**UNIVERSITY OF EDUCATION, WINNEBA**

# MOBILE PHONE TECHNOLOGY AND FINANCIAL INCLUSION AMONG RURAL POPULATION OF THE UPPER DENKYIRA WEST DISTRICT

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# DECLARATION

I, Felix Oteng, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:……

Date:……..……

## SUPERVISOR'S DECLARATION

We declare that, the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis as laid down by the University of Education, Winneba.

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Date:……

# DEDICATION

This piece of work is dedicated to my Mum Mrs. Hannah Appiah and Dad Mr. Richard Oteng.

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# ABBREVIATIONS

| | |
|---|---|
| ATM | Automated Teller Machine |
| CGAP | Consultative Group to Assist the Poor |
| GSS | Ghana Statistical Service |
| ICT | Information Communication Technology |
| MNOs | Mobile Network Operators |
| IFAD | International Fund for Agricultural Development |
| GMM | Generalized Method of Moment |
| MTN | Mobile Telecommunications Network |
| NCA | National Communications Authority |
| NGOs | Non-Governmental Organizations |
| OECD | Organization for Economic Cooperation and Development |
| LPM | Linear Probability Model |
| SMS | Short Message Sending |
| TAM | Technology Acceptance Model |
| SPSS | Statistical Package for Social Sciences |
| UNCDF | United Nations Capital Development Fund |

# ABSTRACT

Over the years, financial inclusion has gained interest in both economic and financial discourse and it has a development policy especially in developing economies. Developing countries such as Ghana are developing various policies and regulatory framework to ensure they reach all those excluded financially especially the rural dwellers. Mobile phone technology has served as an option for rural populace to embark on financial transaction such as payment, transfers, savings and mobile banking. The study therefore examines the role of Mobile phone technology in providing financial inclusion among rural population of Upper Denkyira West District. Using structured questionnaire for a sample size of 400 respondents, the study used both probit and multinomial regression as an estimation technique. It was found that, the usage of mobile phone technology have a positive effect on financial inclusion among rural population of Upper Denkyira West District. The study further found age, average income, household size, perceived trust and employment as the factors that influence the usage of mobile phone technology in providing financial inclusion. Also, the study found transaction cost, distance to bank, trust, volume of transaction, income, age, household size and employment as the factors that determine the usage of bank account, mobile phone and both for making transaction. In other to ensure inclusive finance in rural Upper Denkyira West District, the study recommends that, the Ministry of Finance through Ghana revenue authority should reduce taxes for mobile network Operators. Bank of Ghana should charge financial sectors such as microfinance institutions to build branches in these areas and also implement policies that aim at restoring individual's confidence in the usage of financial institutions.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the Study

Globally, the financial sector has witnessed several progresses and it has become a requirement for achieving sustainable socio-economic development. There are several attempts made by leaders across the world in ensuring financial progress in other to boost economic development and improve the lives of individuals. These attempts have brought some sort of financial improvement in many developing countries like Ghana (Huang, 2010). According to Kabango and Paloni (2011), financial sector liberalization is one major development the financial sector has seen over the past years.

The financial sector in sub Saharan Africa including Ghana is characterized by market imperfections and there are a lot of fragmentations associated (Todaro & Smith, 2011). Various scholars have captured formal and informal financial markets as the two major fragmentations in the financial sector (Aryeetey, 2003; Straub, 2005; Guirkinger, 2008; Giné, 2011).

In an attempt to promote financial inclusion among the under-banked and unbanked, the formal and the informal financial markets face some challenges. The major problem of the informal sector is the ability to fully incorporate many rural folks into their operations as a result of their low resources available. For the formal financial market, its main problem is the rules and regulations that govern its operations. These rules and regulations have become problematic in including people, especially those in the rural areas who are unbanked and under-banked in the formal financial sector. This has been linked to individual's wealth as most people are financially excluded from the formal

financial market because they are not on any credit schemes (Quaye, 2008; Akudugu et al., 2009).

The main difference that exists between the formal and informal financial markets is that compared to lenders in the formal financial market, those in the informal financial market refinance borrowers with no interest payments when the need arises (Onumah, 2003). This continues to widen the gap between the formal and informal financial markets thereby making formal financial inclusion a problem.

Financial inclusion is the process of making basic formal financial services available, affordable and can readily be usable by all members of an economy especially the poor (Sarma, 2008). It is essential as growing the poor's access to basic formal financial services is measure as an operative instrument that can help reduce poverty and income inequality (World Bank, 2013).

Empirical works of Demirgüc-Kunt et al., (2015) showed that, only 2 billion adult populations are unbanked in the world and one out of every four adult have bank account at a formal financial institution. In Ghana, only about 30 percent of the population has bank account World Bank (2012). However, the introduction of mobile technology such as mobile phone has alters individual's financial operations in terms of making transactions such as savings, receiving and sending money (Maurer, 2012). The unbanked and under-banked population of Ghana has a significant opportunity for financial inclusion through mobile phone usage due to increasing levels of mobile penetration. Mobile phone usage is relatively cheap, secured and reliable for millions of people who lack the opportunity to access the formal financial system (Jack and Suri, 2014).

Aker and Wilson (2013) indicated that, in an attempt to increase financial inclusion especially to rural population of Ghana, the Bank of Ghana introduced the EZWICH-biometric Bankcard that can be used as ATMs. Beside this service, the Telecom industries namely; MTN, Vodafone, Airtel-Tigo, Glo, Expresso, have introduce mobile financial services in Ghana in addition to the usual phone and SMS services.

### 1.2 Problem Statement

The issue of financial inclusion has been discussed extensively in the literature due to its widespread importance in developing countries. World Bank report (2012) indicated that, though bank account ownership is almost universal in high income OECD countries, yet only 54 percent of adults in developing countries have a bank account.

The gaps in financial inclusion between developed and developing countries is driven by the inability of financial service providers to expand outreach to the poor at an affordable price due to the high cost of establishing and running "brick and mortar" branches. Financial inclusion advocates such as the World Bank and UNCDF have indicated that, the use of digital financial services through mobile phone can lead to increased access to affordable, safe, accessible, adaptable, and usable financial services, especially among the rural communities in developing countries (Kikulwe, Fischer, & Qaim, 2013; UNCDF, 2015).

In Ghana, the adoption rate of mobile phones is high and it is estimated that, there are more owners of mobile telephones than there are of bank accounts (Porteous, 2006; Comninos, Esselaar, Ndiwalana & Stork, 2008). This statistics resulted from the fact that most people are not motivated to adopt formal banking system. This has made banks concentrated in the urban centers (Gbombe and Tomoya, 2014). This is the case of Upper Denkyira West District where there are few rural banks which are located at

the District capital. The main barriers to access of basic formal financial services are costs, distances and bureaucracy (World Bank, 2014). Currently, the collapsing of the Capital and UT Banks in addition to the merging of the Construction Bank, Sovereign Bank, Royal Bank, Beige Bank and Uni-Bank has also discouraged the public especially the rural populations who are under-bank and unbanked from participating in the financial sector.

However, the issue of why individuals who is unbanked decide to be included financially through the use of mobile phone has not been studied extensively in the literature. This is predominantly the case of Ghana especially rural population of the Upper Denkyira West District where most rural folks are excluded from the basic formal financial services (IFAD, 2003). The determining factors that account for the usage of mobile phone technology as a means for financial inclusion have largely not been identified in the empirical literature. This is a gap that needs to be filled and effective measures are to be developed so as to include individuals whether unbanked or under-banked in the financial sector. This study therefore identifies and analyzes the role of mobile phone technology in ensuring financial inclusion among rural population in Upper Denkyira West District of Ghana.

### 1.3 Research Objectives

The general objective is to examine the role of mobile phone technology in providing financial inclusion among rural population in the Upper Denkyira West District of Ghana.

**To achieve this objective, the study has the following specific objectives:**

1. Examine the factors that influence the usage of mobile phone technology on financial inclusion among rural population of Upper Denkyira West District.
2. Analyze the factors that determine the usage of bank account, mobile phone or both in making financial transaction among rural population of Upper Denkyira West District.

## 1.4 Research Questions

1. What factors influence the usage of mobile phone technology on financial inclusion among rural population of Upper Denkyira West District?
2. What factors determine the usage of bank account, mobile phone or both in making financial transaction among rural population in Upper Denkyira West District?

## 1.5 Significance of the Study

It has been observed that, several studies have been done on mobile phone usage and mobile money in Ghana. However, there seem to be scanty information on this topic in the Upper Denkyira West District. This study aims to make significant contribution to existing works by examining the role of mobile phone technology in providing financial inclusion for the rural population of the Upper Denkyira West District in the Central region of Ghana. Basically, this study focuses especially on households in rural areas who do not have access to formal basic financial services.

The results of the study will guide policy makers, Central Bank, Banks, NGOs and Development partners in the design of appropriate interventions, as well as identify areas of co-operation with Mobile network providers to make necessary policies aimed

at providing financial inclusion for the rural population through the adoption and use of mobile phone services.

The findings of the study will help the government and all stakeholders to know and decide on which policy to implement in order to ensure that people are financially included via mobile phone technology adoption.

The findings of this study will serve as a basis for further investigations in this area. The study will fill the existing knowledge gap in literature with regards to the role of mobile phone technology in providing financial inclusion in Ghana specifically on the people of the Upper Denkyira West District.

### 1.6 Scope of the Study

The study concentrates on mobile phone technology as a financial inclusion mechanism in addition to the factors that promote the usage of bank account and mobile phone for making financial transaction among rural folks of Upper Denkyira West District Central Region of Ghana. The district has nineteen towns excluding the district capital. However, the study specifically focused on four rural communities namely, Afiefiso, Nkronua Anafo, Akwaboso, Ameyaw and Nyinawusu because of the dominance of mobile money vendors and the inadequate financial institutions within these areas.

### 1.7 Organization of the Study

The study is categorized into five chapters.

- Chapter one consists of the introduction. It details background to the study, statement of the problem, objectives of the study, research questions, Significance of the study, Scope of the study and organization of the study.
- Chapter two consists of literature review of existing works carried out by other researchers on the problem under investigation.
- Chapter three focuses on the methodology in addition to the theoretical framework, theoretical model and empirical model, expected results and estimation techniques.
- The fourth chapter centers on the variables, data collection and processing, presentation and discussions of results.
- Chapter five provides summary of the study, conclusions and policy recommendations of the study.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

## 2.0 Introduction

The purpose of this chapter is to provide insights on the theory and other scholarly works and studies done in the same field. This section provides a review of the theories and concept of mobile phone technology and financial inclusion among the rural population of Upper Denkyira West District of Ghana.

## 2.1 The Review of Theoretical Literature

### Demand and Supply Side Twin Theory

Demand and Supply side twin theory is a theory of twin pillar that distinguishes financial inclusion from financial literacy (Chakravarty & Pal, 2011). This theory states that, for inclusive growth to be achieved in an economy there should be an existence of demand side and supply side factors in the financial market. That is, financial inclusion acts from supply side by providing the financial market what individuals want whiles financial literacy also acts from the demand side (Chakravarty & Pal, 2011).

A study by GoI (2007) indicated that rural financial development is capable for inclusion and growth. This is likely to help the rural population that is trapped in poverty with its associated deprivations to have access and gain interest in the formal basic financial services.

According to Mehrotra, Puhashendhi and Sahoo (2009) the supply side factors that are responsible for financial inclusion comes from the financial institutions such as banks. The banks are expected to moderate the supply side processes that prevent the poor and deprived social groups from accessing the financial system. Currently, the supply side

challenges includes non-customized financial product, difficult processes and complex documentation in accessing financial services by rural excluded population, technology availability and acceptance, outreach by available financial institutions (Thorat 2008). Notwithstanding the risk involved, financing of first time business persons is a must for financial inclusion and growth.

