UNIVERSITY OF GHANA

MOBILE MONEY VALUE CREATION IN THE AGRICULTURAL VALUE CHAIN: EVIDENCE FROM A DEVELOPING ECONOMY

BY:

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DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in this work have been fully acknowledged. I therefore bear responsibility for any shortcomings.

_____ _____

Qudiratu Ngmenensoa Ishak (10422378) Date

CERTIFICATION

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

_____ _____

Prof. Richard Boateng (Supervisor) Date

_____ _____

Dr. Acheampong Owusu (Co-Supervisor) Date

DEDICATION

To my mother (Zulfata Salih),
you are the reason I keep striving for greater heights.

ACKNOWLEDGMENT

My greatest gratitude goes to Allah almighty, my greatest source of strength and guidance. I thank Him for leading me to the people that were in the best position to guide me towards the right path. Though this thesis was written by me, it came with enormous support from many people who contributed in diverse ways to make this thesis a success.

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LIST OF ACRONYMS AND ABBREVIATIONS

NCA	National Communication Authority
GSMA	Global System Mobile Association
BOG	Bank of Ghana
MOFA	Ministry of Agriculture
MNOs	Mobile Network Operators
DSTV	Digital Satellite Television
SIM	Subscriber Identification Module
SMS	Short Message Service
STK	SIM Toolkit
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
P2P	Person-to-Person
PIN	Personal Identification Number
MMT	Mobile phone-based Money Transfer
SMEs	Small-to-Medium scale Enterprises
SSA	Sub-Saharan Africa

ABSTRACT

There is a growing indication that, the economy of agricultural value chain is confronted by challenges of delays in money transfers and payments. These challenges have made way for mobile-enabled agricultural transfers over the last few years to change the way activities are conducted along the agricultural value chain. Through the use of mobile money, it is increasingly becoming easier for actors along the agricultural value chain to lessen the amount of time and money spent in getting access to the capital they require to invest in agriculture.

Literature on agricultural value chains and the use of mobile money seem to focus mostly on one of the stakeholders in the agricultural value chain. Additionally, studies on mobile money largely focus on mobile money transfer adoption and acceptance and seldom explore outcome and value creation from these new payment pathways. This study, therefore, calls for research into the value created from the use of mobile money in agriculture. The aim of this study is to assess the value created in using mobile money transfer services on agricultural value chain in Ghana. The study implored the use of critical realism paradigm and the theoretical foundation of the transaction cost theory for the study with particular focus on the actor motivation cost component of the theory in order to assess how mobile money helps to reduce actor motivation costs and enhance commitments in transactions. The study was a qualitative study involving in-depth interviews which served as the main data source for this study. Eleven (11) respondents from two agricultural companies comprising of smallholder farmers, aggregators, input suppliers and management of the companies were interviewed for the study. The choice of agricultural companies for this study was based on their use of mobile money in their agricultural activities for at least a year.

The findings of the research suggest that, mobile money is largely used for input supply, production and aggregation. The value created from the use of mobile money focuses largely on reduction in actor motivation costs in the transaction cost theory, thereby ensuring commitments in financial transactions. This value created could be categorized into Operational (reduction in operational cost), Relational (Strengthening business relationships) and Strategic value (Expansion of businesses). A number of factors including network coverage and reliability, regulations, convenience of the service and availability of mobile money vendors are the factors that enable the creation of value.

Financial literacy and the commission charged, did not seem to be factors that inhibit value creation as discussed in literature. This is because people in rural areas with little or formal education found mobile money very convenience to use as they either memorized mobile money options and procedures or got assistance from their children or from mobile money vendors who were conversant with the system. The issue of commission charged by the network operators did not seem to hinder mobile money as farmers maintained that, they would have had to spend more than the commission charged to travel to a nearby town to access their monies. The agricultural companies also mentioned that they use a mobile money merchant sim cards registered in the companies' names which allows them to transact business with large sums of money for free.

This study has contributed to research by extending the literature of mobile money and agricultural research from a multi-stakeholder perspective which has helped in identifying the dominant activities mobile money is used for and the outcome or value created in using mobile money in agriculture. It has also demonstrated the use of the Transaction Cost Theory particularly the actor motivation cost component in assessing value creation by determining commitments in transactions

The study has also contributed to practice by demonstrating the need for telecommunications companies to make provision of reliable network coverage in rural areas a priority as many agricultural-enabled mobile payments take place in rural areas. Additionally, actors along the agricultural value chain need to be educated on the use of a merchant sim card and how to acquire one in order to save cost from commission charged. This study can contribute to policy by guiding agricultural businesses to know the planning, education, coordination and security policies they need to develop as they use mobile money. Other implications are discussed in the study. This research was limited to the maize value chain hence, future studies could research into the value chains of other crops aside the maize.

Keywords: Mobile money, agriculture, value creation, transaction cost theory.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

The use of mobile enabled agricultural innovations has become a common phenomenon for the various actors along the agricultural value chain. This includes sending money for payment of farms inputs, fertilizers and salaries of workers, as well as receiving money from customers as payment for agricultural products, loans from credit unions and other financial institutions in the form of mobile to mobile transfers (Contini, Crowe, Merritt, Oliver, & Mott, 2011; Kim, Mirsobit, & Lee, 2010).

Agricultural value chains could be viewed as financial units of analysis of commodities that envelops an important categorization of economic exercises that are connected vertically by market connections. The accentuation is on the connections and interrelations among suppliers of input, producers, distributors, traders and processors (UNCTAD, 2000). The agricultural value chain therefore encompasses a set of actors: input dealers, farmers, aggregators, processors and retailers who add value to agricultural products at each stage (FAO, IFAD, & ILO, 2010).

There is a growing indication that the economy of agricultural value chain is confronted by challenges of network limitations, delays in money transfers and payments, unreliable communication and misdirected parcels (containing money) sent via public transport (Au & Kauffman, 2008). For instance, the transfer of money informally become a big challenge in rural areas considering the fact the many banks are mostly located in urban centres (Hughes & Lonie, 2007). Also, informal methods of

transferring money which could include people keeping money on themselves on journeys or sending it through bus drivers are prone to theft and road robberies (Hughes & Lonie, 2007; Kim *et al.*, 2010). Money sent via family and friends sometimes never reaches its requested receiver whereas money sent in parcels and letters with courier companies could be stolen (Sander, 2003).

Recognising these difficulties underscore the need for mobile enabled agricultural transfers over the last few years to dramatically change the agricultural value chain (Kikulwe, Fischer & Qaim, 2014). Developing countries have experienced a speedy spread of mobile phones with the introduction of lower priced prepaid mobile credit cards and the considerable reduction in prices of mobile phoned (Orozco, 2003). This has provided avenues for mobile money beyond voice communication. Transfer of money via mobile phones is part of a larger concept steadily emerging in the industry of electronic banking and payment known as mobile banking (Orozco, 2003). Jenkins (2008) simply defined mobile money service to be the access and use of money via a mobile phone.

The principal purpose of mobile money transfer activities is to lessen the costs of making money transfers or payments from one person to another, particularly across long distances (World bank, 2009). As a result of individuals not withdrawing or sending their money instantly, they tend to accrue savings in their mobile money accounts for a period of time. Hence, mobile money transfer is used as a convenient method of saving in addition to sending and receiving money (Contini *et al*., 2011). At particular times, money can be stored in a mobile money account for the purposes of helping to save a person to avoid carrying a lot of money, particularly on long and

possibly risky road trips. As a result of the large number of mobile money transfer agents in many rural areas, it is increasingly becoming easier for actors along the agricultural value chain to lessen the amount of time and money spent in getting access to the capital they require to invest in agriculture. Hence, there is the need to assess how mobile money is helping actors along the agricultural value chain to perform financial transactions and what the outcomes are. This study therefore aims at assessing the value created in using mobile money transfer services on agricultural value chain in Ghana.

1.2 Research Problem

The agricultural value chain encompasses a set of actors: input dealers, farmers, aggregators, processors and retailers who add value to agricultural products at each stage (FAO, IFAD, & ILO, 2010). Studies conducted on agricultural value chains should therefore include these perspectives. However, literature on agricultural value chains and the use of mobile money seem to focus mostly on one of these stakeholders. For instance, Kikulwe *et al.* (2014) focused mainly on one stakeholder; the small holder farmer, during their analysis of the benefits associated with using mobile money services on activities of households of smallholder farms in Kenya. Similarly, Kirui, Njiraini, Nyikal and Okello (2013) in their examination of the effect of mobile money transfer on the activities of agricultural households focused on the household of the farmer. Recognising the limited focus of studies on agricultural value chain from a multi stakeholder level in the Ghanaian context, it has become necessary for research to be conducted to fill this identified gap in knowledge and offer a representation of perspectives of the different actors involved in the agricultural value chain.

Also, studies focusing on mobile money service adoption and acceptance have seldom explored outcome and value creation from these new payment pathways. These studies mostly focus on factors that affect the adoption and acceptance of the mobile money system to the neglect of the outcome and benefits of mobile money technology. For instance, Ngumbu and Mulu-mutuku (2018) analysed the adoption of mobile money services by women entrepreneur in Kenya. The same can be said for Mallat and Tuunainen (2008) who explore the adoption of mobile payment systems by merchants and discuss factors that drive and inhibit their adoption. Afshan and Sharif (2016) also analysed mobile banking and intention for adoption using the untapped (behavioural, environmental and technological) dimensions of mobile banking acceptance by following a more comprehensive approach. Mcbride (2003) explores the process by which mobile communication technologies are adopted within different countries and seeks to explain the phenomenon using concepts drawn from actor-network theory. This demonstrates the fact that, there seems to be a lot of concentration on studying the factors affecting adoption and acceptance of mobile money services, arguably, mostly without including value creation, outcome or benefits. This study therefore addresses this gap in literature by accessing the value created in using mobile money services along the agricultural value chain.

1.3 Research Purpose

The overarching aim of the study is to assess the value created in the use of mobile money services by actors in agricultural value chain in Ghana.

1.4 Research Objectives

1. To explore the dominant activities that mobile money services are used for along the agricultural value chain in Ghana
2. To explore the value created in using mobile money services along the agricultural value chain in Ghana
3. To explore the factors that affect value creation in using mobile money transfer services along the agricultural value chain in Ghana

1.5 Research Questions

1. What are the dominant activities that mobile money services are used for along the agricultural value chain in Ghana?
2. What is the value created in using mobile money services along the agricultural value chain in Ghana?
3. What factors affect value creation in using mobile money transfer services along the agricultural value chain in Ghana?

1.6 Significance of Research

Significance of the study can be demonstrated along three main dimensions: research, practice and policy.

With respect to research significance, the study expands the current research on mobile money services by exploring the dominant activities that mobile money transfer service is used for along the agricultural value chain with regards to Ghana and the positive influence it has on these agricultural activities. Arguably, literature regarding the use of

mobile money services in agricultural activities is limited in developing countries like Ghana.

With respect to practice significance, this study provides guidelines to the telecommunication companies who provide mobile money services on how to tailor their mobile money services to assist in addressing the peculiar needs of the agricultural value chain. This would be particularly helpful when new services are being designed or during the modification of existing services.

Concerning significance to policy, this study provides feedback on policies that facilitate the agricultural usage of mobile money services. It would also provide suggestions regarding the type of policies that are needed to make it easier for mobile money to be used in creating value in the agricultural value chain. This significance to policy and practice would be crucial in the future when they could be a need for the development of more advanced mobile money services.

1.7 Chapter Outline

The first chapter of this study comprises of: the research background, problem, purpose, the objectives, research questions, significance of this research and concluded with the outline of the chapters that make up the research.

Chapter two aimed at providing a detailed review of relevant literature regarding the use of mobile money services in the activities of agriculture. It also provided literature on value creation and the agricultural value chain in Ghana This gradually led to chapter three.

Chapter three provided a detailed description of the theoretical grounding of this study. This involved, examining the theory and its associated concepts, together with its relevance to the research.

The next chapter, chapter four, focused on the research methods that were employed in this study. It provides information that seeks to justify the selection of the chosen methodology and how the methodology was used in finding appropriate answers to the research questions.

Chapter five then conducted an analysis on the findings to bring out dominant themes. It also includes the discussion of the analysed findings grounded on the research framework and appropriate literature with respect to the research objectives.

Chapter six provides a discussion of the findings in relation to the literature reviewed in seeking to answer the research questions stated in chapter one of the study. The chapter, therefore, brought together the findings of literature from chapter two and the empirical findings and analysis from chapter five.

Chapter seven presents the summary, conclusion and recommendations. It also examines the research questions and how they have been addressed in the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

The purpose of the research as stated in the previous chapter is to explore the dominant activities through which mobile money is used along the agricultural value chain and assess the value created in the usage of mobile money services along the agricultural value chain in Ghana. Therefore, this chapter provides the literature review. The literature focuses on mobile money in agriculture to eventually present a justification on the essence of this research.

There are four sections in this review of related literature. The first section reviews mobile money definition and conceptualization of mobile money. The second section seeks to explain the agricultural value chain and the various activities and actors it encompasses. An overview of financial technologies used in agriculture is discussed in the third section. In the last section gaps in research are discussed to establish the need for this study.

2.2 Defining Mobile Money Services

Mobile money has been described in varied ways by different authors. However, one concept that runs through all the descriptions is the fact that, money transactions can be made electronically through the mobile phone. Mobile money can be described to include the following; an account with electronically stored-value that is linked to the mobile phone of a user, an application or software that users can use to access their accounts on a mobile phone and an exchange between electronic value and cash over a connected system agent (Heyer & Mas, 2010).

Mobile money can also be used to identify a group of various financial services provided via mobile phones and other similar mobile devices (Dolan, 2009). It can simply be used to refer to the access and usage money of through a mobile phone (Jenkins, 2008). In literature, mobile money is sometimes used to refer to mobile payment or financial services. Over a period, the main aim of mobile money service was to provide remittance services. However, purchase of prepaid airtime and payment for goods and services among other service later became part of mobile money uses (USAID, 2010). Sending and receiving of remittances, saving money and making and receiving of payments, are some of purposes for which arguably, a large number of people who are unbanked who have become users of mobile money use the service for. This has created new pathways to address the transactional needs of the unbanked population (Ndiwalana *et al.*, 2010).

2.2.1 Mobile Money Service providers in Ghana

The Ghanaian mobile money business comprises of various mobile money services rendered by various mobile money service providers who use the service to reach more customers. They have therefore, created diverse services to address the needs of customers and promote the status. Mobile money services in Ghana are provided by the three major Mobile Network Operators (MNOs). They are MTN Mobile Money operated by Scancom Ghana, Airtel Money and Tigo Cash operated by AirtelTigo Ghana and Vodafone Cash operated by Vodafone (Cobla & Osei-Assibey, 2018; Yaokumah, Kumah & Okai, 2017).

The service is accessible to both users and non-users mobile phones. The Mobile Money service is given in association with banks and work through approved merchants

who assist in the provision of the service for the benefit of the accomplice banks. Ecobank is one of the partner banks (Etim, 2014).

2.2.2 Mobile Money Ecosystem

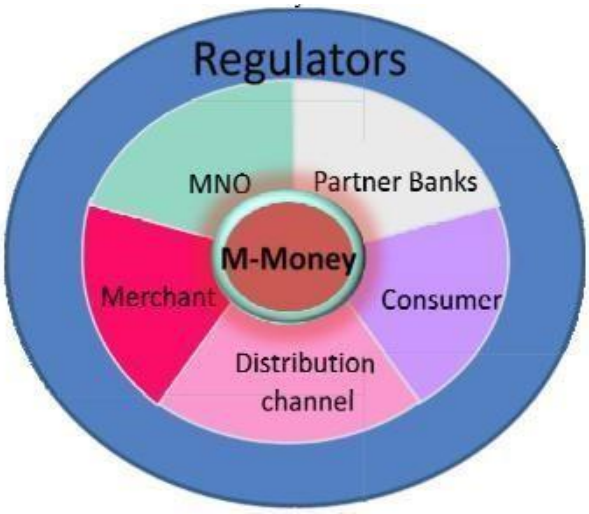
A business ecosystem is a term that was developed from the perspective of the biological ecosystem as well as business networks research. Moore (1993), described business ecosystem as the economic community comprising of competitors, customers, suppliers, partners and other stakeholders maintained by the interaction of individuals and organizations (Moore, 1996). With the use of the business ecosystem concept, there is emphasis on the interconnectedness of various actors and their dependence on each other to survive (Iansiti & Levien, 2004b).

Iansiti and Levien (2004b) reasoned that a firm cannot work in seclusion, adding that, the performance and strength of a firm depends on the performance and strength of the entire business environment. Furthermore, they developed metrics to be used to measure the strength of ecosystems and they suggested niche creation, robustness and productivity as dominating elements. Also, they created operation and innovation strategies which a firm can utilize in respect to its function within an ecosystem (Hartigh & Asseldonk, 2004).

By applying the business ecosystem in mobile money, Tobbin (2011) and Jenkins (2008) proposed that, there exist dominant actors in the ecosystem of mobile money. This ecosystem of mobile money includes; agents, banks, customers, competitors, merchants, Mobile Network Operators (MNOs) and regulators. They all work together for a common aim in the ecosystem. However, there exist other stakeholders. They

include international financial institutions, donors, civil society and micro-financial institutions. These other stakeholders, nonetheless, do not play a crucial part (Jenkins, 2008). The diagram beneath displays the major players in the ecosystem according to the model of Tobin (2011).

Figure 2.1: Mobile Money Ecosystem



Source: (Tobbin, 2011)

2.2.3 Stakeholders of the Mobile Money Ecosystem

Below is a table containing key actors who make up the mobile money ecosystem and the roles they perform in the mobile money service system.

