MM) usage has become a great phenomenon. Orozco et.al (2007) posited that the introduction of prepaid cards and the reduction in price of mobile phone devices have made it less expensive and easier for people to own and operate mobile phones. The diverse opportunities that come with the use of mobile devices, apart from voice calls and messages, have been explored, consequently.

Hughes and Lonie (2007) found that the number of people in the world who own and use mobile phones totalled over 2 billion. This figure exceeds the total number of financially included people in emerging economies, of which Ghana is no exception.

Jenkins (2008) defined mobile money as money that can be used and accessed through mobile phones. Mobile money transfer service is a phase of a broader concept that has risen in the electronic payment and banking industries. Despite the fact that there is no clear-cut definition of mobile money in literature, Tobbin P. (2010) summarised it to include all the various initiatives, long distance remittance, micro-payments and formal air-time battery scheme that is aimed at bringing together financial services to the unbanked, through the use of mobile technology.

Konutsey (2017) held that the mobile money concept is seen by the unbanked population segment as a "just-in-time" technology promising to be the key anchor towards the achievement of financial inclusion around the world; and that as at 2014, there were two hundred and twenty-five (255) mobile money service providers across eighty-nine (89) countries.

Ghana has been one of the countries with four mobile money service providers, with mobile phone penetration reaching in excess of 115% (ibid). The Global Findex (2014) data highlighted that Ghana was one of the thirteen (13) markets that adopted the mobile

financial services (MFS) with penetration rate above 10%. In that same period, it was revealed that 13% of adult Ghanaians reported having access to a mobile account, compared to Sub-Saharan Africa with an average of 11.5% in that same period. The 2015 Financial Inclusion Insight survey also reported that while access to banking had improved, this has been merely slightly; that is, 34% to 36% of Ghanaian adults (CGAP, 2019). Thus, access to mobile money improved from virtually zero to 29% from 2010 to 2015. Similarly, as of November 2015, the number of mobile money transactions per month in Ghana averaged 24 million individual counts, through 44,000 registered agents, with corresponding cash value of GH¢3.4 billion in transaction value. It is therefore apparent that the concept of mobile money and financial inclusion has led to a segment of the population who hitherto were deprived of financial products and services. With the widespread use of mobile phones coupled with the adoption of mobile money and the urgent need for Ghanaians to be banked, it is imperative to establish whether the emergence of mobile money has impacted on financial inclusion in Ghana.

1.2 Problem Statement

The introduction of banking in Ghana predates independence from British colonial masters; however, the formal banking industry has not been able to financially include the large number of the unbanked. This can be traced to the fact that traditional banks have little regard for low value transactions. Their preference lies in the high-frequency transaction-based business which they deem as cost-effective. The traditional bank account holders are nearly twice as likely to have an active bank account that has not been used in the last three months, than Ghanaians who do not patronize formal bank services (Zetterli, 2015).

The widespread adoption of Technology in almost every sphere of life has led to the emergence of numerous systems used for paying and receiving of cash and non-cash items in Ghana and the world at large. In Ghana, the mobile phone is the commonest electronic device for transacting business (Jack & Suri, 2011).

Mobile Network Operators (MNO) in Ghana have identified a clear business opportunity in offering mobile technology-based financial transaction services that include payment/transfer, credit and insurance services, to their customers. This, in ordinary language, is called Mobile Money. Mobile money transfer service is a phase of a broader concept that has risen in the electronic payment and banking industries. Despite there being no clear cut definition of mobile money in literature, Tobbin P. (2010) summarised it to include all the various initiatives, long distance remittance, micro-payments and formal air-time battery scheme that is aimed at bringing together financial services to the unbanked through the use of mobile technology. With the widespread use of mobile phones coupled with the adoption of mobile money and the urgent need for Ghanaians to be banked, it is imperative to establish whether the emergence of mobile money has impacted financial inclusion in Ghana.

In its quest to make sure Ghana fully benefits from financial inclusion, by any legitimate means possible, whether through the Telecommunications or formal financial institutions, the government of Ghana has launched a National Financial Inclusion Strategy (NFIS) which aims at increasing access to formal financial services for the adult population from 58 percent as at 2017, to 75 percent by 2023, focusing primarily on relatively excluded groups. Again, mobile money interoperability system was launched on 10th May, 2018, to enable customers of different mobile money service providers undertake money transfers between two accounts at different mobile money companies, or transfer money from

mobile money accounts to bank accounts. This is an attempt by government and various stakeholders to favour bank-led models in which there exists a direct partnership with banks and mobile money providers. As a result, many financial institutions provide mobile money services as part of their universal services. Mobile money subscribers who own bank accounts can make withdrawals, payments and transfers from their wallets using ATM cards and other banking facilities. It is also possible for mobile money service providers (telecommunications) to provide similar services to their clients who have bank accounts with financial institutions. This confirms Demirgüç-Kunt and Klapper's (2012) finding that mobile money has enabled the rather unbanked to enjoy similar banking services as the banked.

The massive acceptance of mobile money service and the government of Ghana's ambition to ensure high level of financial inclusion among adult Ghanaians, call for critical examination of the extent to which mobile money, which has seemingly been accepted by majority of Ghanaians of varying socio-economic statuses as one of the surest means of transacting businesses, has influenced financial inclusion in Ghana.

Extensive literature on the impact of mobile money on financial growth and development health, and education are easily available. Empirical Studies on the adoption of mobile phones using micro based financial survey data revealed positive impact on savings (Jack and Suri, 2014,2011; Honohan and King, 2012; Shem et al., 2012; Mbithi and Weil, 2011; Wilson et al., 2010; Collins et al., 2009; Comninos et. al., 2009).

In spite of the positive effects of mobile money adoption in Sub-Saharan Africa, Mbithi and Weil (2011) in their study on the impact of M-PESA on some economic and social outcomes using a balanced panel of 190 sub-locations in Kenya, revealed little evidence

linking use of M-PESA accounts as a place to store wealth. In addition, the study findings revealed that increased use of M-PESA had lowered the propensity of people to use informal savings mechanisms such as RoSCAS, but raised the probability of them being banked. Jack and Suri (2011) found similar findings which revealed that M-PESA users with a bank account are much more likely to save on M-PESA due to ease of use and safety.

However, no research has been conducted to evaluate the significant impact of mobile money usage on financial inclusion using bank account, loan request and loan grant as a measure of financial inclusion. Appropriate research needs to be conducted in this area.

The question now is, what is the impact of mobile money usage on financial inclusion in Ghana? This study therefore seeks to measure the impact of mobile money adoption on financial inclusion, using Ghana as the study area.

1.3 Research Purpose

The purpose of the research is to study the extent to which payment systems, specifically the use of mobile money, influences financial inclusion in Ghana.

1.4 Objectives of the Study

The key objective of this research work is to analyse the effects of mobile money on financial inclusion in Ghana. The exact objectives are:

1. To examine the extent to which mobile money (receipt and payment) influences the decision to open a bank account.

2. To examine the extent to which mobile money influences request for loans among households that operate mobile money.

3. To examine whether mobile money subscribers are granted loans by financial institutions or not, based on their mobile money transaction records.

1.5 Research Questions

The study will be guided by the following research questions:

1. Does mobile money usage influence opening of a formal bank account with a financial institution?

2. Does mobile money usage influence a households' request for a bank loan from a financial institution?

3. Does mobile money influence financial institutions' decision to grant loans to subscribers?

1.6 Significance of the Study

The findings of this study will be of relevance to researchers, practitioners and policymakers. It will add to the vast research on financial inclusion, and specifically, the impact of mobile money on financial inclusion in Ghana. This research happens to be one of the few studies that look at the linkages between mobile money and financial inclusion in Ghana.

Secondly, government, financial institutions and mobile money service providers, particularly Telecoms, have a share in applying the findings of the study in fashioning out modules on how to capitalise on the rise in mobile money patronage to influence financial

inclusion. This will, to a large extent, aid in government of Ghana's aim to have 75 per cent of Ghanaians being financially inclusive by 2023.

Moreover, the findings of this study will be useful for policymaking concerning financial development and financial inclusion in Ghana, with development organizations such as the World Bank, International Monetary Fund and African Development Bank.

1.7 Scope of the Study

The study exclusively focuses on the financial inclusion and mobile money link in Ghana by using a nationally representative data from the Ghana Living Standard Survey on some 16,772 households across the country.

1.8 Limitation of the Study

The study is limited to Ghana. It uses country study panel data to determine the effect of financial inclusion on poverty.

Another primary limitation to the study is time constraint for the completion of the study as determined by the university. The study must be started and completed within the academic calendar, but this should not affect the outcome of the study.

1.9 Organisation of the Study

The study is placed under five chapters. Chapter One introduces the study. It highlights the background and context of the study and the argument for this work, in the form of the research problem. It also highlights the questions this study intends to find answers to. Other items in this chapter include the significance of the study, as well as the scope and limitations.

Chapter Two presents the evaluation of literature in line with this study. Chapter Three of the study expatiates on the methodology adopted. It describes the research approaches and strategies used, the population, samples and the sample size. It also provides the source of the data, description of the data and how the data is analyzed.

