Factors affecting adoption of mobile money by farming households in Lomahasha Inkundla of the Lubombo Region, Eswatini

By:

Theophilus Lusito Dlamini

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DECLARATION OF ORIGINALITY

I hereby declare that this dissertation, which I submit for the degree of MSc Agric (Agricultural Economics) at the University of Pretoria is my own work and it has not been previously submitted by me for a degree at this or any institution of higher learning.

Signature……………………………………………………….

Theophilus Lusito Dlamini

Date……………………………………………………….

Approved by:

Signature

Dr M.N. Makhura

DEDICATION

This study is dedicated to all role players in agricultural value chain finance in the Kingdom of Eswatini.

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Name   **:** Theophilus Lusito Dlamini

Degree   **:** MSc Agric (Agricultural Economics)

Department   **:** Agricultural Economics, Extension and Rural Development

Supervisor   **:** Dr M.N. Makhura

ABSTRACT

The conventional banking system has not been meeting the needs of the mass market in Eswatini, which is mostly made of unserved and underserved farmers in rural areas. Mobile money and other recent innovations in fintech present a potential to address the financial exclusion amongst financially marginalised groups in Eswatini. Only 44% of adult Emaswati are formally banked. In a mission to improve financial inclusion, Eswatini MTN introduced mobile money to provide formal financial services for financially excluded groups. This study sought to determine the factors that influence mobile money's adoption by farming households in rural areas of Eswatini. Knowledge of such factors is crucial in formulating policies geared towards financial inclusion in the country.

The study used survey data collected from 160 randomly selected rural farmers from the Lomahasha Inkundla in the Lubombo region of Eswatini. The results of the descriptive statistics show that 93.1% of sampled farmers have knowledge of mobile money, 80% were registered mobile money users, whilst 67% of the non-registered farmers indicated a positive intention to open a mobile money account. A majority (61.3%) of respondents were male. The typical farmer's age was 43 years old. Farmers without formal education accounted for 16.9% of the sample. About 58.8% of respondents held bank accounts, whilst 40% were members of Savings and Credit and Cooperatives (SACCOs). Trust as an informal institution against moral hazard is quite strong across the mobile money value chain. Most farmers believe that the

iv

system is safe and secure. Interpersonal trust between agents and customers is very strong. Users perceive the financial service to be useful, with a majority of the registered users utilizing mobile money for settling utility bills and executing peer-to-peer transfers.

The study developed a set of binary logistic regression models to determine the factors that significantly influence the decisions of farmers to adopt mobile money. Evidence from the results show that, socioeconomic characteristics of farmers have a significant influence on the decisions for adoption of mobile money. Gender, education, ownership of a formal bank account and farming experience were found to significantly influence the decisions for mobile money adoption. The odds of mobile money adoption were higher for female farmers than male farmers. The odds for adoption were also found to be higher for farmers with formal education beyond Primary school. So were the banked farmers as compared to unbanked farmers.

The innovation has evidently shown some prospects to significantly improve the level of financial inclusion in Eswatini. In the study sample, the overall result of financial inclusion was 61.3% before accounting for mobile money adoption. This improves to 80% when we account for active mobile money accounts. The results also show that the fintech is complementary to the conventional banking system. The study recommends that the Mobile Network Operator (MNO) incorporates financial literacy training in their strategy to capacitate mobile money users and prospective adopters. It is also recommended that formal financial institutions leverage potential linkages with informal finance organisations and self-help groups i.e. SACCOs, ASCAs and ROSCAs. However, it is imperative to approach this with caution so to avoid any over-formalisation, which might threaten the existence of the informal financial sector in the rural areas.

LIST OF CONTENTS

vi

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ix

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ASCAs	Accumulating Savings and Credit Associations
ATM	Automatic Teller Machine
CGAP	Consultative Group to Assist the Poor
DFI	Digital Financial Inclusion
FAO	Food and Agricultural Organization
FINTECH	Financial Technology
GSMA	Global System for Mobile Communications Association
ICT	Information Communication Technology
LEDC	Less Economically Developed Country
MNL	Multinomial Logit
MNO	Mobile Network Operator
MOMO	Mobile Money
ROSCA	Rotating Savings and Credit Association
SACCO	Savings and Credit Cooperative
SDG	Sustainable Development Goal
SNL	Swazi Nation Land
TAM	Technology Adoption Model
TAM	Technology Adoption Model
TDL	Title Deed Land
UNCDF	United Nations Capital Development Fund
USSD	Unstructured Supplementary Service Data
WBG	World Bank Group

CHAPTER ONE

INTRODUCTION

1.1 The State of Access to Financial Services in Eswatini

The Kingdom of Eswatini is a developing country with a relatively low rate of financial inclusion. About thirty-seven percent of the adult population has no access to a bank account (Fanta et al. 2019). Most of the financially excluded people live in rural areas. Approximately sixty-four percent of the country's population is situated in rural settlements, which are affected by a high incidence of poverty. Rural development is almost non-existent in these areas owing to the lack of access to credit and other financial services and infrastructure. Chikalipah, and Makina, (2019) argue that it is access to a formal bank account that is a major constraint, which hampers financial inclusion amongst marginalised groups. Thring (2008) suggests that this might be the unintended result of agency requirements, which are prerequisites for opening an account in formal financial institutions. Such regulation unintentionally exacerbates financial exclusion in rural areas where most farmers cannot meet the minimum requirements for opening a bank account with a formal financial institution. A handful of farmers who are able to open bank accounts will still struggle with modalities of accessibility and high transaction costs. Simelane and Odhiambo (2019) cite the lack of banking infrastructure in the country's rural areas as one of the limiting factors to financial inclusion.

The high incidence of unemployment in Eswatini also fuels the exclusion. The unemployment rate was reported at 26.4% in 2017, emerging from similar levels from the previous year (Belle and Gamedze, 2019). About half of the adult population receive income from other people in the form of remittances. Most cash senders are males in urban areas, while the majority of recipients are females in rural areas (Fanta, 2019). In a quest to improve access to financial services, Eswatini MTN, the sole mobile network operator (MNO) at the time, introduced mobile money in the country in 2011. This service was meant to cater to the financially excluded mass market in rural areas by providing affordable, fast, secure and a convenient method of sending and receiving money.

1

There are currently over 500,000 registered mobile money users in the country, with at least 330,000 active users of the money transfer services of mobile money (MTN, 2019). This study seeks to evaluate the usage of the MTN mobile money service in rural areas. Eswatini's main economic activities are spread across the agriculture sector. The sector provides employment to more than 70% of the country's unskilled labour (Khumalo, 2016). As such, it is crucial to examine the extent to which farmers are adopting formal financial services.