The demand side factors like low income or asset holding also have an essential impact on financial inclusion (Mehrotra et al, 2009). Poor individuals and small macro businesses commonly rely on their personal savings and plough back profit to invest in housing, education, health and other activities in other to ensure growth opportunities.

Thorat (2008) also argued that there is a need to mitigate the demand for basic formal financial services among individuals who are financially excluded in addition to supply side interventions from the financial institutions in other to increase financial inclusion.

**2.2 The Technology Acceptance Model (TAM)**

Technology Acceptance Model (TAM) was developed by Fred Davis (1986) to examine how individuals respond and react to information technology systems. It further explains the determining factors of information technology acceptance by individuals. In an attempt to investigate consumers' behavior in accepting a particular technology, several models have emerged. These are; The Theory Reasoned Action (TRA), Theory of Planned Behavior (TPB), The Unified Theory of Acceptance and Use of Technology (UTAUT) as well as Technology Acceptance Model (TAM).

According to Surendran (2012), TAM has widely been used by several scholars to find out how individuals behave and respond to information technology systems. The TAM is an extended version of the Theory of Reasoned Action (Fishbein and Ajzen 1975)

since it allows individual to create a link as to how external variables affect attitude and intentions to use a particular technology (Park, Roman, Lee and Chung, 2009).

The TAM doesn't take into consideration subjective norms in defining individual's behaviour as far as accepting and usage of an innovative technology is concern. However, it uses two basic construct in explaining how human respond in accepting and using a given technology. These include perceived ease of use and perceive usefulness. These factors are considered to have influence to people's attitude in accepting and using of a given technology.

Perceived ease of use is the degree to which a will be users of a particular technology expect the target system to be effort free. With this, it is supposed that the usage of a particular innovative technology would be effortless. This construct further indicate that, human behavior would respond faster to technologies which are easier to use.

Perceived usefulness is defined as a subjective ability that enables individual to adopt a given innovation system which will enhance his/her life performance. This implies that, individuals have a positive behavioral response in accepting and usage of a particular technology that is supposed to beneficial and improves their productivity for a given task.

The TAM considers the degree of influence of external forces that affects individual's intention to use a given technology. Although perceive ease of use and perceived usefulness of a particular technology determines its acceptance and usage, yet they also serve as continuous usage of that technology. When a new technology is introduced, the way of things and life of human changes and continuous usage of that technology accustoms users to do things in a particular way.

Subsequently, Individuals behavioral response to a particular action and circumstance changes when there is an introduction of a new technology. That is, new innovation does not only change user's way of doing things (Simonson & Maushak, 1996).

### 2.3 Review of Empirical Literature

The role of financial inclusion in reducing poverty and promoting economic growth had gain a lot of attention over the years. Several studies have been conducted on how mobile phone technology is crucial in ensuring financial inclusion among the rural unbanked and unserved population.

A survey was conducted by Nnandhi (2012) in New Delhi, India on the usage mobile phone penetration and mobile money on savings practice of low income users. Using a sample size of 180, it was found that, EKO agents provide banking services to individuals who have no access to formal bank account and by 2011, EKO had captured a large customer base. This study considered savings only as a measure of financial inclusion.

Serge and Clovis (2014) also studied on mobile phone savings in Saaba and Ouagadougou in Burkina Faso. Using binary logistic model and a sample size of 500 respondents, it was revealed that, people's ability to save on mobile phone has increase. In effect, the study confirmed that, mobile phone serves as an option means of providing financial inclusion for the unbanked and under-banked population.

The works of Mbogo (2010) on the impact of mobile payments and growth of small-scale business in Nairobi found that, convenience of mobile payment technology, cost and security factors are the rationale behind the adoption of mobile money services by small scale business. The study used a sample size of 409 micro business entrepreneurs.

The study was limited to small scale businesses and it ignored rural folks who are financially excluded from basic financial services.

Litondo and Ntale (2013) conducted a study in Nairobi, Kenya on the determinants of mobile phone usage for e-commerce among micro and small enterprises. The study employed Linear Probability Model (LPM), Logit and Probit and sampled 384 small and medium scale enterprises. It was revealed that, being educated is the main determinant of using mobile phone for e-commerce. The study ignored the rural populace who do not have access to formal basic financial system.

Siddik, Sun, Yanjuan, and Kabiraj (2014) studied on the relationship between mobile banking and financial inclusion in Bangladesh. Using a sample size of 555 respondents and Structural Equation Model, the study revealed that, perceived cost, perceived risk and subjective norm are the major determinants of mobile banking usage by individuals. However, the study could have used probit model in analyzing the results obtained. The Structural Equation Modeling is mostly used for research that is designed to confirm a research study design rather than to explore or explain a phenomenon but the probit model establishes nonlinear effect between the dependent variable and the independent variables in a study.

Again, Ngaruiya, Bosire and Kamau (2014) conducted a study on the effects of mobile transactions on financial performance of small and medium scale businesses in Nakurugu district of Kenya. The study used descriptive statistics and employed purposive sampling on 120 enterprises. It was revealed that, mobile transactions have a significant impact on sales revenue. This study however considered small and medium scale enterprises and ignored the rural poor and vulnerable folks who are financially excluded.

In addition, a research conducted by Muisyo, Alala and Museiga (2014) in Kakamega town in Kenya on the effects of mobile money on the performance of banking institutions found that, mobile money usage have contributed positively to financial performance of banks. Perceived ease of use was the main determinant of mobile money usage. The study could have used probit model in estimating the results obtained from the field. This is because; probit model examines the relationship between the independent variable and dependent variable in the regression.

Orotin, Quisenbery and Sun (2014) studied on unbanked individuals in Uganda on the impact of mobile transfer on market development. Using a sample of 4 MNOs, 8 mobile money retail agents and 19 mobile money users and employing qualitative research design, the study found that mobile money has significant impact on users and market development with mobile transfer as the dominant activity. The study could have also adopted a quantitative method. This is because, results from quantitative method is valid, reliable and generalizable to a larger population than the qualitative method which is not easily replicable or generalizable to the general population.

Empirical studies was done in Kenya using micro financial sector survey data and it was revealed that the adoption and usage of mobile phone has advanced from communication equipment to savings tool by both banked, unbanked and the under-banked individual (Jack and Suri, 2014).

Honohan and King (2012) examined the causes and effects of financial access in Rwanda using a fin-scope survey data base (National Institute of Statistics of Rwanda). The study confirmed that income and being educated are the main determinant of accessing formal banking services. It was further revealed that trust and education are key determinants of being formal banked.

A study was conducted by Demombynes and Thegeya (2012) on mobile savings phenomenon in Kenya. Using a survey data collected in 2010, it was found that the usage of bank integrated mobile savings services is mostly restricted to the rich people. In the rural areas they found that individuals who are male and married are more likely save than males who are not married. They also found that those with registered M-PESA accounts were 32% more likely to have some savings.

Mbithi and Weil (2011) examined the effects of M-PESA in Kenya on economic and social outcomes using 190 sub-locations. The findings of the study revealed that using M-PESA accounts has improves savings. The study also found that connecting ones bank account to M-PESA has improved mobile banking and increase transfers. 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) also found similar results which showed that linking M-PESA account with bank account increases savings of individuals due to ease of use and safety. The studies above didn't consider the section of the rural populace who were financially excluded and had no access to basic financial services.

However, this study focuses on the rural dwellers that had no or limited access to financial services but resort to the mobile phone services in making on financial transactions such as mobile transfer (send and receive), mobile banking, mobile payment and mobile savings.

### 2.4 The Concept of Financial Inclusion

Over the past decade, financial inclusion which is also called banking the poor has gained attention on the center stage of development policy. Financial services entail

wide range of financial products like loans, insurance, payments, savings and deposits in addition to financial intermediation. Financial inclusion helps in making these financial services accessible to all especially the rural poor who are unbanked. This is done by ensuring a strong and robust financial market which is a factor for the growth of the economy.

Financial inclusion is the availability of reasonable valued financial services at affordable costs. Where reasonable valued and affordable cost are seen to be relative to a particular standard. The cost includes both pecuniary and non-pecuniary. This definition suggests that, accessing financial services comes with some importance like savings, credit, credit interest, etc whiles the cost comes in the form of bank charges and commissions (Claessens, 2006).

The India Committee on Financial Inclusion, which is also known as the Rangarajan Committee (2008), also defines financial inclusion as the process of ensuring that individuals have access to formal financial services in addition to adequate access of credit by the vulnerable groups such as low income groups at reasonable cost.

Access to finance according to Demirgüç-Kunt and Levine (2008) has been defined as the absence of price and non-price barriers.

Diniz, Albuquerque and Cernev (2011a) also define the concept of financial inclusion as the access to basic formal banking services by all members of the economy at an affordable cost. They further argue that, financial inclusion has been a key policy contributor to poverty reduction and growth. Gupte, Venkataramani and Gupta (2012) also indicated that though finance is seen and accepted as the life blood of any economic agent, financial inclusion is a quasi-public good.

The World Bank Global Financial Report (2014) also defines financial inclusion as that part of the population that uses financial services. The report indicates that inadequate or lack of usage of the financial services does not mean inadequate or lack of access. That is, individuals may have access to use the financial system but do not use certain financial products because of cost, legal barriers, and market failures (World Bank, 2014).

For the purpose of this study, financial inclusion is defined as the process of making basic formal financial services available, affordable and readily usable by all members of an economy especially the poor. Such basic formal financial services include making financial transaction with the mobile phone mobile savings, mobile banking, mobile payments or transfers in addition to ownership of bank account. This means that the poor really need financial services in order to overcome their financial predicament and the only way to get it is to make it more accessible and affordable to them at their comfort areas. Thus, financial services should be brought to the door steps of the poor with limited restrictions such as cost, distance, documentation challenges and flexible laws to protect the weak and marginalized in society for accessing formal financial services.

### 2.5 Financial Inclusion in Ghana

Access to basic formal financial services is problematic in the financial sector and it is a proxy to financial inclusion in Ghana. World Bank (2012) reported that only 30% of the adult population of Ghana has formal bank account which is higher compared to Sub Saharan Africa average of 24%.

A study by Akudugu (2013) also indicated that about 40% of the adult population is included in the Ghanaian financial market whiles the remaining 60% are financially

excluded. This shows that the level of financial inclusion in the financial sector in Ghana is less than global financial inclusion index of 50% (Demirgüç-Kunt & Klapper, 2012).

There are about 16% of the adult population in Ghana who has savings with formal financial institutions as at 2011 and only 6% of them had taken a formal loan although as many as 29% of the adult population have taken loans from family and friends (Jaising 2013). This shows that the financial inclusion among individuals in Ghana is low. However, mobile transaction services have helped brought about 29% of individuals who are unbanked to be included financially (CGAP, 2016).

The empirical works of Akudugu (2013) revealed that, gender, education and distance are key determinants of financial inclusion in Ghana. That is, the Ghanaian economy has high marginal variations in terms of number of males owning bank account with formal financial institution over females. This is due to the sociocultural norms and perception that explain the capabilities of men and women, what they are allowed access to, in addition to their social and economic roles. These norms and their associated gender roles also serve as barriers to women's access to financial services (Taylor and Boubakri, 2013).

### 2.6 Determinants of Financial Inclusion

Bank account ownership of the adult population is one major determinant of financial inclusion globally (Fungáčov and Weill 2014). The number of individuals who owns savings account as a proportion of household is a major determinant of banking penetration than the number of individuals who make deposit as a proportion of household (Agarwal, 2009).

In understanding financial inclusion, it is crucial to know the number population who unbanked especially in the rural areas. Being financially included doesn't mean greater welfare but the ability to access formal financial services at a reasonable cost by all members of the economy especially the poor.

Kumar (2013) studied on the determinants of financial inclusion in India and found branch network as a major impact of financial inclusion. Using proportion of factories and employment base factors as key variables for financial inclusion index, the study revealed that, socioeconomic association of the region is essential in determining banking practice of the people in India. The study also found that increasing branch network had a significant effect on financial inclusion.