Chapter Four presents the results of the analyzed data. This chapter also reports the various discussions of these results, in relation to existing literature and the context of the study.

Finally, Chapter Five summarizes the study and highlights its implications for research and practice, as well as other policy implications. It also highlights some suggestions and recommendations on the study, and then ends with a conclusion.

CHAPTER TWO

LITERATURE REVIEW

There have been a good number of scholarly articles and publications on the impact of financial inclusion on the various sectors of economies. Though the study on financial inclusion has been comprehensive, it is not exhaustive. This study explores the extent and the impact of mobile money on financial inclusion. This is a gap in literature that must be filled with regards to the study on financial inclusion and mobile money in Ghana. To achieve this objective, a review of existing literature relevant to the study on financial inclusion is very important.

The literature review seeks to critically analyze and examine scholarly articles and books on financial inclusion in Sub-Saharan Africa and globally. This chapter will therefore provide a description, summary, and a critical evaluation of each work with the aim of achieving the research objectives.

2.1 The Concept of Financial Inclusion and Exclusion

Financial inclusion targets bringing the unbanked masses onto the official financial systems, affording them the chance to access financial services like savings, payments, and transfers to credit and insurance institutions. Financial inclusion does not suggest that everyone must make use of formal financial services, or that suppliers should neglect risks and additional costs when planning to provide services. On the other hand, deliberate exclusion and adverse risk-return features may prevent a household or a minor firm, notwithstanding uncontrolled access, from using one or extra services. Such consequences do not essentially permit policy involvement. Relatively, a course of action ingenuities ought to be targeted to address market disappointments and remove non-market obstacles, to gain access to an extensive variety of financial services (Demirguc-Kunt et al, 2008).

Financial inclusion can help make financial services more accessible to all including the poor, by ensuring that there is a robust financial market which is an element for economic growth.

2.1.1 Definition of Financial Inclusion

Prevailing works on financial inclusion have altered definitions of the term. Several analyses ascertain financial inclusion in relations to financial exclusion, which transforms to a bigger framework of social exclusion. For instance, Leyshon (1995) defines it as exclusion of some entities and humans from having admission to official financial systems, whereas Sinclair (2001) emphasizes it as a failure to have access to needed financial services in a suitable system. Alternatively, Amidžić, Massara, and Mialou (2014) and Sarma (2008) outlined financial inclusion. Amidžić, Massara, and Mialou (2014) define financial inclusion as economic behaviour where individuals and businesses are not denied access to basic financial services. An all-inclusive financial system has several benefits. An inclusive financial system enables the effective administration of advantageous funds and can possibly abate the cost of capital. Moreover, admission to acceptable financial services can advisedly advance the everyday administration of finances.

The significance of financial system is well known in the policy sphere and lately financial inclusion has turned out to be a policy tool in several nations. Openings for financial inclusion have emanated from the financial controllers, the regimes and the banking industry. Legislative accomplishments have been achieved in certain economies. For instance, in the United States of America, the Community Reinvestment Act (1997) demands banks to provide credit all over their absolute breadth of operation and forbids them from affecting only the affluent areas. In France, the law on exclusion (1998)

demands a person's right to have a bank account. In the United Kingdom, a Financial Inclusion Task Force was adopted in 2005 to curtail the advance of financial inclusion.

The World Bank Global Financial Report (2014) describes financial inclusion as the share of individual and firms that uses financial services. The report adds on that absence of use does not mean lack of access. Some could accept admission to financial services but will not make use of certain financial services for the reason of cost, admitted barriers, and market failures or because of religious beliefs or cultural practices (World Bank, 2014). This study adopts the description by Sarma (2008) who believes financial inclusion is a process that guarantees easy access, availability, and use of financial services for all participants in an economy. Sarma's (2008) description forms the idea of financial inclusion on several dimensions, comprising accessibility, availability, and usage, which can be argued independently.

A study on financial exclusion has a well-defined ambience of a bigger affair of societal segregation of some sets of individuals from the official banking structure of the people. Leyshon (1995) explains banking exclusions as any process that seeks to stop individuals, social groups and bodies from admission to the official banking system. Carbo et al. (2005) explain financial exclusion as largely the difficulty of some individuals or groups to have admission to formal financial services. However, Conroy (2005) tries to define financial exclusion as a practice that exempts deprived and underprivileged social groups from having admission to the proper financial systems in their home countries. Mohan (2006) as well explains that financial exclusion is the non-existence of admission by some sections of society to appropriate, less expensive, reasonable and harmless financial packages and services from accepted suppliers. The World Bank (2014) describes intentional exclusion as a situation where part of the population or businesses decide not to

make use of financial services, the reason being that they do not need them or because of their cultural or religious motives. On the other hand, unintentional exclusion occurs when individuals are suffering from insufficient income and have high risk profile or because of selective market failures and imperfections.

2.1.2 Measurement of Financial Inclusion

Although the significance of a comprehensive financial system is generally accepted by policy makers, banks, and educational institutions around the globe, empirical literature on financial inclusion does not have an agreed standard measure that can be used to evaluate the level of financial inclusion from one economy to the other (Sarma, 2008). The writer acknowledges several indicators that have been used to specify the level of financial inclusion by different researchers. Those authors make use of indicators that include substantial deposit accounts (current and savings) as a share of the grown-up population (Sarma, 2008), number of loan accounts as a part of the adult population (Samantaray, 2007), as well as the number of bank branches per million people, the number of ATMs per million people, amount of bank credit, and amount of bank deposit (Sarma, 2008).

Sarma (2008) discovered that indicators when used separately, offer only fractional evidence on the comprehensiveness of the financial system of a country. Therefore, the writer advocates a complete measure of financial inclusion that includes material on quite a lot of aspects of financial inclusion. The author maintains that a single digit measure permits cross country assessments, trends to study and assess a nation's improvement of policy and responding to academic problems such as relationships between economic development and financial inclusion.

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The meaning is not quite clear.

In partnership with the Indian Council for Research on International Economic Relations (ICRIER), Sarma (2008) established a strong and inclusive measure of financial inclusion

that integrates information on several dimensions of financial inclusion, his measure is easy and not difficult to calculate, and it can be used to compare across nations. The measure is known as the Index of Financial Inclusion (IFI) which is comparable to some of the UNDP assessments for calculating well-established indices such as the Human Development Index (HDI) and the Gender-related Development Index (GDI). The IFI joins three basic dimensions of financial inclusion in its calculations, namely depth, availability, and usage. The rest of the indices include the Euro barometer Survey 60.2 (European Commission 2008) and the Patrick Honohan's Index of access to finance. These indices are centred on the dimension of access.

2.1.3 Benefits of Financial Inclusion

The significance of an inclusive financial system is extensively identified in the strategy circles (Sarma, 2008), and financial inclusion has developed as a strategy and a main concern in several countries (Sarma, 2008). The popularity of the importance of an inclusive financial system was determined by finding the important role of finance as one of the serious features for growth and development. This acknowledgement, together with the fact that growth alone cannot be viable, has encouraged an interest in financial inclusion among the academic world, public policy makers, and scholars.

A comprehensive financial system enables the effective distribution of useful funds, and this can possibly lessen the cost of capital (Sarma, 2008). Financial inclusion offers an opportunity for placing the savings of the poor into the official financial intermediary scheme and station them into investment.

Financial Inclusion can aid in slowing the progress of dismissive channels of credit such as money lenders which are time and again seen to be unfair (Sarma, 2008). Financial inclusion safeguards the deprived from the controls of informal money lenders. Persons

left out from formal financial system often depend on the informal sector to assist them with finance and they are frequently charged excessively high rates. It is as a result that the financially left-out individuals do not have access to more credit options. Therefore, a cruel cycle of high cost finance is customary where an individual borrows at high costs and pays out a considerable share of his/her income to money lenders.

Participation in the formal financial system can considerably advance everyday managing of finances (Sarma, 2008). In economies that promote cashless systems, for instance, Western Europe and North America, as well as those in evolution, the non-existence of admission to operate a bank account could indicate the variance between indebtedness and prosperity. Individuals without accounts have difficulty in undertaking individual commitments, like the settling of bills. Persons without a transactional bank account depend on an unsafe money centred trade that renders such individuals open to theft and uncertainty.

Generally, this is supported by certain hypothetical and experimental investigation studies that show the serious role that better access to finance has in encouraging faster and impartial growth as well as sinking income disparity (Beck & Demirguc-Kunt, 2007; Honohan, 2008). This is because a well-built financial system elevates poor individuals into the formal financial system and makes such individuals participate more energetically towards their personal economic development.