1.2 The Importance of Mobile Money Adoption in Financial Inclusion

In October 2013, the then president of the World Bank Group (WBG), Jim Kim, set forth a goal for achieving Universal Financial Access (UFA) by 2020 (Beck, 2016). Access to a transaction account is arguably the primary step towards financial inclusion. However, financial inclusion is not limited to transaction account access, but it encompasses a plethora of other formal financial services. These include but not limited to savings, credit, transactions, as well as insurance (World Bank, 2013). The WBG goal of universal financial access was a huge endeavour taking into consideration that 2.5 billion adults around the world have no access to formal financial services. This propagates the need to bring on board some innovative ways of banking the world's unbanked. Branchless banking services can play a remarkable role in extending access to the financially excluded. The success of these models will largely depend on their ability to meet the needs of unserved and under-served low-income households.

Financial inclusion is viewed in different ways. These are centred upon the main ideology of the provision of timely access to quality formal financial services that meet users' needs and preferences. According to the Consultative Group to Assist the Poor or CGAP, 2014), financial inclusion is the means for individuals and businesses to have access to a useful and affordable range of financial products and services that meet their needs in a responsible and sustainable way.

2

Extending access to finance is a strong foundation in enabling people to build a better life and improve their overall economic position. Even though financial inclusion is not explicitly mentioned in the Sustainable Development Goals, it has been signalled by the United Nations Capital Development Fund (UNCDF) as an enabler in seven of the SDGs (SDGs) of 2030. Financial inclusion and SDGs are closely related. This implies the enabling role of financial inclusion in overall human development.

Fanta et al. (2019) argue that despite a rapid diffusion of information communications technologies (ICT), the financial infrastructure gap has remained wide in Africa. The diffusion of ICT has brought about innovative ways of creating access to finance, including but not limited to cellphone banking, branchless banking and fintech. These are relatively new and innovative approaches, which are potential enablers in fostering inclusive finance. These methods entail the delivery of formal financial services outside the conventional bank infrastructure, through retail agents and communications technologies designed for finance i.e. Fintech (Ivantury and Mas, 2008).

Communications technologies and retail agents transmit details of financial transactions and this allows customers to deposit, transfer and withdraw funds (Okello, 2010). Recently branchless banking applications have incorporated payment services and insurance. This bridges the financial infrastructural divide between urban and rural setups. It also makes it possible to perform financial transactions even in remote rural areas. Transactions are carried out safely and securely, mitigating the need for physical security. Sub-Saharan Africa relatively has a fewer number of bank branches and automated teller machines (ATMs) per hundred kilometres, furthermore, these services are mainly urban-centric. Their geographical locations make accessibility a challenge for peripheral rural farmers to access banking services (Beck et al, 2007). However, such constraints can be mitigated by using fintech as means of providing banking services to people in remote rural areas that have no physical banking infrastructure.

Most people in rural villages rely on informal finance, usually from family and friends. Borrowing from informal and unregulated moneylenders due to lack of access to formal

financial services is common in rural areas. A majority of these people are deemed to be "too poor" to bank and fail to qualify for banking services that are provided by the formal financial institutions (Schoombee, 2011). The innovativeness of mobile money presents an alternative approach in banking to such marginalized portions of the population. The service eliminates most of the systemic barriers that are present in the conventional banking sector. Mobile money facilitates the provision of formal financial services through the application of fintech rather than physical banking infrastructure i.e. branches, ATM's, etc. Mobile money also allows registered users to access formal financial services from their mobile phones as opposed to brick and mortar branches. This presents an opportunity for unbanked and under-served low-income groups, particularly poor rural households and small-scale farmers. Most of these have ownership of a mobile phone and therefore can access formal financial services through fintech using their phones.

On the Global System for Mobile Communications Association (GSMA) survey, Jenkins (2008) argued that 1,7 billion unbanked people were people with mobile phones. This evidence shows just how much potential mobile money presents towards financial inclusion. Formal financial services can be extended to these people through the provision of access to mobile money. Mobile phones have the potential to deliver money fast, securely, and at low-cost compared to most formal financial systems that are in place and currently in use at formal financial institutions. Fintech converts cash money into digital wireless money, making it easier to transfer it anywhere without the use of physical infrastructure, which might not be essentially present for the poor in rural areas. Mobile money is one of the fastest growing financial technologies under branchless banking. This together with the emergence of digital currencies are considered revolutionary and disruptive to the traditional financial system.

Mobile money is categorised under Digital Financial Inclusion (DFI) instruments, defined as digital access to and use of formal financial services by excluded and underserved populations (CGAP, 2014). CGAP (2014) identifies three key components of DFI (Fig 1.1). The first is the digital transactional platform, which allows customers to receive or make payments and transfers as well as to store their money in electronic form through a device that can receive and transmit data. The second component is retail agents, who have a device connected to a

4

communications network that can send and receive data. Agents convert physical cash money into electronically stored value and convert stored value into cash. Agents are the intermediaries between the MNOs and the mobile money customers. The third component is a device that can send and receive transactional data just like a mobile phone.
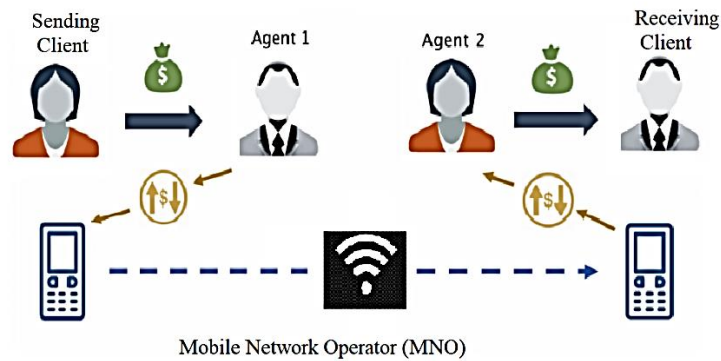
Figure 1.1 Mobile Money Flowchart

The growth of mobile phone ownership in developing countries particularly in Africa has prompted Mobile Network Operators (MNO) to diversify their services. These have tapped into the formal financial services market by providing financial services to their customers via mobile phones. This programme has been pioneered successfully in 2007 by Safaricom, which was an MNO in Kenya when they introduced M-PESA. The cellphone-based financial services system is used to transfer, receive and store money. Agents working for the MNO act as intermediaries for deposits, withdrawals as well as account opening (Munyegera and Matsumoto 2016). The key feature of M-PESA and other mobile money systems is that usage does not require any direct relationship between customer and bank and no minimum account deposits and balance is required for an M-PESA account opening (Chuhan-Pole and Angwafo, 2011).