Table 2.1 Dominant Actors in the Mobile Money Ecosystem

Actors	Roles Performed
Mobile Network Operators	Provision of communications and infrastructure service Quality control and oversight of agents When it is permissible by law, issuing of electronic money Use of leadership in actively bringing the mobile money ecosystem closer and provide mobile money strategy advice for other businesses like insurers, banks and utilities
Banks	Provide banking related services via a mobile device Keeping accounts in the names of customers. Perform cross-country transactions and adhere to financial sector regulation
Agents	Carry out cash-out as well as cash-in transactions Assist customers to perform simple procedures such as registration. Inform the appropriate authorities of suspicious transactions in accordance with law
Regulators	Provision of conducive business conditions for mobile money business Ensure stability of the mobile money system Show leadership to motivate and guide change of behaviour
Customers	Utilizing mobile money to perform transactions to make their lives easier

Source: Jenkins (2008)

As it is evident in table 2.1, there are a substantial percentage of major actors within the mobile money service system otherwise described as the mobile money ecosystem. These actors include; banks, consumers, merchants, Mobile Money Operators (MNOs) and regulators and their functions as mentioned in table 2.1 are described below.

2.2.3.1 Mobile Network Operators (MNOs)

Infrastructure, comprising of the mobile device application, back-end mobile-commerce server, wireless communication and application facilities are provided by the MNOs. Also, the MNOs provide a large distribution avenue for the selling of prepaid mobile credit cards. Avenues like these can serve more customers than banks and some financial institutions available. The capability of MNOs to reach many people across different categories affords them the opportunity to become major players in the system as stated by Jenkins (2008). It is the duty of the MNOs through their trained agents to provide customers with customer services.

2.2.3.2 Banks

Banks control the provision of license and storage of the deposits of mobile money customers in a trusted account in the bank. This is done by using their customer trust and the vast experience. The banks perform the role of intermediaries between the agents and the MNOs in the acquisition of electronic value. Merchants use the banks as points of aggregation, and the agents use them as the distribution channels. In the case of merchants, the banks present a connection to the account of a merchant to assist the movement of money from an electronic-float account to their main transactional accounts. The banks are authorized to handle transactions across countries and regularly give advice to MNOs on financial issues (Jenkins, 2008).

2.2.3.3 Agents or Vendors

Agents or vendors form the distribution channels of the mobile money ecosystem and they have principal contact with customers. They are entities that are not necessarily banks that are like retailers. Some of them are retailers from the MNO, others are individual retailers who deal with registrations for customers and perform cash-in and cash-out services acting in place of the MNOs (Jenkins, 2008; Tobbin, 2011). Through their rich understanding of the needs of customers, they contribute to the enhanced development of mobile money services. Initially, it was expected that the MNOs would use their available distribution channels, who sell airtime, as their main mobile money agents. Nevertheless, agents have widened their activities to retailers particularly in rural areas. Just like how banks have branches, the branches of the MNOs are the agents or vendors.

With 140,000 active mobile money agents and just 1,300 bank branches, Ghana's mobile money providers appear to be well placed as key enablers on the path to an inclusive digital economy (GSMA, 2018). The most important factor selecting an agent is the liquidity of the retailer. These retailers usually have adequate liquidity from their other businesses to meet the needs of the customer in withdrawing cash. There is a commission charged on the mobile money services rendered and a percentage is paid to the agents. These commissions are however, arguably, small amounts for each transaction, the volume of these transactions gradually build up to a substantial amount. Existing retailers who are agents have an added advantage of decreasing their risk of transporting large amounts to the bank and back (Jenkins, 2008).

2.2.3.4 Merchants

Additional reasons to use mobile money services is provided through merchants and sometimes utility providers. These merchants comprise; casinos, retail shops, lotteries, online shops and providers of general products and services who are adopting and making use of the platform to receive payments from their customers (Tobbin, 2011). Customers buy the electronic-value from agents and then use as payment to the merchants by the transfer of the electronic-value from the customer's account, to the account of the merchant. For instance, through mobile money, customers are able to pay their utility bills such as DSTV. The mobile money system, therefore, gives some convenience to a utility user, since this payment method is faster and provides security to customers and merchants. As a result of the conveniences offered to customers, the customer base could increase for the merchants (Jenkins, 2008).

2.2.3.5 Regulators

A regulator in the mobile money ecosystem helps in the continuing survival of the system. The understanding and experiences of the various institutions and industries involved in the ecosystem are brought to bear by regulators. They are responsible for imposing regulations to promote stability between value creation, innovation, financial inclusion, prudence and efficiency. Mobile money operators are performing a major function in the provision and delivery of the services of mobile money cross the world with sixty percent of nearly all mobile money services operated by MNOs. For example, in Sub-Saharan Africa (SSA) more than half of all the MNOs have successfully rolled out a mobile money service, about 75 out of 144. Their knowledge in creating trusted brand awareness, distribution networks, owning the channel used in enabling accessibility to mobile money services on mobile devices, the USSD (Unstructured

Supplementary Service Data) and mass marketing is a great asset to them (GSMA, 2014). The activities of regulators are manifested in the activities of the other members in the ecosystem (Tobbin, 2011). A report by GSMA gives direction regarding the development of a regulatory framework to be used in mobile money services with particular emphasis on remittance. This results from the fact that, mobile operations do not have sufficient experience in regulations regarding payment. Hence, the goal of that report was to help describe likely regulatory challenges that could arise payment service issues of mobile operators (GSMA, 2007).

2.2.3.6 Customers

The final beneficiary of the mobile money service is the customer. Customers bring their varying needs which become possible opportunities in the ecosystem of mobile money. Tobbin (2011) emphasized that, the engagement of customers with the service determines whether it will be successful or not. Hence, it is essential that the needs of customers are addressed. Meeting the needs of customers would decrease the risks that customers would perceive.

2.2.4 The Mobile Money Process

Mobile money is made up of many systems that are interconnected and make up the mobile money system with a client server-based system that has its client application on a SIM card. This SIM card is a chip that serves as an identification to phone number of the subscriber which connects to the server of an MNO. The application connects to the network of an MNO and with the help of the SMS protocol, it communicates with the mobile-commerce server when initiated. The mobile money services usually involve three steps. They are; registration, withdrawals and payments.

2.2.4.1 Registration

Firstly, customers need to register with an agent of their network for the service. Registration is done only once it is needed before a user would be able to use any mobile money service. This registration is traditionally, free. A customer would have to visit an agent or vendor with a valid national identification card. The agent would then use his or her phone to carry out the registration procedures for the customer temporarily on the mobile commerce server of the MNO. A mobile wallet account is then created on the mobile-commerce server, after which a confirmation in the form of a Short Message Service (SMS) is sent to the customer. A secret PIN would be set for the account by the customer (Adasa, Li, Safia, & Hossin, 2018). It is usually comprised of a set of four unique numbers. The PIN should be known to the user of the account only as it is the key to the account.

2.2.4.2 Cash - In

Customers are allowed to deposit money into their account after activation of the account for free subject to the network provider involved. This process includes the exchange of cash for electronic money to be loaded into the mobile money account. The electronic money is transferred from the SIM card of the agent in a mobile phone to the account of client via the mobile commerce server after the agent has received a corresponding amount of the electronic money from the customer (Adasa *et al.*, 2018). Subsequently, there is a request for a transfer of e-value between the two accounts, that is sent to the m-commerce server from the phone of the agent as an encrypted SMS. The customer then confirms the transaction when an SMS is sent to him or her immediately (Stuart & Cohen, 2011).

2.2.4.3 Withdrawals and Payments

When customers have loaded mobile money accounts, they are able to buy airtime, send money to people in any part of the country and pay their bills. These transactions are typically performed using the mobile money interface a customer has on their mobile phone. Many implementations of the mobile money service make use of a menu mode of access through the SIM toolkit, a standard software common to all mobile phones, in order to ensure a balance among costs, usability and security (Hughes & Lonie, 2007). Withdrawing money from a mobile money account, involves the customer contacting an agent to withdraw cash from the mobile money account belonging to the customer. To send money to a different person, a customer, with the use of the SIM toolkit or a short code transfers an electronic value from his or her phone to the mobile money wallet of the recipient. An encrypted SMS is then sent to the m-commerce server from the mobile phone of the sender with a request to transfer the required amount to the specified recipient. A verification is done to ensure the sender has sufficient funds to complete the transaction (Adasa *et al.*, 2018). The sender's account is then debited with the specified and appropriate service charge by the m-commerce server and the account of the recipient is credited. As SMS confirming the transaction is sent to the sender and the specified recipient (Camnar & Sjöblom, 2009).

2.2.5 Mobile Money Uses

There exists, several uses for which mobile money is adopted. They include; savings, sending and receiving money, paying bills and purchasing of airtime among many others. These uses are described as functional transactions (Davidson & Penicaud, 2011). Below is a description of some of the uses of mobile money.

2.2.5.1 Savings

Mobile money services permit users to keep their funds via an account they already have with a bank or a mobile money account they have with their mobile network provider (Solin & Zerzan, 2010). Therefore, some individuals who do not withdraw or send the money in their mobile money accounts instantly, are able to accrue savings on their mobile money accounts over a period. Hence, mobile money transfer is used as a convenient method of saving, in addition to sending and receiving money (Contini *et al*., 2011). The Ghanaian mobile money environment allows mobile money subscribers to transfer funds from bank accounts to mobile money accounts and vice versa. Mobile money accounts are thus, becoming a means of storing funds and not only through the usual savings in a bank account.

2.2.5.2 Purchasing of Airtime

One of the most widely used functions of mobile money is the purchasing of mobile phone credit from mobile network providers. This involves users purchasing credit for themselves or sometimes for others by inputting the mobile phone number on the menu of the mobile money service (Berman, 2011). Network providers have largely encouraged customers to use this service as it lessens the costs that is incurred in distributing airtime the conventional way. This function is the most commonly used function as active users of mobile money carried out averagely 4.5 mobile airtime top-ups in December 2014 alone (GSMA, 2014).

2.2.5.3 Sending and Receiving money (Person-to-Person transfers)

Mobile money is also widely used for sending and receiving funds with mobile money users and non-mobile money users. Fees charged per transaction is dependent on the

service provider and the amount of funds transferred (Intermedia, 2012). The sender is usually asked to authorize the transaction by providing their PIN when prompted by mobile money system. When the PIN is entered by the sender, the transaction is then executed by the network operator and the sender and receiver are notified of the transaction through SMS (Gutierrez & Choi, 2014).

2.2.5.4 Payment of Bills

With the use of mobile money services, customers are allowed to pay for various bills, such as utility bills and school fees. Electricity bills are also being integrated into the system in collaboration with real time bank reconciliations that offers customers to opportunity to pay their electricity (Ndiwalana *et al.*, 2010). A study by Aker and Wilson (2007) found that users in Ghana were using the service for receiving transfers (eighty percent) or savings (seventy-six percent), and usage was highest among those who had access to a mobile phone. MTN Mobile Money Ghana, provides services such as money transfers, savings, loans, deposits, withdrawals, purchase of MTN shares, banking services, payment of bills (Dstv, Gotv, school fees payment, water and electricity bills and MTN post-paid services), pensions and insurance.

2.2.5.5 Payment for Retail Services

Retail payment through the use of mobile phones is gradually being used in both online and offline retail activities. While purchasing online, customers provide shopping websites with information such as mobile number and provide verification for the ownership of the mobile phone with the help of SMS confirmation. With respect to shopping off-line, the use of a one-time bar code is employed. It is created using an application which encrypts information about mobile phone number. This service is

however, limited to approximately 270 US$ to avoid undue purchases by scammers (Gutierrez & Choi, 2014).

2.3 The Use of Mobile Money in Ghana

Table 2.2 Mobile Money Statistics from Bank of Ghana for the year 2017

Indicators	**January to September, 2016**	**January to September, 2017**	**2017 Growth (%)**
Mobile money accounts registered (Cumulative)	18,862,941	22,010,756	16.69
Mobile money accounts active	8,099,190	10,578,039	30.61
Agents Registered (Cumulative)	123,129	163,869	33.09
Active Agents	95,061	140,288	47.58
Volume of Total transactions	368,304,806	685,674,266	86.17
Value of total transactions (GH¢ million)	51,430.32	109,133.60	112.20
Balance on Float (GH¢ million)	845.18	2,157.15	155.23

Source: BOG (2017)

Note:

*There are three (3) MNOs who offer mobile money services: MTN, AirtelTigo and Vodafone.

*Active customers are customers who have made a transaction on any mobile money platform at least once in the 90 days preceding the report.

*Active agents are who have made a transaction on any mobile money platform at least once in the 30 days preceding the report.

Money transfers via mobile phones helps to resolve problems associated with users having to travel to urban areas to set up accounts with traditional banks. It is a strategy, that is aimed at offering financial inclusion for people who are unbanked (Hinson, 2011). This evolvement of the banking system is contributing to changing many lives globally (Uzor, 2011). Serving as an aid in financial inclusion and economic growth, mobile money is expected to have many benefits for the various sectors of the economy in Ghana (Hinson, 2011). The lead role in offering the mobile money service has been given to financial institutions by virtue of the Bank of Ghana's regulatory framework. This has enabled the creation of an open scheme of an almost flawless method of sending and receiving funds (Ayo *et al.*, 2012).

Statistics from Bank of Ghana displayed in table 2.2 above additionally established that in the year 2017, the overall number of mobile money customers registered was approximately 22 million and the total number customers that were active, was approximately 10 million. Service operators in developing economies like Ghana are increasingly re-designing business strategies and developing methods to offer new and innovative services to already existing customers as well as be able reach new clients, by mostly taking advantage of the mobile banking industry (Krugel, 2007). To promote wide outreach and connectivity through barring exclusive partnerships promoting partnerships of MNOs, banks and stakeholders that would help meet the needs of each other's customers, the bank of Ghana, announced in 2008 that financial institutions like the banks and the agents that work for them are the only category of institutions with the authority to provide mobile banking services. Key guidelines were also given to financial institutions and other stakeholders interested in offering mobile money services (Bank of Ghana, 2008).

Statistics from the Bank of Ghana in table 2.2 indicate that, in the year 2017, the volume of mobile money annual transaction in Ghana was close to 110 billion Ghana cedis. It is expected that this figure would increase steadily if more people recognise and accept mobile money and this would offer enormous benefits to the stakeholders.

2.4 Benefits of Using Mobile Money Services

Usage of mobile money has the capacity to enhance economic activities. Costs and delays associated with the trade of goods and services is greatly lessened, thereby supporting the growth of transactions. Okello *et al.* (2012) indicated that mobile money transfer services enhance the transfer of money faster and less expensive. Mobile money is relatively less expensive than many alternatives to cash. McKay and Pickens (2010) in their comparison of twenty-six banks reported that, the use of branchless banking, of which mobile money is a part of, averagely, costs 19% less than alternative services. The difference was even more noticeable when transactions involved low transaction amounts.

Furthermore, mobile money is facilitating the growth of a cashless economy for Ghana. Attributing to the limited number of formal financial institutions in rural areas, a majority of people transact their businesses through the use of physical cash, making it challenging for the monitoring of the trail by regulators. Reduced leakages, overheads, and transaction costs could be the impact on poor households if they are linked to an electronic payment system which offers them the opportunity to make cash transfers. The transactions of mobile money are transparent with a trail of records. This similar to credit or debit cards which provide an avenue for monitoring by the regulators. Movement of money from the informal to the formal sector is made more visible, and therefore, it is easy to determine the velocity of money.

Mobile money has greatly changed the remittance patterns of costumers. Gradually, customers are making smaller but more recurrent money transfers whereas urban settlers are remitting smaller amounts more recurrently (Morawczynski & Pickens, 2009). A typical example is, before M-PESA was adopted, Morawczynski and Pickens (2009) reported that, many customers were remitting their relatives at home once every month or once in two months. They further explained that mobile money was less expensive and more accessible and that is responsible for the recurrent transfers. Hence, a customer could send any amount anytime and everywhere. This has led to a rise in the income levels of people in rural areas, creating an opportunity for them to save when receiving money from remittances. World Bank suggests that declining commission fees by 2% to %% could possible cause an increase in remittances by 50% to 60% and hence, would boost local economies. A decrease in the commission charged on individual remittances could allow for the sending of lower amounts of remittances than the current average transfer value. There has been an increased level of remittances as a result of mobile money and has therefore caused an increase in economic activities leading to faster economic growth.

Transaction cost is also reduced by mobile since customers are no longer required to pay transport fares to urban areas, in order to access financial services. On the contrary, customers are currently able to transact their business directly with mobile money agents (Morawczynski & Pickens, 2009). Costs like these comprise fix costs that involves time and travel costs. It also involves variable costs which results from losses as a result of theft or robbery during road trips. A decline in such costs is critical especially for rural dwellers, as they are heavily dependent on remittances from

relatives outside the rural areas for their livelihoods. These benefits have led to the rising contribution of mobile money towards economic growth in Ghana.

The swiftness of mobile money coupled with its liquidity offer major benefits. In periods of crisis, poor people readily have funds available from their savings in their mobile money accounts to sustain them. This is crucial because, poor people have limited assets such as gold or livestock or land. These assets are difficult to liquidize in times of crisis and their market value could fall if many other people in such crisis are seeking to liquidate their assets. Furthermore, having to send physical assets such as livestock, gold or cash to people in need could be risky. The convenience and accessibility of mobile money makes it more reliable as compared with other informal methods of money transfer as people are able to access cash when they need it regardless of the location (Stuart & Cohen, 2011).

2.5 Factors that affect the Derivation of Benefits from Mobile Money Services

The use of mobile money services to achieve certain benefits is affected by certain factors. These factors could increase or reduce the benefits of using mobile money which could lead to value creation. Below are some of the factors found in the literature reviewed.

2.5.1 Financial Literacy

Research has shown that the utilization of financial services is proportional to an increase in the levels of education (Nunoo & Andoh, 2011; Cole *et al.*, 2011). Normally, literacy is critical in providing mobile money services since the mobile device which serves as the product delivery platform, requires a person to possess the fundamental

knowledge about reading from screen of a mobile device. Be that as it may, financial literacy is more crucial since there is improved utilization and access to financial services. Subsequently, customers are handed the capability to measure the value of the service and also to request for more value-added mobile money services. In 2006, a FinScope survey that was conducted shows that before M-PESA in Kenya and Tanzania was launched; there was a low level of financial penetration in both countries. Nonetheless, Tanzania had a much lower level in financial access with about 54% exclusion rate as compared to Kenya with 38% (FinScope, 2006; FinAccess, 2007). This is a clear indication that Kenya had a much higher level of financial awareness.