Empirical studies of Babu (2015) on the determining factors of financial inclusion in Andhra Pradesh showed that, most rural populace rely on the informal sources of finance because of financial literacy and lack of documentation in using and access formal financial sector. The study aimed at why people are financially excluded in addition to the determinants of households approach usage of informal source of finance.

Agarwal (2009) also stressed on distance, lack of documents and infrastructure as the factors that affect the unbanked to be financially included. The study also revealed that the rural poor do have documents that proof their identity as well as low income and this prevent them from accessing the formal financial sector. Besides, even if they register with these financial institutions, they may not use them regularly as compared to others due to long distance between the bank and their homes.

Zins and Weill (2016) further examined on the factors that determines financial inclusion in Africa using a secondary data from World Bank's Global Findex. The

study focused on 37 African countries and it was found that a man, higher education, richer and older is positively related to financial inclusion. They study recommended that, the government has to adopt policies that aims at ensuring financial inclusion.

A study conducted by Kempson, Atkinston and Pilley (2004) in Nairobi used banking penetration and availability of formal banking services and usage the services as a measure of financial inclusion. The study found that, average loan, average deposit, number of bank ATM per 1000km$^2$ and nearness of financial institutions like bank are the main determinants of financial inclusion. It further concluded that, financial inclusion should not only be measured by the number of bank accounts held by the weaker sections, but also by the amounts borrowed by them.

### 2.7 Banking in Ghana

Banking is the process of creating credit by lending money to borrowers, thus providing a platform for deposit on the bank's balance sheet. The activity of lending money to borrowers can be performed directly or indirectly through the capital market. Bank of Ghana (BOG, 2004) revealed that Ghana's banking system is composed of national network of licensed and legal financial institutions that perform banking business under specific regulations.

Traditionally in Ghana, banking is categorized into retail or commercial, merchant and development banks. Both commercial and development banks deals directly or indirectly with all forms of individuals in the financial market whiles the merchant banks deals with corporate individuals (Hinson, Mohammed and Mensah 2006). Hinson et al. (2006) further indicated that, universal banking laws has permitted all forms of banking to be embarked by a corporate entity rather than narrowing their practice path. This has improved the activities of banking thereby increasing the

coverage of banks in the country. The Bank of Ghana (BOG, 2004) indicated that, the activities of banks are backed by law due to the important role they play in the economy. It was against this backdrop that the universal banking concept was introduced.

The concept of universal banking was defined by Addison and Teixeira (2003) as a commercial institution in which banks creates a network of branches thereby providing different kind of services, holding claims of firms and involving in corporate governance of firms that depend on banks for funding.

Rural banking was introduced by the BOG with the aim of ensuring that credits are made available to the small scale rural producer and the rural community. Rural banks were basically introduced by BOG to buy shares that belongs to the rural communities and are mandated to serve as financial intermediaries between the rural folks and the financial institutions. However, the ineffectiveness of these financial sectors to address the needs of low income customers due to shareholder competition has led to the introduction of microfinance institutions.

Microfinance institutions was introduced in Ghana to respond to the inability of the formal banking to cover the activities of rural poor who cannot over transaction cost and risk barriers (Demirguc-Kunt, Beck, Laeven and Maksimovic 2006).

Microfinance is defined as the provision of loans, savings and other basic financial products which aims at helping the poor in opening and expanding business (Robinson, 2001). One major objective of Microfinance institutions is to create avenue for loans and offer capital at a reasonable low cost (Dichter and Harper, 2007). The poor who is either unbanked or under-banked lacks assets as security for loans (Karlan and Morduch, 2009). Also, the unbanked or under-banked populations are small to generate

interest from financial institutions when they make transactions and therefore use profit seeking as way of financing their business (Johnston and Morduch, 2009).

Hinson et al. (2006) categorize banking activities as Formal, semi-formal and informal financial institutions. Formal financial institutions are incorporated institutions which has been regulated under the Companies Code 1963 and licensed by the Bank of Ghana (BOG) under either the Banking Law 1989. The semi-financial institutions are legally registered but not licensed by BOG. It includes Non-Governmental Organizations (NGOs) and Credit Unions (CUs). The former is not profit oriented and the later are to take deposits and offer loans to their members. The informal financial institutions consider several activities such as Susu including individual daily saving collectors, rotating savings and credit association. It also comprise of personal loan from friends and relative, trade creditors, self-help groups and money lenders.

**2.8 Electronic Banking**

Electronic banking has no agreed definition and various scholars see it from different angle. It is commonly called branchless banking approach and it is when banking services are provided to customers via technology such as mobile phones, payment cards and post offices (Ivatury & Mas, 2008).

Electronic banking is an automated delivery system that allows customers of financial institution to access and use their account via public or private network such as internet (Federal Financial Institutions Examination Council, 2003).

Kalakota and Whinston (1997) also describe electronic banking as a financial transaction that occurs online between the buyer and the seller. This is usually promoted by digital financial tools such as encrypted credit card numbers, electronic cheque or digital cash with the backing of a financial intermediary.

## 2.9 Types of Electronic Banking

**Automated Teller Machine (ATM):** it is a type of machine that incorporates computer terminal with money vaults in addition to record keeping system that permits customers to use the bank's book keeping system with plastic card that has personal details of the customer (Rose, 1999).

**Credit and Debit Cards:** It is card that is made of plastic which makes sellers hope in making financial transaction such as payment of goods and services (Pierce, 2001).

**Electronic Fund Transfer at Point of Sale (EFT/POS):** it is an online based transaction which uses plastic cards at terminals or merchant premises. This allows customers to transfer money from their bank account instantly to sellers account when buying. Debit cards are used to activate the transfer process (Chorafas, 1998).

**Mobile or Telephone Banking:** Mobile or telephone banking is a form of banking that allows customers to access financial services via mobile devices and networks. The transaction is basically done by Automated Voice Response (AVR). Customers do this by dialing a touch-tone connected to an automated system of the bank (Balachandher, Santha, Norazlin and Prasad, 2001).

**Online/Internet Payments:** This system allows customers to embark on financial transaction with banks through the internet. Customers access their own bank account and make payment online provided by the bank guided by difficult security system (Neuman & Medvinsky, 1996).

## 2.10 Mobile Phone Technology and Financial Inclusion

Empirical literature shows the relevance of financial inclusion which acts as a win-win situation for unbanked populace. In some part of India currently, financial inclusion is

limited to having access to savings (Shashank, 2014). There are several ways of measuring financial inclusion and this is based sometimes on customer's involvement and usage of financial products like access to credit facilities. Leeladhar, (2006) indicated that, owning current account or savings account cannot be considered as an accurate measure of financial inclusion.

Technological advancement can assist financial institutions like banks to expand their activities to unserved people like the rural poor in other to help them meet their business goals (Shashank, 2014; NBC, 2016). World Bank (2014) indicated costs, distances and bureaucracy as the key barriers individual household face in accessing financial system. These barriers don't only affect financial market failures but helps policy makers in developing strategies towards poverty reduction. Market failures prevent the poor from accessing financial products like deposit, credit and insurance. However, the role of information communication technology (ICT) is possible to address these market failures, by helping the poor to have access to formal basic financial products need by them.

Over the years, various scholars have paid more attention as far as financial inclusion in developing world is concern. This is basically on the effects of ICT like mobile phones in ensuring inclusive finance (Mihasonirina & Kangni, 2011; William, & Tavneet, 2011; Maria & Frida, 2014; Shashank, 2014). They found that mobile phone usage among individuals has encouraged access to basic financial services like bank deposit and borrowing leading to economic growth. This means that, ICT can serve as a tool which will assist developing countries to expand financial operations to rural communities, and can also help banks reduced the cost of building 'bricks and mortar' branches as well as transaction costs and increase customers reachability (Shashank, 2014).

Apart from reducing transaction costs, mobile phones allows clients to interact directly with their banking institutions like checking account balance and making transaction wherever they found themselves. Also, mobile phone usage in making transaction gives customers some level of ease and immediacy. A study by Mihasonirina and Kangni (2011) on the relationship between mobile phones and economic growth in Africa from 1988 to 2017. Using generalized method of moment (GMM) approach, the study revealed that mobile phone usage promotes financial inclusion in terms of borrowing and this stimulates growth of the economy. Maria and Frida (2014) also used the same GMM approach and came out with the same conclusions that, mobile phone enhances financial inclusion.

Andrianaivo and Kpodar (2012) also conducted a study on mobile phone penetration rate in addition to mobile local calls in fostering economic growth. Using a sample of African countries from 1988 to 2001 and GSS estimator, it was concluded that, mobile phone penetration contributes to economic growth in Africa thereby increasing financial inclusion.

Additionally, the factors that affect mobile phone usage also have a link with regulatory environment. A research conducted by Peter (2015) on the regulatory effects of mobile money and financial inclusion in some selected African countries such as Kenya, Nigeria, Tanzania and Uganda. The study revealed that, countries with frequent financial reforms are likely to drive innovation in mobile financial services and this increases inclusive finance.

A study conducted by Jonathan and Camilo (2008) revealed that the lives of the rural poor have been transformed by the mobile phone penetration, which has not only provided communication but also access to basic formal financial services (see also

Demombynes & Thegeya, 2012). Medhi, Ratan and Kentaro (2009) argued that the total number of mobile phone usage is higher than bank account usage across the world.

World Bank (2014) indicated that, an increase in mobile phones penetration, lack of affordable alternatives, and lower transaction cost relative to bank account fees have resulted into rapid use of mobile money, especially among rural communities in developing economies (Mas & Radcliffe, 2010)..

Scholars like Must and Ludewig (2010), Aker and Mbiti (2010) have observed that in developing countries such as Ghana, large number of people migrate from the rural areas to urban centers to earn a living. With this, they have the great need to send money back to their families on regular basis. However, money transfer services can be very difficult and expensive. Thus, in such circumstances, mobile transfer becomes the most suitable medium for transferring money.

Mobile Money Global Event (2015) conducted a study in Kenya on the effect of mobile money in providing financial inclusion. The study indicated that, accessing money via the mobile phone has improved financial inclusion as mobile money transactions increased about 90 million valued at about $2.16 billion (KSh227.9 billion) in 2015 with over 129,357 registered mobile money agents. This study confirms the debate that mobile money as a means for economic development is capable of improving financial inclusion in Sub-Saharan Africa as postulated by Donovan (2012) and Kasekende (2014). Thus, accessing money via the mobile contributes to banking the unbanked especially among the rural population in Sub-Saharan Ghana.

Conversely, these studies analyze the determinants of mobile money which using cross-countries data at the macro level. The effects may differ between countries due to heterogeneity and endogeneity issues associated with the usage of mobile phones.

These issues may cause bias estimations. This studies attempts to address these issues in Ghana specifically Upper Denkyira West District at the micro level on the role of mobile phone technology in providing financial inclusion among rural population.

### 2.11 Chapter Summary

Financial theories over the years have stressed on the relevance of financial inclusion in ensuring growth in addition to poverty reduction. Many financial inclusion advocates currently agree that direct access to finance services can improve individual livelihoods amongst the poor by enabling them to manage scarce resources more efficiently, thereby smoothing consumption and protecting against economic shocks. (Collins, Murdoch, Rutherford & Ruthven, 2009).

Financial inclusion is of great importance for economic development of a country. However the arguments of the effects of mobile phone usage and financial inclusion are theoretically and empirically fragile. Most of these studies have been recent and cross country. Indeed, there is good reason to ask us questions about the relationship between mobile phone usage and financial inclusion. However, this study therefore seeks to fill the eminent knowledge gap at the micro level on the role of mobile phone technology in providing financial inclusion among rural population of Upper Denkyira West District of Ghana.

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This Chapter discusses the processes and techniques used in carrying out this study in order to answer the research questions and to achieve the objectives of the study. It discusses the theoretical framework, the model specification and the measurement of variables. It further provides an outline of the research design, instruments for data collection, methods adopted in the administration of the research instrument, data collection procedure, and data analysis.