With mobile money, clients can open and keep accounts on a zero balance for as long as they are using the mobile network operator. Unlike banks, which generate their profit margins primarily through the provision of financial services, mobile network operators, on the contrary, provide financial services as benefits, which is a strategy to retain customers and

5

create brand loyalty (Donner and Tellez 2008). Using mobile money bridges, the gap where the conventional banking system has proven to be impractical. The unique elements of fintech has made mobile money one of the most successful branchless banking innovations to date. The success of mobile money is most evident in developing countries in which formal financial services are scarce for the poor, especially the rural poor (Dermish, 2011).

The outspoken success of fintech is fuelled by its uniqueness and its objective of achieving an all-inclusive economy, which will ensure that remote rural dwellers reap the benefits of formal financial services usage (Sharma, 2013). The most popular amongst mobile money applications in Africa is M-PESA. The Kenyan mobile money service achieved massive uptake, where it was able to reach two million users within its first year of rollout (Ivatury & Mas, 2008; Vaughan, 2007). This was a great feat in the mandate towards an all-inclusive financial services economy. The success of M-PESA created a domino effect, which saw other MNOs in various other African countries replicating similar models in their countries of establishment.

The greatest selling point of mobile money is not only accessibility, but the system makes transactions cheaper and thus affordable for people from a different orientation. McKay and Pickens (2010), found that branchless banking was nineteen percent cheaper on average when compared with the other available financial services alternatives. The system can be used by anyone. All they need to do is to cash-in the wallet at an agent point and use it for offline and online transactions whenever they need to. Unlike commercial banks' cell phone banking applications like mobile money can function without the internet making it possible to be utilized in internet deprived areas. The application uses USSD technology which are advantageous not only because of lower costs but also because USSD protocol works in all cell phone models even the earlier and least technologically advanced models (Balaji and Kannan, 2020).

6

1.3 Statement of the Problem

Financial inclusion in Eswatini has been very low. Less than half of the country's adult population is formally banked. Only 44 percent of the adult population has access to a bank account, against 88 percent of adults that have ownership of at least one connected mobile phone (FinScope, 2011). Some 37 percent of the adult population is still financially excluded and fully reliant upon informal financial services (Simelane, B. and Odhiambo, 2019). This is a cause for concern regarding the country's economic progress as marginalized groups are still not able to fully participate in the country's financial system. Lower-income segments of the population, particularly the rural poor and small-scale farmers, continue to remain excluded from a wide range of formal financial services from which they could potentially benefit. As a result, they are left on the side-lines of economic activity as access to formal credit remains a major issue for those without bank accounts.

About two-thirds of the adult population resides in rural areas. These are people participating mainly in subsistence production, artisan jobs and other low-income generating activities (Mkhabela, 2006). This fraction of the population is often marginalised by the formal financial institutions due to their lack of assets to put up as collateral hold against credit access. Another limiting factor being the concentration of formal financial institutions in urban areas with very little or no penetration to rural constituencies. All of the commercial banks in Eswatini either have their branches located in the major cities Manzini and Mbabane with a few other branches in the district towns and absolutely nil in rural areas. Banking facilities like ATM's are also remote from rural areas hence even those with bank accounts still struggle with modalities of accessibility. Accessibility is costly for people in the remote rural constituencies who are compelled to take transport and travel to the nearest bank branch or ATM to access financial services. Thus, financial exclusion remains heavy in rural areas because people do not have access to banking infrastructure and facilities there.

Ivantury and Mas, (2008) highlighted that owing to the commercial nature of their business models, conventional banks have difficulty providing their services profitably through traditional channels to poor clients. This is because of geographical relief, accessibility and economies of size. Rural areas have a few bankable people scattered over wider geographical

7

locations, making it less feasible to bring physical bank branches to where they can collectively access them. The remoteness and urban-centric nature of banks therefore exacerbates the costs of access to financial services for the rural poor. Hence, most remain systemically excluded from the formal banking system (Poulton et al, 2006).

Although most rural adults have access to mobile phones, it has not yet been established whether they are able to use these phones to access formal financial services for the advancement of their financial inclusion status (Mutsonziwa, 2016). Mobile money is an emerging approach to banking Eswatini's unbanked. The service presents a potential for the provision of access to formal financial services for those that are unserved or underserved by the formal financial institutions (Myeni, 2020).

Despite the potential of mobile money to address the financial needs of those that are excluded from accessing financial services, there is a shortage of scholarly research that investigate the actual financial needs of the poor (Maurer, 2008). Environmental contexts cannot be generalized in a several number of cases since data is not homogenous, hence there is a need to take into consideration the unique social, economic and cultural environments within which these systems operate (Donner and Tellez 2008).

Government's financial inclusion policy endeavours to improve access to financial services for the poor by bringing innovation to the financial sector. Studies on Fintech in the country are just emerging and the introduction of mobile money has been cited as the motivation for this action (Myeni, 2020). These will be helpful in the development of informed financial inclusion policy and framework. Mas and Kumar (2008), emphasize that understanding the actual needs of the financially excluded is very important as this can help to improve fintech adoption and achieve desirable rates of financial inclusion in a country. This study on mobile money adoption and use aimed to identify the factors that influence the adoption and use of mobile money. It also aims to establish farmers' attitudes and preferences towards the mobile-based financial service.

1.4 Research Question

The main research question is to identify the critical factors influencing the adoption of mobile money amongst farmers in rural areas of Eswatini.

The specific research questions include;

- What are the socioeconomic characteristics of farmers in the Lomahasha Inkundla of Eswatini?

- Do farmers in rural areas in Eswatini have enough knowledge about mobile money as a formal financial service?

- Is trust, as a governance mechanism, present amongst mobile money value chain actors?

- What are the socioeconomic factors that influence the decision to adopt mobile money by small-scale farmers in rural areas in the Eswatini?

1.5 Objectives of the Study

The main objective of the study was to establish the factors that influence Mobile money adoption amongst the unserved and underserved farmers at rural areas in Eswatini.

The specific objectives are;

- To describe users and non-users of mobile money at Lomahasha Eswatini according to their socioeconomic characteristics

- To establish farmers' knowledge, perceptions, use and preferences for mobile money adoption and use in rural areas in Eswatini.

- To determine the presence of trust as an informal institution amongst mobile money value chain actors.
- To determine the socioeconomic factors that influence the decision to adopt mobile money by small-scale farmers in rural areas in Eswatini.