2.5.2 The Quality of Substitute Financial Services

Research shows mobile money is capable of yielding benefits or creating value if there is low quality in the services provided by banks and also alternate remittance channels like debit and credit cards (payment cards). Preceding M- PESA launch, sending relatives and friends, personally travelling to deliver and the use of post offices were all the common ways by which money was sent in Kenya (Camnar & Sjoblom, 2009; Kabbucho *et al*., 2003; Morawczynski, 2008). Many Kenyans perceived the utilization of the money remittance service of the post office as inconvenient and expensive due to high user fees and limited locations (Mas & Ng'weno, 2010). Furthermore, the alternative ways of moving cash from one place to the other were unsafe, since people could get robbed or assaulted easily. Movement of cash was also unreliable, due to the fact that there was no guarantee monies would be received in good time or reach their intended destination. This mode of money transfer was also time consuming, since there a person would have to take time off work just to travel long distances to give out

money. All these conditions contributed in the fast growth of M-PESA in Kenya, which provided better services and enabled customers to gain maximum benefits.

2.5.3 Level of Economic Growth

When M-PESA was launched, Kenya had a more robust economy with a per capita income of about 700. This was considerably high (World Bank, 2010).This considerably strong economic development level allowed Safaricom to develop a broader and effective network of agents from their current base of airtime sellers who were largely made up of SMEs with many outlets of retail who became a component of their network of extensive retailers (Camner *et al.*, 2009; Heyer & Mas, 2011). Additionally, Kenya's solid economy play a tremendous role in the level of the financial system development which is incompletely credited to the achievement of MPESA. The success of mobile money operations by agent networks is boosted by the broad system of well-trained agents who offer mobile money vendor points in local areas (Heyer & Mas, 2009). Vendors or agents are essential in empowering a money mobile service operator to gain service efficiency through the provision of dependable services and addressing questions of users, hence, assisting to build trust and credibility in the service usage

2.3.4 Urbanization

A higher rate of urbanization is sometimes characterised by the ideology of capitalism development, and policies that allow for urbanization by the modernization the urban areas whilst turning a blind eye towards the rural areas thereby leaving them greatly under-developed (Ross & Weisner, 1977; Camner & Sjoblom, 2009). This influences those from the rural areas, usually the men who more often than not are heads of

families hence travel to urban areas in search of job opportunities. However, existing superstitious beliefs and cultural practices which include ancestral inheritance to land provides reasons for migrants in urban centres to keep ties with their relations in rural areas, which are strengthened by the act of sending remittances (Heyer & Mas, 2011; Morawczynski, 2011). This results in the growth of a leading urban-rural remittance pathway that has influenced the greater derivation of mobile money services.

2.3.5 Regulations

There exist regulations set to oversee the activities of mobile money. These activities could either constrain or facilitate the delivery and eventual creation of value by mobile money service through two major ways. To begin with, regulations could impact the structure of the business model, which decides the capacity of a mobile money operator to rapidly achieve a more extensive customer base or to increase the agents (World Financial Discussion, 2011; Heyer & Mas, 2011).

2.3.6 Financial Autonomy

A social viewpoint that encouraged the M-PESA adoption in Kenya is the commitment to expanding the monetary independence of the less empowered people in a family unit that is largely made up of women with very low income. In many communities in Kenyan, the conventional practices, for example, sole responsibility for resources by men only has limited the power of women to bargain within families. Thus, women have frequently looked for different choices to manage their income, which incorporate associating themselves with some informal savings groups, for example, ROSCAs (Pivoting Investment funds and Credit Affiliation) and ASCAs (Accumulating Reserve funds and Credit Affiliations). Anderson and Baland (2002) who conducted a survey

found that eighty-four percent of members of ROSCA are women. The survey also revealed that the married women are more likely to join ROSCAs. While investigating this phenomenon, the research found that women take part in ROSCAs so as to hide their money from their spouses. This practice is complemented my M-PESA by furnishing women with a more imperceptible and secure route for them to manage their incomes without looking for endorsement from their spouses, hence, expanding the bargaining power of their family (Plyler *et al.*, 2010; Morawczynski, 2009; Jack & Suri, 2011)

2.6 Challenges in Mobile Money

Mobile money transfer has many benefits as mentioned earlier and is undergoing speedy development globally in recent times. However, there are a number of challenges that customers encounter in their use of mobile money services.

Poor quality and unreliable network connection are a challenge that the mobile money service faces. Network connectivity is the most crucial factor in mobile money service operation. Slow or poor network connection delays mobile money transactions. It prolongs the time that it takes to send the confirmation message to the mobile money vendors and the customers and thus slowing down the whole process. Senso and Venkatakrishnan (2013) indicated that network failures are the main factor that inhibits a large number of customers from being able to use the service. A similar research by Ndunge (2011) also emphasized that network connectivity challenges particularly in rural areas is a principal issue of concern to mobile money users. Sending of confirmation messages after transactions could be slow in some locations as a result of the nature of telecommunication networks. This creates delays and inconveniences for

customers as merchants could receive receipts of payment hours later whilst customers might be impatient.

Another challenge facing customers that use mobile money services is the issue of fraud and other security concerns. The occurrence of fraud in mobile money transactions was mentioned by many researchers as a major difficulty which inhibits customers in their use of the services. This challenge is becoming more alarming with the growing use of mobile money remittances globally, which are not necessary covered by traditional financial institution regulations (Ernst and Young's Global Member (EYGM), 2009). Mobile commerce is growing steadily, as such, theft of personal customer financial details and are also increasingly becoming a threat that must be curtailed. Fraud management adds additional complexities and costs to this process, making it increasingly difficult for the success of new market entrants (EYGM, 2009). Ndunge (2011) reported that numerous women were reported to have lost their money through fraud and the most frequent form of fraud being the receiving of an SMS or a call from fraudulent persons claiming that, they had sent money to their M-PESA accounts in Kenya mistakenly and request unsuspecting women to send them the money. Various fraud methods are also used in such activities such as fake money, swapping of SIM cards, and unfaithful workers are as observed by both customers and agents. Many times, customers are deceived that they have won false awards or prizes from network providers by swindling them of large sums of money (Senso & Venkatakrishnan, 2013).

Moreover, inadequate education is a challenge facing mobile money services. Inadequate information on the utilization of mobile money services amongst clients is a major concern in ensuring the advancement of the service. The vast majority of mobile

money clients see mobile money as just a service just for accepting or sending money, an observation of enlisted clients irrespective to whether they were from provincial, peri-urban or urban regions (GSMA, 2015). Likewise FITS (2013) revealed that, one-fourth of all clients said they required assistance from other individuals whilst performing mobile money functions or transactions, many times they seek help from vendors or agents to assist them with transactions.

In addition, mobile money vendors or agents are sometimes the cause of some of the challenges customers face. Agents have a crucial job in aiding mobile money clients with the greater part of their informational and transactional needs. In any case, agents can likewise be a reason for dissatisfaction, particularly when these agents are impolite, missing or run out of cash or electronic value to assist in performing a transaction; a larger part of registered clients of mobile money services complained they have ever experienced issues with agents to nearly all service operators in rural and urban areas (FITS, 2013; FII, 2014). A number of clients described how frustrating it is to move from one vendor to the next with a similar answer, that they lacked cash or electronic money to attend to the clients, causing delays and wasting of customers (Senso & Venkatakrishnan, 2013).

2.7 Defining Value creation

Value creation is defined as the management of the execution of business activities with respect to rates of return earned after some time or income generated (McTaggart, Kontes & Mankins, 1994). Mizik and Jacobson (2003) characterize value creation as the procedures involved in a firm advancing, delivering and conveying value to the market. A comparative definition is given by Priem (2007), who characterizes value

creation as any advancement given by the firm that sets up or expands a customer's valuation of the advantages of consumption benefits. Building on the concept of utilization and exchange value given by Bowman and Ambrosini (2000), Priem (2007) again, identifies that value creation is the aftereffect of two activities in the firm: expanding use value and/or diminishing exchange value. Hence, value creation has consistent spotlight on benefit at the spending of available contributions to value which are made by relationships or connections (Walter, Ritter, & Germunden, 2001). As recommended by Vargo *et al.* (2008) in their study, the setting of value creation is as essential the abilities of the stakeholders. Value creation demonstrates the creation of value by buyers being used and further describes that co-creation of value as a piece of cooperation (Grönroos & Voima, 2013).

Vargo *et al.* (2008) present two generic definitions of value. They are: Value-in-use and Value-in-exchange. They each signify two diverse perspectives of value. Therefore, value is created with various actors; consumers and companies. The consumer is the one who solely finally determines the value even there are other stockholders, government, employees and many actors (Vargo *et al.*, 2008). Key players are constantly a component of value creation (Lusch & Nambisan, 2015). The value-in-context component states that value is not constantly co-created, it could be formed by different actors or resources (Lusch & Vargo, 2014). Association with resources and actors offers an opportunity for delivering value to key players (Chandler & Vargo, 2011).

Goods-Dominant (G-D) logic is guided by value-in-exchange description of value (Vargo & Lusch, 2014). The goods-dominant logic value is created solely inside the

organization and distributed within the market, but not in the interaction with others or among customers (Vargo *et al.,* 2008). It is founded on an idea of value proposed by Smith (1776); the real value originates from the work of the organization. The major issue in goods-dominant logic is to ensure the sale of goods and services (Vargo *et al.,* 2008). Arnould, Malshe and Price (2006) hold a viewpoint where goods-dominant logic is insufficient for describing the job of consumers in the utilization of their resources which could be used in value-in-use from the service of a provider in an innovative manner.

The other view is service-dominant logic (S-D logic) which is value-in-use being tied (Vargo & Lusch, 2008a). The service-dominant logic is founded on the basis of products being an approach to provide service to a customer (Vargo *et al*., 2006). With the service dominant logic, consumers as well as other stakeholders are together, creating value so it is termed as value co-creation which describes the fact that, value is created in communication and relations with other stakeholders (Vargo *et al.,* 2008). All actors produce the value in the creation of value for value-in-use in universal market from the service-centred view (Vargo *et al.,* 2008). Heinonen *et al.* (2010) and Grönroos (2011) appreciate that, there is an absent understanding about value and its co-creation as well, and also the fact that, it is not only the guarantee of value, but additionally, the control of value creation by customers. Value could be created in various places and processes when it comes to customers, for some individuals, value may be created whilst they are dreaming of an excursions or vacations and others may create their value from learning processes and memories (Voima *et al.,* 2011). All actors, companies and consumers co-make value, making the creation of value a wrapping process (Grönroos, 2011). However, here Vargo and Lusch (2006) have stated that value creation is

"perceived and determined by the customer on the basis of value-being used", this assertion leaves value uncertain. Hence, Grönroos and Voima (2013) revealed that per available knowledge, the value could not be value-in-use yet, it could not also be value-in-exchange, this accounts for the unclear impression of value.

2.8 The Agricultural Value Chain

Value chains are described to comprise of all the various activities which are required to ensure that a service or product from the beginning of production, through the various stages of production reach the final consumers (Hellin & Meijer, 2006). An Agricultural value chain refers to all the steps that an agricultural product takes, from its point of origin to the consumer. It incorporates all organizations and the activities they undertake in the supply of input, production, transportation, and marketing or sale of agricultural products (Tchale & Keyser, 2010). Agricultural value chains could be viewed as financial units of analysis of commodities that envelops an important categorization of economic exercises that are connected vertically by market connections. The accentuation is on the connections and interrelations among suppliers of input, producers, distributors, traders and processors (UNCTAD, 2000).

They likewise connect urban utilization with provincial production. The evolving demand, as a result of urbanization, development of present-day patterns of consumption or fresh patterns in global trade, effects on rural zones along within chains and overflow to production and marketing systems. The rural-urban connections bear difficulties yet, it provides common advantages for both consumers and producers and can also be key promising entrance points for improvement interventions (Höffler & Maingi, 2006). Therefore, agricultural value chains could incorporate at least three of

the accompanying: input sellers, farmers, wholesalers, customers and retailers. The accomplices along the value chain cooperate to identify aims and are eager to share benefits and risks and as well as contribute their time, assets and energy to ensure a working relationship.

Figure 2.2 The stages in the agricultural value chain

Source: (Tchale & Keyser, 2010)

2.8.1 Stages in the agricultural value chain

As shown in figure 2.2, the general agricultural value chain has various stages. Each of the stages has actors who perform certain activities to achieve of the goal of that stage of the agricultural value chain. Each of these stages have been explained below.

2.8.1.1 Input Supply

Input suppliers specialise in distributing genetic materials used to produce crops or livestock. For example, seeds or breeding stock that are used to produce the main agricultural products (MOFA, 2011). This is, essentially, the stage before farming. There is often significant research and development involved in producing what is called seedstock. In agriculture, input suppliers can be private enterprises (Adu *et al.*, 2014).

2.8.1.2 Production

Producers are the farmers who prepare the land, plant the crops, apply fertilizers, weed and harvest the crops among other practices. Production involves four particular kinds of farmers: surplus farmer, subsistence farmer, developing commercial farmer and a

well-established commercial farmer. Nonetheless, it is critical to take note of that producers of maize are exceedingly differentiated, even among smallholder farmers. For instance, Jayne, Chapoto and Chamberlin (2010) reported that, 1-2% of families in Malawi, accounted for half of the promoted maize, this was mainly as a result of the rising commercial farmers while 16-18% of families produced for the other half of maize marketed, which is however dependent on the years. During the same period, approximately 80% of the homestead family units were not able to sell any quantity of maize, so from a maize production of about two to two and half million metric tons, only about five hundred thousand to six hundred thousand metric tons were marketed well. Out of maize marketed, about seventy-five percent originated from little smallholder farmers, given the balance of twenty-five percent from well-established commercial farmers. The large commercial farming business in Zambia, greatly contributes to the promoted maize, however, smallholder farmers dominate the overall production. In the interim, Mozambique has a less volume of maize produced on a large scale, with most of it coming from smallholder farmers (Cutts & Hassan, 2003).

2.8.1.3 Aggregation

Aggregation involves the buying of agricultural produce from small holder farmers in order to accumulate a large quantity for sale or processing. Several actors in the agricultural value chain collect agricultural produce like maize from many remote rural areas and aggregate it to satisfy the needs of large-scale processors and international buyers such as the World Food Program (WFP) and Non-Governmental Organizations (NGOs). At the bottom of informal channels of aggregation are the petty aggregators who largely operate from motorcycles, small trucks or bicycles and gather small quantities of agricultural produce from farms in rural areas (Tchale & Keyser, 2010).

They offer ready market to farmers who are ready to sell, even though, their prices may not be the preferred price of the farmers. These smaller traders are focused on particular geographic locations as such, they are able to gather enough quantities for the medium aggregators. Medium-sized aggregators sell to large-sized aggregators such as food reserves, and mills who deal in huge quantities.

Medium-sized aggregators usually own large trucks which serve as their transport systems, although they may sometimes directly transport to the storage units of large aggregators (Kapuya *et al.*, 2010). Large aggregators may also directly purchase from farmer associations and large producers. They also sell to the processers like millers and exporters. Further, large aggregators sell big grain markets where agricultural ends up going back to villages again.

2.8.1.4 Processing

The predominant action in the processing of many grains or other agricultural produce is refining it into a meal. Daily or weekly family unit grain needs are processed at small mills, or at huge mills used for commercial purposes and milled at a fee (MOFA, 2011). Processing generally includes finished animal fee and human food products. While a significant number of the mills mainly engage in providing milling services, some of them also purchase agricultural grains to store, process and sell later on at higher prices. Feed factories can either be independent plants or delivering feed for business deal (Creature Feed Makers Affiliation (AFMA), 2010).

2.8.1.5 Retail

In an agricultural value chains, the processor may combine commodity products, transforming them into an ingredient for further processing or use by a consumer as an ingredient (MOFA, 2011). Retailers are, therefore, responsible for distributing food products directly to the end consumers. Retailers deal in both unprocessed and processed agricultural produce (Akramov & Malek, 2012).

2.8.2 Selection of Maize Value Chain

Maize (Zea Mays) is grown across a wide range of geographical locations in Ghana. Maize is largely grown in upper west, the forest zones, upper west and southern regions in Ghana. Rain-fed conditions and traditional production methods of smallholder farmers are mostly the conditions under which maize is cultivated in Ghana. Maize is the largest produced and most widely consumed cereal in Ghana and the production of maize has been an increasing trend since 1965 (FAO, 2008; Morris *et al.*, 1999).

In Ghana, it is a great source of calories in, and reports show that, it has almost become a replacement for staple crops in Northern Ghana such as pearl millet and sorghum (SRID-MoFA, 2011). In Ghana, the total estimate of maize production is about 880,000 hectares with a total yield of 1,692,000 metric tons and average yield per hectare of 1.92 metric tons (SRID-MOFA, 2015). Maize contributes to about 50% cereal production in Ghana and 85% of the produced maize goes into human consumption (Akramov & Malek, 2012) whiles 15% is used as animal feed. The annual yield of maize has been reported to be rising by 1.1% (IFPRI, 2014).

Approximately, 70% of small holder farmers cultivate the overall maize produced. The yearly average maize produced was indicated to be 1.5 million metric tons from 2007 to 2010 (Rondon & Ashitey, 2011) together with an average yield of approximately 1.7 t/ha (SRID-MoFA, 2011). Post-harvest loss range between 5% to 70% (FAO Statistical Division, 2012). All parts of maize have economic value. It is used for poultry feed and to a lesser extent to feed livestock. Maize is the second largest commodity crop after cocoa. The leading producing areas of maize are the Ashanti Region, Brong-Ahafo region and Eastern region. 84% of maize are grown in these areas where the remaining 16% are grown in the northern regions of Ghana.

One million metric tons of maize is indicated to be annually marketed in Ghana. A substantial amount of maize produced stays inside family units of producers as an essential staple food. Maize is consumed in diverse cultures and traditions and a percentage of the maize is also utilized as feed in the poultry business. About 20% to 25% of the complete maize promoted is utilized for industrial purposes. Wholesale cost of maize is subject to closeness to markets and the year's season, with costs commonly high in the off seasons (Amanor-Boadu, 2012).