## 3.1 Research Design

Research design refers to the collection and analyzing of data in order to meet the research objectives through empirical evidence (Cooper and Schindler, 2008). The study adopted a quantitative research design in order to establish a relationship between mobile phone technology and financial inclusion. Quantitative research, according to Aliaga and Gunderson (2002), is a research approach aimed at explaining a phenomenon through collecting data in numerical form and analyzing with the help of statistics. The reason behind the choice of quantitative research design was that, it is more reliable and objective. Quantitative research design also assumes that, the sample selected is representative of the population (Weinreich, 2009). However, financial inclusion was measured based on the financial transaction such mobile banking,

savings, payment and transfers performed by individuals via mobile phone among rural folks of Upper Denkyira West District.

### 3.2 Theoretical Framework

The theoretical framework of this study is grounded on the theory of financial innovations which is a more traditional theory for explaining financial inclusion in respect to mobile phone usage. Financial innovation theory was developed by Silber (1983) cited in Agufa (2016) and it explains the relevance derived from expanding money related foundations as a major goal of financial inclusion (Li & Zeng, 2010). This theory establishes rationale behind new innovation like mobile phone transactions that comes from the failure of the financial sector in reaching out to the unbanked rural poor (Błach, 2011). In addition, the theory explains how crucial financial innovation has served as a driving force in the financial system thereby increasing economic advantage to individuals without formal bank account (Sekhar, 2013).

The theory of financial innovation explain an improvement in the financial sector by coming up with new ways of production, technological advancement in solving problems and making returns to scale better hence increase economic growth in a country. The application of new technology in the financial sector ensures growth through reduction of financial and administration cost costs (Sekhar, 2013).

Financial innovations ensure efficient resources allocation in addition to improvement of financial market liquidity hence improving financial inclusion (Błach, 2011). The development of financial inclusion models via mobile phone and other digital financial system in some African countries have helped in bridging the gap of financial impediments in these countries (Omwansa & Waema, 2014). Individuals are willing to

embrace the usage of mobile phone as means of financial inclusion based on several indicators such as perceived transaction cost, perceived ease of use, social influence and perceived trust (Gakii 2012). The poor and vulnerable people who reside in rural areas and are financially excluded use transaction cost, distance, and trust as a baseline for their exclusion.

Mathematically,

$FI = f(X_i)$…….. (3.0)

Where FI is Financial Inclusion which is measured with making financial transaction such as mobile transfer, mobile savings, mobile banking and payment with the mobile phone device and $X_i$ indicates factors such as transaction cost, perceived trust, perceive ease of use among others that enable individuals to accept a particular technology or innovation.

### 3.3 Model Specification

Model specification for the usage of mobile phone technology and financial inclusion among rural population of Upper Denkyira West District.

The Probit model is used to estimate the factors that influence the usage of mobile phone technology on financial inclusion among rural population of Upper Denkyira West District of Ghana. The Probit model was used because the dependent variable is binary and takes responses say, ‘yes’ if an individual uses mobile phone for financial transaction or ‘no’ is otherwise (Gujarati, 2004). The choice of probit is that, though it has a normal distribution yet it has the ability to overcome the fundamental problem of linearity as assumed by the linear probability model (LPM). Because the dependent variable is dummy in nature, the aim is to find out the chance of an event occurring,

hence the study seeks to find the probability of a person using mobile phone to make financial transactions such as mobile transfer, savings, mobile banking and payment. Using a data obtained from self-administered questionnaires, the study examines the reasons for the usage of mobile phone for financial inclusion (financial transaction). Therefore, the dependent variable FI is a binary response variable that takes two values thus, 1 or 0.

Letting Y represent the response of the sampled population as to whether or not they use mobile phone for making financial transaction. Hence, takes value of 1, if a person transact with the mobile phone or Y= 0, if does not transact with the mobile phone. It then follows that,

$$Y_i=f(X_j) \quad \text{(3.1)}$$

Where; f is the functional form of the model and X denotes the variables that enable individuals to accept a particular innovation. This illustration indicates the relationship between the usage of mobile phone technology and financial transaction. Hence, the model will be given as;

$$\text{Probit } Y_i = \alpha_i + X_i\beta + Z_i\gamma + \varepsilon_i \quad \text{(3.2)}$$

Where $Y_i$ is the proxy for making financial transaction with the mobile phone as a measure of financial inclusion for individual i and Zi includes the demographic factors of individual i. $X_i$ indicates factors that enable individuals to accept a particular technology or innovation.

$$\text{Probit } [p(y=1)]=\alpha+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+e \quad \text{(3.3)}$$

Y= dependent variable which is binary in nature and takes '1' if a person indicates whether he/she makes transaction with mobile phone and '0' if a person does otherwise.

$X_1$= Age

$X_2$= Average income

$X_3$= Household size

$X_4$= Perceived Ease of use

$X_5$= Perceived trust

$X_6$= Employment Status

$X_7$= Education

$X_8$= Occupation

$X_9$= Gender

e= Error term

For the factors that determine the usage of bank account, mobile phone or both for financial inclusion among rural population of Upper Denkyira West District, the model is specified below.

With the help of Marshallian's utility framework, we can establish a model that determines the factors that enables the usage of bank account, mobile phone or both in ensuring financial transaction among rural population of Upper Denkyira West District. This is shown in equation (3.4)

$U=f(K, V)$ …… (3.4)

s.t. $p(x) \leq y$

Where,

U is the utility derived by individual i in making financial transaction either with bank account, mobile phone or both (bank account or mobile phone).

K is a vector that determines the factors that enables the usage of bank account and mobile phone in ensuring financial transaction among rural population of Upper Denkyira West District. These factors include attributes of an individual, household size, distance to bank of the respondent, the volume of transactions done by individual i, the transportation cost that individual i incurs while doing transactions among others).

V is a vector of stochastic term which assumes that individuals are able to financially transact either with bank account, mobile phone or both (bank account or mobile phone) when transaction cost is low and satisfaction is high. In a more explicit form,

Financial services (bank account, mobile phone, both)= f(age, household size, Employment status, average income, distance to bank, volume of transaction, transaction cost and trust in the bank). ……. (3.5)

Empirical literature shows that, individuals, households and firms use at least bank account, mobile phone or both bank account and mobile phone to making financial transactions. However, this leads to a three-categorical dependent variable in the financial services in equation (3.5) above. In order to estimate the equation above, we use a multinomial regression model because it can integrate a nominal categorical dependent variable.

Transforming equation 3.5 above empirically, the model to be estimated is:

$$FT = \alpha+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta_9X_9+e \quad \ldots\ldots\ldots\ldots\ldots\ldots (3.6)$$

Where;

FT= financial transaction of individual. This variable represents the extent to which the individuals make financial transaction with either bank account, mobile phone or both (bank account and mobile phone).

$X_1$= Age

$X_2$= Average income

$X_3$= Household size

$X_4$= Distance to bank

$X_5$= Transaction cost

$X_6$= Employment Status

$X_7$= Volume of transaction

$X_8$= Trust in the bank

$X_9$= Gender

e= Error term

### 3.4 Definitions, Measurement of Variables and Their Expected Signs

#### 3.4.1 Dependent variables

##### 3.4.1.1 Financial transaction

Financial Transaction is basically measured using mobile payment, mobile transfer, mobile savings and mobile transfer done by persons with mobile phone. The variable 'Y' (Financial transaction) is a dependent variable, where a person transact with the mobile phone or otherwise. Financial Transaction was a dummy variable which takes one if a person makes transaction with the mobile phone and zero if a person doesn't make transaction mobile phone.

##### 3.4.1.2 Mobile phone usage and bank account ownership

Bank account and mobile phone usage utilization has seen a new way to offer unbanked people opportunities in using the financial sector. In ensuring financial inclusion, individuals who are excluded from basic formal financial services resort to the usage

of mobile phones in making transaction (Seng, 2017). Technology has made people to either use bank account, mobile phones or both to undertake financial transaction. In view of this, there is a need to investigate the factors that enables rural folks of Upper Denkyira West District to use bank account, mobile phones or both in performing financial transaction. Using a multinomial logit regression with a base category of both bank account and mobile phone usage, mobile phone usage and bank account ownership were used as the dependent variable as against other factors such as volume of transaction, distance to bank, transaction cost, trust in addition to other demographic variables.

### 3.4.2 Independent variables

#### 3.4.2.1 Perceived ease of use

Perceived ease of use refers to an extent to which a person finds mobile phone usage an easy way of doing financial transaction. It is a continuous variable which allows respondent to select the extent to which mobile phone ensures convenience in making financial transaction. Perceived ease of use is a major factor that accounts for the adoption and usage of a particular technology (Carter and Belanger, 2005). New technology is likely to be accepted by individuals if it effortless to operate. The determinants of perceived ease of use in the literature include knowledge of mobile phone usage, self-efficacy, innovativeness, facilitating conditions, and accessibility (Gu, Lee and Suh 2009). Several studies have concluded that perceived ease of use is a primary determinant of consumer's behaviour intentions in adopting a particular technology (Pousttchi & Wiedemann, 2005).

It is essential to note that, the use of mobile phone in making financial transaction is user-friendly and convenient, making it easy for all ages within the population profile

to adapt to it especially in emerging markets like Ghana. With this, it is expected that, perceived ease of use should have a positive significant relationship with individual's intention to use mobile phone technology for financial transaction.

#### 3.4.2.2 Perceived trust

Trust issue is an important element as far as making financial transaction via mobile phone is concern. Perceived trust refers to the extent to which a person finds mobile phone to be secured in making financial transaction. It is a continuous variable that allows respondent to select the extent to which mobile phone service is secured in making financial transaction. The adoption of a particular technology is based on how safe that system is perceived to be. Perceived trust measures the level of assurance of consumers that the mobile phone is secured in making financial transaction such as mobile payment, savings, transfers and mobile banking. Individuals who use mobile phone in making financial transaction should have confidence in the system and it should be safe in performing such function. Numerous studies have revealed that, perceived trust is a significant determinant influencing consumers' intention in adopting mobile phone for transactions (Kim, Shin and Lee, 2009). With this, it is expected that, Perceived trust should have a positive significant relationship with usage of mobile phone technology for financial transaction.

#### 3.4.2.3 Perceived cost

Perceived cost is also a major factor that determines the adoption of a particular technology. It is a continuous variable which refers to the extent to which a customer finds the usage of mobile phone services costly in making financial transaction. The perceived cost of using a technology is a prime factor that determines customer's intention to use it. Users of mobile phone for making financial transaction are likely to

adopt the services if the cost of using the service is less compared to other alternative (Luarn & Lin, 2004). The major factor that enables the rural unbanked population to adopt mobile phone is the cost and convenience in making financial transaction (Tobbin, 2012). With this, it is expected that, Perceived cost will have a negative influence on peoples intention to use mobile phone technology for making financial transaction.

#### 3.4.2.4 Gender

Gender is whether the person is male or female. Gender is a dummy variable that takes the form one if male and zero if female. Comparing females to males, all things being equal, males are more likely to make financial transactions mobile transfer, savings, payments and mobile banking than their female counterparts. This is because males control the economic resources than females.

With regards to mobile savings, females are expected to save more than males due to the fact that, females are economically disadvantaged and so usually take safety measures to protect themselves against unforeseen circumstances. This confirms the studies of Mbarathi and Diga (2004) who indicated that women are likely to save more especially through mobile phone because of unexpected risk. With this, it is expected that, gender will have an ambiguous sign on people's intention to use mobile phone technology for financial transaction.

#### 3.4.2.5 Distance to bank

Distance is defined as the numerical measurement of how far places are apart. Distance to bank is how long a person moves from his/her household in accessing and transacting with the bank. It was a continuous variable which allows clients to indicate the kilometers they cover in using the bank. Distance is a key determinant of consumer's

intention to use a particular financial institution. All other things being equal, the far away the bank or financial institution the less likely consumers uses it. With this distance to bank is expected to have a negative sign on individual's intention to adopt mobile phone technology for making financial transaction.