2.1.4 Dimensions of Financial Inclusion

The agenda of financial inclusion has absolutely influenced decisions of policymakers such as the World Bank, the Consultative Group to Assist the Poor (CGAP), Asia Development Bank, African Development Bank, International Monetary Fund (IMF) and governments of some Sub-Saharan African countries to ensure the need for inclusiveness in the financial sector. The primary appearance to defining the degree of financial

inclusion is to recognize the instruments that admit the smooth availability, usage and superior advantage of financial services in an economy. Policymakers essentially need dependable affirmations about the level of present inclusiveness in their corresponding countries, for this is imperative to structure policies and plans to eradicate obstacles to financial inclusion. The Financial Inclusion Data Working Group (FIDWG) of the Alliance for Financial Inclusion (AFI) has settled on three key ambits of financial inclusion that act on the advancement of data gathering. They are access, usage and quality. The group documents that the accepting of a broader and multidimensional definition of financial inclusion is basic to modifying the notion that inclusion will unavoidably be accomplished through the offering of sufficient access points.

The ambit of financial inclusion is ample categories in which indicators can be grouped, without being cramped. The ambit simply gives a framework to policymakers in developing robust measurement strategies that reflect the multi-dimensional attributes of financial inclusion. Contained by this framework, policymakers will still be in charge to structure a set of indicators acceptable to their needs and level of assets in their individual countries. The World Bank Report (2012) on financial inclusion strategies accommodates abundant descriptions on access, usage and quality dimensions of financial inclusion including a fourth dimension which is the impact of firms and household. A detailed discussion is stated below:

Access: the opportunity to use absolute financial services and packages from official organizations. Accepting intensities of access could need intuition into and analysis of attainable obstacles to having and using a bank account for any drive, such as charges and closeness of bank service points (for example, branches and ATMs). An appropriate straightforward alternative for access can be accomplished by counting the number of

accounts that are opened through financial institutions and approximating the percentage of the citizenry with an account.

Quality: the adaptation of the financial service or product to the accepted needs of the consumer. Quality involves the captivation of the consumer, accustomed in outlooks and angle in the administration of those products that are presently attainable to them. The degree of appropriate quality would be acclimated to the measurement, the attributes and assimilation of the link as part of the financial service supplier and the end user.

Usage: Outside the fundamental acceptance of banking services, usage centers extra on the perpetuity and assimilation of financial products and use. Therefore, defining usage needs added details about the consistency, occurrence, and interval of use over time. To measure usage, it is necessary that information reveals the user's point of view, that is, data accumulated from a demand-side survey.

Impact: barometer variations in the lives of consumers that can be adjusted to the usage of a financial device or product pose astringent procedural tests to the survey design. This advice can be acquired either from the demand side, that is, at the individual, household, or firm level, or from the supply side, that is, at the level of a financial institution, or from a mixture of both.

2.2 Channels of Remittances

Remittances flow and fund transfers have become an interesting area of research among scholars and researchers as well as international policy makers in recent times. Irving, Mohapatra and Ratha (2010) indicated that remittances from migrants to households provide the most tangible and least contentious relation between migration and development, and have the potential to reduce poverty and other UN Sustainable

Development Goals. It has then become very vital to know the means of remittances and funds transfer, to enhance transparency and accountability.

Remittances may either take the formal or the informal channel. Formal channels may include cash transfers that are usually based on personal relationships through businesspeople, or carried out by courier companies, friends, relatives or oneself. The international standard sector on anti-money laundering and combating the financing of terrorism (AML/CFT), FATF generally describes "Formal" funds transfer systems as those included in the regulated financial system, remaining all other methods of "Informal" category. In Hernández-Coss's (2005) work, he described formal institutions that aid in remittances transfers as those that are supervised by government agencies and laws that determine their creation, characteristics, operations and closure.

The informal channel, on the other hand, is defined as all types of remittances transfer services that do not involve formal contracts, and hence are not likely to be recorded in national accounts, thereby comprising 10 percent to 50 percent of the total remittances (Ratha, 2003). Maimbo and Ratha (2005) indicated that informal channels charge fees under 1 percent of how much is being charged at the formal channel. In Bangladesh for instance, Siddiqui (2003) concluded that the cost of informal channel is 45 percent of the formal channel. Freund and Spatafora (2008) also showed that the negative impact of transaction cost in most cases influences migrants' decisions to use the informal channel of remittance. Hernández-Coss (2005) found many other factors that influence the choice of the informal channel, which include relatively higher cost of sending money through the formal system, intention to evade taxes, strict government regulations and many others. In a survey conducted in 176 remittance receiving and remittance-source countries worldwide by Irving, Mohapatra and Ratha (2010), it was confirmed that high cost is perceived to be the top single factor hindering migrants from using formal channels. Other

factors cited by respondents included mistrust of or lack of information about financial systems, products, and channels. Irving et al. (2010) identify cultural and cost factors to be some of the important factors that influence the use of informal channels. Sending remittances within co-ethnics is perceived to strengthen the social relations that exist between friends and family. The paper concluded that high cost of transfers, dual exchange rate for money transfers, and lack of legal documentation for formal transaction by remittance-sender migrants are considered as the main reason why migrants will opt for an informal channel. Freund and Spatafora (2008) saw that recorded remittance is significantly influenced by the stock of migrants and the transaction cost of remittance. High transfer cost reduces the money sent home by migrants. This implies that migrants use informal method to transfer money or refuse to transfer money.

2.2.1 Empirical Perspective

There are varying empirical works that have been conducted on the extent to which mobile money impacts on remittances. For instance, Dahlberg, Guo and Ondrus (2008) analyzed 73 peer-reviewed papers on the issue of "mobile money and payments". The methodology adopted revealed that in addition to obstacles, the lack of effective marketing efforts; the profitability of the mobile money business models (including consumer pricing, cost reduction strategies for customers; financial sustainability; and the manner through which services are priced and perceived by the users); liquidity factor for agents; public regulations; and the need to reach scale were found to influence mobile money usage. For a number of authors, mobile money is still a very complex service which must be simplified before it may become a useful financial service for mass users. Duncombe and Boateng (2009) updated the work of Dahlberg et al. (2008) by reviewing additional 43 papers comprising 17 peer-reviewed papers and 26 non-peer-reviewed papers. The methodology employed in reviewing the papers included the year of publication, and the

study area. The study found that a connection existed between the number of mobile phone users and use of mobile money for transfers and payments.

On a slightly different track, Walia and Goodman (2007) assessed the impact of airtime transfer services in Egypt, surveying 700 users and 300 non-users of the service. This highlighted one of many novel adaptations of mobile phones as electronic money. However, the study found that balance transfer is not used as a money substitute but is used by low income users as a means of managing airtime to make mobile use more affordable. It also has an important social function tending to reinforce family and friendship networks. Ivatury and Pickens (2006) touched on assessing impact and found that those on low incomes are making use of cell phone banking (via WIZZIT), but not the poorest, and predominantly those with higher levels of education and technological sophistication. The perception of the initiative from non-users classified as poor was found to be similar as towards other formal banking channels - of distrust and a belief that it is not for them.

In studies, issues of policy and regulation were alluded to as significant constraints on m-finance adoption in a range of studies and reports (CGAP, 2006; CGAP, 2008). The backdrop to the regulatory issues concerned the convergence of two previously separated and distinct regulatory regimes of banking and telecommunications and the blurring of the distinction between services that were bank-led (a licensed financial institution or bank delivers an m-banking service to bank customers through a retail agent) and non-bank led. These studies further suggested that whilst rigid regulatory regimes presented a constraint, those which were adaptive and flexible facilitated innovation. These findings were also affirmed by Coetzee, Kabbucho and Njema (2003) in relation to a mobile banking initiative in Kenya, which was initially set up using a vehicle service and VHF communications networks, but which subsequently migrated to GSM networks. The

service caters for previously un-served rural communities, and survival and growth of the service was only guaranteed after the Kenyan government introduced special dispensations within the regulatory regime.