Domestic maize trade depends greatly on a linked system of traders connected ethnic and personal ties. Market queens dominate the local and regional markets and aggregators usually buy from farmers they have had long standing relationships with. Some of the popular markets in Ghana known for their huge sale of maize are the Techiman market, Dormaa maize market, Badu Maize market, Ejura and Odumase markets amongst others.

2.9 Review of Mobile money Research

Table 2.3 Literature Review Table

Research Paper	Context	Perspective	Theory	Methodology	Gaps Identified
Babcock (2015)	Uganda, Zambia, Ghana	Farmers	No theory/Model	Qualitative	Need to extend the study to the other actors who work with farmers and their use of digital finance with farmers
Kikulwe, Fischer & Qaim (2014)	Kenya	Farmers and households	Conceptual framework	Quantitative	Research using a multi-stakeholder approach rather than focusing on only farmers and their households
Kirui, Okello, Nyikal & Njiraini (2013)	Kenya	Farm households	Conceptual framework	Quantitative	Need to examine the effect of using well-known mobile money innovations announced after Mobile Money services such as Pesa-Pap and Pesa-Connect on the welfare of smallholder farmers
Sekabira & Qaim (2016)	Uganda	Farm households	Conceptual Framework	Quantitative	The need to analyse the usage of mobile money among the various actors of the agricultural value chain.
Yu & Ibtasam (2018)	Ghana	User Perspectives	No theory/Model	Qualitative	Need to consider examining contextual user's needs, actual financial transactions and use cases and taking advantage of these to fully exploit and engage stakeholders in mobile money
Afshan & Sharif (2016)	Pakistan	University students	UTAUT, TTF and ITM.	Quantitative	Analysis of the effect of personality traits, such as individual tendency to trust, in their preliminary trust model instead of

					concentrating completely on environmental aspects.
Grossman & Tarazi (2014)	Ghana	Farmers	No theory/Model	Qualitative	Need to extend the study to the other actors who work with farmers and their use of digital finance with farmers
Aker (2011)	Developing Countries	Public sector programs	No theory/Model	Mixed methods	Test cases programs should be surveyed utilizing thorough effect assessments, which evaluate the causal effect, in addition its components; determine if such methodologies are supplements or substitutes for conventional expansion.
Batista & Vicente (2017)	Mozambique	Farmers	No theory/Model	Quantitative	Their test structure, which was constrained by statistical power, can be refined further as far as creating increasingly explicit variety that can be interpreted vigorously as social network pressure.
Duncombe (2012)	Uganda	Market and user perspective	Conceptual framework	Qualitative	There is the need to tackle the take-up of m-fund applications that move past exchanges to include account-based services and mobile payments, in this way tending to a more extensive scope of money related issues

The agricultural value chain encompasses a set of actors; input dealers, farmers, aggregators, processors, and retailers, who add value to agricultural products at each stage (FAO et al., 2010). Studies conducted on agricultural value chains should, therefore, include these perspectives. However, literature on agricultural value chains and the use of mobile money seem to focus mostly on one of these stakeholders. For instance, Kikulwe *et al.* (2014) focused mainly on one stakeholder; the small holder farmer, during their analysis of the benefits of mobile money transfer usage on the activities of smallholder farm households in Kenya. Similarly, Kirui, Okello, Nyikal, and Njiraini (2013) in their examination of the impact of mobile phone-based money transfer on agricultural households focused on the household of the farmer. Recognising the limited focus of studies on agricultural value chain from a multi stakeholder level in the Ghanaian context, there is, therefore, the need for research such as this to fill the gap in knowledge and offer a representation of perspectives of the different actors involved in the agricultural value chain.

Also, studies focusing on mobile money service adoption and acceptance have seldom explored outcome and value creation from these new payment pathways. These studies mostly focus on factors that affect the adoption and acceptance of the mobile money system to the neglect of the outcome and benefits of mobile money technology. For instance, Ngumbu and Mulu-mutuku (2018) analyses the adoption of mobile money services by women entrepreneur in Kenya. The same can be said for Mallat and Tuunainen (2008), who explore the adoption of mobile payment systems by merchants and discuss factors that drive and inhibit their adoption. Sharif (2016) also analysed mobile banking and intention for adoption using the untapped (behavioural, environmental and technological) dimensions of mobile banking acceptance by

following a more comprehensive approach. Mcbride (2003) explores the process by which mobile communication technologies are adopted within different countries and seeks to explain the phenomenon using concepts drawn from actor-network theory. This demonstrates the fact that, there seems to be a lot of concentration on studying the factors affecting adoption and acceptance of mobile money services, arguably, mostly without including value creation, outcome or benefits.

2.10 Chapter Summary

To sum up, this chapter reviewed literature on mobile money definitions, types of services provided by mobile money, key actors in the mobile money system as well as a review of literature on the agricultural value chain. This therefore paves the way to further discuss the research framework to back this study in the next chapter.

CHAPTER THREE

THEORETICAL FOUNDATION

3.1 Chapter Overview

The current chapter discusses the theoretical foundation used in the study. The previous chapter brought to bear an existing gap of arguably, few studies on value creation in mobile money usage. Hence, the aim of this study is to add to the literature on value creation using mobile money by using the transaction cost theory as the sole theoretical foundation of the study. This section discusses literature relating to the theoretical framework chosen in order to guide the research towards achieving the purpose of the study.

3.2 The Transaction cost theory – An Overview

Coase (1937) presented the idea of transaction costs accompanying with negotiation, information, coordination, monitoring and contract enforcement. With the transaction costs encountered by firms as a basis, Coase conceived the natural development of intermediary firms to diminish these costs. From that point forward, a significant volume of literature has been used in relation to the transaction costs of agricultural markets. Expanding on Coase, Hobbs (1997) classified the various parts of transactions costs with respect to the transaction: negotiation costs as the physical cost of performing the transaction; checking costs as costs incurred in guaranteeing the adherence of the terms of the transactions; and information costs as costs that emanates before the transaction. The Transaction Cost Theory originated from the contemporary theory of the firm (Schmidt, 2000). The transaction cost point of view suggests that trading is mainly about information. It includes communication and sharing of information, leading to the trading of products and services, as well as relationship management

between parties concerned. Consequently, participants in a transaction look for new and creative ways to reduce costs in communicating, acquiring and accessing information for pre-trade, amid trade and post-trade purposes (Williamson, 1985).

The transaction cost theory focuses on the allocation of transactions or economic activities across different methods of organisation (bureaus, firms, markets) with the firm at one end and the market at the other. Transaction costs can be described as the "friction" that is evident in many units of production in a firm, that are cooperating (Williamson, 2005). This implies that, whenever transactions are conducted between specified actors, there exists some friction that leads to costs. Different factors depending on the context can encourage this friction in transactions. For instance, these are incorporated in the hierarchy or organisational settings of business markets. "Transaction costs can be described as the costs of operating a system", (Williamson, 1985). It has two types of costs: actor motivation costs and coordination costs (Williamson, 1981).

3.2.1 Coordination Costs

Coordination encompasses the costs associated with communication and information before, during and after conducting a transaction. These costs include searching goods or services, suppliers, customers, and ensuring the compliance of contracts and post-contractual agreements (Wigand *et al.,* 1997). It could also be described as the cost incurred in finding suppliers, vetting bids, determining whether the product required is on the market and identifying the products with the least price (Gebken & Gibson, 2006). Policing or enforcement incurs costs in ensuring that the contracting party abides by the terms of the contract as well as the costs incurred in taking appropriate legal

action when a breach arises (Hackett *et al.,* 2007). Therefore, using the perspective of transaction cost, trading encompasses the communication and sharing of information, leading to the exchange of products and services, and relationship management between the different parties involved in the trade (Boateng, 2011). Boateng (2011) went further to focus on the coordination costs and how mobile phones help to reduce them in order to generate benefits and effects for traders as he examined the impact of mobile phones on micro-trading activities. This research, however, would dwell more on actor motivation costs, exploring how mobile money is helping actors along the agricultural value chain to enhance commitments in transactions to facilitate decision making and enforce compliance of agreements.

3.2.2 Actor Motivation Costs

The costs involved in having asymmetrical or incomplete information and a commitment that is imperfect in a transaction. It emanates from opportunism, which constitutes one of the two main assumptions of human behaviour with respect to the transaction cost theory. These two assumptions are opportunism and bounded rationality (Williamson, 1981). Opportunism describes the inadequate or contorted information disclosure among parties undertaking a transaction. Opportunism assumes that, people are not just rationally bounded, they, in some cases, show opportunistic conduct (Douma & Schreuder, 2008). It demonstrates that human actors in the trade relationship will be guided by contemplations of personal circumstance with cleverness. This incorporates practices, that could include, swindling, lying, and unpretentious types of agreement violations (Williamson, 1985). In Transaction Cost Theory, the presence of opportunism offers ascend to transaction costs through monitoring conduct, securing assets, and ensuring that the other party does not take part in astute conduct

(Grover & Malhotra, 2003). Given the chance, decision makers may look to serve their very own interests, and it is hard to determine straightforward who is dependable and who is not dependable (Barney, 1990). Opportunism represents a danger on business connections because of the presence of explicit resources that help connections.

It consists of the expenses of inspiring specific operators to adjust their interests when data is fragmented and unevenly dispersed, and the expenses incurred from commitments that are imperfect (Milgrom & Roberts, 1992). These costs influence enforcement of mechanism compliance and decision making and add to the loss of agreements and disputes associated with legally binding contracts (Pare, 2003). As stated earlier, this research would dwell more on actor motivation costs, exploring how mobile money is helping actors along the agricultural value chain to enhance commitments in transactions to facilitate decision making and enforce compliance of agreements.

3.2.3 Limitations of the Transaction Cost theory

Despite the relatively large amount of research in support of the transaction cost theory, there are still a number of limitations and challenges in using the theory in the literature noted by a couple of researchers. For instance, Macher and Richman (2008) acknowledged that, there was an absence of a consensus with respect to meanings of key terms and ideas in the theory. Irregularities and difficulties in estimating such terms as opportunism, asset specificity, and uncertainty create a difficulty in translating results among different studies.

Another limitation of the theory is associated with the assumption that, people act opportunistically, which means with self-interest and without thinking of morality. In this way, transactions should dependably be bounded by strictly specific contracts, since partners in a trade will always be out looking for ways to hurt one another which could be costly (Williamson, 1975). Many of the limitations of the transaction cost theory in literature are in connection with several instances of the model. These are widely attached to the behavioural assumptions of the model and to the unclearness regarding some definitions of the transactional attributes concepts which have apparently caused operationalization difficulties. Chen *et al.* (2002) sustain that, it is not every economic actor who is likely to be opportunistic, hence reliance on the assumption of opportunism has led to a large number of criticisms and that a major reason that the theory has triggered such a large debate is because it is concentrated on the opportunism assumption, which is a feature of human nature.

Meramveliotakis and Milonakis (2010) argue that transaction costs are not able to give an adequate basis to the clarification of institutional emergence given its ahistorical, universalistic and static nature. As a result of the static nature of this theoretical structure, the dynamic procedures by which new social relations are made and used, and the subject of how these social relations influence the formation of organisations and institutions, are left to a great extent unexamined. The transaction cost thinking is just a relative static exercise, which is difficult to reconcile with the elements of institutional change and development. Masten (1996a) explained that “reduced-form estimates do not disclose the magnitude of transaction costs” and that “without additional information, the magnitude of transaction cost differentials and the effects of organizational form on performance cannot be inferred from standard empirical tests of

transaction cost hypotheses". Simply, even if empirical findings are consistent with the expectations of the theory, this does not in itself show that transaction costs are being reduced.

In sum, the limitations of transaction cost theory are arguably focused on methodological issues. This is as a result of the weaknesses attached to the ambiguity around the central concept of opportunism as well as the unclear definitions of other concepts in the model and difficulties of operationalization of the model they cause.

3.2.4 The Choice of Transaction Cost theory for this Study

The core aim of this study is to assess the value created in using mobile money services in agricultural value chain in Ghana. The value being assessed by this study is mainly in the area of reduced operational cost, enhanced commitments in transactions and enforcement of compliance of agreements. Hence, there is the need to make use of a theory that can help the study achieve its purpose. The transaction cost theory presents a way to assess this value in one of its components known as actor motivation costs.

Actor motivation costs involves the costs of having asymmetrical or incomplete information and a commitment that is imperfect in a transaction. It emanates from opportunism; one of the two major assumptions of human behaviour in the transaction cost theory; bounded rationality and opportunism (Williamson, 1981). Opportunism describes the inadequate or contorted information disclosure among parties undertaking a transaction. Opportunism assumes that, people are not just rationally bounded, they, in some cases, show opportunistic conduct (Douma & Schreuder, 2008). It demonstrates that human actors in the trade relationship will be guided by

contemplations of personal circumstance with cleverness. This incorporates practices, that could include, swindling, lying, and unpretentious types of agreement violations (Williamson, 1985).

In Transaction Cost Theory, the presence of opportunism offers ascend to transaction costs through monitoring conduct, securing assets, and ensuring that the other party does not take part in astute conduct (Grover & Malhotra, 2003). Given the chance, decision makers may look to serve their very own interests, and it is hard to determine straightforward who is dependable and who is not dependable (Barney, 1990). Opportunism represents a danger on business connections because of the presence of explicit resources that help connections.

It consists of the expenses of inspiring specific operators to adjust their interests when data is fragmented and unevenly dispersed, and the expenses incurred from commitments that are imperfect (Milgrom & Roberts, 1992). These costs influence enforcement of mechanism compliance and decision making and add to the loss of agreements and disputes associated with legally binding contracts (Pare, 2003). As stated earlier, this research would dwell more on actor motivation costs, exploring how mobile money is helping actors along the agricultural value chain to enhance commitments in transactions to facilitate decision making and enforce compliance of agreements.

Boateng (2011) in his study on assessing the impact of mobile phones on micro-trading activities which is arguably, somewhat in close proximity to this study, focused on the other component of the transaction cost theory; coordination costs. Coordination Costs

are the costs involved in searching for goods or services, suppliers, customers, and ensuring compliance of contracts and other agreements after contracts (Wigand *et al.*, 1997). Coordination costs was used as a basis for assessing how mobile phones was used in micro-trading transactions to generate benefits and effects.

This study, in contrast focused on actor motivation costs. It used actor motivation cost as a basis of exploring how mobile money is helping actors along the agricultural value chain create value. This was achieved by examining how the use of mobile money along the agricultural value chain helps to reduce or eliminate opportunism among actors, which is one of the causes of actor motivation costs in the transaction cost theory. The reduction or elimination of opportunism in transactions would contribute to enhancing commitments in transactions which would in turn facilitate decision making and enforce compliance of agreements.

3.3 Chapter Summary

In sum, this chapter contains the theoretical foundation of the study, that is, the transaction cost theory. It provides detailed description of the theory, an explanation of its components, an explanation for the choice of theory and its limitations. The next chapter explains the methodological approach chosen for the study.

CHAPTER FOUR

METHODOLOGY

4.1 Chapter Overview

The preceding chapter provided a detail description of the theory needed to undertake this study. This chapter presents a thorough discussion of the research methodology for the study. In addition, this chapter offers an explanation of the research paradigm, the research design used, data collection methods employed, and the method of analysis methods used in this study. Both the quantitative and qualitative research methods are discussed in this chapter with a justification of the research approach and philosophical underpinnings the study for the choice of the qualitative method. The method of data collection together with the instruments used for data collection and are also discussed.

4.2 Research Paradigm

Research paradigms can be described as "set of beliefs, values and techniques which is shared by members of a scientific community, and which acts as a guide or map, dictating the kinds of problems scientists should address and the types of explanations that are acceptable to them" (Kuhn, 1970). Research paradigms are founded on three dimensions. These are, Ontology, Epistemology, and Methodology (Lincoln, Guba, & Lynham, 2011). The dimension of ontology focuses on the nature of a phenomenon and ascertains if it is different and from the researcher or if the phenomenon is created by the actions of the researcher. Additionally, Epistemology is focused on the idea of information (Ritchie & Lewis, 2003) and whether it is made and examined by checking empirically a theory that is also concerned with whether or not the knowledge is formed as a result of the researcher's interaction with the social setting (Rowland, 2003). In conclusion, the methodological element of a research paradigm is focused on the strategies engaged with information gathering and analysis for reaching a legitimate

determination during research whether, qualitative, mixed methods or quantitative (Lincoln *et al.*, 2011).

There exist three primary paradigms in information systems research. Myers and Avison (2002) examine these as the positivist, interpretive and critical. The positivist research paradigm explains that objective reality can be viewed empirically and clarified with logical analysis. This paradigm holds that, the researcher and the investigation must be isolated entities. Thus, it is assumed that the positivist researcher is neither affected by the subject under study nor does he affect the subject under study since the researcher is deemed as being independent of the subject of research (Rermenyi, Williams, Money, & Swartz, 1998). Hence, it uses direct observation in establishing facts (Krauss, 2005). Rene Descartes's epistemology and belief were adopted by positivism, which holds that, the ideal method to create knowledge about reality is through reasoning (Descartes & Cress, 1998). Positivism which is not only grounded on the presence of reality that occurs beyond the reasoning of humans, but it is also based on the acquisition of unbiassed knowledge of the real world (Weber, 2004). However, ontological positivist argues that the existence of reality is not only beyond human creation but also on action and knowledge of human beings (Orlikowski & Baroudi, 1991).

Information systems researchers who adopt the positivist paradigm focus their emphasis on variables that can be measured, testing the hypothesis regarding samples of the phenomena from the specified a population in the study and formal evidence preposition. Smith (1991), as well as Guba and Lincoln (1994) have argued that positivist adopt scientific methods from the natural science in studying social

phenomenon. Therefore, epistemological positivists have indicated that knowledge can be attained by the independent and objective study of reality, even though there exists objective knowledge.