#### 3.4.2.6 Volume of transaction

Volume of transaction refers to the total amount of money transactions processed from, to or through any services and platform during any applicable period of time. It was measured as a continuous variable and it is a major factor that affects the usage of either bank account or mobile phone by individual household in making financial transaction. All other things being equal, it is expected that, the volume of transaction will have a positive sign for both the usage of bank account and mobile phone technology in making financial transaction among individual household.

#### 3.4.2.7 Marital status

Marital status is a dummy variable which indicates whether a person is married or unmarried. Thus, it takes one if married and zero if single. Marital status is anticipated to have an ambiguous effect on individual's intention to adopt mobile phone for financial inclusion. On the financial transaction front, individuals who are married are expected to use mobile phone for financial transaction than those who are single. This is because increase married individuals have several social relations and are supposed to transact money to their in-laws, cousin, parents and others due to distance barrier and so gives a positive sign. Those who are unmarried or single doesn't have several social relations all things remaining the same hence will not be expected transact money via phone so gives a negative sign.

### 3.4.2.8 Average income

Average income is a continuous variable and it simply refers to the amount of money gained from engaging in any economic activity. In terms of making financial transaction, individuals with relatively high incomes are more likely to make transaction with mobile phone than relatively low income earners, all things being equal. This can be attributed to the fact that, relatively high income earners engage in series of transactions and so are more likely to use either mobile phone or banks. With this, relatively high income earners will have positive effect and negative sign for relatively low income individuals.

### 3.4.2.9 Employment status

Employment refers to whether a person embarks in any activity economically or not, thus, whether the person is employed or not. Employment status is a dummy variable and it is described as one if a person is employed and zero if one is unemployed. All other things being equal, individuals who are employed have a better chance of making financial transaction via a mobile phone than those who are unemployed. This is because those who are employed earn income and has higher chance of making transactions hence, the coefficient for employment status will be positive for those are employed and negative for those who are unemployed.

### 3.4.2.10 Educational status

Education refers to the minimum level of schooling attained by individuals. That is whether a person has reached at least a minimum of basic education to the tertiary level or uneducated. Educational status is a categorical variable that takes the following form; zero if uneducated, one if basic education, two if secondary and three if tertiary.

The educational status of individuals plays an essential role in adopting a particular technology. The probability that a person with high educational status embarks on financial transaction with the mobile phone or bank is higher than individuals with little or no education. This is because persons with high education have access to formal financial services and have knowledge of various modes of making financial transactions (Mbarathi & Diga 2004). However, it is expected that persons with high educational status will have a positive effect while those with low or no education will have a negative effect.

#### 3.4.2.11 Occupation

Occupation refers to whether a people have a job or not. It is a categorical variable that takes the following form; zero if one does not work, one if mining, two if teaching, three if trading, four if farming and five if others such as driving. The occupation of a person is significant in terms of adopting a particular technology. A person is likely to make financial transaction via mobile phone if that person has a job. This means that, such a person may earn a certain amount of income and this will enable him/her make transaction than those who do not have a job. With this, it is expected that, occupation being a categorical variables is expected to have a positive effect on individual's intention in subscribing to mobile phone technology for making financial transaction.

#### 3.4.2.12 Age

Age is continuous variable of which it is expected to have a positive effect on mobile phone usage and financial inclusion. On the financial transaction model, Persons within the working age group 19-50years are more likely to make transaction either via mobile phone or banks than persons whose age above 50years. This can be linked to the fact that, people within the age group 19-50years are economically active all other things

remaining constant hence more likely to undertake financial transaction than those above 50years. With this, it is expected that, Age will have positive sign for 19-50years and negative for those above 50years.

### 3.5 Study Area

The study focuses on the role of mobile phone technology in providing financial inclusion in Ghana among rural population in the Upper Denkyira West District of Ghana. Upper Denkyira West District is one of the 22 administrative districts in the Central Region. It was carved out of the erstwhile Upper Denkyira District with Diaso as the capital.

The District has a total land area of 579.2 square kilometers which represents 3% of the total land area of the Central Region. The population of Upper Denkyira West District, according to Ghana statistical service (2012), is 60,054 with relatively more males (50.3%) than females (49.7%). The district is entirely rural with few rural banks located at the district capital. Out of the population, 52.4 percent own mobile phones. The indigenes of the area are Denkyiras. Until the booming of 'galamsey' activities about twelve years ago, the area was dominated by Denkyiras and Asantes constituting about 97 percent.

It is the northernmost district in the Central Region. The main economic activities in the district are subsistence farming, mining and few engaging in petty trading. When Continental Mining Company was in operation, about ten years ago, the most sustaining economic activity in the area was mining. Although, many people were into crop farming than mining, the life of miners was highly improved than farmers. When the company collapsed, most miners who could not return to their hometowns became farmers, planting mainly cocoa. Besides, there are few rural banks located in the district capital indicating that most people are financially excluded from the formal banking

services. This inhibits their ability to save, make payments especially transfers, access credit, and insurance and this motivated the researcher to consider this district as the choice of the study area.

Also, Upper Denkyira West District is selected for the study as a result of proximity and access to information. This study intends to cover wider scope of the activities of the problem but was constrained by personal, logistics, finance and time. The study is also limited to some selected rural communities in the District where mobile phone usage and mobile money activities thrives.

Contextually, the study will cover only mobile phone users who embark financial transaction in the district. For the purpose of this study, the researcher restricted the study to the accessibility and usage of mobile phone for making financial transaction such as mobile savings, transfer, payments and mobile banking as the basis for financial inclusion.


***Figure 1: Map of Ghana showing the area of study***

**Source: Google map**


Source: Ghana Statistical Service, GIS

***Figure 2: A Map showing the study district***

**Pilot Test**

Pilot testing is a mini version of a full-scale study (also called 'feasibility' studies), as well as the specific pre-testing of a particular research instrument such as interview or questionnaire. It is a crucial element of a good study. In this study, a pre-testing was done on thirty people in Ateitu, a community in Winneba in the Effutu municipality after which the research instrument was refined for data collection. Ateitu was selected because it had similar characteristics of the study area. The questionnaire of the pilot tested 15% of the sample for the study and found out that, mobile phone usage has a positive relationship with making financial transaction. This means that, mobile phone

usage has the probability to increase financial inclusion of individuals within the rural areas. Probit regression model was used to analyze the pilot test conducted to examine the role of mobile phone technology in providing financial inclusion.

### 3.6 Data Collection

Data collection is essential as far as gathering the required information about the respondents is concerned. It helps the researcher in achieving the research objectives stated. Basically, there exist two sources of data for every research. These data sources are primary and secondary data sources. The researcher acknowledged the various options available as data collection methods, each with its advantages and disadvantages. In order to identify and analyze the role of mobile phone technology in providing financial inclusion among rural population in Upper Denkyira West District, primary data was adopted for the study. Primary data are data collected with a given purpose in mind (Yin, 2003). Primary data sources consist of first hand data originated by the researcher for the specific purpose of addressing the research problem. It is obtained from the field using questionnaire from mobile phone users who have made financial transaction within Upper Denkyira West District of Ghana.

### 3.7 Population

In this study, the population is composed of all mobile phone users within the district. The study was motivated by the fact that, there are few rural banks in the district located at Diaso the capital. This implies that majority of the population is financially excluded. However, there are Mobile Network Operators (MNOs) in the district which include; MTN, Vodafone, Tigo, Airtel. These MNOs in the district all operate mobile financial services which have the tendency of providing financial inclusion. Hence, motivated the researcher to consider this district as the choice of the study area. There are about

31,468 mobile phone users in Upper Denkyira West District constituting 52.4% of the total population (Boateng, 2012). This target population is defined as persons who possess and uses mobile phone to making financial transaction such as mobile savings, banking, payments and transfers.

### 3.8 Sample Techniques

Sampling refers to observing a part in order to gather information about the whole (Corbetta 2003). It is a deliberate selection of a number of units to denote a bigger population (Anderson, 2004). Therefore, Saunders, Lewis and Thornhill (2009) suggested that a sampling process is required to aid in organizing the study to a controllable size. Sampling procedures can be categorized into probability and non-probability sampling. The study employed simple random sampling technique and systematic sampling in selecting the respondents. The simple random sampling procedure was used to select five rural communities in the district such as Afiefiso, Nkronua Anafo, Akwaboso, Ameyaw and Nyinawusu. These rural communities were selected because the activity of mobile phone transactions thrives in addition to inadequate access to formal financial sector within these areas. Simple random sampling was used to give equal opportunity to the rural communities to be selected. The study further adopted systematic sampling technique which ordered households to be selected into the sample base on a fixed, periodic interval. This ensures proper representation of each household in the sample and to maintain a low risk of manipulating data obtained from the respondents within these rural communities.

### 3.9 Sample Size

This study focuses on mobile phone users in Upper Denkyira West District. However, due to time and financial constraint, the study was not able to cover the entire population in the district. With this, a representative sample was selected for the study base on Green (1991) rule for modeling multiple regressions. Green (1991) proposed that the sample size (n) must be greater than 50+8P, where P is defined as the number of independent variables. This study used nine independent variables in the empirical model and with reference to the equation; the sample size for this study should be > 50 +8(9) = 122.

However, this study used 400 respondents which is greater than 122 [that is; (n= 400) > 122]. This means that the sample size used for this study satisfies the rule proposed by Green (1991) for modeling multiple regression.

### 3.10 Data Collection Method

Data collection is a very significant aspect of every research study and if data is gathered inaccurately, could lead to an invalid result. According to Tashakkori and Teddlie (2003), data collection is used when trying to derive data that will be used for making decisions and keeping records and has different methods which comprise of interview, questionnaire, and observation. Data was collected using questionnaire approaching respondents made up of all individuals who owns and uses mobile phone for making financial transaction either at their homes or at various agents' points. The questionnaire was translated and interpreted to Twi (a native language) to enable the respondent who cannot read and write.

### 3.11 Method of Data Analysis and Presentation

Data analysis is a very important aspect of a research and Porter (2008) portrays it as a process, started even before the collection of data ends. After successful data collection exercise, the obtained data was verified and edited for completeness and consistency. The probit regression model was used to examine the factors that influence the usage of mobile phone technology on financial inclusion and the multinomial logit model was also used to analyze the factors that determine the usage of bank account, mobile phone or both (bank account and mobile phone) in Upper Denkyira West District. The probit model was used because of the dichotomous or binary nature of the dependent variable as well as the ability to overcome the problem of Linear probability model whiles the multinomial logit regression model was used because the dependent variable was categorical in nature as to whether individuals use bank account only, mobile phone only or both accounts in making financial transactions. With the help of Stata and Statistical Package for Social Sciences (SPSS), data was analyzed base on the objectives of the study. The SPSS was used to enter the data gathered from the field whiles the Stata was used for data processing and analysis.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## 4.0 Introduction

This chapter highlights on the analysis and discussion of the results of the study. The chapter employed descriptive statistics and regression analysis in presenting the results obtained. The chapter is made up of various sections namely; summary of descriptive statistics of the respondents', probit regression analysis of the factors that influence the usage of mobile phone technology on financial inclusion and multinomial logit regression on the factors that determine the usage of bank account, mobile phone or both (bank account and mobile phone) in making financial transaction.