1.6 Purpose of the Study

This study examines the benefits and potential impact of mobile money adoption in promoting financial inclusion amongst people in rural areas. The formal financial services sector rarely take into account the needs of poor, low-income and non-commercial clients. This study focuses on the prospects of how the fintech of mobile money presents a potential to bridge the gap between the formally bankable and non-bankable clients in rural areas Eswatini. This is in a quest to achieve the governments' goal of a fully inclusive economy by 2022. To achieve this goal, the unique needs as well as the preferences for mobile money services as a suitable fintech vehicle for banking the unbanked masses were identified, analyzed and discussed.

The study explores how the adoption of fintech (particularly the mobile money) can improve financial inclusion in the Kingdom of Eswatini. This is to enable access to financial services using this emerging technology. This is important to establish the conditions and environment that is conducive for access to mobile money services. An improvement in mobile money accounts uptake will ensure better access and use of quality financial services by small-scale farmers and rural dwellers.

The introduction of financial technology (fintech) and branchless banking, mobile money, has significantly reduced the transaction costs and agency problems in financial markets for the poor and unbanked Munyegera and Matsumoto (2014). One of the benefits of this is the improvement in the rate of financial inclusion. Costs of travelling to towns in order to access bank branches, the opportunity cost of time that farmers spend away from their fields as well as banking fees and account maintenance fees are part of the costs that fintech seeks to eliminate. This is made possible by the use of personal mobile phones as the alternative

"wallets" or accounts, which need no external maintenance, require no minimum account balances to maintain and ensure functionality.

Fintech makes it possible for mobile money cash deposits and transfers as well as withdrawals to be easily made at local mobile money agents. This eliminates the need to travel and hence transport costs and other transaction costs are factored out. Opening of a mobile money account is easier compared to traditional bank accounts. It generally takes a few minutes to open a mobile money account and requires only the user's identity document and physical address. Jack and Suri (2011) and Munyegera and Matsumoto (2014) have shown that the adoption of branchless banking has had a positive impact on the socioeconomic status of early adopters in other African countries, for example Kenya through M-PESA and M-Shwari as well as Uganda's Mobile Money. Previous research has presented evidence that fintech and branchless banking plays a huge role in overall development when used effectively by the target populations.

The Kingdom of Eswatini has a large portion of a financially excluded adult population that could potentially benefit from mobile money adoption. Eswatini MTN offers this fintech. The Mobile Network Operator (MNO) is currently the only one extending mobile money as an alternative fintech in the country. Apart from farmers, several stakeholders like, cooperatives, agro-dealerships, and other non-agricultural value chains could potentially benefit from the use of branchless banking services through ease of payments for purchase of goods and services, payment of utility bills, insurance as well as cash deposits, transfers and withdrawals.

11

1.7 Outline of the Study

The first chapter of the document covers the introduction and a general background of Mobile money, focusing particularly on Mobile money in Eswatini. The problem statement describing in detail the research question is also presented in the first chapter. Chapter two presents a review of literature on digital financial inclusion, concepts and analytical literature. Research techniques and methods are presented in chapter three; this comprises of the analytical econometric models and techniques applied in the analysis of the data. The fourth chapter is a presentation of statistical data and descriptive results. Chapter five presents and discusses the empirical results for the econometric models. The conclusion and recommendations to stakeholders and other researchers are presented in the final chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature related to this study. It discusses the concept of financial inclusion, followed by a discussion on the factors influencing access to financial services, their demand, use and quality. Barriers to financial inclusion are also discussed with the support of literature. Finally, it presents the theoretical framework for technology adoption. This introduces the two models of technology adoption whose concepts have been employed in determining the factors affecting mobile money adoption.

2.2 The Concept of Financial Inclusion

2.2.1 Financial inclusion

Financial inclusion can be approached from three main dimensions, namely; access, use and quality of available financial services. Timely access to quality and affordable financial services by unserved rural and underserved low-income groups has the potential to play a key role in propelling rural development. Access to financial services is considerably the most important component of financial inclusion (CGAP, 2014). However, accessibility alone cannot do much if not coupled with use. Therefore, the ability to use financial services once they are made accessible is a crucial factor towards banking the unbanked. Inclusive finance must entail wide range of financial services, these services should go beyond just savings and credit to include services such as crop insurance, the ability to make payments as well as the ability to send and receive money with ease.

13

2.2.2 Access to financial services in rural areas

The first step towards achieving financial inclusion is financial literacy, followed by the creation of access to formal financial services, which enable users to safely and securely deposit, save and receive money (Ramakrishnan, 2012). A number of countries in Sub-Saharan Africa (SSA) have struggled with both fundamental components of financial inclusion. This is evident by critically low rates of financial inclusion compared to developed countries (Mutsonziwa, 2016). In most of the developing countries, adults do not have access to formal financial services, bank account ownership is very low, and this poses a challenge to rural development as households are exposed to financial shocks (Collins et al 2009). Access to formal financial services is key to approaching financial inclusion, hence there is a strong need for innovative models that can be used to extend financial services to financially excluded groups of the population. The dynamics of mobile money make it a suitable tool for reaching out to unserved and underserved groups. Mobile money has the versatility that most formal financial institutions lack. It allows for mobility and can be accessed anywhere so long as the user is connected to the MNO network.

According to Beck et.al (2014), despite the potential benefits of financial inclusion, two billion adults were reported to have no access to a bank account in 2014. This portion of the world population remains economically excluded and cannot effectively take part in income generating activities that could enable them to lift themselves out of poverty. Financial inclusion plays an integral role in financial development, and therefore a higher degree of financial inclusion should be at the core of any human development agenda (Allen et al. 2016). Countries that have moved financial inclusion up their priorities have shown some improvement in economic growth and their reduction in rural poverty. This has been evident in India, where the extension of bank branches to rural areas has triggered a decrease in rural poverty (Burgess and Pande, 2005).

Financial inclusion plays a remarkable role in agriculture, it allows timely and adequate access to credit for farmers as their needs occur. This, in turn, results to improved productivity and performance. Borrowing from informal sources such as friends and family does not offer the same kind of benefits as it often restricts the amount of money that farmers are able to access

14

at a given point in time, due to the coincidence in credit demand owing to the covariant nature of agriculture. Demand for credit tends to increase during farming seasons and informal money lenders are often in short supply, this always leaves farmers credit constrained.

Access to insurance is another element of financial inclusion. In farming, access to agricultural insurance for farmers is crucial in managing financial risks that can emanate from crop failure (Karlan and Morduch, 2010). Agricultural insurance pools covariant risks, which are a common occurrence in agriculture. According to Karlan et al (2014) farmers tend to shift frem low-risk low-return crops to high-risk high-return crops with the availability of crop insurance. This proves how financial inclusion can enhance farmers' profitability.