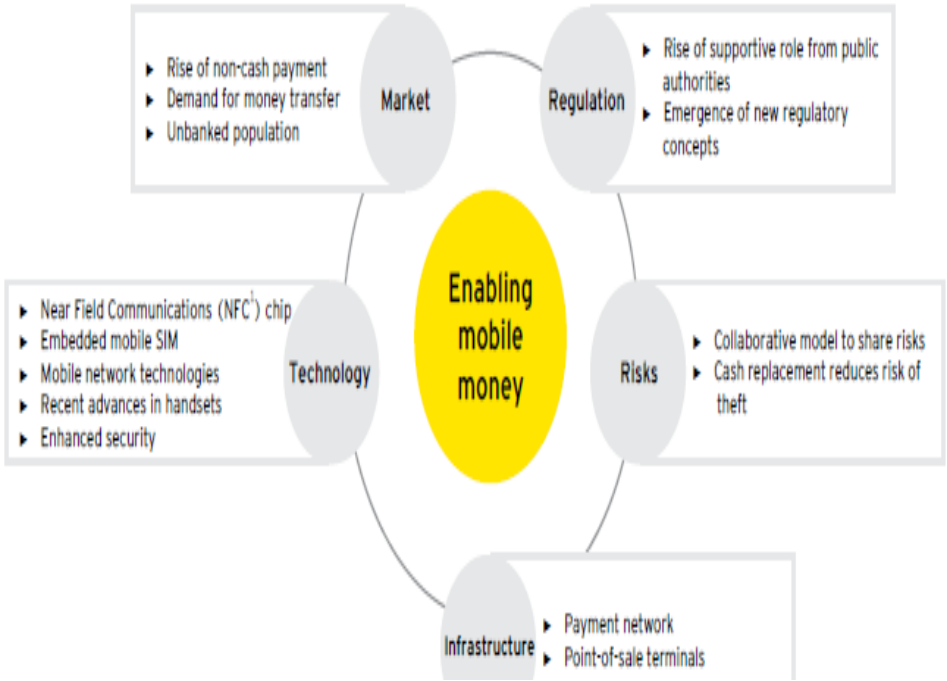
Jenkins (2008) found that mobile money facilitates financial inclusion as it is used for transfers of money, payments for utilities, government revenue and others. The paper also found that mobile money integrates the excluded into the formal financial system which is a critical prerequisite for effective market participation and development. Ehrbeck (2012) noted that in Sub-Saharan Africa (SSA), there is emerging collaboration between banks and mobile network operators (MNOs), which is an indication of a positive move towards financial inclusion for the 80 percent of Africa's unbanked population. The paper positioned Kenya as the leading country in terms of mobile money in Sub-Saharan Africa and therefore established that the West Africa sub-region is building ahead towards financial inclusion but remained behind the Eastern and South African regions. Bold et al, (2012) also indicated that in SSA, the use of mobile phones for mobile money services is the main driving force behind the recent progress made towards financial inclusion. Weber and Darbellay, (2010); Porteous, (2006) and Dias and McKee, (2010) have sub-divided mobile money into mobile banking (m-banking) and mobile payment (m-payment) models in SSA region, which they described as additive and transformative models respectively. These papers explained that the additive models allow bank account owners to use their mobile phones to access their existing bank accounts and associated services such as checking account balances, transfer funds between accounts or view cheque images, while the transformative models allow the unbanked to access financial products without existing bank accounts, mainly through their mobile phones, based on services provided by mobile money operators, microfinance institutions and non-bank agencies. Lastly, Dias and McKee, (2010) found that mobile subscribers in Kenya and South Africa who do not

have bank accounts were using mobile money for banking-related transactions such as bill payment, payroll deposits, international remittances, loan receipts and payments, airtime purchases, groceries, bus tickets and a whole range of other financial services.

2.3 Conceptual framework

The conceptual framework represents the researcher's synthesis of the literature on how to explain a phenomenon. The concept maps out the actions required in the course of the study given his previous knowledge of other researchers' point of view and his observations on the subject of research. This study embraces the framework adopted by Regoniel (2015) as presented in Figure 3.1.

Figure 3.1: Conceptual Framework



Source: Regoniel (2015)

Recent developments in handset functionality, chip and mobile network technologies, and upgrades to point-of-sale infrastructure have significantly altered and dramatically improved the environment for mobile money solutions, and as such help bring together diverse industry groups such as banks and the operators of mobile phone. From Figure 3.1, while a number of countries (especially developing countries) have not yet developed regulations to govern the transaction of mobile money, the cross-industry nature of mobile money prompts regulators in both the telecom and financial sectors, to confront key issues and develop a new generation of financial regulation. In consequence, this leads to the development of new regulatory concepts of e-money and payment. Mobile money applications provide a channel to expand traditional services and extend access to multiple segments including underserved or unserved groups. These applications address the very different banking needs for both the banked population in developed markets and the unbanked population in developing economies such as Ghana, Africa and Latin America. In developed markets, the service is at the initial stage and is seen as a convenience that does not generate high revenues, but one on which to build value-added applications. Tobbin and Kuwornu (2011) posited that in emerging markets, the large rural populations provide a perfect base to tap the unbanked group with no bank account but a mobile phone. The younger generations in developed markets are also a high potential segment, given their willingness to adopt new technologies. They often cannot access financial services as they are not old enough but are actively involved in virtual gaming transactions. Convenience provides the main motivation for them to try new services. Lower income workers are also likely to take up mobile money services, as they are not well served by the large banks. Prepaid recharge or top-ups are a key revenue source for many carriers as they provide an affordable and convenient service for low-usage

customers. Existing service infrastructure currently makes the process of reloading prepaid SIMs unfriendly for the low-usage segment.

2.3.1 Theories of mobile money

This part of the review presents a number of theories that help explain mobile money activity. The theories cover the social resource theory and the learning theory.

2.3.1.1 Social resource theory

The social resources theory cogitates the structural factors of social networks. This theory posits that social resources, in the form of wealth, socioeconomic status, power, etc., is embedded in a person's social network; and it is believed to positively influence the access of information (Song & Chang, 2012). Lin (1998) found out that the education of network members is positively associated with the frequency of health information seeking in the U.S. Lai (1998) also revealed that contact resources positively influence the finding of a job for men in the U.S. Households with more connections to network members with rich socioeconomic resources are more active in financial information seeking. Song and Chang (2012) found out the mechanisms through which social resources influence the frequency of health information seeking and diversity. Drawing on this analogy, two of the mechanisms may also be applied to financial information seeking: increased exposure to financial information and enhanced seeking abilities. Therefore, once connected to network members with higher socioeconomic status, individuals are more likely to be exposed to financial information and products from their network members, which can motivate them to utilize the respective products.

2.3.1.2 The learning theory

The social learning theory stipulates that social networks should be connected to the exchange of information, material and services (Bandiera & Rasul, 2006). Households

may know someone in their social network group but may not necessarily communicate with them about the use of mobile money. Without information exchange on mobile money, simply knowing a social network member may not produce the learning externalities of social networks, especially for mobile money which is highly unobservable (Maertens & Barrett, 2013). Additionally, Bandiera and Rasul (2006) used the number of adopters among family and friends to capture the impact of social learning on technology adoption in India. They therefore asked respondents whether they would approach a specified progressive farmer for advice in case of problems with their biotechnology cotton crop. In addition, they asked respondents whether they pass by the social network members' fields when going to their own fields. The assumption is that households would observe the biotechnology cotton crop in the fields of social network contacts and this likely influenced their adoption decision.

The social network benefits may emanate from specific type of network connections such as strong and weak ties. The strength of a tie is a combination of the amount of time, emotional intensity and reciprocal services that characterize a relationship (Granovetter, 2005). Granovetter further explained that the strength tie, among actors in a network, has an impact on the quality of information transferred and shared. The weak tie contacts know other contacts outside the household's circle of friends and possess diverse and heterogeneous information that overlap less with what one already knows (ibid). While weak ties convey heterogeneous and more diversified financial information, Zhang, Lin and (2012) accentuated that the social influence flowing through strong tie contacts can increase a household's capacity to mobilize the actual financial resources possessed through contacts. Within the context of the developing economy, strong ties are often used as referrals when seeking credit from both formal and informal institutions. This serves as a risk mitigating factor; for the reason that the lenders feel reassured lending money to

borrowers referred by a close contact. The strength of a tie can be measured by the type of relationship, acquaintanceship and the frequency of contact (Zhang et. al., 2012). Chen (2013) reported that the classification based on the type of relationship highlights the number of acquaintances (weak tie contacts) in one's social network relative to close friends and relatives (strong tie contacts). Chen (2013) defined the strength of network ties based on the frequency of contact. The frequent interactions between contacts represent a strong tie whereas infrequent contact captures weak ties; and that people with strong ties may meet regularly and in varying settings, while people with weak ties often meet irregularly and exchange diverse and often crucial information.

2.3.2 Townsend model of financial deepening and growth

Financial deepening and growth are intertwined and how this could help Ghana increase gross domestic product over time, in concurrence with the increase of monetized exchange. Early empirical contributions focusing on growth and financial structure were undertaken by Shaw (1973), McKinnon (1973), and King and Levine (1993). These bodies of empirical studies established that financial deepening is at least an intrinsic part of the growth process and may be causal; that is, repressed financial systems harm economic growth. Models have posited expensively bilateral exchange or intermediation costs, for instance a fixed cost to enter the formal financial system, and marginal costs to subsequent transactions. Other theoretical contributions such as Bencivenga and Smith's (1991) turned intermediation on and off exogenously and have an external effect that makes growth with intermediation higher.

Acemoglu and Zilibotti (1997) revealed that capital accumulation is associated with increasing intermediation and that better diversification, which comes with higher levels

of wealth, reduces the variability of growth. Likewise, well-known are seminal contributions on growth and inequality. A paper by Forbes (2000) confirmed previous regression studies that high (initial) inequality is associated with low subsequent long-run growth but found that the relationship is the opposite for the medium term. Resting separately from this strand of the empirical literature are the deservedly well-known theoretical contributions more motivated by other studies' assertion that growth may bring increasing, and eventually decreasing inequality; namely, Banerjee and Newman (1993), and Lloyd-Ellis and Bernhardt (2000).

2.4 Conceptual background on Mobile Technology-based payment

Financial services rendered using digital mobility technologies have multiple configurations, aims and features. Depending on the combination of agents, technologies and objectives, they may have features that may be close to banking and hence will be referred to as mobile banking. They may also have certain transaction payment characteristics and hence the name mobile payment. Finally, they may imitate the concept of money with digital features, which is then called mobile money (Diniz, Porto de Albuquerque & Cernev, 2011).