***Table 4.1 Summary statistics***

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Gender | .6525 | .4767725 | 0 | 1 |
| Age | 34.285 | 12.04706 | 18 | 70 |
| Marital Status | .5375 | .4992162 | 0 | 1 |
| Employment Status | .8625 | .3448057 | 0 | 1 |
| Average income | 1201.99 | 1343.583 | 50 | 1500 |
| Household size | 3.7025 | 1.992956 | 1 | 15 |
| Volume of transaction | 580.1567 | 612.4964 | 20 | 5000 |
| Transaction cost | 25.85251 | 12.5767 | 5 | 150 |
| Distance to bank | 65.94395 | 47.94128 | 10 | 170 |
| Perceived trust | 4.12782 | 1.101029 | 1 | 5 |
| Perceived ease of use | 4.303258 | .9381712 | 1 | 5 |

Source: Author's estimation using field data in 2019

The results from table 4.1 above show that, out of 400 respondents sampled, male were more represented than female. Specifically, 265 of the respondent are males constituting about 65.25% whiles the remaining 139 constituting about 34.75% are females. The mean age of respondents was 34 years old with a standard deviation of 12.0. The youngest respondent was 18 years old whiles the oldest was 70 years old.

Exactly 215 representing 53.75% of respondents were married as opposed to being single, separated, widowed or divorced of 185 representing 46.25%. Individuals who are employed constitute 345 representing 86.25% whiles the remaining 55 representing 13.75% are unemployed. In terms of income earned by the respondent averagely at the end of the month, the mean income was GH₵ 1201.99 with a standard deviation GH₵ 1343.583. The lowest average income was GH₵ 50 and the highest income was GH₵ 1500. The mean household represented had 3 to 4 members with the largest having 15 members.

In terms of financial transaction with mobile phone, the mean volume of transaction done by individual was GH₵ 580 with the lowest amount of GH₵ 20 and highest amount of GH₵ 5000. It cost individuals GH₵ 25 on average in making financial transaction with bank with the lowest cost of GH₵ 5 and the highest cost of GH₵ 150. Individuals cover a mean distance of about 66kilometers in accessing the bank with the lowest distance of 10kilometers and highest distance of 170kilometers.

## 4.1 Analysis of the Factors that Influence the Usage of Mobile Phone Technology on Financial Inclusion

This section looks at the factors that influence the usage of mobile phone technology on financial inclusion among the rural population in the Upper Denkyira West District. Employing probit model, the analysis was done using Stata (version 14.0) and the result is presented in table 4.2 below.

***Table 4.2: Probit regression results for the factors that influence the usage of mobile phone technology on financial inclusion***

| **Financial Transaction** | **Coefficients** | **Robust Std. Err.** | **Probability P>\|Z\|** | **Marginal Effect (dy/dx)** |
|---|---|---|---|---|
| Age | -.0647356 | .0096246 | 0.000 | -.006324 |
| Average income | .0003584 | .0001998 | 0.073 | .000035 |
| Household size | -.1604374 | .0509886 | 0.002 | -.015673 |
| Perceived ease of use | -.1484504 | .1113483 | 0.182 | -.014502 |
| Perceived trust | .2247613 | .100274 | 0.025 | .0219567 |
| **(Ref: Unemployed)** | | | | |
| Employed | .6137177 | .3287008 | 0.062 | .0864026 |
| Cons | 3.231444 | .5480858 | 0.000 | |
| Probit regression | | | Number of obs = 400 | |
| | | | Wald chi2(6) = 88.39 | |
| | | | Prob > chi2 = 0.0000 | |
| Log pseudolikelihood = -87.899995 | | | Pseudo R2 = 0.4091 | |

Source: Computed by the author using Stata (14.0) corp.

The Probit model is significant at 1% since Prob>chi2 is 0.000 and there is about 41% variation of the dependent variable (financial inclusion which is measured by financial transaction one performs with the mobile phone) is explained by the independent variables such as employed, average income, household size, age and perceived trust.

From the table above, the results from the model shows that, Age is significant at 1% but negative. The results show that, there is an inverse relationship between age and making financial transaction with mobile phone. This means that, the older one becomes, the less likely the person uses mobile phone to make financial transaction. The result also shows that, the probability of an individual to use mobile phone for

financial transaction falls about 0.6% when one gets older. This result supports that of Akudugu (2012) who found that, as individual grows the demand and usage of financial services decline.

Results from the table also indicate that, Average income is statistically significant at 10% level and positive. This means that, there is a positive relationship between average income of the respondents and making financial transaction with the mobile phone. That is, the higher one's income, the more likely one makes financial transaction with the mobile phone. The probability of an individual to use mobile phone for financial transaction rises about 0.0035% when one's average income rises. The result is similar to the studies of Serge and Clovis (2014) who indicated that age is significant in making financial transaction such as mobile savings.

Household size is also significant at 1% but negative. This indicates that, there is an inverse relationship between household size of the respondents and making financial transaction with mobile phone. The results show that, the bigger or larger the household size of the respondents, the less likely one uses mobile phone to make financial transaction. This means that, the chance of an individual to use mobile phone for making financial transaction decreases about 1.6% when one's household size increases. This result is similar to the studies of Ouma, Odongo and Were (2017) who found out that household size is inversely related to making financial transaction like savings.

Perceived Trust is significant at 5% and positive. This means that, there is a direct relationship between perceived trust of mobile phone service and making financial transaction. This further indicates that, individuals who perceive to have trust in using mobile phone to make financial transaction is more likely to use the system. That is,

the higher the trust in making transaction with mobile phone, the more likely an individual uses mobile phone services to make financial transaction. This means that, the probability of an individual to use mobile phone for making financial transaction increases about 2.2% when one's perceive to have trust in the system. This finding confirms the works of Abel, Mutandwa and Pierre (2018) who found trust to be positive related to financial inclusion.

Employment status is statistically significant at 10% and positive. Employment status was coded as a dummy variable with '0' as unemployed and '1' as employed. Using unemployed as the base category, there is a positive relationship between individuals who are employed and making financial transaction with mobile phone. The probability that an employed individual will use mobile phone to make financial transaction is about 8.6% higher than individuals who are unemployed. The result is similar to the studies of Serge and Clovis (2014) who indicated that age is significant in making financial transaction such as mobile savings.

## 4.2 Analysis of the Factors that Determine the Usage of Bank Account, Mobile Phone or both (Bank Account and Mobile Phone) in Making Financial Transaction

This section looks at the factors that determine the usage of bank account, mobile phone or both (bank account and mobile phone) in making financial transaction among the rural population in the Upper Denkyira West District. Employing multinomial regression model, the analysis was done using Stata (version 14.0) and the result is presented in table 4.3 below.

*Table 4.3: Multinomial regression results for the factors that determine the usage of bank account, mobile phone or both (bank account and mobile phone) in making financial transaction*

| Total Transaction | Coefficients | Robust Std. Err. | Probability P>\|Z\| | Marginal Effect (dy/dx) |
|---|---|---|---|---|
| **BOTH BANK AND PHONE** | **(base outcome)** | | | |
| **BANK ONLY** | | | | |
| **(Ref: Unemployed)** | | | | |
| Employed | -1.829353 | .7373676 | 0.013 | -.1301283 |
| Volume of transaction | .0001308 | .000778 | 0.867 | 4.75e-06 |
| Average income | -.0005768 | .0004809 | 0.230 | -.0000209 |
| Household size | .324279 | .1168451 | 0.006 | .011767 |
| Age | .1144099 | .0203633 | 0.000 | .0041516 |
| Transaction cost | -.0346201 | .0600209 | 0.564 | -.0012563 |
| Distance to bank | -.0025107 | .0149525 | 0.867 | -.0000911 |
| **(Ref: Don't Trust)** | | | | |
| Trust | 1.90989 | 1.085879 | 0.079 | .0475576 |
| **Cons** | -6.708999 | 1.404275 | 0.000 | |
| **PHONE ONLY** | | | | |
| **(Ref: Unemployed)** | | | | |
| Employed | -16.27791 | 1.251637 | 0.000 | -1.82e-13 |
| Volume of transaction | .0044271 | .0022278 | 0.047 | 2.64e-20 |
| Average income | -.0023836 | .0012593 | 0.058 | 0 |
| Household size | .892514 | .3349413 | 0.008 | 1.77e-17 |
| Age | .0717108 | .0489309 | 0.143 | . |
| Transaction cost | -4.379203 | .3168788 | 0.000 | 0 |
| Distance to bank | 1.016892 | .0662173 | 0.000 | 1.16e-17 |
| **(Ref: Don't Trust)** | | | | |
| Trust | -13.79852 | 1.534124 | 0.000 | -7.98e-15 |
| Cons | 15.79164 | 1.17564 | 0.000 | |
| Multinomial logistic regression | | | Number of obs = 395 | |
| | | | Wald chi2(16) = 6300.66 | |
| | | | Prob > chi2 = 0.0000 | |
| Log pseudolikelihood = -80.272761 | | | Pseudo R2 = 0.7252 | |

Source: Computed by the author using Stata (14.0) corp.

The model is significant at 1% since Prob>chi2 is 0.0000. The model yields a pseudo R2 of 0.7252 which means that 73.00% of the variation in the dependent variable (determinants of using bank account or mobile phone by individuals) can be explained by changes in the independent variables, that is age, employment status, volume of

transaction, average income, household size, trust, transaction cost and distance. The model used both mobile phone usage and bank account usage as the base outcome because of the charges incurred in using and connecting ones bank account with mobile phone.

From the model above, employment status was a dummy variable and it is significant at 5% level of significance but negative. This means that, there is an inverse relationship between individuals who are employed and using bank account only for making transactions than using both mobile phone and bank. Compared to unemployed, employed individual is less likely to use bank account only for making transactions than using both mobile phone and bank. The odd of using bank account only for making transaction for employed person decreases about 13% as compared to using both bank and mobile phone. The findings support the view of Tugume, Kobusinge and Nanteza (2015) who also found employed to be significant in making mobile transaction like mobile payment.

Interpreting age, as one grows older the odds of using bank only for transaction as opposed to the usage of both bank and mobile phone increases. This shows a positive relationship between age and bank account usage only for making transaction. As one gets older, the chance of a respondent using bank account only for making transaction rises about 0.42% higher than using both bank account and mobile phone. This result is statistically significant at 1% level of significance. The result is supported the study of Peña, Hoyos and Tuesta (2014) who found out that, as people grow they become knowledgeable about the various financial products and start using financial institutions like bank.

Household size is statistically significant at 1% and positive. This indicates that, there is a positive relationship between household size and bank account usage only for financial transaction than using both bank and mobile phone. This means that, the large the household size the higher the chance of using bank account only for transaction as compared using both bank and mobile phone. That is, as household size rises, the odd of using bank account only for making transaction also increases about 1.17% as compared to using both bank account and mobile phone.

From the model, trust is a dummy variable and it is significant at 10%. There is a positive relationship between trust and using only bank account for making financial transaction than using both bank and mobile phone. Compared to the respondents who don't trust the bank in making transaction, the higher the level of trust in making transaction with the bank only, the higher the chances of using the bank only as compared to using both bank account and mobile phone. The probability of using bank account only for making financial transaction increases about 4.8% higher than using both bank account and mobile phone. This finding confirms the works of Abel, Mutandwa and Pierre (2018) who found trust to be positive related to financial inclusion.

Volume of transaction, average income, distance to bank and transaction cost are also not significant determinants of using bank account only for making financial transaction as compared to using both bank and mobile phone. Nevertheless, the results show that, there is about 0.000475% chance of using bank account only for transaction than using both bank and mobile phone when one's volume of transaction is bigger. An extra transaction cost creates about 0.1256% less odds to using bank account only as compared to using both bank and mobile phone. Also, a higher distance to the bank creates about 0.009% decrease odds in using bank account only for making transaction

as compared to both bank and mobile phone. A higher average income also creates about 0.002% decrease odds in using bank account only for making transaction as compared to both bank and mobile phone.

With regards to the usage of mobile phone only for making financial transaction, individuals who are employed are less likely to use mobile phone only to make financial transaction as compared to both bank account and mobile phone. This shows an inverse relationship between employed respondent and using mobile phone only for financial transaction. Compared to unemployed, employed individual is less likely to use mobile phone only for making transactions than using both mobile phone and bank. The odd of using mobile phone only for making transaction for employed person decreases about 1.82% as compared to using both bank and mobile phone. This result is statistically significant at 1% level of significance. The findings support the view of Tugume, Kobusinge and Nanteza (2015) who also found employed to be significant in making mobile transaction like mobile payment.