Thring (2008) argues that, for the low-income segments of the population to realize the potential benefits of financial inclusion, financial services need to be tailored to the needs and requirements of the target market. The increased penetration of information technology in Sub-Saharan Africa has made it possible to deliver financial services outside the conventional banking system using mobile phones and agents. Nonetheless, it has not yet been established if this statement holds true for the kingdom of Eswatini. Mobile money has recently been introduced in the country in order to improve financial inclusion for the unbanked population.

2.2.3 Demand and use of financial services in rural areas

The use and demand for mobile money in rural areas is directly associated with the demand for banking and formal financial services. Helms (2006), argues that, unless and until there is substantial demand for banking services, people would not adopt alternative banking solutions like mobile money regardless of the convenience and accessibility that they present. Financial services are a basic need for all despite the space that one might be occupying. Both rural and urban dwellers have the overarching need to access and use quality and reliable financial services whenever a need arises. The use of various financial services however depends on their accessibility and availability in that environment.

15

Rural areas are commonly marginalised by formal financial services in general, banks. Formal financial institutions always set up shop in urban and suburban areas where affluent clients are generally found in their numbers. This makes it hard for poor and low-income earners from peripheral rural areas to access banking services due to the high costs of transaction involved. People from the rural areas have to pay transport fares to get to the city in order to access formal financial services. Once they get to the bank, they are further marginalized and considered risky clients as they have little or no property of value to place as the collateral that would be required by the bank when taking up credit (Light and Pham, 1998).

The lack of government regulated financial services in rural areas has created a grey area. This has allowed for predatory financiers who tend to charge exorbitant interest rates to poor clients to set up operations in these peripheral rural areas. As a result, most poor people in rural areas are trapped within a vicious cycle of debt. Rural people tend to also rely on social capital for financing, a majority normally depend on friends and family to avoid these high-interest rates that are charged by money lenders and loan sharks. This however leaves most borrowers credit rationed as they would not often be able to access the full amount of money that they require at that time. This goes to show that rural people do use financial services like all other human beings therefore there is a demand for affordable and reliable financial services in rural areas. The rendition of regulated financial services would curb some of the challenges that are faced by people in rural areas when they try to access financial services.

Zellar and Sharma (2002), found that there was a high demand for formal financial services in rural areas in Ghana, however, people were discouraged by supply-side factors such as the requirement for collateral and other procedural specifications that led to their exclusion from accessing formal financial services. It may also be argued that individuals in the low-income bracket shy away from formal financial services in order to enjoy the low to zero transaction costs and flexibility that they enjoy when using social capital. Dependence on social capital is very common in rural areas this is because of the prevalence of informal institutions. People tend to have a higher degree of interpersonal trust; hence it becomes easier to lend money to family or friends, solely based on good faith, which is not the case with formal financial institutions. Banks would require one to have assets, which can be held as collateral in order to extend a similar courtesy to a client. This shows that trust in principal-agent relationships is

not as strong because of the agency problem, therefore collateral is required to ensure adherence.

On a quest to address the issues of financial exclusion, the unbanked population in a number of rural areas Eswatini has been engaging in various finance approaches to service their needs for financial services. Self-help groups like Rotating Savings and Credit Associations (ROSCAs), Accumulating Savings and Credit Associations (ASCAs) and Savings and Credit Cooperatives (SACCOs) have been established. These are operational in several constituencies. Such, groups are categorized as semi-formal financial institutions because they tend to employ both statutes of formal financial regulation as well as employ their own informal institutions. These savings groups provide credit and allow for savings and deposits, however they lack several financial services, e.g. insurance, transfers as well as the ability to make transactions. Another short-coming of these self-help groups is their dependence on social capital and sometimes lack of legal regulation making them prone to the agency problem of moral hazard.

2.2.4 Quality of financial services

The quality of financial services for financial inclusion is determined by the extent to which financial services can address and meet the banking needs of the poor and low-income earners (Wright, 2000). A financial service is of good quality when its users are able to benefit beyond the cost of service provision. This means that financial services for the poor should be designed such that they are low cost as well as efficient enough for them to be willing to adopt and sustainably utilize. At its core, mobile money is designed upon this foundation, in order to deliver formal financial services to the poor and low-income earners at a reasonable cost that they can afford. Zeithaml, Berry and Parasuraman (1996), found that perceived service quality significantly affected the decision on whether to adopt and continue using some financial services. This was later reiterated by (Duncan and Elliot, 2002) who also found that not only does service quality affect the adoption of financial services and usage decisions, it also affected the principal's financial performance. This shows just how much quality matters in principal-agent relationships under financial services sector.

Quality financial services attract customers, especially where money is involved. Clients need the assurance that their savings and investments will be safe and their contracts honoured. Therefore, enforcement is a major prerequisite in formal financial services. What makes mobile money ideal is that it ticks all the boxes yet still have the ability to provide low-cost services to its customers (Maurer, 2012). Compared to other formal financial institutions, MNOs have a comparative advantage because the mobile money service does not require fixed banking infrastructure as banks would normally need to have multiple branches. Services are wireless, allowing them to reach even the most remote rural areas, so long as they have network connection. This ensures affordability, security and convenience for customers (Jenkins, 2008).

Due to the lack of sustainable financial solutions in most rural areas in the SSA, people in rural areas lack access to formal financial services. This results in them utilising unsafe, insecure and non-regulated financial services, exposing themselves to risks and exorbitant interest rates on loans (Aterido, Beck and Iacovone, 2013). Therefore, there exists a need for quality financial services in rural areas that can address these issues, especially financing mechanisms and products that would be adapted to meet needs of rural people especially those engineered towards agriculture. Aterido et al. (2013), also found that woman and the youth formed a larger portion of the financially excluded population in SSA. Fox, Senbet and Simbanegavi (2016), also came to a similar conclusion. This is because banks target mainly income earning clientele for their services, which on a larger scale are adult males. This leaves women and the youth excluded from financial services. There need for non-discriminating financial products like mobile money can never be overemphasized as it presents the opportunity to bank these predominantly financially excluded groups.

Mobile money also presents the opportunity for people in rural areas to utilize financial services that have previously been reserved for commercial agriculture. Through there service, MNOs partner with insurance companies to provide, micro insurance products for their clients. This is the case with MTN Eswatini an MNO that has partnered with Old Mutual Eswatini in order to provide all MTN mobile clients with Life insurance and funeral cover worth E500.00 for free with the option to increase the cover amount through paid monthly subscriptions (MTN

Eswatini, 2018). This courtesy by the two companies is targeted at increasing both mobile money users and insurance clients.