Interpretive studies are concerned with understanding the contextual meaning that people give to different social phenomena (Myers, 1997; Walsham, 2006; Orlikowski & Baroudi, 1991;). The claim of interpretivists is that, certain social construction like consciousness of language and shared meaning of things is really what is used to access reality (Myers, 1997). Therefore, they focus fully on the human sense and its complexity as events emerge (Kaplan & Maxwell, 2005). Walsham (1995a) has therefore said that reality under interpretivism can be group into two forms: inter-subjective reality constructed between researchers and their respondents and subjective reality which is constructed by an individual or groups of people. In contrast with positivist, the interpretivist believe that knowledge is humanly composed, therefore fact and values are subjective (Walsham, 1995a, 2006). In essence, knowledge without the researcher is unrealistic since the experiences drawn from the researcher may help in steering the study. Furthermore, the perception of the respondent and the researcher may change as a result of the interaction with each other during the study (Myers, 1997).

Critical realism is a combination of realist ontology and interpretive epistemology (Archer 1995; Bhaskar 1998b;). It holds that, even though, there is an existence of a real world, knowledge of it by researchers is socially constructed and imperfect. Saunders *et al.* (2007), described realism as the epistemological position, whereby the existence of objects is not dependent on of our existence and knowledge. The realism paradigm makes way for understanding of the thoughts and beliefs of persons who are

being assessed from a broader perspective. Real subjects exist by themselves according to realist, as a result of the human mind's consciousness. A combination of both the interpretivism and positivist paradigms can be way to understand the subject betters. Qualitative approaches in the form of case studies and interviews are largely used (Sobh & Perry, 2005). However, this philosophy is time consuming, much more expensive and the researcher needs to know many approaches and methods as well as the appropriate way of mixing the methods. In spite of the above limitations, the mixed methods can answer a wider range of research questions due to usage of more than a research method. It also overcome the weakness of both the interpretivists and the positivists (Johnson & Onwuegbuzie, 2004).

4.2.1 Critical Realism Paradigm Chosen: Why Critical Realism?

Having looked at the above, this research therefore made use of the critical realist approach to assist in achieving the research purpose; to assess the value created in using mobile money transfer services in agricultural value chain in Ghana. Critical realism has also increasingly gained interest in recent years as substitute to interpretive and interpretivist information systems research (Lyytinen & Newman, 2008; Bygstad, 2010). Critical realism was chosen for this study, mainly because, it allows a researcher of information systems to "get beneath the surface to understand and explain why things are as they are, to hypothesize the structures and mechanisms that shape observable events" (Mingers, 2004).

Another reason why critical realism is suitable for this study is because of the retroduction strategy that a critical realist needs to adopt. A critical realist needs to adopt a retroduction research strategy; where researchers choose an unexplained phenomenon

and suggest through hypothetical means that, if they existed, would produce that which is to be explained. The meaning of this, is moving away from experiences in the empirical realm to likely structures in the real world (Easton, 2010; Mingers, 2002). Retroduction allows a critical realism researcher to determine the minimum conditions of a phenomenon, such as mobile money services to exist. The phenomenon will not therefore exist if these conditions were not met.

Boateng (2014) explains that, using retroduction as a research strategy comprises three main stages. The researcher commences by first examining the connections and events observed in a social phenomenon. In relation to this research, the prerequisite was met by first of all conducting a literature review on mobile money services in chapter two to assess what has previously been done on the topic. Secondly, the researcher postulated the presence of real mechanisms and structures as well as their explanation and description of observed relationships, if they existed (Easton, 2010). Finally, the third step was then to determine the processes and existence of these mechanisms and structures.

4.3 Research Design and Methods

Research design describes the procedures and plans for a study that range from extensive assumptions to comprehensive data collection methods and analysis (Creswell, 2009). Furthermore, Creswell (2009) discussed research design from three main approaches; qualitative, qualitative and the mixed approaches. Quantitative research principally describes a phenomenon in terms of quantifiable units indicating the degree to which something can either occur or not in terms of number, frequency amount and so on (Jonker & Pennink, 2010). Creswell (2009) further expatiates this as

the process of accessing the relationship among variables which then becomes a way of testing objective theories. These particular variables can in turn be measured with the use of statistical procedures.

The mixed methods approach as the name suggests involves both qualitative and quantitative approaches. It is an approach to that involves more than one methodological approach, hence two ways of investigating, together with two kinds of data gathering analysing techniques as well as presenting the human phenomena, for the purpose of creating a better understanding of the phenomenon being studied (Greene, 2006).

The research method adapted for this study, however, was the qualitative method. This is because the study seeks to appreciate particular issues through the investigation of the behaviour and perspectives of the people in certain situations as well as the context within which they perform certain actions (Kaplan & Maxwell, 2005). Therefore, making it suitable to serve the purpose of this research which to assess the value created in using mobile money transfer services in agricultural value chain in Ghana**.**

4.3.1 Case Study as a method of research

The focus of this research is to assess the value created in using mobile money transfer services along the agricultural value chain in the Ghanaian context and as such the use of case study as a method of is appropriate. A case study research is deemed best method to undertake this research based on the definition of case study research by Yin (2009). This definition describes case study research as an ideal approach to study when "how" or "why" research questions, when the researcher does not have control over events as

well as when the emphasis is on a contemporary phenomenon which lies within a real-life context using several data collection methods to accumulate information from few entities. The method of case study is "an empirical enquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p. 13).

Furthermore, this method of research is appropriate to go together with the critical realism paradigm (Easton, 2010). Since a phenomenon being studied or research about cannot be secluded from its context, the method of case study would use a method which combines specific techniques to serve as guidelines in the collection of data and analysis with particular reference to the stated the theoretical assumptions (Yin, 1994, p. 13; Hakim, 1987, p. 67).

The aim of using the method of case study is to advance, improve and test a theory using replication logic, whether presenting contrasting results or predicting similar for reasons that are predictable (Yin, 1994, p. 45-46; De Vaus, 2001, p. 262). The primary unit of analysis is the various actors at the different stages of the agricultural value chain. One agricultural business that belong to at least one of the five (5) stages of the agricultural value chain and have used mobile money services for at least a year in their business was chosen for the study. A total of eleven (11) respondents were interviewed for the study.

4.3.2 Case Study Design

One of the accepted research strategies used information systems is case study (Boateng, 2011). For instance, Boateng (2011) used case study in his study to determine the

impact the mobile phone usage has on micro-trading activities of female traders in the Ghanaian context. This study is built on the descriptive case study strategy which requires the use of theory to be used as a guide in the collection of data, therefore, also requiring that, the theory be clearly stated in and reviewed at the beginning of the study to form the basis of the research (Yin, 2003). Therefore, the case study approach was hence selected for this study because of its flexibility and the multiple sources from which data can be collected.

Additionally, a multiple-case approach was used for this study to help draw similarities or comparisons in case results. When the intent of the research is theory building, theory testing or descriptive, it is best to use a multiple case design. The boundaries of a case study research are defined by the unit of analysis (Khalfan, 2004). These can be the individuals (employers or employees), events (decisions or programs) or entities (groups or organisations). In this study, the unit of analysis ultimately focused on the three elements listed above in such order; entities, encompassing individuals and their events.

4.3.3 Selection of Cases

Studies on firm-level phenomena require site selection that is based on the features of the organisation (Benbasat *et al.*, 1987). As a result of this, only an agricultural companies that use mobile money services were selected for this study.

Further, Agro Company 1 and Agro Company 2 were selected because of their use of mobile money services for agriculture related transactions for at least a year. Agro Company 1 and Agro Company 2 are not the real names of the companies but

pseudonyms that were given to company by the researcher for the purpose of this study. These companies also fall under at least one stage of the agricultural value chain involved in maize production. The emphasis on maize production has been discussed in the literature review chapter. This was in line with Benbasat et al. (1987) who advised that site selection must be thought about carefully and not opportunistic whilst ensuring that, there is enough information to assist in achieving the objectives of this study.

For above reasons, these companies which operates along the agricultural value chain fit the objective of this research which is seeking to assess the value created in using mobile money transfer services in agricultural value chain in Ghana and hence, their selection.

4.4 Data Collection Methods

Based on the guidelines of critical realism and case study approach, data from more than one source was combined to support the findings of the research (Benbasat, Goldstein & Mead, 1987). Also, critical realism promotes the use multiple methods of data gathering to facilitate triangulation of different perspectives and also identify structures and mechanisms that underpin readily observable events. Case study evidence could be provided from six sources, namely, interviews, participant-observation, direct observation, documents, archival records and physical artefacts (Yin, 2009).

4.4.1 Interviews

The author used interviews because it provided the opportunity to access first-hand information from respondents along the agricultural value chain who are involved

directly in using mobile money for agricultural activities. The questions comprised of both open-ended and close-ended questions. The questions were designed based on the objectives of this study. These questions were reviewed with the help of the researcher's supervisors to ensure that they were the right questions to ask in order to answer the research questions. A pilot interview was undertaken in one agricultural company with two employees to test the feasibility of the questions. There was an interview guide which is included in the appendix that helped to guide the interviewer during the interview in order to stay focused on the topic being discussed.

The author conducted interviews with six (6) persons from Agro Company 1. The persons were, the Chief Executive Officer of (CEO), the Chief Operations Officer (COO), the Chief Technology Officer (CTO) officer and two farmers who regularly request for the tractor services of the company and one tractor owner. Five (5) persons from Agro Company 2 were also interviewed. They were, the Managing Director, the deputy Managing Director, the accounts officer and two farmers who are out-growers for the company. Eventually, eleven (11) persons were interviewed for the research. This was done to solicit their first-hand views on the research objectives.

4.4.2 Interview Ethics

1. The researcher upon gaining access to the companies via phone calls, text messaging, personal visits and emails solicited introductory letters from the Department of Operations and Management Information Systems (OMIS) as means of providing evidence of the department's support in the undertaking of this study.

2. The interviews were recorded with a Samsung Galaxy J7 Duo smartphone as the voice recording device after obtaining permission from the respondents together with notetaking in a book. The notes taken were used as guidelines for the follow up questions that were asked.

3. The interviews were conducted with the times that were convenient for the respondents. Each interview lasted not less than 45 minutes and not more than 1 hour.

4.4.2 Documents and Archival records

To match evidence to the facts collected during the interviews, documents and archival records were collected. This category of data included reports, emails and other relevant documents.

4.5 Data Collection

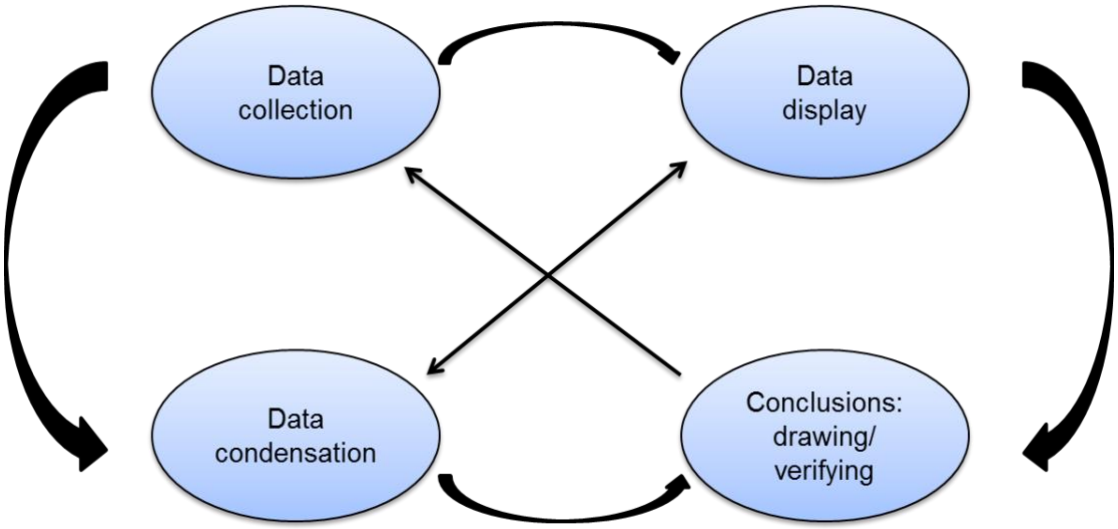
The collection of data for this study began on the 29th of October and ended on the 21st of November 2018. Data collected from the interviews were then transcribed. In addition, the transcribed interviews were reviewed and revised to clearly understand the data and to determine if it reflects the overall meaning. Researchers are encouraged to write down notes and sort them out into categories according to their importance to the different respondents and how they address the research questions (Boateng, 2014).

4.5 Data Analytical Approach

Data analysis is a critical step in research, it involves a systematic process of organizing or sorting the data as well as classifying the data collected (Greene, 2006). Using the

research framework and research purpose as guides, the data analysis technique for the study was adopted from Miles and Huberman's (1994) transcendental realism technique which highlights three key components for analysis; data condensation, data display and drawing and verification of conclusions.

Figure 4.1 Data Analysis Approach of Miles and Huberman



Source: Miles and Huberman (2013)

4.6.1 Data Condensation

Miles and Huberman (2013) describe data condensation as the way of choosing, simplifying, focusing and abstracting, as well as the transformation of the data in reviewed field notes, transcripts from interviews, reports and other observational materials. Boateng (2014) underscores that, data condensation is done in three phases and begins at the underlying research stage and proceeds all through the analysis. Also, the procedure is portrayed by three phases. The beginning phase is the place the researcher summarized, fragmented and edited the data gathered. At this stage, the researcher showed issues and discussions instead of the real words utilized in the

discussion. This was displayed in the arrangement of explanations to accentuate pertinent focuses.

The following stage which is the centre stage is coding. The data was condensed into significant segments and labels were assigned to the segments identified (Boateng, 2014). Finally, the data collected data was linked with the theory and previous literature in the discussion section (Boateng, 2014).

4.6.2 Data Display

To highlight and make data gathered straightforward for understanding, the data was composed into diagrams, tables and figures. Miles and Huberman (2013) refer to data display as a well sorted out, compressed assembly of data that permits drawing of conclusions. Boateng (2014) accentuates that, data display summarizes and organizes the data to help build up themes and additionally become the reason for future analysis

4.6.3 Conclusions Drawing and Verification

Miles and Huberman (2013) designated data reduction and display were done to assist in arriving at conclusions. Although, conclusion drawing is the logical step after data reduction and display, early conclusions drawn at the early stages of analysis, may be ill-informed and unclear and as such, they were treated as uncertain until further analysis and discussions when done from all the data collected and reviewed.

4.8 Summary

This chapter starting with giving the outline of the research methods that have been used to assist in answering the research questions stated when the study commenced,

with emphasis on the research paradigm, method, sampling approach, data collection as well as method used in the analysis of the data. The chapter further discussed the criteria for selecting case firms, data collection methods and the approaches for data analysis. With this firmly in place, the next chapter will provide the research findings.

ANALYSIS OF RESEARCH FINDINGS

5.1 Chapter Overview

The preceding chapter presented various research paradigms and explained why the critical realism research paradigm and case study methodology were considered the most suitable in this study and how they influenced the data collection methods. The current chapter seeks to present the research findings as related to the case descriptions of the two companies involved: Agro Company 2 and Agro Company 1, and their mobile money use in their agricultural activities.

5.2 Case Description of Agro Company 1

Agro Company 1, is an agricultural technology company established in September 2016 after emerging winners of the of Kosmos Innovation Centre (KIC) Agritech Challenge, through which they received fifty thousand dollars ($50,000) as seed money. The company is headquartered in Accra, Ghana.

The company operates a platform that connects farmers and tractor operators. This platform allows tractor owners to monitor movement and work progress of their equipment; and helps farmers reach out to the mechanization centres/tractor services and operators to request, schedule, and prepay for various mechanization services. They operate on the basis of providing available, accessible and affordable mechanization services to farmers.

5.2.1 Ownership of Tractors and Farm Implements

The company does not own any farm implements on its own. However, they work with tractor owners who provide them with tractors, tractor implements and tractor operators

that they use in rendering services to farmers after which proceeds from the services rendered are shared at a fixed percentage between the company and tractor owners.

5.2.2 Services Provided

The company is categorized under the production stage of the agricultural value chain as a result of the services they provide to farmers to help them cultivate and harvest their crops. These services include:

Agricultural mechanization is made available and accessible to rural smallholder farmers without discrimination. Tractor owners registered on the system are given a dashboard that allows them to monitor both their asset and revenue. Technical training in the form of capacity building for tractor operators, tractor mechanics and field officers who act as extension agents providing farmers with Good Agricultural Practices (GAP) support. Support projects by implementing partners and donors by providing agricultural mechanization services.

5.2.3 Mechanization Services Provided

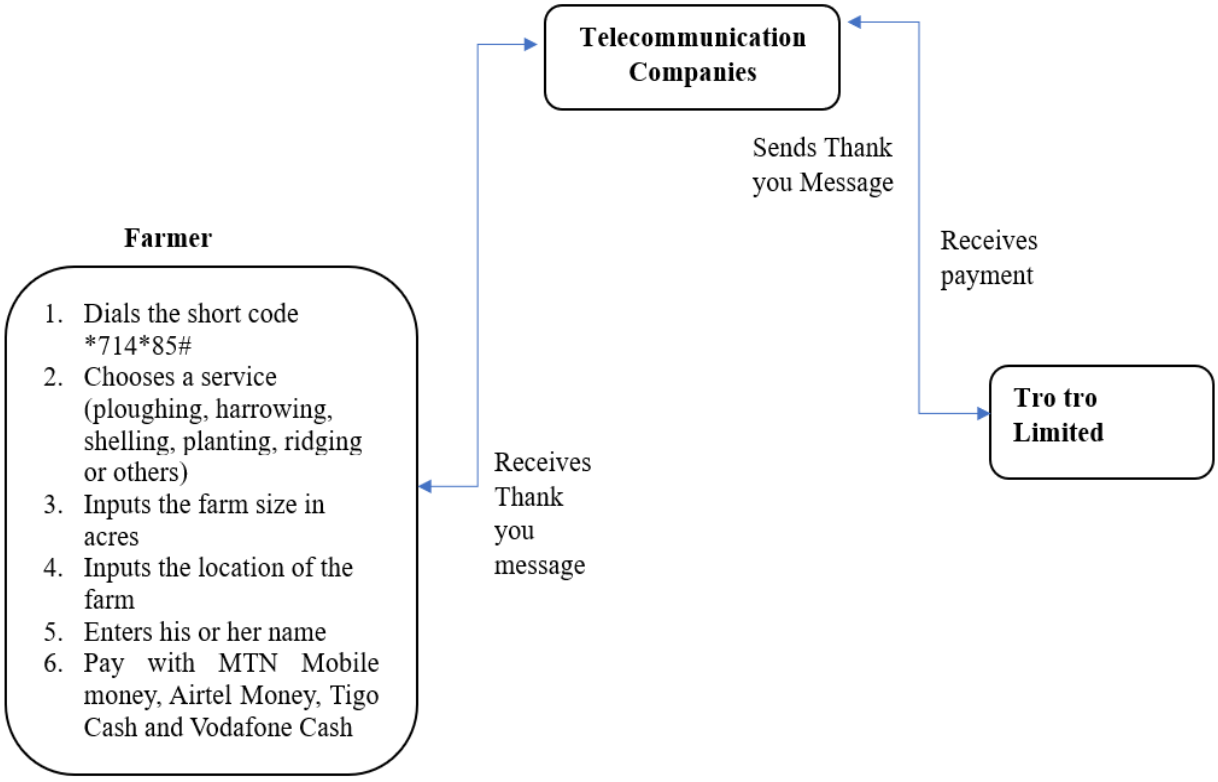
The following mechanization services are offered by the company to farmers:

Table 5.1 Mechanization services provided by Agro Company 1

Type of Mechanization Service	**Description**
Ploughing	The plough farm implement is used together with a tractor to turn the soil to loosen it in preparation for planting or sowing of seeds.
Harrowing	A method of land preparation where the soil is evened-out or smoothened with the help of the harrow implement and a tractor.
Planting	The process of sowing seeds in rows with the use of a planter.
Shelling	The process of removing shells from a nut or seed.