Volume of transaction is significant at 5% and positive. This means that, there is a direct relationship between volume of transaction and using mobile phone only for financial transaction as compared to both bank account and mobile phone. This means that, the higher the volume of transaction the more one uses mobile phone to make transaction as compared to both bank and mobile phone. The probability of using mobile phone only for transaction as compared to using both bank and mobile phone rises about 2.64% when volume of transaction increases. This result is consistent with the studies of Gakii (2012) who found that a positive relation in making mobile financial transaction.

Interpreting average income, as one's income rises the odd of using mobile phone only for financial transaction decreases as opposed to the usage of both bank and mobile phone. This shows a negative relationship between average income and mobile phone usage only for making transaction. As one's average income rises, the chance of a respondent using mobile phone only for making transaction falls as compared to the usage of both bank account and mobile phone. This result is statistically significant at 10% level of significance. This finding is in line with the results of Sivapragasam, Agüero and Silver (2011) who found that those on higher income are less likely to use mobile phone for financial transaction like savings.

Household size is statistically significant at 1% and positive. This indicates that, there is a positive relationship between household size and mobile phone usage only for financial transaction than using both bank and mobile phone. This means that, the large the household size the higher the chance of using mobile phone only for transaction as compared using both bank and mobile phone. That is, when an extra member is added to the household, the odd of using mobile phone only for making transaction also increases about 1.77% as compared to using both bank account and mobile phone. This result confirms the study of Kikulwe, Fischer and Qaim (2014) who found that household with more members are more likely to use mobile phone for transactions.

From the model, trust is a dummy variable and it is significant at 1%. There is a negative relationship between trust and using mobile phone for making financial transaction than using both bank and mobile phone. Compared to respondents who don't trust in making financial transaction with mobile phone, individuals who have trust in using mobile phone for financial transaction is less likely to use the system rather than using both bank and mobile phone. The probability of using mobile phone only for making financial transaction falls about 7.98% than using both bank account and mobile phone.

This finding confirms the study of Akudugu (2013) who found trust a major determinant of financial transaction.

Transaction cost from the model is statistically significant at 1% and has a negative coefficient. This means that, there is an inverse relationship between transaction cost and using mobile phone for financial transaction. That is, the higher the cost of transaction, the less likely one uses the system to make transaction. As transaction cost rises, the chance of a respondent using mobile phone only for making transaction falls than using both bank account and mobile phone. This result is consistent with the studies of Gakii (2012) who found that high transaction cost to be a barrier in making mobile transaction.

Distance to bank from the model is significant at 1% and has a positive coefficient. This indicates that, there is a direct relationship between distance to bank and using mobile phone only for making financial transaction rather than using both bank and mobile phone for transaction. This means that, this means that people who see the distance to bank to be a problem are less likely to use bank but resort to mobile phone for making transaction. The odd of using mobile phone for transaction rises about 1.1% than using both bank and mobile phone when distance to bank increases. This finding confirms the works of Abel, Mutandwa and Pierre (2018) who found distance to bank to be significant determinant of financial inclusion.

However, age is not a significant determinant of using mobile phone only for making financial transaction as compared to using both bank and mobile phone. Nevertheless, the results show that, there is a higher chance of using mobile phone only for transaction than using both bank and mobile phone when one gets older.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.0 Introduction

This chapter summarizes the results of the study as well as discusses the conclusions drawn based on the findings. It further gives the recommendations based on the findings discussed.

## 5.1 Summary of Findings

- The results of the study show that, the usage of mobile phone technology for financial transaction such as mobile transfer, payments, savings and banking has deepens the level of financial inclusion among the rural population in the Upper Denkyira West District. The use of mobile phone technology in providing financial inclusion however depends on the factors pertaining to the usage of mobile services in addition to other demographic factors of the individual. Using a probit and multinomial regression, the study modeled the use of mobile phone technology in ensuring financial inclusion in addition to the factors that determines the usage of bank account, mobile phone or both (mobile phone and bank account) in making financial transaction.
- The results were interpreted basing on marginal effects and it was found that the age, average income, household size, perceived trust and employment status (employed) of individuals are statistically significant determinants of financial inclusion among rural population of Upper Denkyira West District. The results of the study show that, age and household size of the respondents are inversely related to the usage of mobile phone for making financial transaction. That is,

the chance of using mobile phone in making financial transaction decrease as one grows as in addition to a rise in household size.

- The result further indicate that, average income, perceived trust and employment status (employed) of individuals is positively related to the usage of mobile phone in making financial inclusion. In ensuring financial inclusion with the help of mobile phone technology, individual who is employed and perceived to have trust in using mobile phone for making financial transaction is more likely to adopt mobile services. An increase in average income of individuals also increases the usage of making transaction with mobile phone.
- With regards to the factors that determine the usage of bank account, mobile phone or both mobile phone and bank account in making financial transaction among rural population of Upper Denkyira West District, the study found that, age, employment status, volume of transaction, average income, household size, trust, transaction cost and distance to be the significant in making financial transaction. The study found out that, household size, age of respondent and trust are positively related in using bank account only for making financial transaction as compared to the usage of both bank and mobile phone for transaction. Employed was also found to be inversely related in making financial transaction with bank account only as compared to the usage of both bank and mobile phone for transaction.
- Also, the results of the study show that, average income, transaction cost, trust and employed are inversely related in using phone only for making financial transaction as compared to the usage of both bank account and mobile phone for transaction. Whiles volume of transaction, household size and distance to bank are positively related in using phone only for making financial transaction

as compared to the usage of both bank account and mobile phone for transaction.

## 5.2 Conclusion

The study focused on mobile phone technology and financial inclusion among rural population of Upper Denkyira West District of the Central region of Ghana. Using a sample size of 400 respondents, the study employed probit and multinomial regression estimation technique to analyze the results.

- Financial inclusion over the years has gained attention from various scholars and organizations due to its widespread importance in promoting economic growth in developing countries. This has been facilitated by the introduction and usage of mobile phone devices in making financial transaction such as payment, transfers, savings and mobile banking.
- Mobile phone transaction such as payment, transfers, savings and mobile banking is capable of ensuring financial inclusion hence growing the economy. It can also help to strengthen global competition. The study found out that, the usage of mobile phone technology has the tendency to encourage financial transaction by improving savings behavior of individuals especially the rural folks who are excluded from formal basic banking. It has also been seen that, mobile phone technology has solved the problems of rural remittance and has enabled individuals who have stayed away from their households to extend some support through mobile transfers to their family anytime and anywhere due to its perceived convenience and trust. The perceived trust involved in using the mobile phone services has enabled the rural folks to undertake financial transactions. It was evident that, an individual who uses mobile phone to embark

on financial transaction such as payments, savings, transfers and mobile banking were found to be more likely to be financially included.

### 5.3 Policy Recommendations

With reference to the findings obtained from the study, the following recommendations are made;

- The ministry of finance through Ghana revenue authority should reduce taxes for mobile network operators in order to make cost of financial transaction affordable for customers. This will attract individual's especially rural folks who are financially excluded to patronize the usage of mobile phone services to make financial transaction such as payment, savings, transfer and mobile banking hence ensuring inclusive finance.
- Bank of Ghana should charge formal and semi-formal financial sectors such as microfinance and other corporative credit unions to establish bricks and mortar branches in rural areas that do not have access to financial institutions due to distance in using and making financial transaction with banks.
- Bank of Ghana should implement policies and strategies that will restore confidence of individual's in the financial institutions since most people in the rural areas are financially excluded and unbanked due to lack of trust. This can be done by increasing awareness through financial education in addition to the creation of institutions that will aim at compensating depositors after losing their savings when a particular financial institution collapse.

## 5.3 Limitations of the Study

- The study is limited in terms of time and resource constraints because for a study of this nature larger samples are required and a considerable amount of time and money is needed to achieve such a target.
- It was initially difficult for the respondents to disclose information about their financial transaction undertaken using their mobile phone due to the activities of fraudsters. Educating them about purpose of this study consumed time.

## 5.4 Direction for Further Studies

The study mainly investigated the role of Mobile phone usage in providing financial inclusion among rural population of the Upper Denkyira West District. It is recommended that future research should:

- Expand the scope to other rural areas within Central Region or Ghana as a whole in order to find out the role of mobile phone usage in ensuring financial inclusion.
- Also consider other financially excluded population such as the disabled persons and refugees as the population in future studies.

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# APPENDICES

## APPENDIX A

## QUESTIONNAIRE

I am a student at the Department of Economics Education of the University of Education, Winneba reading a degree programme in Master of Philosophy (Economics). As an academic requirement in partial fulfillment for the award of the degree, I'm conducting a research on the topic **"Mobile phone technoloyg and financial inclusion among rural population in the Upper Denkyira West District of Ghana".**

Therefore, I will be grateful if you could answer the questions below to enable me successfully conduct the study. The information given is purposely for academic study and will be treated with utmost confidentiality.

**DEMOGRAPHIC INFORMATION**

1. Gender Male [ ] Female [ ]

2. Age …….

3. Educational level: None [ ] Basic [ ] Secondary [ ] Tertiary [ ] others specify…….

4. Marital status: Single [ ] Married [ ]

5. Employment Status Employed [ ] Unemployed [ ]

6. Occupation: Not working [ ] Trading [ ] Teaching [ ] Mining [ ] Farming [ ] others (please specify)……...

7. How much on average do you earn in a month? …….

8. Household size: ……..

**INFORMATION ON MOBILE PHONE TECHNOLOGY USAGE**

9. Do you own a mobile phone? Yes [ ] No [ ]

10. Which of the following financial transaction(s) do you use your mobile phone for?

a) Mobile transfer (Send or receive money) [ ]
b) Mobile payments (Pay bills/for goods/airtime) [ ]
c) Mobile savings [ ]
d) Mobile banking/financial services [ ]
e) None of the above [ ]

11. Have you subscribed to mobile money account? Yes [ ] No [ ]

12. Do you have knowledge and skillsets in reading and understanding the financial products on the market using the mobile phone? Yes [ ] No [ ]

13. If no, who helps you in understanding the financial product?

a) Son/Daughter [ ]
b) Spouse [ ]
c) Friend [ ]
d) mobile money agent [ ]
e) Others
specify…….

14. What financial service do you mainly use your mobile money account for?

a) Mobile transfer (Send or receive money) [ ]
b) Mobile pay (Pay bills/for goods) [ ]
c) Mobile savings [ ]
d) Others specify
……

15. How much on average do you transfer (Send or receive) on average in a month via mobile money?
…….

**The questions below are based on a scale of 1 to 5. With 1 being the lowest rating and 5 being the highest rating, please rate the extent to which you agree with the following statement.**

16. The extent to which you perceive the ease of using mobile phone for making financial transaction.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

17. The extent to which you find the transactional cost of using mobile phone for making financial transaction less expensive.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

18. The extent to which your friends or family members influence you to make financial transaction with mobile phone.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

19. The extent to which you trust financial service providers to keep records when you perform financial transaction with your mobile phone.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| | | | | |

20. Do you have a bank account? Yes [ ] No [ ]

21. If yes, which bank do you have account with? a) Commercial bank b) Rural bank c) Microfinance d) Savings and loans e) Others specify…….....

22. If No, please indicate any reason you do not have an account with any financial institution

……
……

23. What are the main transactions you do with the bank?

a) Deposit/savings [ ]
b) Loans/credit [ ]
c) Payment of bills [ ]
d) Salary processing [ ]
e) Cheque clearing [ ]
f) Others specify ……..……..