2.3 The Current Formal Financial Services Landscape in Eswatini

Eswatini has four major commercial banks, which have the function of collecting deposits from clients with surplus cash and lend funds to clients who need financing. These banks operate in the money market and are regulated and monitored by the Central Bank of Eswatini, which the monetary authority of the state is (Thring, 2008). The major commercial banks are First National bank, Nedbank Eswatini, Standard Bank Eswatini, which are all subsidiaries of South African banks and the Swazi Bank. None of all the commercial banks have branches in rural areas this makes them inaccessible to individuals in rural areas, these banks main clientele consists mostly of working-class males in the four regional towns where the bank branches are located (MAP, 2014).

The Swazi Bank is the unique of the four institutions. The bank, which is a government subsidiary that was formerly known as the Development and Savings Bank, was re-launched in the year 2001 and given the name Swazi Bank (Thring, 2003). The Swazi Bank was an effort by government to provide quality formal financial services to Swazi citizens after a realization that the three commercial banks we are discriminating on low-income earners. The bank was also established to provide agricultural financing which was a product that the major commercial banks was only offering to large scale commercial farmers with collateral to hold against the loans. Small-scale farmers couldn't benefit from the system therefore the government established the Swazi Bank to provide such services to small-scale farmers at reasonable interest rates on loans.

The formal financial services sector in the country also constituted of 74 registered cooperatives in 2014. These cooperatives are also regulated and monitored by the Central Bank of Eswatini and supported by the Ministry of Finance through the Microfinance Unit division (Flank, 2013). The Microfinance Unit (MFU) is tasked with driving financial inclusion, bridging the gap between the regulators, financial service providers, the MSME's and the

19

consumers of financial services particularly rural households. However, the unit also does capacity building for self-help informal financial services in rural areas such as ROSCA's and ASCA's in order to promote good practices for handling finances.

Insurance was liberalized in the year 2005, after many years of the Eswatini Royal Insurance Company (SRIC) operations as a state-owned monopoly. The state-owned SRIC had the power to manipulate prices in the market since it was the only player and this was not efficient for clients, it is on that regard that the government decided to liberalize the market. Many other insurance companies have since entered the market to service local businesses and individuals since 2006. Thompson (2017) reported that there were currently six long term long and three short-term insurance companies that have entered the market since the liberalization.

MTN Eswatini, the sole mobile network operator (MNO) at the time, entered the formal financial services market in 2011 as a provider for e-money using their mobile money product offering. However, MTN has since lost its monopoly privilege and a new telecommunications network Swazi Mobile entered the market in 2017. Nevertheless, Swazi Mobile does not provide e-money yet and MTN Eswatini remains the sole provider of e-money in the telecommunications the spectrum. The Swazi Post Office is also a player in the sector providing remittance and bill payment services.

2.4 Barriers to Financial Inclusion in Rural Areas in Eswatini

2.4.1 Financial exclusion

Financial exclusion is the inability to access formal financial services or hold a formal banking account. Lack of access to banking services is a major problem in most developing countries and affects the vast majority of the population. Third world countries have significantly lower levels of financial development when compared to their counterparts. Financial exclusion in developing countries is usually due to underdevelopment of the financial sector (Carbo, Gardener and Molyneux, 2005). Rural areas have no banking infrastructure, bank branches are found in distant towns which makes accessibility a challenge for people in rural areas. Distance associated with high costs of travelling which are further exacerbated by the relatively high

transaction costs in banks making them less ideal for poor people in rural areas. Eswatini suffers from similar challenges. This section discusses in detail the barriers to financial inclusion in the context of the country.

2.4.2 Poor development in rural areas

According to the National Development Strategy (2006), there has been lack of growth in the country's two major cities, Mbabane and Manzini for a prolonged period. This has affected negatively the development of rural areas. More than 80% of the rural population has no portable water. Only 58% have access to electricity compared to 71% in urban areas. Access to modern amenities is highly skewed towards urban areas. This affects development where amenities are required for service provision. Unpredictable draught has also been cited as a cause of poverty in many communities around the country (Lwanga, 2000). A study by Thring (2007), into Eswatini's ICT infrastructure found that the country has poor ICT infrastructure in rural areas and improvements in any of the sectors that required updates would be very costly and take too long. Kempson et al. (2004), argues that there cannot be a single cause to blame for financial exclusion of the poor. Therefore, attention must be given to several collective strategies in order to address the problem of financial exclusion.

2.4.3 Access to banking facilities

Access to banking facilities is a major impediment towards financial inclusion in Eswatini, only the urbanized areas in the country have full access to banking facilities. The country has a well-developed urban banking system, with access to modern banking infrastructure, internet and cellphone banking. Rural areas however have no physical access to banking infrastructure, and thus cannot benefit from similar financial services as their counterparts in urban areas. Hawkins (2005), argues however that an increase in the number of access points may not be enough to improve the usage of banking facilities unless this is coupled with affordability and appropriateness. Affordability is a major challenge for the unserved and underserved, the results from this study also suggested affordability as one of the reasons the poor do not have access to formal financial services. Most research on access to financial services cites lack of physical infrastructure as a constraint to access in rural areas.

2.4.4 Regulatory implications

According to Thring (2008), a minority of adults who do not have bank accounts in Eswatini have at least once been refused by formal financial institutions. The reasons for the banks to decline to issue bank accounts to some individuals include failure to meet the criteria required by formal financial institutions as enforced by the Central Bank and the Financial Services Regulatory Authority (FSRA). There is a range of regulatory barriers exacerbating financial exclusion amongst the poor.

Proof of Address: 75% of Eswatini's population lives in rural areas, mostly on communal Swazi Nation Land (SNL). Property rights are not clearly defined, thus there is no allocation of physical addresses. Property is assigned through the local chiefdoms under the Tinkhundla system of governance, which does not allocate any formal addresses to households. Consequently, the rural populace would be financially excluded.

Bank Requirements: As a prerequisite in Eswatini, banks require positive proof of identity in the form of a passport for internationals and a national identity card for citizens. The introduction of smart national identity cards is relatively new and many people in rural areas still do not have these documents. As a result, they do not quality for opening bank accounts. This makes it a challenge to bank the rural poor in the country.

Bank Terms, Conditions and Charges: Kempson et al. (2004) found that formal financial institutions impose artificial barriers through their terms and conditions that tend to deter the poor from opening bank accounts. Minimum bank balance is one of the barriers cited in the study, this ranges between E120 and E5000 in Eswatini. The mass market is often offered savings accounts (these have limited financial services) as opposed to (transactional accounts) that offer a wider range of financial services. Genesis Analytics (2005) also concur with the findings from the Hawkins study.