Ridging	The creation of long, narrow elevation of land for the planting of crops
Spraying	The process of dispersing herbicides, pesticides, and fertilizers in liquid form on crops.

Figure 5.2 Procedure in Requesting a mechanization service from Agro Company 1



Source: Agro Company 1

5.2.5 Impact

Through their core mandate of making tractor services accessible to small holder farmers, the company has been able to achieve some success in the following areas:

Increased utilization of arable farmland: Due to the scarcity of agricultural machinery in Ghana and the entire sub-Saharan region, smallholder farmers are limited with the size of farm to be cultivated in a season. Mechanization speeds up land preparation

activities and improves the condition of the soil for increased productivity and farm size.

Job creation: Farming is becoming more lucrative to others. As their fleet increases, there is the need for more tractor operators, mechanics and field officers. This has led to direct jobs and ancillary ones.

Business for investors: Their business model has a component that presents to individuals the business opportunity in becoming a tractor owner. These ones are updated weekly on their investment.

Food Security: This is in direct relation with access to agricultural mechanization, increased farmland utilization and improved productivity. They help put food on the table of the hungry.

5.2.6 Examples of Partners and Projects

The company has worked with a number of partners on a few projects that are worthy of mention. They include:

Ghana's Ministry of Food and Agriculture (MOFA) in partnership with Japan international Co-operation Agency (JICA) has rolled out an agricultural mechanization training and certification for tractor owners, operators and mechanics in Ghana. This training is to hone the skills of operators and mechanics and help tractor owners well manage their equipment for profitability.

Alliance for a Green Revolution in Africa (AGRA) is considering financial inclusion for smallholder farmers in Ghana with the onboarding of tractors.

Grameen Foundation in Ghana partnering Agro Company 1 to enable their registered smallholder farmers access agricultural mechanization by using our platform.

5.3 Case Description of Agro Company 2

Agro Company 2 was established and incorporated in 2004 under the laws of Ghana Private Company Act of 1962. The enterprise is located in Wa, which is the capital of the Upper West Region of Ghana. The core business of the company is to produce and distribute high quality seeds, supply fertilizers, agro-chemicals and simple farm tools accessible to poor small-scale farmers at affordable prices, with the aim of increasing productivity, incomes and standard of living of farmers in the region.

5.3.1 Mission and Objectives

To enhance access to high quality seeds, supply of fertilizers and agro-chemicals by small-scale farmers in the Upper West Region and Ghana as a whole.

The company is also into networking with agro-input dealers, distribution and sales of agro-products to farmers, granting short-term credits to farmers and agro-input dealers. The company aims to increase distribution of its products by engaging agro-dealers, expanding transport facilities and warehouse capacities, and expand seed production by producing hybrid foundation seeds as improved seed instead of OPVs. The company is also determined to expand its service base to cater for the needs of its customers which

is in line with its vision of being an engine of growth for agricultural development in the Upper West region.

The main objectives of the company are:

- To increase production in the agricultural sector through the supply of high-quality farm inputs such as fertilizers, agro-chemicals, and farmer tools to small holder farmers at affordable prices.
- To educate farmers on the best use of agro-inputs such as fertilizers and chemicals, and the need to use high quality seed in particular.
- To increase farm productivity and incomes among small scale farmers in the Upper West region

5.3.3 Company Operations

The company by virtue of the services it provides is categorized under three stages of the agricultural value chain, namely, input supply, production and aggregation. The company is also segregated and has about 8 operational areas, namely:

1. **Agro farms**

   The farm aspect of the company produces mainly maize. It produced over 900 metric tons (MT) in the 2013 cropping season. This being the highest for the past five (5) years of production. This was attributed to strategic management and analysis of the previous rain fall patterns. They also produce soya bean, rice, cowpea and groundnut but not in large quantities Their immediate buyers include Premier Foods-Kumasi, Guinness Ghana-Accra and local buyers. They have an aim to explore the international market as well in the near future.

2. Fertilizers

The company is the main distributor for Yara Ghana limited fertilizer in Wa and they distribute over 100,000 bags of fertilizer annually (65% of total region's consumption), even though they face some competition from other distributors in the region. They distribute as well as retail in the Wa Township, parts of northern Region and Upper East. They have the potential to distribute over 250,000 bags annually if they had a bigger storage facility as well as more trucks for transportation.

3. Chemicals

The company faces a stiff competition in the area of chemicals distribution/marketing. The market for chemicals is over saturated with a lot of people moving into this sector especially during the rainy season. There are over 30 chemical sellers in the region. Agro Company 2 still captures about 43% of the market share. This is as a result of our wholesale and retail. Our main supply comes from Wynca Sunshine Agro Chemicals, BonAgro and Rainbow Chemicals located in the Kumasi metropolis. We have a core duty to serve farmers and as such, we provide the best of prices in all the markets available.

4. Seed production and sales

Taking into consideration areas of operations, Agro Company 2 is a sole private seed producing company in the region and one of the best in the country. Even with the Seed Producers Association of Ghana (SEEDPAG), we supply over

80% of certified seeds to farmers in the region and beyond. The company currently produces over 600 metric tons of seeds annually and has the potential to reach 200 metric tons. The company has its own ultra-modern seed conditioning plant, laboratory for seed analysis and a warehouse for storage

5. **Tractor Services**

The company has nine (9) tractors that are at the doorsteps of farmers. They are manned by well trained and qualified operators. These are used for the company's activities as well as for other farmers who might need the services.

6. **Out growers and Agro Dealers**

Dealing currently with 86 out growers' seed producers and 74 agro input dealers all over the region, Antika supports them with credit facilities and other logistics to aid in the production as well as supply of seeds and farm inputs. The out growers are provided with foundation seed, fertilizer, chemicals and at times cash to carry out activities such as sowing, weeding and harvesting.

7. **Others**

The company is also a service provider to the Savannah Accelerated Development Authority (SADA), operating in 8 districts in the Upper West Region. Again, the company collaborates with a number of NGOs and projects such as ADVANCE, AGRA, MADE, MEDA, COMPRO II-IITA, MOFA, IFDC-ATT, APSP, GIZ, MOFA, GSID, SEEDPAG, NASTAG and OCP-Ghana among others, to set up demonstration plots to educate farmers on the

best far, practices. There is also free extension education on the best farm practices that farmers could perform including the organization of field days.

5.3.4 Social Impact and Recognition

The company currently has 47 employees on the payroll and over 350 casual workers that are engaged in the activities such as loading and offloading of fertilizer and seed, sowing (mainly women), weeding, harvesting and cleaning (processing of seed). Thus, they provide immediate employment to the youth in the region. In addition, over 2,000 farmers are engaged in the process which at the end increase their family income and to an extend reduce the poverty levels in the various communities.

As a result of their contributions towards the growth of Agriculture in the region and the country, they have received lots of awards and credentials from the districts to the regional level by MOFA and other NGOs. Another being the award of the 2nd national best farmer (2013) in the country to the Managing Director, received under the hands of the president of the republic of Ghana, his excellency John Dramani Mahama. The company was part of the Ghana breeding team being awarded the best breeding team in West Africa by IITA in 2016 and best information dissemination team in 2017.

5.4 Case Findings

This sub-section provides the findings of the two case firms representing different stakeholders in the study.

5.4.1 Case one: Agro Company 1

Agro Company 1 performs the following agricultural activities:

Agricultural mechanization is made available and accessible to rural smallholder farmers without discrimination. Tractor owners registered on the system are given a dashboard that allows them to monitor both their asset and revenue. Technical training in the form of capacity building for tractor operators, tractor mechanics and field officers who act as extension agents providing farmers with Good Agricultural Practices (GAP) support. Support projects by implementing partners and donors by providing agricultural mechanization services.

5.4.2 Agricultural Activities Mobile Money is used for at Agro Company 1

Out of the four main agricultural activities of the company, mobile money is used for two of the activities: provision of tractor services to small holder farmers and the transactions with tractor owners.

The Chief Executive Officer of Agro Company 1 claimed that *"... mobile money is used in the main focus of this company, which is providing tractor services to smallholder farmers. The farmers who request for our services pay us via mobile money".* One of the respondents who is a tractor owner with Agro Company 1, confirmed what the CEO said by adding that "*as tractor owners, we are paid our incomes from the tractor services provided via mobile money".* These two statements affirm the company's use of mobile money in their activities and what it is used for.

5.4.3 Mobile money use in creating value at Agro Company 1

The use of mobile money has enabled the company to create some value in their agricultural business. The Chief Operations Officer (COO) of the Company mentioned that: "*Mobile money has helped as to keep and provide financial records to tractor owners whom we work with and thereby providing transparency*". This statement is very crucial in establishing value creation in the company. The COO mentioned how the mobile money service has helped them provide transparency, which goes a long way in building trust and strengthening the relationship between them and the tractor owners.

Another respondent who is a smallholder farmer and requests the services of the company often, mentioned that it has helped him to build financial history for himself. *"I am able to keep record of the agricultural services that I pay for with mobile money transactions and serves as financial trail or records for me when I am asked for credit facilities from financial institutions*". This is an indication of a source of financial inclusion for smallholder famers in rural areas who were previously unbanked.

Another smallholder farmer who also requests the services of Agro Company 1 often made an assertion to support the statement of the previous respondents. He gave some insight into how mobile money is helping him save money for subsequent farming seasons. *"…because I know I will use mobile money to pay for tractor services and other services when the farming season starts, I leave majority of the money I receive as payment for my agricultural produce on my mobile money wallet as savings. So that, when the farming season starts, I use it to pay for the services and inputs I need".* From this statement, it is evident that, the use of mobile money in their agricultural activities

as farmers has helped them to see the need to save while using their mobile money wallet as the medium.

The Chief Executive officer went on to add a few more ways by which mobile money has helped them create value in terms of reduction in operation cost and expansion of their business. Their operational cost has reduced since they no longer have to keep a staff in each of the locations to collect the money. He asserted that: "... *we used to have a staff in each region to collect money for the tractor services rendered. So, for each of the locations that we do not have a staff station there to collect the money, it is cost saved to the company*".

He went further to state that: "*mobile money is helping us expand our business continousuly because of how the technology behind mobile money is scalable. It is easy to onboard as many new customers as possible because mobile money allows any number of customers to use the system*". The Chief Operations Officer also highlighted the assertions made by the CEO and added that: "*we also now have reduced occurrences of theft. we experienced a few cases of theft in the beginning when operators were the ones collecting the money on the locations. Some of them would collect the money and would not record it".*

5.4.4 Factors that affect Value Creation in using mobile money at Agro Company 1

These are factors that have enabled the company to use mobile money with the other actors along the value chain to create value. The Chief Technology Officer (CTO) of the company, when asked about the factors that affect the value they can create from

the use of mobile money in their activities claimed that: "*... availability and reliability of network coverage, rules and regulations governing mobile money, mobile money Interoperability, availability of third-party service providers in the system such as Hubtel and the availability of mobile money vendors are the factors that greatly affect our use of mobile money to create value*".

Another respondent, one of the smallholder farmers confirmed the assertion made by the CTO by adding that:*"... the fact that, I have a good network in my community and there are mobile money venders around makes it easy for me to use it. The system is also simple to use. My only problem is the commission charged"*. This statement provides an insight into the factors that help or could inhibit their creation of value with the use of mobile money.

Table 5.2: Summary of Agro Company 1's mobile money uses, value created and factors affecting value creation

Agricultural activities	Value Created	Factors affecting value creation
1. Provision of tractor services • Receiving payment for tractor services provided to farmers **2. Transactions with Tractor owners** • Paying tractor owners their revenue from tractor services provided.	**1. Reduction in Operational cost** • No need for a staff to be stationed in locations to collect money for tractor services • Reduced risk of theft **2. Strengthening of relationships** • Creating transparency and establishing trust by providing financial records **3. Expansion of business** • Farmers ability to save money on their mobile money wallets for the next season's agricultural activities. • Ability to continuously onboard more customers as the mobile money technology is scalable.	1. Network Coverage and Reliability 2. Convenience of the service 3. Mobile money Interoperability 4. Commission Charged 5. Availability of third-party service providers in the system such as Hubtel 6. Rules and regulations governing mobile money 7. The availability of the mobile money vendors

Source: Author's construct

5.4.5 Case Two: Agro Company 2

As mentioned in the previous chapters, mobile money refers to the exchange of electronic money value stored in a mobile phone registered by Mobile network operators which is accessed through the use of cellular phone (Wamuyu, 2014). A large number of the people in emerging economies such as Ghana are unable to have access to banks, credit unions or other financial services (Hinson, 2011). Therefore, mobile money services assist agricultural activities through the provision of a convenient means of moving money among stakeholders in agriculture (Payne & Kumar, 2010).

The main agricultural activities that Agro Company 2 performs are:

Supply of inputs; fertilizer, agrochemicals, certified seeds and seed production; hybrid seed production and certified seed production. Provision of tractor services, ploughing, threshing. Aggregation of produce from out-growers. Production; Cultivation of crops such as maize, soya bean, rice, cowpea and groundnuts. Sale of agricultural produce

5.4.6 Agricultural Activities Mobile Money is used for at Agro Company 2

Out of the five main agricultural activities of the company, Mobile money is used in the performance of four of these agricultural activities. Namely, supply of inputs, provision of tractor services, aggregation of produce from out-growers and the sale of agricultural produce.

The deputy managing director of Agro Company 2 emphasized that mobile money is used to pay out-growers, pay their suppliers from whom they receive input supplies and receive payment from some customers who buy inputs from them. He added that: *"we also use mobile money to receive payment for the tractor services we render to*

customers and in sending money to our drivers to buy fuel while transporting our supplies to us."

From this statement, it is evident that, mobile money is used for various agricultural activities within the company. Another respondent, who is an out-grower with Antika farms confirmed this assertion by speaking from his use of mobile money in his agricultural activities and his transactions with Agro Company 2. The respondent asserted that he uses mobile money a lot in his activities as a farmer. He also indicated that most of the people who buy his farm produce including Antika Company pay him through mobile money. *"I save the money in my wallet and use it later to pay for agricultural inputs such as seeds and fertilizer as well as my own personal transactions".*

5.4.7 Mobile money use in creating value in Agro Company 2

When asked about the mobile money use has enabled them to create in their agricultural business, the deputy manging director of Agro Company 2 claimed that it has helped them to create value in their agricultural activities. In terms of the transportation it has lessened the burden of the drivers having to either carry physical cash or get someone's bank account for us to transfer money into for their fuel and upkeep. *"Now we just put the money into their mobile money wallets, and they can withdraw it anywhere on their journey. As such we are getting timely delivery of our goods".* This statement goes to indicate a reduction in the risk of drivers carrying money on their trips to pick up supplies, as they could be robbed on the journey or have the money misplaced.

Another respondent who is the accounts officer of Agro Company 2 also added another way by which the company is creating value with the use of mobile money in their

agricultural activities. It has increased sales in the input supply business. *"Now people can walk into our office and pick up input and pay via mobile money or they can stay at their various locations, whether it is the village or the hinterlands and just send us mobile money and we will deliver the inputs to the people"*. As a result, more people especially those in the rural areas are buying agricultural inputs from us now.

From the initial responses from the respondents, it was evident that, the value mobile money has helped them create in their agricultural activities could cause a reduction in operational cost, strengthen their relationships with other actors along the value chain and promote expansion of their agricultural business. Therefore, respondents were asked about how mobile money has helped them achieve any of the above benefits. The Managing Director of the Agro company 2 emphasized that mobile money has greatly reduced their operational cost especially in terms of transportation of farm inputs. Previously, there were instances where a driver could call and say he's at any of the nearby villages or somewhere on the journey and he has run short of fuel. *"We would have to take a car from Wa and buy fuel and drive all the way to where the driver is and give the driver the fuel so he can drive back to Wa which was an additional cost to us"*. In contrast, all they do currently when a driver calls and says he has run short of fuel is to ask him, whether where he is, he can get a mobile money vendor, so they will just send the money via mobile money and he withdraws it and buys the fuel.

The accounts officer of the Agro company 2 went on to ascertain how mobile money has helped to reduce operational cost by providing more ways by which their operational cost has been reduced. Revenue mobilization has improved as it is much easier to now collect money from people that we supply inputs to. Previously, when

they sell their agricultural produce to wholesalers and retailers on credit, they had to go around and collect the money which is stressful and time consuming and demands additional staff. *"However, with mobile money all we need to do is possibly remind the people to pay and they will send it to us via mobile money, no need to go around chasing people for money".*

When asked about how mobile money has helped to strengthen the relationship between their company and other actors along the value chain, the deputy managing Director stated that their suppliers now trust that they will pay them via mobile money as they always do when they supply them with inputs. Hence, they are not scared to supply them with inputs on credit. It is also the same with the wholesalers and retailers who buy agricultural produce from them to go and sell. *"We have come to trust that they will pay us via mobile money as they always do as such, we are not scared to give them the produce on credit".* This statement emphasises the fact that, trust has been built through the use of mobile money with other actors along the agricultural value chain. As a result of this trust, the relationship between these actors has been strengthened.