2.4.1 Mobile Telephony Technology

Kpodar and Andrianaivo (2011) defined mobile telephony technology in terms of Information and Communication Technology (ICT) characteristics. In Gates notes, mobile telephony technology was described in relation to mobile banking as it was defined as a simple digital device that allows individuals not only to communicate but transact/ access basic financial services without much difficulty (Bill and Melinda Gates Foundation, 2015). Gates Foundation (2015) has made conscious efforts to relate their respective

definitions to mobile banking and by extension, financial inclusion. However, such an approach failed to recognize the extent to which mobile telephony technology relates specifically to financial inclusion, not necessarily within the formal mobile banking sector.

2.5 Evolution of mobile money

Mobile financial services are among the most promising mobile applications in the developing world. It is estimated that at least 110 mobile money systems are currently deployed with almost more than 40 million users (Donovan, 2012). The M-PESA is the commonest mobile money system. The M-PESA was started in March 2007 by Kenya's largest network operator, Safaricom. Its aim was to provide an innovative means of making financial services available to the unbanked. Pesa is a Swahili word for cash and M for money. Hughes and Lonie (2007) established that M-PESA registered more than 20,000 clients within the first month of operation, far exceeding their target business plan.

The concept of the system was such that customers need not have a formal bank account to enjoy certain banking services. The M-PESA customer must register with Safaricom to be able to receive and pay money in an easy and secured way (Hughes and Lonie, 2007). Since 2007, many other countries in Africa have replicated the system. For instance, South Africa's WIZZIT managed to attract 250,000 customers in its four years of operation. Tanzania's M-PESA has attracted 100,000 registered clients (Mas & Morawczynski, 2009). In Ghana, almost all the telecommunication providers operate mobile money.

2.5.1 The business of Ghana's mobile money

Adam and Walker (2015) posited that Mobile Money Operators (MMOs) provide mobile infrastructure, customer base and agents' network for the mobile money business. These MMOs are profit-maximizing entities which issue electronic-money which is held in the

banks. In the same manner, banks provide infrastructure for the flow of money between two parties and therefore provide physical custody of the electronic money. Every unit of electronic money that is issued by the Mobile Network Operators (MNO) is backed by an equivalent amount of Bank of Ghana notes and coins held in a bank to ensure equilibrium in the MM market (ibid). The Bank of Ghana regulates, supervises and oversees the activities of the banks and Specialized Deposits-taking Institutions (SDIs) to ensure that the banking sector and the payment ecosystem are safe, reliable and efficient (Etim, 2012). The Bank focuses on key issues relating to Anti-Money Laundering Countering Financing of Terrorism (AML/CFT); consumer protection; promotion of competitive practices, assets quality, solvency, liquidity, earnings, systems and control and management with respect to oversight of the mobile money sub-sector. The National Communication Authority (NCA) oversees security of customers' data; and integrity of MM technologies. It regulates and oversees the activities of the Mobile Network Operators which own the Mobile Money Companies.

According to Ghana Social Marketing Association (2013), the Mobile Money Operators' agents facilitate cash-in (converting cash into electronic form) and cash-out (issuing cash on demand) to ensure convertibility between MM and cash. Agents are effective liquidity managers in the MM sub-sector. Merchants and retailers accept MM payments in exchange for different products and services. While fintech companies also provide a wide array of support services including mobile phone manufacturing, network equipment vendors and software, MM users are generally subscribers or non-subscribers of mobile network operators. According to Mbithi and Weil (2011), a prospective user of MM approaches an MNO and procures a SIM card which is also used for mobile money transactions. Users may be linked to bank accounts for various services such as investment, ATM and for bill payments. For convenience of the user, mobile money

wallets are linked to bank accounts to provide the user with unique consumer experience in terms of providing access to a variety of financial services which are designed to meet the needs of the poor and the unbanked (ibid).

According to Perron (2017), mobile money users can access innovative and affordable financial services in the form of micro-loans and repayment schemes designed specifically to suit the needs of the poor, the unbanked and the underserved. An example is the award-winning product by Ecobank Capital Advisors TBILL4ALL which was launched in October 2016 and has since attracted international attention on account of being the first of its kind anywhere in the world. The product was nominated for the World Summit Award in 2014. Mobile money operators prefer to pay one monthly lump-sum commission to agents using the MM platform. The commissions are derived from the two-way transaction cost paid by users of MM services.

Presently in Ghana, Mobile Money is gradually becoming a key means of payment for the unbanked and the underserved population. The rapid growth of MM usage in Ghana is partly on account of increasing penetration and application of mobile phones particularly in the rural areas (Nortey, 2014). The widespread proliferation of MM among the unbanked and underserved is premised on the recent advances in handset functionality, chip and mobile network technologies, and upgrade in Point-Of-Sale (POS) infrastructure (ibid). These developments have improved the environment for MM solutions, and brought together different industry players, such as banks and mobile money operators to establish MM businesses. The use of MM services as a means of payment brings several benefits to the user including convenience, speed, flexibility and affordability (GSMA, 2013). MM may be described as electronic cash backed by equivalent amount of the Bank of Ghana notes and coins stored using the Subscriber Identification Module (SIM) in a

mobile phone as an identifier. MM is issued by Mobile Money operators (MMOs) who keep the electronic account on the SIM in the mobile phone for the users of MM.

In Ghana, the mobile money wallet is mainly used to transfer value from one person to another person (P2P), for payment of goods and services such as buying airtime, paying for utility bills, Gold and DSTV bills, salaries of some workers, taxi fares, micro-credit, savings and micro-insurance. The store of value function of MM leads to quarterly payments of interests on balances on mobile money float. Total float balance was GH¢1,257.40 million at End - December 2016, compared to a float balance of GH¢547.96 million at End - December 2015, reflecting a growth of 129.5 percent (PSD, 2016). Total interest paid to holders of electronic money wallets in 2016 amounted to GH¢24.79 million.

The MM industry creates jobs for the MM agents, service providers and users including Fintech companies, merchants, retailers, and aggregators. The number of MM agents at End - December 2016, was 107, 415; with MTN mobile money contributing 54.0 percent; TIGO Cash, 24.9 percent; Airtel Money, 11.0 percent; and Vodafone Cash, 10.1 percent (PSD Prudential Returns, December 2016). The Bank of Ghana in 2016 reported that mobile money volume of transactions registered a growth rate of 737.4 percent from 2012 to 2016. The marked increase in mobile money usage is not unique to Ghana. Nigeria, Kenya, Uganda, and South Africa also registered significant growth in mobile money transactions (Diniz, Porto de Albuquerque & Cerney, 2011).

The growth of mobile money services has been identified as one of the most significant trends in the coming years. As technology advances and the mobile money network expand, mobile phones are becoming a multi-purpose payment platform. Mobile money transactions across the globe will transform the world of finance and the world of mobile.

It will change human's lives with increased convenience, enhance the standard of living for the unbanked population and stimulate economic development. Even though the advancement of varying technology is expected to enhance the quality of life, security is a question in consumers' minds. Until their fears are quelled, the uptake of mobile money services is likely to suffer. Technologies such as fingerprint identification, facial recognition and iris scanning provide strengthened security by authenticating users before transactions are authorized. In several of parts of the globe, there are no regulatory frameworks in place to cover these new services. A key enabler will be with regulators, both in telecom and financial services, to clear the way for mobile money through unified regulation approach. Meanwhile, resistance from merchants and a shortage of handset choice are emerging as new obstacles or barriers. Participants across a number of industries are considering moving into the mobile payment marketplace. While there is no definite answer as to who would win the game, nor is there a single model that fits every market, it is rational to expect that the party which owns the customer would have a higher chance of success.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the methodology used in the study. It gives an idea of the research process, the technique that was employed and the tools needed to arrive at the research objectives. In essence, this chapter describes the data used in the research, the source of the data, the methodology that was employed on the data and the justification for the choice of the method. The chapter begins with the estimation technique (methodology) that is employed on the data and justifies the choice of the method, the specification of the model, and then goes ahead to define the various variables used in the model. The sample data that is used in the study as well as the sources of the data are explained. Finally, in this chapter, the techniques and data analysis tools are detailed.

3.1 Research Design and Data Source

This study seeks to investigate the extent to which mobile money influences financial inclusion in Ghana. The study is quantitative in nature and uses data from Ghana Living Standard Survey (GLSS R6), 2014. Ghana Living Standard Survey is a research project that was initiated in 1980 by the Policy Research Division of the World Bank and tailor-made by the countries that are responsible for its implementation, including Ghana. The first time the Ghana Living Standard Survey was conducted was in 1987. The very latest of the survey was conducted between October 2012 and October 2013, which is the source of the data for this study.