22

Simplicity and Ease of Use: There is a major lack of knowledge on the use of modern banking facilities amongst people in rural areas. Literacy levels are low and thus people cannot operate ATM's with English menus and options. Path dependency also plays a role on the fear of adopting newer technologies. Rural people mostly adults feel comfortable going inside bank branches and get assistance from bank tellers than using self-help systems as they find these complicated.

These above are some of the challenges that generally cited by the mass market for not having access to formal banking services. The formal financial services sector has long failed to meet the banking needs of lower income segments. Mobile money seeks to address most of the barriers that are prevalent in the formal financial services sector. The following subsections discuss how mobile money aims to address these challenges for the mass market.

2.5 Role of Mobile Money in Inclusive Finance for Farming Households

Mobile money is one of the latest innovations in several approaches that have been developed to address the lack of or poor access to financial services by poor households and low-income earners in rural areas. As an inclusive finance tool, this system of banking seeks to improve financial inclusion amongst societies, by enabling groups, which have been previously excluded from the formal financial services sector to use formal financial services at a relatively lower cost. This allows all income groups the ability to open and hold a mobile money account and have access to formal financial services. However, mobile money services are not rendered by banks but are a service provided by Mobile Network Operators (MNO) to their registered customers using cell phones and hired agents working for the MNO who acts as middlemen between the companies and their customers (Ehrbeck,2012). Normally the mobile money agents are not fully hired and are paid commission for rendering their services to the MNO.

According to Hughes et al. (2007), mobile money as mentioned in the previous paragraph is normally delivered by companies outside the conventional financial services sector. This inclusive finance tool gained its popularity through the inception of M-PESA, a very successful

23

mobile money service by Safaricom in Kenya. M-PESA achieved a very high rate of adoption, 70 percent of Kenya's adult population had adopted M-PESA within its first four years of operation (Jack and Suri, 2011). Other mobile network operators (MNO) across Sub-Saharan (SSA) have since replicated and implemented the M-PESA model in the markets to expand their services by proving financial services to their customers. Nonetheless, the success rates of M-PESA have not echoed across these new markets, a typical example being South Africa where the MNO Vodacom had to terminate the programme.

According to (Sarma et al. 2012) there is a positive correlation between money adoption and financial inclusion. This cannot be far from the truth, since the more people are able to access and use quality formal financial services, the higher the rate of financial inclusion. Financial inclusion is also critical for farmers' market participation in many developing countries (Aker, 2008). When farmers can access credit, they are able to buy farm inputs in time and leverage favourable weather conditions for crop development. This increases productivity and ensures that there is enough surplus to put in the market. Crop insurance also hedges farmers from risks of crop failure and hence minimizes financial losses in times of unfortunate events.

Dupas and Robinson (2009), argue that the poor and low-income earners are hindered by the lack of access to adequate formal financial services from saving and investing. As a result, they fail to engage in mechanisms aimed at poverty reduction and rural development. The lack of savings also means that low-income earners particularly rural households cannot afford to invest in education and farm mechanization. Mobile money, therefore, endeavours to reach the mass market through provision of cost affecting financial services to the unbanked. It allows them to have access to formal financial services with minimum requirements on registration and not minimum account balances required. This enables even the poorest of the poor to have access to a mobile money account and enjoy the full benefits of a formal financial service without having to go through all the screening processes that are required by the traditional banking sector.

 Several studies have been carried out on the role and potential of mobile money on accelerating financial inclusion through the provision of access to a formal financial account, (Claessens,

2006) successfully established that there is a positive relationship between adoption of financial services and financial inclusion. It is evident therefore that mobile money can play a significant role in poverty reduction and achieving the other Sustainable Development Goals (SDGs) when effectively and adequately used by the mass market.
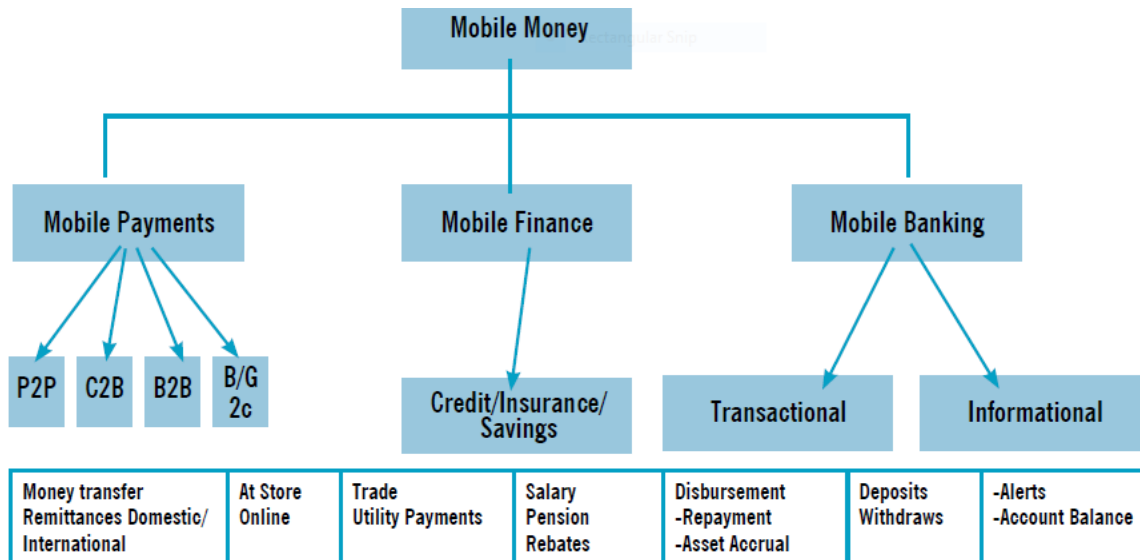
Figure 2.1 The Conceptual Framework of Mobile Money

2.6 Theoretical Framework for Technology Adoption

2.6.1 Technology adoption models

There are two popular models prevalent in technology adoption literature. These are Davies's (1989) Technology Acceptance Model (TAM) and Roger's (1983) Innovation Diffusion Model (IDM). Davis (1989) also structure the extended technology acceptance model in a quest to explain the possible behavior of consumers when adopting and accepting new technologies and innovations. Subsequent scientific research has since been using these models to develop the factors that influence consumer behavior when adopting new technologies.