When asked if mobile money has helped to expand their agricultural activities, the deputy MD claimed that more suppliers, individual farmers, wholesalers and retailers want to do business with them. *This is because of the trust we have built with existing customers and suppliers through our use of mobile money for making and receiving payments. Many people find our mode of payment convenient and faster".*

5.4.8 Factors that affect Value Creation in using mobile money at Agro Company 2

These are factors that have enabled the company to use mobile money with the other actors along the value chain to create value. One of the farmers who is an out-grower with Agro Company 2 made this assertion about what factors or conditions have helped him use mobile money to create value, *it is mainly the reliability of the network especially MTN which is available is so many places that my farms are". Also, there are mobile money vendors all around so I can easily deposit and withdraw money. Mobile is also easy to use and very convenient. My only problem is the commission charged but it is not too bad".*

The Managing Director confirmed what the out-grower mentioned by adding that in the communities, is it is easier for their farmers and other people that they work with to use mobile money as they do not have to pay transportation or walk long distances to go to the town to use a bank since there are mobile money vendors in almost all the communities so they just go there and they take their money." *Hence, it's very convenient for the people that they work with".* He went on to add that: "… *the fact that we do not pay commission for our transactions is a factor for us. We are not charged commission because we have registered our sim as a merchant sim in the name of the company and that means we get to use the system virtually for free*".

Table 5.3: Summary of Agro Company 2's mobile money uses, value created and factors affecting value creation

Agricultural activities	Value Created	Factors affecting value creation
1. Supply of inputs • Paying Suppliers • Sending money to drivers conveying supplies for fuel while on the journey • Receiving payment from farmers and retailers who buy their agricultural inputs **2. Provision of tractor services** • Paying for machinery part replacement from sellers • Receiving payment for tractor services provided to farmers **3. Aggregation of produce from out-growers.** • Paying smallholder farmers (out-growers) for agricultural produce aggregated **4. Sale of Farm produce** • Receiving payment from customers (Poultry farmers, Wholesalers, Retailers)	**1. Increased Revenue** • Sale of agricultural inputs and produce to more customers in the hinterlands **2. Reduction in Operational cost** • No more need to send another vehicle with fuel to help a truck carrying inputs stranded on the road as a result of insufficient funds to buy fuel. • Reduced risk of theft • No need for a staff to go around to collect money from customers who buy on credit **3. Strengthening of relationships** • Building of trust • No more fear in selling on credit **4. Expansion of business** • Willingness of more suppliers and customers to do business with them because of their convenient payment system	1. Network Coverage 2. Network Reliability 3. Commission Charged 4. Convenience of the service 5. The availability of the mobile money vendors 6. Fear of Fraud

Source: Author's construct

5.5 Chapter Summary

The chapter provided case descriptions of the two agricultural companies considered for this study and also provided the case findings which sought to show the agricultural activities mobile money is used for within these companies, the value created and the factors affecting the value creation. The next chapter would present the analysis and discussion of these findings.

CHAPTER SIX

DISCUSSION OF RESEARCH FINDINGS

6.1 Chapter Overview

The preceding chapter examined the research findings of the study in connection to the research questions mentioned in chapter one and the Transaction Cost Theory. The analysis undertaken to recognize the concepts and rising issues of the research findings. This chapter presents about the discussion of the findings based on the literature reviewed so as to address the research questions identified in chapter one of the research. This chapter unites the empirical findings and analysis from the past chapter with literature findings from chapter two (2).

The discussion of research findings would focus on the following three (3) objectives:

1. The dominant activities that mobile money services are used for along the agricultural value chain in Ghana.
2. The value created in using mobile money services along the agricultural value chain in Ghana.
3. The factors that affect value creation in using mobile money services along the agricultural value chain in Ghana.

6.2 The Dominant Agricultural Activities Mobile Money is used for along the agricultural value chain

The first research question was aimed at finding answers to what agricultural activities mobile money is used for along the agricultural value chain, particularly the maize value chain. Hence, the following subsection discuss these agricultural activities.

From the literature, input supply involves the distribution of agricultural inputs such as fertilizer used to produce crops or livestock through input dealers, whereas production involves farmers who prepare the land, plant the crops, apply fertilizers, weed and harvest the crops among other practices (Adu *et al.*, 2014).This goes to show that these two stages of the agricultural value chain work closely.

The findings affirm the use of mobile money associated with input supply as stated by Grossman and Tarazi (2014) and Kirui *et al.* (2013). Grossman and Tarazi (2014) assert that there is the potential for mobile money to be used in the sale of agricultural inputs as an increasing number of farmers as well as input dealers are actively using the service Further, Digital financial Systems such as mobile money are addressing a number of traditional pain points in the context of agricultural finance, making it easier for farmers to borrow, manage irregular income save, and obtain agricultural inputs (Grossman & Tarazi, 2014). The respondents indicated that mobile money was used to purchase agricultural inputs from suppliers outside the region, send money to drivers conveying supplies of agricultural inputs for fuel while on the journey and receiving payment from farmers and retailers who buy their agricultural inputs.

The findings also show that, for the production stage, both companies used mobile money largely for receiving payment for tractor services provided to farmers and paying for machinery part replacement from sellers. Agro Company 1 which had a peculiar case of dealing with tractor owners asserted that, they used mobile money to pay tractor owners their revenue from tractor services provided. This finding affirms the assertion made by Kirui *et al.* (2013) that, a large proportion of mobile money

transactions in agriculture are used in the payment of mechanization services and payment for inputs.

Findings from this study also depict that, with regards to aggregation and sale of agricultural produce, mobile money is used in paying smallholder farmers (out-growers) in rural areas and even sometimes outside the region for agricultural produce aggregated from them as well as receiving payment from customers (Poultry farmers and so on) within the region. This affirms the findings of Sekabira and Qaim (2016) who asserted that mobile money services assist in reducing cash constraints and enhance transactions with buyers in other locations. It also emphasizes that maize farmers also use mobile money to buy a lot of maize from small holder farmers from the hinterlands (Jayne, Chapoto & Chamberlin, 2010; Cutts & Hassan, 2003). A summary of stages of the agricultural value chain that uses mobile money frequently is shown in figure 6.1.

Figure 6.1 Frequent users of mobile money from the findings.

Source: Author's own construct

Lesson One: The dominant activities that mobile money is used for are the supply of agricultural inputs, aggregation of agricultural produce from smallholder farmers and payments for mechanization services.

6.3 Mobile money use in creating Value

From the findings, the value created from the use of mobile money focuses largely on reduction in actor motivation costs as described from the transaction cost theory. The findings show that, mobile money is helping actors along the agricultural value chain to enhance commitments in transactions by making and receiving payments through mobile money to facilitate decision making and enforce compliance of agreements. Therefore, reducing actor motivation costs. This value can be categorized into Operational, Relational and Strategic. These forms of value are associated with the suggested benefits of ICT use in or trade or commerce (Boateng *et al.*, 2008).

With regards to operational value, the findings indicated that, costs of operations had reduced since there was no longer the need for a staff to be stationed or go around locations to collect money for tractor services as well as no need for customers to pay through the banks. This affirms the assertions of McKay and Pickens (2010) and Okello *et al. (*2012) who indicate that mobile money is relatively, less expensive than many alternatives to cash. Again, using mobile money services has reduced the risk of carrying huge cash on trips to hinterlands to pay farmers or to other regions to buy agricultural inputs, and this has led to reduced risk of theft and armed robbery. The need to send another vehicle with fuel to help a truck carrying inputs stranded on the road as a result of insufficient funds to buy fuel has also been reduced since mobile money was now used. This, therefore, affirms the conclusions from Lochan *et al.* (2010) that connecting actors along the agricultural value chain to a cash transfer system which is an electronic payment

system could bring about significant impact via reduced transaction costs, overheads and leakages.

> **Lesson Two:** Operational value is created along the agricultural value chain in Ghana using mobile money because of the reduction in the costs and risks associated with transacting business with cash.

As a result of some of the operational value created, relational value resulted. This came about as there was a creation of transparency and building of trust by virtue of the fact that, all parties involved in any of the agricultural transactions involving mobile money are provided with financial records. This affirms that mobile money use among actors of the agricultural value chain helps to strengthen relationships among these actors and build trust (Babcock, 2015). Mobile money is a convenient and accessible method to keep financial records (Stuart & Cohen, 2011). This form of value is crucial as it is helping actors along the agricultural value chain to enhance commitments in transactions to facilitate decision making and enforce compliance of agreements. Therefore, reducing actor motivation costs.

> **Lesson Three:** Actor motivation costs are reduced with the use of mobile money as financial records are provided for transparency and building of trust leading to relational value.

Furthermore, from the findings, the relational value has progressively led to strategic value creation along the agricultural value chain. One important value that mobile money use has helped to create as asserted by (Batista & Vicente, 2017) is creating and promoting a saving culture among farmers especially smallholder

farmers. This is because, farmers especially smallholder farmers are beginning to save money on their mobile money wallets after they receive payments for their agricultural produce for their next farming season, which is helping them expand their business as they are more prepared and plan out their spending behaviour. This, therefore, confirms that mobile money services enable users to keep money through a bank account or a mobile money account with the mobile network provider (Solin & Zerzan, 2010). Hence, mobile money transfer has become a convenient method of saving, in addition to sending and receiving money (Contini *et al.,* 2011). Input suppliers are also able to sell agricultural inputs and produce to more customers in the hinterlands as a result of mobile money use. More suppliers and customers are more willing to do business with companies using mobile money because of their convenient payment system and thereby expanding their reach. This confirms that agricultural businesses are able to expand when relationships among the various actors are strengthened (Grossman & Tarazi, 2014). Also, for companies like Agro Company who use the mobile money platform to deal with many customers, the ability to continuously onboard more customers as the mobile money technology is scalable is continuously helping them to reach more customers.

> **Lesson Four:** Relational value in the form of building of trust and strengthening of business relationships influences the expansion of business.

6.4 Factors affecting value creating in mobile money use

The study shows that, there are certain factors which have enabled mobile money to be used in creating value along the agricultural value chain and some other factors which have reduced or inhibiting value creation. The enabling factors are network

coverage and reliability, convenience of the service, the availability of the mobile money vendors, mobile money interoperability, availability of third-party service providers in the system such as hubtel and rules and regulations governing mobile money. This is crucial as it affirms the findings of Kirui *et al.* (2013) and Babcock (2015) that network coverage and reliability, convenience of the service, the availability of the mobile money vendors and rules and regulations guarding mobile money operation as specified by the appropriate regulators are important factors to the successful use of mobile money to create value in agriculture. Factors indicated by Mas and Ng'weno (2010) such as quality of other financial services among others, that were identified as factors that could influence the use of mobile money along the agricultural value chain were not found to be important factors to respondents. Additionally, the inhibiting factors included: network failures, commission charged and fear of fraud. This confirms Senso and Venkatakrishnan (2013)'s assertion that network failures are a major factor that hinders mobile money use. This finding also empathizes that network challenges particularly in rural areas is a key challenge to users of mobile money (Ndunge, 2011).

> **Lesson Five:** Enabling factors for value creation are: network coverage and reliability, convenience of the service, the availability of the mobile money vendors and rules and regulations whilst the inhibiting factors included: network failures and fear of fraud.

Also, factors from literature such as level of financial literacy and commission charged (Nunoo & Andoh, 2011; Cole *et al.*, 2011), that were viewed to hinder mobile money use did not hinder or reduce the value created in using mobile money services as claimed by respondents. People in rural areas with little or formal

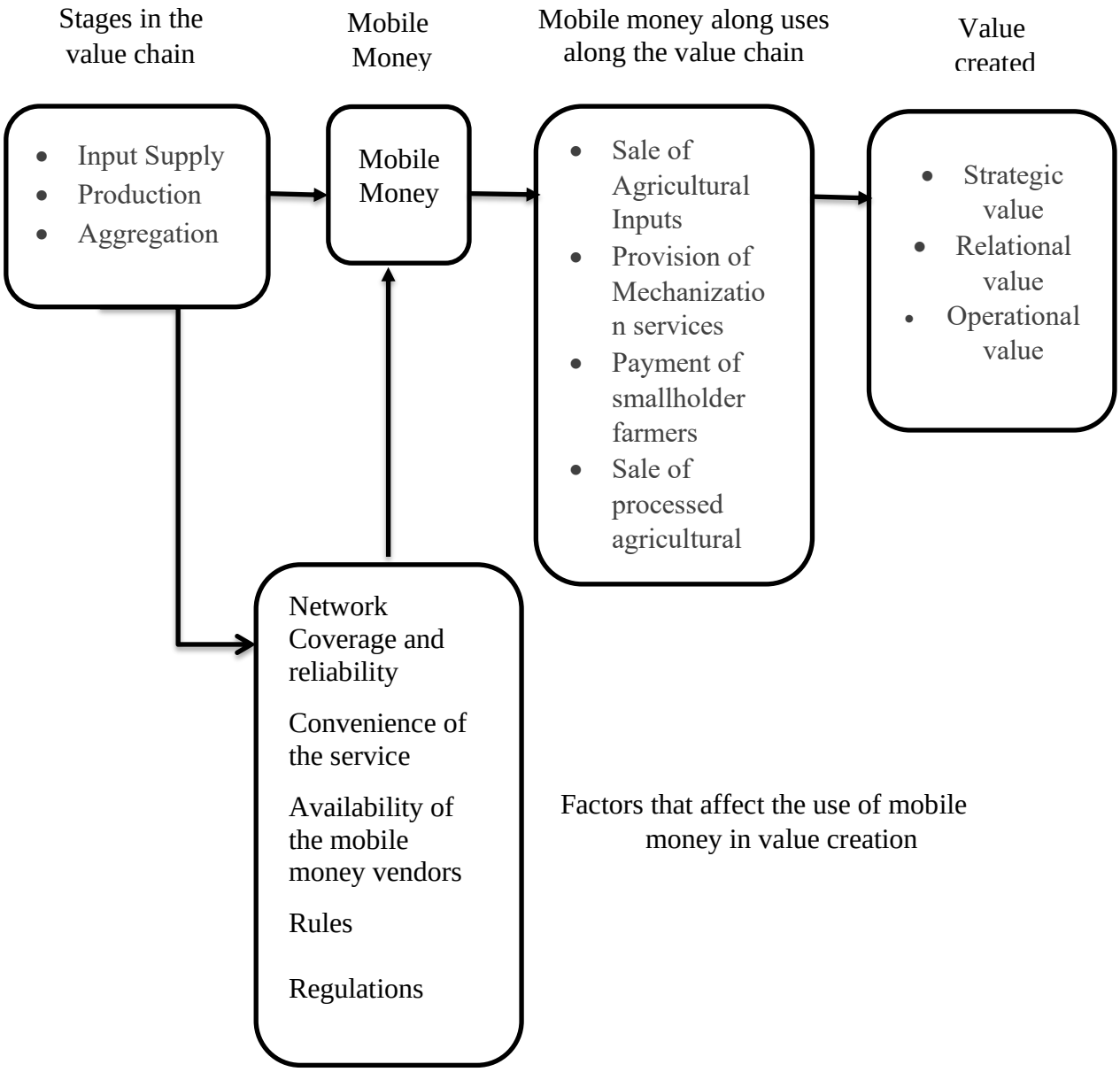
education found mobile money very convenience to use as they memorize mobile money options and procedures. The issue of commission charged by the network operators did not seem to hinder mobile money as farmers maintained that, they would have had to spend more than the commission charged to travel to a nearby town to access their monies. The agricultural companies also mentioned that they use a mobile money merchant sim cards registered in the companies' names which allows them to transact business with large sums of money for free.

Lesson Six: The level of financial literacy and commission charged that do not necessarily hinder or reduce the value created in using mobile money services.

6.5 The use of mobile money to create value in the agricultural value chain

A summary of the findings as discussed are depicted in figure 6.2 indicating the agricultural activities mobile money is being used for, the value created and the factors that affect value creation.

Figure 6.2 Summary of findings



6.6 Chapter Summary

The chapter set out to discuss the analysed case findings of the preceding chapter with particular relation to the research questions. These discussions were done vis-à-vis the literature reviewed in chapter two.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Chapter Overview

This concluding chapter offers the summary of the major issues determined and discussed in the study. It is an account of the whole thesis and comprises all the ideas that have emerged during the duration of this study which includes the contributions to research, practice and policy. The final session of the chapter provides the limitations of the study and proposals for future research.

7.2 Summary of the Research Process

The purpose of this research was to assess the value created in the use of mobile money services by actors in agricultural value chain in Ghana. The first chapter is comprised of the research background, problem, purpose, the objectives, research questions, significance of this research and concluded with the outline of the chapters that make up the research. This was to give a clear direction towards the achieving the research objectives.

Chapter two aimed at providing a detailed review of relevant literature regarding the use of mobile money services in the activities in agriculture. It also provided literature on value creation and the agricultural value chain in Ghana and offered a justification for the choice of the maize value chain. This gradually led to chapter three. Chapter three provided a description of the theoretical grounding of this study. This involved, examining the Transaction Cost Theory and its associated concepts, together with its relevance to the research. The ability of the Transaction cost theory to provide a suitable

way of determining the value created in terms of reducing the actor motivation costs was the motive for its selection.

The next chapter, chapter four, focused on the research methods that were employed in this study. It provided information that sought to justify the selection of the chosen methodology and how the methodology was used in finding appropriate answers to the research questions. A qualitative case study was adopted for the study in which two agricultural companies were used as case studies. Selected employees and customers of Agro Company 1 and Agro Company 2 were interviewed to solicit their opinion and perception of mobile money use in their agricultural activities.