24. How far (in km) do you cover in accessing the bank? ……

25. Do you incur transport cost in moving from you house to the bank? Yes [ ] No [ ]

26. If yes, how much do you pay? ……..……..

27. Do you believe that financial institutions (bank) have the best interest of their clients at heart? Yes [ ] No [ ]

28. If no, why? ……..

29. Relative to other financial access alternatives (e.g. bank), what strategic advantages would you attribute to use mobile money?

a) It is more available [ ]
b) It is cheaper than other service providers [ ]
c) The transaction fees are lower [ ]
d) It is more convenient [ ]
e) Others specify ……..

**Thank you**

# APPENDIX B

## PROBIT REGRESSION RESULTS FOR THE FACTORS THAT INFLUENCE THE USAGE OF MOBILE PHONE TECHNOLOGY ON THE FINANCIAL INCLUSION

```
. probit FINANCIAL_TRANSACTION AGE AVERAGE_INCOME HOUSEHOLD_SIZE PERCIEVED_EASE PERCIEVED_TRUST employed, vce(robust)

Iteration 0:   log pseudolikelihood = -148.75066
Iteration 1:   log pseudolikelihood = -92.343941
Iteration 2:   log pseudolikelihood = -87.940348
Iteration 3:   log pseudolikelihood = -87.900006
Iteration 4:   log pseudolikelihood = -87.899995
Iteration 5:   log pseudolikelihood = -87.899995

Probit regression                                 Number of obs     =        400
                                                  Wald chi2(6)      =      88.39
                                                  Prob > chi2       =     0.0000
Log pseudolikelihood = -87.899995                 Pseudo R2         =     0.4091
```

| FINANCIAL_TRANSACTION | Coef. | Robust Std. Err. | z | P>\|z\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| AGE | -.0647356 | .0096246 | -6.73 | 0.000 | -.0835994 | -.0458719 |
| AVERAGE_INCOME | .0003584 | .0001998 | 1.79 | 0.073 | -.0000333 | .00075 |
| HOUSEHOLD_SIZE | -.1604374 | .0509886 | -3.15 | 0.002 | -.2603732 | -.0605016 |
| PERCIEVED_EASE | -.1484504 | .1113483 | -1.33 | 0.182 | -.3666891 | .0697883 |
| PERCIEVED_TRUST | .2247613 | .100274 | 2.24 | 0.025 | .0282278 | .4212948 |
| employed | .6137177 | .3287008 | 1.87 | 0.062 | -.030524 | 1.257959 |
| _cons | 3.231444 | .5480858 | 5.90 | 0.000 | 2.157216 | 4.305673 |

```
Note: 0 failures and 1 success completely determined.

. mfx

Marginal effects after probit
      y  = Pr(FINANCIAL_TRANSACTION) (predict)
         =  .95327895
```

| variable | dy/dx | Std. Err. | z | P>\|z\| | [ | 95% C.I. | ] | X |
|---|---|---|---|---|---|---|---|---|
| AGE | -.006324 | .00144 | -4.38 | 0.000 | -.009151 | -.003497 | | 34.285 |
| AVERAG~E | .000035 | .00002 | 1.90 | 0.058 | -1.2e-06 | .000071 | | 1201.99 |
| HOUSEH~E | -.015673 | .00532 | -2.95 | 0.003 | -.026091 | -.005255 | | 3.7025 |
| PERCIE~E | -.014502 | .01148 | -1.26 | 0.207 | -.037003 | .007999 | | 4.2925 |
| PERC~UST | .0219567 | .0094 | 2.34 | 0.020 | .003527 | .040387 | | 4.1675 |
| employed* | .0864036 | .06241 | 1.38 | 0.166 | -.035921 | .208728 | | .8625 |

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1

.
```

# APPENDIX C

## MULTINOMIAL REGRESSION RESULTS FOR THE FACTORS THAT DETERMINE THE USAGE OF BANK ACCOUNT, MOBILE PHONE OR BOTH (BANK ACCOUNT AND MOBILE PHONE) IN MAKING FINANCIAL TRANSACTION

```
. mlogit TOINCL employed VOLUME_OF_TRANSACTION AVERAGE_INCOME HOUSEHOLD_SIZE AGE TRANSACTION_COST DISTANCE_TO_BANK trustt, baseoutcome(1)
>  vce(robust)

Iteration 0:   log pseudolikelihood = -292.07811
Iteration 1:   log pseudolikelihood = -156.08583
Iteration 2:   log pseudolikelihood = -98.236875
Iteration 3:   log pseudolikelihood = -86.489307
Iteration 4:   log pseudolikelihood = -82.125613
Iteration 5:   log pseudolikelihood = -80.986434
Iteration 6:   log pseudolikelihood = -80.417793
Iteration 7:   log pseudolikelihood = -80.297636
Iteration 8:   log pseudolikelihood = -80.278316
Iteration 9:   log pseudolikelihood = -80.274121
Iteration 10:  log pseudolikelihood = -80.273025
Iteration 11:  log pseudolikelihood = -80.272804
Iteration 12:  log pseudolikelihood = -80.272765
Iteration 13:  log pseudolikelihood = -80.272761

Multinomial logistic regression                 Number of obs     =        395
                                                Wald chi2(16)     =    6300.66
                                                Prob > chi2       =     0.0000
Log pseudolikelihood = -80.272761               Pseudo R2         =     0.7252
```

| TOINCL | Coef. | Robust Std. Err. | z | P>\|z\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| BOTH_BANK_AND_PHONE | (base outcome) | | | | | |
| BANK_ONLY | | | | | | |
| employed | -1.829353 | .7373676 | -2.48 | 0.013 | -3.274567 | -.3841388 |
| VOLUME_OF_TRANSACTION | .0001308 | .000778 | 0.17 | 0.867 | -.0013941 | .0016556 |
| AVERAGE_INCOME | -.0005768 | .0004809 | -1.20 | 0.230 | -.0015193 | .0003657 |
| HOUSEHOLD_SIZE | .324279 | .1168451 | 2.78 | 0.006 | .0952669 | .5532911 |
| AGE | .1144099 | .0203633 | 5.62 | 0.000 | .0744987 | .1543212 |
| TRANSACTION_COST | -.0346201 | .0600209 | -0.58 | 0.564 | -.1522589 | .0830186 |
| DISTANCE_TO_BANK | -.0025107 | .0149525 | -0.17 | 0.867 | -.031817 | .0267955 |
| trustt | 1.90989 | 1.085879 | 1.76 | 0.079 | -.2183935 | 4.038173 |
| _cons | -6.708999 | 1.404275 | -4.78 | 0.000 | -9.461327 | -3.956671 |
| PHONE_ONLY | | | | | | |
| employed | -16.27791 | 1.251637 | -13.01 | 0.000 | -18.73108 | -13.82475 |
| VOLUME_OF_TRANSACTION | .0044271 | .0022278 | 1.99 | 0.047 | .0000607 | .0087936 |
| AVERAGE_INCOME | -.0023836 | .0012593 | -1.89 | 0.058 | -.0048519 | .0000847 |
| HOUSEHOLD_SIZE | .892514 | .3349413 | 2.66 | 0.008 | .2360411 | 1.548987 |
| AGE | .0717108 | .0489309 | 1.47 | 0.143 | -.0241919 | .1676136 |
| TRANSACTION_COST | -4.379203 | .3168788 | -13.82 | 0.000 | -5.000274 | -3.758132 |
| DISTANCE_TO_BANK | 1.016892 | .0662173 | 15.36 | 0.000 | .8871081 | 1.146675 |
| trustt | -13.79852 | 1.534124 | -8.99 | 0.000 | -16.80535 | -10.79169 |
| _cons | 15.79164 | 1.17564 | 13.43 | 0.000 | 13.48743 | 18.09585 |

```
. mfx, predict (outcome(2))

Marginal effects after mlogit
      y  = Pr(TOINCL==BANK_ONLY) (predict, outcome(2))
         =  .03770874
```

| variable | dy/dx | Std. Err. | z | P>\|z\| | [ | 95% C.I. | ] | X |
|---|---|---|---|---|---|---|---|---|
| employed* | -.1301283 | .08568 | -1.52 | 0.129 | -.298055 | .037798 | | .863291 |
| VOLUME~N | 4.75e-06 | .00003 | 0.17 | 0.868 | -.000051 | .000061 | | 560.506 |
| AVERAG~E | -.0000209 | .00002 | -1.08 | 0.278 | -.000059 | .000017 | | 1210.62 |
| HOUSEH~E | .011767 | .00485 | 2.42 | 0.015 | .002255 | .021279 | | 3.68861 |
| AGE | .0041516 | .00121 | 3.42 | 0.001 | .001774 | .006529 | | 34.038 |
| TRANSA~T | -.0012563 | .0023 | -0.55 | 0.585 | -.005771 | .003258 | | 22.0861 |
| DISTAN~K | -.0000911 | .00054 | -0.17 | 0.865 | -.001141 | .000959 | | 56.2481 |
| trustt* | .0475576 | .01902 | 2.50 | 0.012 | .010281 | .084834 | | .779747 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```
Marginal effects after mlogit
      y  = Pr(TOINCL==PHONE_ONLY) (predict, outcome(3))
         =  1.645e-19
```

| variable | dy/dx | X |
|---|---|---|
| employed* | -1.82e-13 | .863291 |
| VOLUME_OF_TRANSACTION | 2.64e-20 | 560.506 |
| AVERAGE_INCOME | 0 | 1210.62 |
| HOUSEHOLD_SIZE | 1.77e-17 | 3.68861 |
| AGE | . | 34.038 |
| TRANSACTION_COST | 0 | 22.0861 |
| DISTANCE_TO_BANK | 1.16e-17 | 56.2481 |
| trustt* | -7.98e-15 | .779747 |

(*) dy/dx is for discrete change of dummy variable from 0 to 1

# APPENDIX D

**POPULATION BY SEX, NUMBER OF HOUSEHOLDS AND HOUSES IN THE 20 LARGEST COMMUNITIES WITHIN UPPER DENKYIRA WEST DISTRICT**

| Serial number | Community Name | Total | SEX | | Households | Houses |
|---|---|---|---|---|---|---|
| | | | Male | Female | | |
| **1** | Ayanfuri | 4,660 | 2,401 | 2,259 | 1,158 | 690 |
| **2** | Diaso | 4,492 | 2,208 | 2,284 | 1,036 | 608 |
| **3** | Dominase | 2,993 | 1,440 | 1,553 | 670 | 481 |
| **4** | Nkotumso | 2,955 | 1,515 | 1,440 | 660 | 469 |
| **5** | Ntom | 2,891 | 1,410 | 1,481 | 639 | 478 |
| **6** | Maudaso | 2,203 | 1,069 | 1,134 | 479 | 334 |
| **7** | Bethlehem | 1,900 | 921 | 979 | 404 | 304 |
| **8** | New Obuasi | 1,546 | 767 | 779 | 316 | 263 |
| **9** | **Nkronua Anafo**** | 1,531 | 764 | 767 | 350 | 285 |
| **10** | **Akwaboso **** | 1,455 | 755 | 700 | 325 | 273 |
| **11** | **Afiefiso **** | 1,397 | 647 | 750 | 382 | 220 |
| **12** | Besease | 1,353 | 677 | 676 | 304 | 219 |
| **13** | Jameso Nkwanta | 1,340 | 627 | 713 | 313 | 213 |
| **14** | **Nyinawusu **** | 1,334 | 703 | 631 | 328 | 227 |
| **15** | **Ameyaw**** | 1,214 | 642 | 572 | 263 | 189 |
| **16** | Ayanfuri Gyaman | 1,166 | 581 | 585 | 229 | 186 |
| **17** | Kwameprakrom | 1,153 | 569 | 584 | 223 | 184 |
| **18** | Abora | 1,078 | 548 | 530 | 236 | 194 |
| **19** | Treposo | 1,069 | 532 | 537 | 207 | 138 |
| **20** | Breman | 995 | 527 | 468 | 199 | 169 |

Source: Ghana Statistical Service, 2010 Population and Housing Census