3.2 Sampling Procedure

Stratified sampling design was the method used by the Ghana Living Standard Survey in gathering their data. Stratified sampling involves the process of segregating subjects which is followed by random selection of the respondents (Sekara, 2003). The GLSS R6's was designed in two stages; at the first stage, 1,200 enumeration areas were selected to form primary sampling units which were allocated into the 10 regions using probabilities proportional to population size of the regions. The enumeration areas were further divided into urban and rural localities of residence. A complete listing of households from each primary sampling unit was undertaken to form secondary sampling units.

The stage two of design ended with 15 households from each of the primary sampling unit selected systematically with the final total sample size of 18,000 household nationwide (GLSS R6, 2014).

3.3 Sample Size

Sample size used nationwide was 18,000 on the onset, that is, 15 households each in the 1,200 enumeration areas. However, with a response rate of 93 percent, a total sample size of 16,772 was eventually used for the GLSS R6, 2014.

3.3.1 Estimation Technique

Regression method has become one of the integral methods used for predicting outcome of the relationship between a dependent variable (response variable) and one or more independent variables (explanatory variables). The nature of data used in the research determines the type of regression method to be used. The Ordinary Least Square (OLS) and Linear Discriminate Function Analysis are the common types that are often used

(Hosmer & Lemeshow, 2000). Hosmer and Lemeshow (2000) posit that the goal of using logistic regression method is to find the best fitting and parsimonious model to analyze and describe the relationship between a dependent variable, which is always a categorical variable, and a set of independent variables.

This study calls for the analysis and prediction of outcomes that are dichotomous in nature. Due to the strict assumptions underpinning OLS or Linear Discriminate Function Analysis such as linearity, normality, and continuity for OLS regression and multivariate normality with equal variances and covariance for discriminate analysis, the logistic regression is ideal and most acceptable method for predicting dichotomous outcome (Cabrera, 1994).

Generally, logistic regression is suitable for describing and testing hypothesis about the relationship between a categorical outcome and one or more categorical or continuous predictor variables (Peng et.al, 2002). This is because, according to Cox and Snell (1989), it is extremely flexible, easy to use and it lends itself for good interpretation.

3.3.2 Model Specification

The research seeks to empirically investigate whether mobile money services have impact on financial inclusion in Ghana. The element of financial inclusion includes Bank Accounts, Loan Requests and Loan Grants, and represents dependent variables, though categorical, are binary in nature. This calls for the use of binary logistic regression which models how binary response variables depend on a set of explanatory variables such as mobile money, household size, educational, salaries, distbank and profraud which can be categorical, continuous or a mix of both in a model.

The subject of interest in a regression problem is the mean value of the dependent variable, given the values of the explanatory variables. It is often referred to as the conditional mean and expressed as $E(Y|x)$, which is the anticipated value of Y, given the value of x. In this case, the dependent variable is represented by Y and x denotes the explanatory variable. In the linear regression it is assumed that this mean may be stated as an equation linear in x, such as:

$E(Y|x_i) = \beta_0 + \beta_1 x_1$……**(a)**

The implication of this expression is that it is possible for $E(Y|x_i)$ to range between $-\infty$ and $+\infty$ values.

For simplicity, the conditional mean of Y given x is represented by quantity $\pi(x_i) = \frac{e^{\beta_0+\beta_1 x_i}}{1+e^{\beta_0+\beta_1 x_i}} = E(Y|x_i)$……...**(b)**

$\pi(x_i)$ can be transformed into a logit function and expressed in a univariate form as:

$g(x_i) = ln\left[\frac{\rho(x_i)}{1-\rho(x_i)}\right] = \beta_0 + \beta_1 x_i + u_i$……..**(c)**

Since this study uses more than one independent variable and requires the use of a multiple logistic regression method, the general logistic model is as follows

$g(x_i) = ln\left[\frac{\rho(x_i)}{1-\rho(x_i)}\right] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p + u_i$……...**(d)**

Where:

$g(x_i)$ is the dependent variable

$\rho(x_i)$ is the probability of event x occurring

$1 - \rho(x_i)$ is the probability of event x not occurring

β_0 is the value of the log-odds if the independent variables are zero

u_i is the error term

$x_i \; to \; x_p$ are the values of the explanatory variables

3.3.3 Empirical Models

$$Financial\ Inclusion_i = ln\left[\frac{\rho(x)}{1-\rho(x)}\right]$$
$$= \beta_0 + \beta_1 MM + \beta_2 \text{HHSize}_i + \beta_3 \text{MalesAbove18}_i + \beta_4 \text{FemalesAbove18}_i$$
$$+ \beta_5 \text{MembersSHS}_i + \beta_6 \text{MembersTer}_i + \beta_7 \text{Salaries}_i + \text{DistBank}_i$$
$$+ \beta_9 \text{PerFraud}_i + u_i \ldots\ldots\ldots\ldots\ldots\ldots (b)$$

Model 1

$$Bank\ Account_i = ln\left[\frac{\rho(x)}{1-\rho(x)}\right]$$
$$= \beta_0 + \beta_1 MM + \beta_2 \text{HHSize}_i + \beta_3 \text{MalesAbove18}_i + \beta_4 \text{FemalesAbove18}_i$$
$$+ \beta_5 \text{MembersSHS}_i + \beta_6 \text{MembersTer}_i + \beta_7 \text{Salaries}_i + \text{DistBank}_i$$
$$+ \beta_9 \text{PerFraud}_i + u_i$$

Model 2

$$Loan\ Request_i = ln\left[\frac{\rho(x)}{1-\rho(x)}\right]$$
$$= \beta_0 + \beta_1 MM + \beta_2 \text{HHSize}_i + \beta_3 \text{MalesAbove18}_i + \beta_4 \text{FemalesAbove18}_i$$
$$+ \beta_5 \text{MembersSHS}_i + \beta_6 \text{MembersTer}_i + \beta_7 \text{Salaries}_i + \text{DistBank}_i$$
$$+ \beta_9 \text{PerFraud}_i + u_i$$

Model 3

$$Loan\ Grant_i = ln\left[\frac{\rho(x)}{1-\rho(x)}\right]$$
$$= \beta_0 + \beta_1 MM + \beta_2 \text{HHSize}_i + \beta_3 \text{MalesAbove18}_i + \beta_4 \text{FemalesAbove18}_i$$
$$+ \beta_5 \text{MembersSHS}_i + \beta_6 \text{MembersTer}_i + \beta_7 \text{Salaries}_i + \text{DistBank}_i$$
$$+ \beta_9 \text{PerFraud}_i + u_i$$

Where;

Financial Inclusion represents the probability that 16,772 households under consideration who responded to questions on mobile money are likely to open bank account(s) and request for loan(s) from financial institutions. This is vital because most financial institutions in Ghana provide mobile money services as part of their operations.

MM represents households that receive and pay remittances using mobile money system provided by any of the network providers.

HH Size represents the size of the households under consideration. That is the number of people living in each of the 16,772 households. This, to a large extent, will help determine the need by household members to register with telecommunication companies in order to remit one another when the need arises.

Males Above18 represents the number of households that have male members who are 18years and above. This class of people is often regarded as working class and hence they may need mobile money accounts to receive their wages, in some case, and to transfer money to their dependents.

Females Above18 is the number of households with female members who are 18 years and above. Likewise, their male counterparts, females above 18 years are likely to be earning income and these are often received via mobile money.

Salaries are a dummy variable that denotes whether households receive monthly salaries or not.

MembersSHS is the number of households with members who have attained SHS education.

MembersTeriary is the number of households that have members who have attained tertiary education. People who have attained both secondary and tertiary education are more likely to have a mobile money account. This is because, relatively, they can operate it with ease as compared to others who do not have any formal education.

DistBank is the distance between households and the nearest financial institution

PerFraud is people's perception about the fidelity of financial institutions

3.4 Variable Definitions

The variables that are used in the study are broadly grouped under two main sub-headings; the dependent and the independent variables. The independent variables, which are also known as the predictor variables, are made of mobile money usage, household size, males above 18 years, females above 18 years, salaries, members with SHS level of education and finally, members that have attained tertiary education.

The dependent variable in the study is financial inclusion which comprises bank account opening, loan request and loan grant.

3.4.1 Independent Variables

- **Household size**

The size of the household, in terms of the number of people in the household, has a significant influence on financial inclusion. Households with bigger size are presumed to have positive impact on financial inclusion since most members are likely to access and use financial services. A prior, the study expects household size to have a positive

relationship with financial inclusion since most of their transfers and receipts of cash are via mobile money.

- **Number of households with males and females above 18years**

Generally, there is a likelihood that males in households remit more than females. According to existing literature, gender gap in financial inclusion favors male households, and youthful age also improves the chances of a households' likelihood of being financially included. Households that have more males with ages above 18 years are presumed to use financial services more, compared to households with few males and households with males below the age of 18 years.

Again, females above 18 years are, in some jurisdiction, regarded as part of the working class and are likely to earn money and other benefits and hence have higher chances to be financially included even though there is a huge gap that exists between males and females in access and use of financial services, which obviously favors male household members. The study will help examine the extent to which female members above 18years influence financial inclusion through their transactions with mobile money service providers.