Chapter five then presented the findings as related to the case description of the companies involved: Agro Company1 and Agro Company 2, and their mobile money use in their agricultural activities. Chapter six offered a discussion of the findings in relation to the literature reviewed in seeking to answer the research questions stated in chapter one of the study. The chapter, therefore, brought together the findings of literature from chapter two and the empirical findings and analysis from chapter five and they were discussed with respect to the research objectives.

7.3 Revisiting the Research Objectives

The first objective of this study was to explore the dominant activities that mobile money services are used for along the agricultural value chain in Ghana. The findings depict that, the dominant activities mobile money is largely used for input supply, production and aggregation. Mobile money is used to purchase agricultural inputs from suppliers outside the region, send money to drivers conveying supplies of agricultural

inputs for fuel while on the journey and receiving payment from farmers and retailers who buy their agricultural inputs. The study also shows that, for the production stage, both companies asserted that, mobile money was largely used for receiving payment for tractor services provided to farmers and Paying for machinery part replacement from sellers. Mobile money is also used in paying smallholder farmers (out-growers) in rural areas and even sometimes outside the region for agricultural produce aggregated form them.

Secondly, the study sort to explore the value created in using mobile money services along the agricultural value chain in Ghana. From the findings, the value created from the use of mobile money focuses largely on reduction in actor motivation costs in the transaction cost theory. This value can be categorized into Operational, Relational and Strategic. Cost of operations have reduced considerably since there was no longer the need for a staff to be stationed or go around locations to collect money for tractor services as well as no need for customers to pay through the banks. Also, the use of mobile money services has reduced the risk of carrying huge cash on trips to hinterlands to pay farmers or to other regions to buy agricultural inputs, and this has led to reduced risk of theft and armed robbery. As a result of some of the operational value created, relational value resulted. This came about as there was a creation of transparency and building of trust by virtue of the fact that, all parties involved in any of the agricultural transactions involving mobile money are provided with financial records. Furthermore, from the findings, the relational value has progressively led to strategic value creation along the agricultural value chain. Input suppliers are also able to sell agricultural inputs and produce to more customers in the hinterlands as a result of mobile money use. More suppliers and customers are more willing to do business with companies using mobile

money because of their convenient payment system and thereby expanding their reach. Also, for companies Agro Company who use the mobile money platform to deal with many customers, the ability to continuously onboard more customers as the mobile money technology is scalable is continuously helping them to reach more customers.

The final objective was to explore the factors that affect value creation in using mobile money services along the agricultural value chain in Ghana. The enabling factors for mobile money use in value creation are; network coverage and reliability, convenience of the service, the availability of the mobile money vendors, mobile money interoperability, availability of third-party service providers and rules and regulations governing mobile money. Additionally, the inhibiting factors included; network failures, commission charged and fear of fraud. The finding also emphasizes that network challenges particularly in rural areas is a key challenge to users of mobile money. Also, factors from literature such as level of financial literacy and commission charged, that were viewed to hinder mobile money use did not hinder or reduce the value created in using mobile money services as claimed by respondents. They maintained that they would have had to spend more than the commission charged to travel to a nearby town to access their monies. The agricultural companies also mentioned that they use mobile money merchant sim cards registered in the companies' names which allows them to transact business with large sums of money for free.

Table 7.1: Summary of Conclusions

Research Purpose: To assess the value created in the use of mobile money services by actors in agricultural value chain in Ghana.			
Research Objective	**Research Findings**	**Extant Literature**	**Contributions, Implications and Recommendations**
To explore the dominant activities that mobile money services are used for along the agricultural value chain in Ghana.	The dominant activities that mobile money is used for are the supply of agricultural inputs, aggregation of agricultural produce from smallholder farmers and payments for mechanization services.	Mobile money is addressing traditional pain points in the context of agricultural finance, making it easier for farmers to save, and obtain agricultural inputs (Grossman & Tarazi, 2014; Kirui *et al.*, 2013). A large proportion of mobile money transactions in agriculture are used in the payment of mechanization services and payment for inputs (Kirui *et al.*, 2013). Mobile money services assist in reducing cash constraints and enhance transactions with buyers in other locations (Sekabira & Qaim, 2016). Maize farmers use mobile money to buy maize from small holder farmers from the hinterlands (Jayne,	The study has provided useful insights into the agricultural activities that mobile is used for. This study, can therefore, guide agricultural businesses to know the planning, education, coordination and security policies they need to develop as they use mobile money This study has extended the literature of mobile money and agricultural research from a multi-stakeholder perspective which has helped in identifying the dominant activities mobile money is used for.

		Chapoto & Chamberlin, 2010; Cutts & Hassan, 2003)	
To explore the value created in using mobile money services along the agricultural value chain in Ghana	Operational value is created along the agricultural value chain in Ghana using mobile money because of the reduction in the costs and risks associated with transacting business with cash. Actor motivation costs are reduced with the use of mobile money as financial records are provided for transparency and building of trust leading to relational value. Relational value in the form of building of trust and strengthening of business	Mobile money is relatively, less expensive than many alternatives to cash (McKay & Pickens, 2010; Okello *et al.,* 2012). Connecting actors along the agricultural value chain to mobile money system could bring about significant impact via reduced transaction costs, overheads and leakages (Lochan *et al.,* 2010). Mobile money use among actors of the agricultural value chain helps to strengthen relationships among these actors and build trust (Babcock, 2015). Mobile money is a convenient and accessible method to keep financial records (Stuart & Cohen, 2011). Agricultural businesses are able to expand when relationships among the various actors are strengthened (Grossman & Tarazi, 2014). Mobile	The study offers insights to actors along the agricultural value chain on the potential benefits of using mobile money in their transactions with each other. The study extends literature on the outcome or value created in using mobile money in agriculture along the agricultural value chain in Ghana and the value that is created along the agricultural value chain. It also extends literature on the factors that affect value creation with the use of mobile money along the agricultural value chain. This research has demonstrated the use of the transaction cost theory particularly the actor motivation cost

	relationships influences the expansion of business.	money service has become a convenient method of saving, in addition to sending and receiving money (Contini *ssssss* 2011) (Batista & Vicente, 2017) Solin & Zerzan, 2010).	component in determining commitments in transactions.
To explore the factors that affect value creation in using mobile money transfer services along the agricultural value chain in Ghana.	Enabling factors for value creation are network coverage and reliability, convenience of the service, the availability of the mobile money vendors and rules and regulations, Whilst the inhibiting factors included: network failures and fear of fraud. The level of financial literacy and commission charged that do not necessarily hinder or reduce the value created in using mobile money services.	Network coverage and reliability, convenience of the service, the availability of the mobile money vendors and rules and regulations guarding mobile money operation as specified by the appropriate regulators are important factors to the successful use of mobile money to create value in agriculture (Kirui *et al.*, 2013; Babcock, 2015) . Level of financial literacy and commission charged hinder mobile money use did not hinder or reduce the value created in using mobile money services (Nunoo & Andoh, 2011; Cole *et al.*, 2011)	These findings of the study demonstrate the need for actors along the agricultural value chain to be educated on the use of a merchant sim card and how to acquire one in order to save cost from commission charged. Also, since mobile money is one of the few crucial ways through which farmers in rural areas can become financially inclusive, it would be helpful if the telecommunications companies would make the provision of reliable network coverage in rural areas a priority.

7.4 Implications of Study

As stated in chapter one, this study has implications for research, practice and policy.

7.4.1 Implication for Research

This study has extended the literature of mobile money and agricultural research from a multi-stakeholder perspective. Many of the literature reviewed, focused mainly on one actor, largely farmers. This study has therefore extended the literature of mobile money and agricultural research from a multi-stakeholder perspective.

It has also extended the literature on the outcome or value created in using mobile money in agriculture by exploring the dominant activities that mobile money service is used for along the agricultural value chain in Ghana and the value that is created along the agricultural value chain. It also extends literature on the factors that affect value creation with the use of mobile money along the agricultural value chain. Literature on the use of mobile money services in agricultural activities especially among actors along the agricultural value chain is arguably limited in developing countries like Ghana.

This research has demonstrated the use of the transaction cost theory particularly the actor motivation cost component in determining commitments in transactions. There is arguably, limited literature on outcome or benefits of mobile money use as compared to its adoption and acceptance. As a result of this, there is arguably fewer literature on the use of the transaction cost theory to assess the outcome of mobile money use hence, this study helped in addressing this gap.

7.4.2 Implication for Practice

Actors along the agricultural value chain need to be educated on the use of a merchant sim card and how to acquire one in order to save cost from commission charged. Also, since mobile money is one of the few crucial ways through which farmers in rural areas can become financially inclusive, it would be helpful if the telecommunications companies would make the provision of reliable network coverage in rural areas a priority. The insights from this study would therefore be helpful in providing guidelines for improved use mobile money along the agricultural value chain. It would also serve as a guide to the telecommunication companies who provide mobile money services on how to modify their mobile money services to address the needs of the agricultural value chain.

7.4.3 Implication for Policy

In terms of policy, this study has demonstrated the importance of mobile money use along the agricultural value chain. It has also provided useful insights into the agricultural activities that mobile is used for. This study, can therefore, guide agricultural businesses to know the planning, education, coordination and security policies they need to develop as they use mobile money.

7.5 Limitations and Future Research Directions

This study, like many other studies is susceptible to limitations and shortfalls. Firstly, this study only focused on two agricultural companies; their employees and customers. This, hence, presents a small sample size. Additionally, the study could not cover all the stages of the agricultural value chain especially, the processing. There is the need for research into agricultural processing companies who use mobile money, as the

processing companies that the firms in this study work with, preferred not to use mobile money. There is also the need for research into the agricultural value chains of other crops aside maize. Again, the outcome of the qualitative study may not be necessarily be valid in quantitative studies. Therefore, upcoming studies could consider conducting this study in a quantitative context to generate rich insights.

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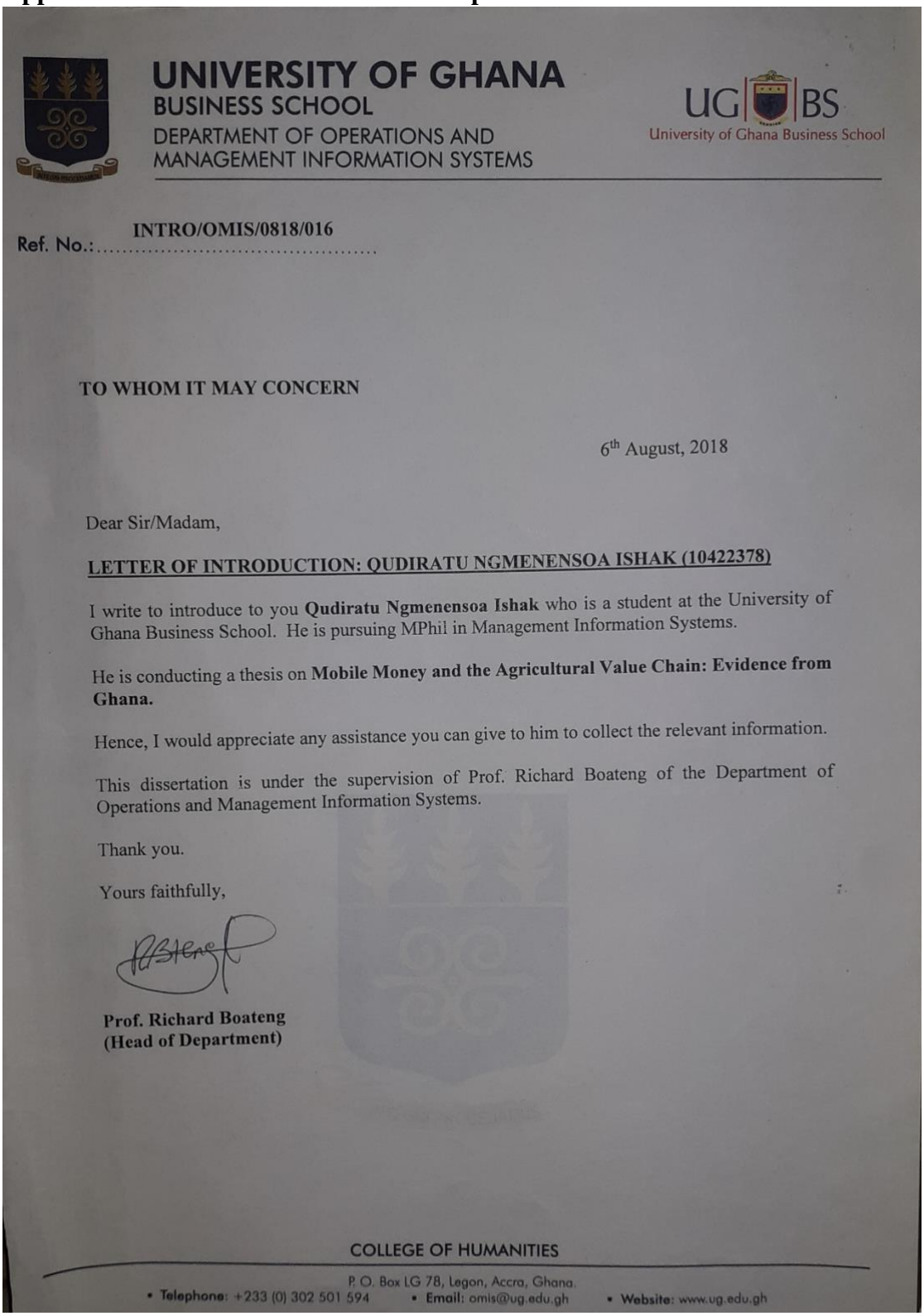
APPENDICES

Appendix A - Introduction Letter for Respondents



UNIVERSITY OF GHANA
BUSINESS SCHOOL
DEPARTMENT OF OPERATIONS AND MANAGEMENT INFORMATION SYSTEMS

UGBS
University of Ghana Business School

Ref. No.: INTRO/OMIS/0818/016

TO WHOM IT MAY CONCERN

6th August, 2018

Dear Sir/Madam,

LETTER OF INTRODUCTION: QUDIRATU NGMENENSOA ISHAK (10422378)

I write to introduce to you **Qudiratu Ngmenensoa Ishak** who is a student at the University of Ghana Business School. He is pursuing MPhil in Management Information Systems.

He is conducting a thesis on **Mobile Money and the Agricultural Value Chain: Evidence from Ghana.**

Hence, I would appreciate any assistance you can give to him to collect the relevant information.

This dissertation is under the supervision of Prof. Richard Boateng of the Department of Operations and Management Information Systems.

Thank you.

Yours faithfully,

Prof. Richard Boateng
(Head of Department)

COLLEGE OF HUMANITIES

P. O. Box LG 78, Legon, Accra, Ghana.
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Appendix B – Research Interview Guide
Introduction

My name is Qudirat Ngmenensoa Ishak. I am a student of the University of Ghana Business School pursuing

a master's degree in Management Information Systems. I am conducting a study on ***the value created in using mobile money transfer services in the agricultural value chain in Ghana.***

Overview of Research

The use of mobile enabled agricultural innovations has become a common phenomenon for the various actors along the agricultural value chain. This includes sending money for payment of farms inputs, fertilizers and salaries of workers, as well receiving money from customers as payment for agricultural products, loans from credit unions and other financial institutions in the form of mobile to mobile transfers

The primary function of mobile money transfer services is to reduce the costs of making payments from one individual to another, especially across large distances. With a large network of mobile money transfer agents in the rural areas, it can especially make it easy for agricultural households to reduce the time and cash expense in accessing the funds they need to invest in agriculture. This study, therefore, seeks to;

1. *Explore dominant activities that mobile money transfer service is used for in the agricultural value chain in Ghana.*
2. *Explore the value created in using mobile money transfer services in the agricultural value chain in Ghana*

3. *Explore the factors that affect value creation in using mobile money transfer services the agricultural value chain in Ghana.*

You are not under any onus to answer questions to which you feel uncomfortable with. Thank you for your valuable contribution in advance. Your participation is vital to the success of this research. Information to be gathered from you is purely intended for academic purposes.

Background of Respondent

1) Kindly enlighten me on your job details.
2) How long have you been using mobile money in your agricultural activities?
3) Do you belong to any agricultural association? What is the name of the association? What is the aim of the association?

Stages in the agricultural value chain

4) Which stage of the agricultural value chain does your work fall under?
5) What other stages of the agricultural value chain do you work with?
6) What agricultural activities do you carry out in relation to the other stages of the agricultural value chain that you work with?
7) Do the other stages of the agricultural value chain that you work make use of mobile money?
8) Which of the agricultural activities you carry out in relation to the other stages of the agricultural value chain do you use mobile money for?

Activities along the agricultural value chain

9) What agricultural activities do you carry out at your stage of the agricultural value chain?
10) Before you started using mobile money, how were you performing the above-mentioned agricultural activities?

Activities along the agricultural value chain that use mobile money

11) Among the agricultural activities that you carry out, which of them do you use mobile money for?
12) How is mobile money used in performing the above-mentioned agricultural activities?

Benefits/Value created in using Mobile Money in activities along the agricultural value chain

13) How has mobile money changed the way you carried out your agricultural activities?
14) What benefits does mobile money provide in your activities?
15) How does mobile money enabled you to reduce operational costs?
16) How does mobile money enabled you strengthen relationships with other actors along the value chain?
17) How does mobile money enabled you to expand your business?

Factors that affect the use of mobile money in value creation

18) What factors have enabled you to create value in your agricultural activites by using mobile money services?

19) What factors have reduced/inhibited the creation of value in your agricultural activites by using mobile money services?

Closure:

20) I am done with my questions; do you have any questions to ask me or anything you might have wanted to say that I did not ask?

21) Can you please lead me to another informant if there is any that you know of who can provide me with further information?

22) Are there any available documents?

Appendix C - Some Key Definitions

Mobile Money	An account with electronically stored-value that is linked to the mobile phone of a user
SIM card	A chip that serves as an identification to phone number of the subscriber which connects to the server of an MNO
Server	A computer or computer program which manages access to a centralized resource or service in a network.
E-money	Money that exists in banking computer systems that may be used to facilitate electronic transactions
Mobile Phone	A telephone with access to a cellular radio system so it can be used over a wide area, without a physical connection to a network.