- **Education**

Education, as used in the study, is to examine whether the level of education attained by members of a household has any influence on financial inclusion in Ghana or not. Literature has demonstrated that households with higher levels of formal education tend to save and use financial services more. Individuals with higher education can help in enhancing financial literacy levels when making decisions concerning financial issues. The study uses secondary and tertiary level of education variables since these people are more likely to use mobile phones, transact business via mobile phones and understand the essence of financial inclusion.

- **Salaries**

Salaries represent members of households that receive payment of their monthly income from their employers through financial institutions. This has a high probability of influencing financial inclusion. Empirical works have shown that most salary earners receive their income through financial institutions compared to menial jobs that pay by-day wages to workers. The study projects a positive relationship salaries and financial inclusion.

- **DistBank**

This is the distance between households and the nearest financial institution. Financial institution as used in the study includes banks, saving and loans, Susu, Microfinance and many others. Dupas et al. (2016) with suggestive evidence concluded that distance to bank is a predictor of usage of financial services. The closer a household is to a financial institution, the higher the probability of members being financially inclusive. The study expects DistBank to be positively correlated to financial inclusion, to a large extent.

- **PerFraud**

People's perception about the fidelity of financial institutions plays a critical role in determining whether members of households will be financially inclusive or not. Ghana has recorded so many instances, in recent times, of financial institutions duping their clients. Some of the financial institutions are often not able to meet the demands of Bank of Ghana and hence lead to liquidation and transfer of ownership. Ghanaians will want to rest, assured of the safety of their savings, and would therefore wish to use orthodox means of savings if there is public perception of fraud. A study by Dupas et al. (2012) and Bachas et al. (2016) revealed that people may not open accounts and be financially included because they may not trust banks. This study examines if the perception of fraud

among Ghanaians have any impact on bank account opening, loan requests and loan grants. A prior, the study expects a negative correlation between financial inclusion and PerFraud, if there exists a higher level of perceived fraud.

3.4.2 Dependent Variables

The dependent variables in this study that is used to measure financial inclusion includes Bank Account, Loan Request and Loan Grant.

- **Bank Account**

The study examines whether mobile money has the potential to influence the decision of the households to open bank accounts with financial institutions. The study takes into consideration account with Banks and other official financial institutions. The account can be a savings account, a fixed deposit account, salary account or current account.

- **Loan Requests**

This study examines whether mobile money has any impact on the possibility of a household to request for loans or not. This study concentrates on how mobile money influences the request for loan among mobile money account users in Ghana.

- **Loan Grant**

This study examines whether the use of mobile money service influences financial institutions' decision to grant the subscribers loan request or not.

CHAPTER FOUR

ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents the data sources for the study, data description, descriptive statistics, and analyses and discusses findings of the study based on scientific methods and procedures. The chapter acts on the research questions as provided in chapter one and provides detailed discussions and empirical findings in the form of tables to show the estimated results of the study. The results are presented in tabular forms for clarity. The chapter further analyses and discusses, in details, the findings of the study. Answers to all research questions are therefore found in this chapter. For all results, discussions are made based on theoretical and empirical views.

Table 1: Descriptive Statistics of the Dependent variables and some Independent variables

	Yes		**No**		**Total**	
Variables	Freq.	Per.	Freq.	Per.	Freq.	Per.
Loan Application	1954	11.7	14806	88.3	16760	100
Bank Account	8026	47.9	8732	52.1	16758	100
Loan grant	1778	10.6	14994	89.4	16772	100
Use mobile money	773	4.6	15999	95.4	16772	100
Salaries	798	4.8	159974	95.2	16772	100

Source: Author's calculations based on survey data

Table 1 briefly describes some of the independent variables and all the dependent variables (Loan Application, Bank Account, Loan grant) used in the study. The purpose of this description is to provide a summary statistic of the binary response (YES/NO) obtained from the data. Table 1 shows the frequency and percentage of the respondents

who responded either Yes or No to questions relating to Loan Application, Bank Account opening, Loan Grant, Mobile Money and Salaries.

From table 1, it is observed that a larger percentage of the respondents do not have bank accounts. As expected, it is seen that respondents who have ever applied for loans are more than respondents who are granted loans. This is partly because of high default rate prevailing in Ghana that usually compels financial institutions to do thorough scrutiny before granting loans. In their (financial institutions') attempt to reduce risk associated with default, many loan applicants are denied their loan request thereby leading to only 10.6 percent of the 11.7 percent loan applicants being granted their loan request.

Table 2: Descriptive Statistics of the independent variables

Variables	Description	Obs.	Mean	Sd.
HHsize	Total number of respondents in each household	16772	2.21	1.671
MalesAbove18	Number of male members who are 18 years and above in each of the households	15452	2.09	1.643
FemalesAbove18	Number of female members in each of the households under consideration who are 18 years and above in each of the households	15452	2.22	1.723
PerFraud	This represents the total number of respondents who perceive fraud in the financial service	15452	2.23	1.742
DistBank	Number of households that are close to financial institutions	15452	2.23	1.742
MembersSHS	Fraction of respondents who have attained SHS level of education	15452	0.27	0.583
MembersTer	Fraction of respondents who have attained Tertiary level of education	15452	0.18	0.509

Source: Author's calculations based on survey data

Table 2, just like table 1, provides a summary of the independent variables in the model of the study. It shows the observation, sum, mean and the standard deviation of some of the independent variables. The independent variables statistically summarized in table 2

include the size of the household, number of males and females who are above 18 years in the 16,772 households under consideration, the number of respondents who perceive that there exists some risk in patronizing financial services, nearest of the households to financial institutions, and lastly, the number of people with Senior High and Tertiary level of education.

4.1 Findings and Discussions

The findings provide answers to the research questions and indicate the fulfillment of the research objectives in chapter one of the study. Variables that are significant to the study in the findings are critically examined and justified. This study uses asterisks to indicate variables that are significant to the study and the extent of the significance. The Pseudo R^2, which explains the likely percentage of the variation in the dependent variables which are explained by the independent variables, the Omnibus test which signifies the extent to which the independent variables help to improve upon the model and the Hosmer and Lemeshow test which depicts the level of best fit of the model are also presented in the findings to show the results for the study are presented in tables 3, 4 and 5.

Table 3: Logistic Regression results showing how mobile money influences Bank Account Opening

		Account Opening		
		coefficient	**Sig.**	**Exp(B)**
	Mobile Money	0.766*	0.038	1.262
	HHSize	-0.112***	0.000	0.894
	MalesAbove18	-0.024	0.580	0.976
	FemalesAbove18	0.031	0.134	1.031
	MembersSHS	-0.014	0.762	0.986
	MembersTer	0.081*	0.023	1.085
	Salaries	0.458***	0.002	1.001
	DistBank	0.532***	0.000	2.001
	PerFraud	-0.223**	0.004	1.532
	Constant	-2.060	0.000	0.127
Pseudo R^2:	Cox & Snell R Square	0.060		
	Nagelkerke R Square	0.110		
Omnibus Test		81.298***	0.000	
Hosmer and Lemeshow Test		13.475	0.097	

** p<0.05, ** p<0.01, ***p<0.001*
Source: Author's calculations based on survey data

The findings in Table 3 above shows households that have their members registering and using mobile money are likely to have a bank account. There is the high tendency to open a bank account because certain financial institutions have direct links with mobile money service providers. Clients are therefore able to enjoy services from either of the service providers at a given time. It is therefore found that mobile money patronage has positive impact on the likelihood that households will have bank accounts.

Other variables such as households with at least a member attaining tertiary education and members who receive monthly salaries and wages are also likely to open a bank account. Education has positive correlation with account opening since people who are educated have high tendency of receiving salaries and wages through financial institutions and hence the need to open formal accounts. Other reasons may include the fact that education creates awareness about the benefits of financial inclusion and so people with high levels of education are more likely to open accounts.

Again, there is a positive relationship between the proximity of households to financial institutions and bank account opening. That is, the closer households are to financial institutions positively impact bank account opening while households that perceive they may be duped by financial institutions are unlikely to open bank accounts. This is evidenced in the fact that a number of banks experienced some level of insolvency, thereby creating some fear in people to open bank accounts.

Table 4: Logistic Regression results showing how Mobile Money influences Loan Request

		Loan Request		
		coefficient	**Sig.**	**Exp(B)**
	Mobile Money use	0.822	0.002	2.083
	HHSize	-0.003	0.951	0.997
	MalesAbove18	0.030	0.750	1.031
	FemalesAbove18	0.071	0.106	1.074
	MembersSHS	-0.144	0.173	0.866
	MembersTer	0.313**	0.004	1.368
	Salaries	0.530**	0.003	2.452
	DistBank	0.432**	0.005	1.671
	PerFraud	0.832	0.132	2.845
	Constant	-1.439	0.000	0.237
Pseudo R^2	Cox & Snell R Square	0.260		
	Nagelkerke R Square	0.390		
Omnibus Test		43.491***	.000	
Hosmer and Lemshow Test		14.325	.074	

** p<0.05, ** p<0.01, ***p<0.001*
Source: Author's calculations based on survey data

Table 4 shows the factors that interplayed in influencing households that use mobile money services' decision to request for loans. The focus of this test is to find out how

mobile money usage influences the probability that the 773 households who responded to have registered and use mobile money out of the 16,772 households will request for loans from financial institutions. It is observed that only households that use mobile money services ($Exp(B) = 2.083,\ p = 0.002$), households that have members with tertiary education ($Exp(B) = 1.368,\ p = 0.004$), salaries ($Exp(B) = 2.452,\ p = 0.003$) and proximity of households to financial institutions ($Exp(B) = 2.845,\ p = 0.005$) are the factors that are significant and positively influence respondents' loan requests.

A household that enjoys mobile money service has 2 times likelihood to request a loan from a bank than households that have not registered for mobile money. Again, households that have members with tertiary education also had 1.368 chances of requesting for loans from financial institutions than households that do not have members with tertiary education.

A household that is closer to a financial institution is 2 times more likely to request for loans than households that are not close. This is likely to be the case because households that are close to financial institutions are better informed of the services of financial institutions than those that are otherwise far apart.

Finally, it can be observed that households that have members receiving salaries have high tendency with 2.452 chances of requesting for loans from financial institutions than households that do not have members receiving salaries.

Table 5: Logistic Regression results showing how mobile money influence Loan Grant

		Loan Granted		
		B	**Sig.**	**Exp(B)**
	Mobile Money	-0.941	0.378	0.390
	HHSize	-0.104***	0.000	0.901
	MalesAbove18	-0.061	0.161	0.940
	FemalesAbove18	0.082***	0.000	1.086
	MembersSHS	0.108*	0.017	1.114
	MembersTer	0.478***	0.000	1.613
	Salaries	0.504**	0.001	2.996
	DistBank	0.043	0.134	1.575
	PerFraud	-0.673	0.312	2.592
	Constant	-2.295	0.000	0.101
Pseudo R^2	Cox & Snell R Square	0.180		
	Nagelkerke R Square	0.360		
Omnibus Test		256.301***	.000	
Hosmer and Lemshow Test		34.929	.061	

** p<0.05, ** p<0.01, ***p<0.001*

Source: Author's calculations based on survey data

Table 5 shows the extent to which using mobile money services influence households' likelihood of receiving loans from financial institutions. It is very crucial to know whether financial institutions will be willing to allow overdraft services when a bank holder will want to withdraw an amount that exceeds how much (s)he has in the account via mobile money, since most of the banks have synchronized customers' bank accounts and mobile money accounts. It is observed that mobile money has significant effect on the likelihood that households will be granted loans in the form of overdraft facility when there is an urgent need for cash. However, it is observed that banks take into consideration education of households and whether or not households receive salaries in granting loans.

Also, there is a positive relationship between females above 18 years and loan grant, indicating that females are likely to be granted loans because of the trust financial institution have in females compared to males, with respect to loan repayment.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this final chapter of the research work, the main findings of the study, conclusions as well as recommendations are highlighted. To be able to achieve this, the chapter has been divided into four major sections. The first section presents the summary of the study. The second section talks about the key findings of the research while the third section emphasizes the conclusion and recommendations of the study for policy makers and government. The final section of this study provides the gaps that may be worked on in future studies.

5.2 Summary

Over the last decade, financial inclusion has made its way into the center stage of development policy and has been every government's goal in the developing economies. Many countries are working on various strategies and regulatory frameworks to ensure they reach all those excluded financially. For optimal resource mobilization and social economic balance, every government's focus is to have an efficient and inclusive financial system for the purpose of equity in resource mobilization. With private and commercial institutions' efforts to align various technological evolutions, the government is also trying to explore and implement innovative models that will deepen Ghana's financial sector to support savings, transactions and investment growth. The study sought to determine the relationship between mobile money services and financial inclusion in Ghana. The study used secondary data obtained from Ghana Living Standard Survey Round 6 (GLSS R6).

The study found that mobile money transfer services have positive effect on financial inclusion in Ghana.

5.3 Major Findings

The results from the study showed that households that have their members subscribed to mobile money service have a higher tendency of opening bank accounts with banks than households that do not have members who enjoy mobile money services. The likely reason for the finding is because of the alliance banks and telecommunication agencies have had over the years in Ghana.

It was also found that households that transact business via mobile money are more like to request for overdraft from financial institutions. There are occasions when a mobile money subscriber whose mobile money account has been linked to his formal bank account may not have enough funds in the mobile wallet and hence may be tempted to use request for overdraft or loans from his bank to effect the transaction. In essence, it can be said that mobile money services have contributed significantly to deepening financial inclusion in Ghana.

Lastly, the study found that the use of mobile money by subscribers, regardless of how frequent, does not influence banks' decision to grant loans to applicants. Over the years, Ghanaian banks have recorded a high level of default rate leading to several interventions by Bank of Ghana. The high default rate has led to banks and other financial institutions demanding collateral, in some cases, where the borrower is deemed to be a risky borrower. It is not surprising that the study found households' usage of mobile money services insignificant to loan grant.

5.4 Conclusion

Mobile services are on track to achieve greater integration in the financial habits of the population in most developing countries around the world. Countries such as Mali, Ghana,

Kenya and many others have, to a very large extent, embraced mobile services while meeting a real need for P2P transfer services. For this reason, mobile money services are playing an important role in financial inclusion. In addition, this study shows that mobile money is used not only for savings but also influences loan requests. Majority of Ghanaians, especially the illiterates, until the evolution and emergence of mobile money services, were unbanked. This is because of the bureaucracies and the complications of dealing with banks. This has over the years denied Ghana of the numerous benefits that accompany financial inclusion. But as this evolution of mobile money expands in more mature markets, it has been observed that Ghanaians, over the years, are increasingly becoming more financially inclusive.

5.5 Recommendations

This study therefore recommends that mobile Money Network Operators (MNOs) and banks should pursue more synergistic operating models that facilitate information and experience sharing in order to develop a wider range of bank services that can be extended to mobile money users. Financial actors, particularly microfinance institutions, which seem to be poorly represented in the mobile finance sector, should also be included in these operating models. Microfinance has played an important role in the increase of financial and bank access, especially through leading in saving services, and their experience and culture of proximity can have a leveraging effect in the mobile finance sector.

The second recommendation is related to regulation. Mobile money services regulation has been until now encouraging, concerning electronic money. However, the sector is expanding quickly. For this reason, regulation must also evolve quickly on some crucial

aspects such as the protection of users, guidelines for the use of personal data in the context of digital data sharing between banks and MNOs, and the possibility for banks to access mobile data with the aim of increasing accessibility for low-income users. This could allow greater access to savings and credit options for a portion of current mobile money customers.

Again, this study recommends that the price of mobile services remains high for customers even if they are potentially lower than those charged by traditional money transfer operators. Generally, an increase in the level of competition in this market always results in a notable fall of prices. A more competitive mobile services market would benefit African populations by reducing the cost of international money transfers, which represent an important share of their income. The Ghanaian market would benefit from a competitive market at the regional level, and from interoperability between the two MNOs currently present on the market. Indeed, it is currently not possible for users to send money through one mobile network and recipients to withdraw it through the other. Thus, the majority of mobile money users own two SIM cards because they do not want to be penalized by this lack of communication between the two networks. But by doing so, they bear increased costs for using mobile phones. Other financial operators could be allowed to offer transfer and other financial services through mobile networks. Regulations should encourage a higher level of competition that can lower costs in the interest of financial inclusion. Lastly, better connection to internet networks, which are still limited in Ghana, will certainly bring change not only in mobile service offerings, but also in price structures for these services.

Lastly, partnerships between banks, financial institutions, microfinance institutions and the mobile industry players should be sought out and encouraged. In order to sustain the growth of these mobile banking success stories, there is a need to support a single

integrated framework (between financial institutions and the mobile industry) to cut costs, in order to provide consumers with the convenience of banking from home, the farm or other remote areas.

Mobile money service providers (telecommunication companies) should endeavour to upgrade their technology to be able to adopt the new mobile banking emerging technology and should seek solutions that are user-friendly and easy to implement. The increased access to cell phones by the unbanked Ghanaians would be the most cost-effective and economically efficient method of providing financial services to a wide segment of the Ghanaian population in the very near future.

5.6 Recommendation for further studies

The development of mobile banking contributes to boosting domestic savings. People prefer mobile money to other means of transferring and receiving money because it reduces financial transactions costs, leading to lowering the cost of doing business, which tends to benefit individuals, small and medium enterprises, and overall private sector development. Hence, the mobile phone is becoming much more than a phone to the poor and the unbanked population in Ghana. It is transforming people's handsets into banks in their hands or pockets.

It is therefore very crucial to study the feasibility with which mobile money services can be used for international transactions. It is necessary because, a prior, the extension of mobile money services to international level participation is likely to increase money transfers from the diaspora at low costs.

Again, future studies can look at how challenges associated with telephony and mobile money services such as low incomes, illiteracy, large signal black spots which are key

obstacles to the acquisition and use of mobile phones, and high taxes, can be addressed by the authorities through policy reforms and scaling up investment in the ICT sector.

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