The Technology Acceptance Model (TAM) was established based on the user's perceptions of usefulness and ease of use of the new technology. It is assumed that technology adopters are

25

willing to adopt new technologies if they perceive them as useful in meeting their needs and when those technologies are relatively easier to use than those that are already existing. Davis (1989), describes perceived usefulness is the "degree to which a person thinks that using a particular system will enhance his or her performance", whereas, perceived ease of use is "the degree to which a person believes that using a particular system will be free of effort". These two models are relevant in the financial services industry too, because consumers already have many existing financial services in the market.

Therefore, for farmers to adopt mobile money, the services of the technology must be perceived by consumers to provide a relatively better experience than the already existing financial services and tools. The Innovation Diffusion Model (IDM) proposes that diffusion of an innovation is driven by how a social system first accepts an innovation and then begins to use the idea or the technology. On the IDM adoption is assumed then to depend on product or service characteristics, in this respect, it is like the TAM.

This study utilized concepts of both models and employed the independent variables that were relevant in the study area. This was because the study encapsulates both the diffusion of mobile money as an innovative technology as well as the decisions for adoption by the mass market. The independent variable of choice was derived from both models, with modifications to allow them to suit the context of this study.

2.6.2 Mobile money adoption

New banking technologies and innovations present a new hope in accelerating the rate of financial inclusion amongst previously excluded sections of the population around the globe. In order to realize the potential that mobile money presents in banking low-income groups and those that are financially excluded by the formal financial institutions, it is imperative to first establish and understand the factors that determine the adoption of this technology. Uaine, Arndt and Masters (2009) argued that in order to capture the optimum contribution of a new technology in economic growth the technology needs to be widely diffused. The technology diffusion however is a result of individual decisions to adopt that technology. Rational

26

economic agents make decisions and choices based on their evaluation of the costs and benefits of using the technology. Consumers are always in quest for utility maximization therefore the benefits must outweigh the costs that are associated with the product in order to justify adoption.

Foster and Rosenzweig (1996), argued that literature on the adoption or non-adoption rather of new technologies by farming households focuses mainly on imperfect information, risk, uncertainty, institutional constraints, human capital and infrastructure as the benchmark that adoption decisions are made upon. The new body of literature has since started to focus on social capital, knowledge sharing and information dissemination (Thompson, 2018). Social networking allows people to interact and share ideas and information and hence people quickly learn about the emergence of new technologies and start experimenting on their adoption. According to Bernard *et al* (2018), knowledge sharing in agricultural value chains is very crucial as it enables farmers to make properly evaluated decisions. Social capital easily facilitates this endeavour.

According to Munyegera and Matsumoto (2016), mobile money that is provided by MNOs is cheap and convenient for both the provider and the service user. The service provider can expand operations and provide a service to large numbers of people in rural areas without the establishment of conventional banking infrastructure as a bank normally would. The users of mobile money on the other hand benefit from the reduced time and transaction costs of accessing financial services. Rural areas are generally dominated by informal financial services that are not under state regulation. Due to the lack of regulation, these informal institutions tend to operate opportunistically towards their clients, charging high interest rates and often using unlawful methods for debt collection. Aleem (1990) however argued that these high interest rates are not opportunistic and are justified by the existence of imperfect information between borrowers and lenders, which present a high level of risk and uncertainty to the credit provider.

Ngugi, Pelowski and Ogembo (2010), found that mobile money adoption provided a solution to most of the banking challenges faced by people in rural areas in Kenya. In their study, they found that early adopters of mobile money travelled less frequently to town for cash

27

withdrawals at conventional bank branches. They also found that mobile money users felt safer and secure using the innovation than using the services of informal moneylenders. We can therefore argue that the perception towards mobile money safety and security influences the decision for adoption of the financial service. This might arise from the fact that even though mobile money is not like the conventional banking system, it is regarded as a formal financial service under state regulation (Donovan, 2012). This therefore protects users of the service from opportunistic behaviour by service providers, building consumer confidence and thus influencing the decision for adoption of the mobile money.

2.7 The Factors Influencing Adoption of New Technologies in Rural Areas

2.7.1 Adoption of new technologies

Poor and low-income groups are systemically excluded from formal financial services citing agency problems. Asymmetrical information between the principal and the agent is generally cited as a problem in the adoption of new technologies. There is a need for innovators to create awareness around the technologies that they introduce for public use. For farmers to adopt these, they need to have positive perceptions towards the technology's utility. However, the will to adopt is not enough, it has to be coupled with the targeted user's ability to use and benefit from the technology. Enforceability also becomes paramount in these principal agent relationships, where the MNO is handling its customer's monies. The customers need to know that their money is safe, and that the MNO can be held accountable if anything goes amiss. This is necessary in the building of trust, which is a prerequisite in principal-agent relationships.

2.7.2 Awareness

Hanafizadeh and Khedmatgozar (2012), argue that before customers develop the willingness to adopt a product or service, they pass through the process of knowledge, persuasion, decision, and confirmation. Adoption of new technologies therefore begins once customers become well are of the innovation, its benefits and disadvantages. Howcroft et al. (2002) and Sathye (1999), in their studies concluded that banking customers lack awareness about internet banking and

28

its benefits was the reason they were reluctant to use the fintech. Therefore, raising public awareness about branchless banking services is fundamental to improving the rate of their adoption in order to improve financial inclusion. Information availability of mobile money services can be argued to be the beginning of the decision-making process in adoption of this fintech.

2.7.3 Perceived utility

Perceived usefulness affects the demand and subsequently the adoption and use of a new technology Marumbwa, and Mutsikiwa (2013). Consumers tend to adopt only innovations that they deem to add value through improving the way they have carried their daily activities. The perceived utility of mobile money will therefore vary from one individual to the next as well as from one economic region to another depending on the value that the service adds in improving the way that people carry out their financial transactions.

Bauer et al. (2005), discovered that, contrary to their earlier expectation that developed economies were more likely to adopt mobile money, this wasn't the case. The realization was that people in Europe and the US had very low rates of adoption as they deemed other fintech to be of higher utility to them than mobile money. The reason for this might be the differences in the levels of technological development in fintech. Developed economies have advanced fintech therefore creating a wider array of fintech choices for consumers in those countries.

2.7.4 Level of literacy

Gagel (1997) identifies six themes of technological literacy, namely; cognitive performance, cultural identity, knowledgeability, language communication, reading and writing, and utility. The two themes are relevant in mobile money adoption, namely reading and writing and utility. The ability of customers to read and write affects their demand for mobile money. This is mainly because mobile money requires a certain level of English literacy, as the menu options

29

are written in English. This affects the rate of adoption of mobile money services in rural areas the mostly because it is in these are where levels of illiteracy are predominant.

In their study carried out in the Philippines, India, Kenya and South Africa, Medhi et al. (2009) found that the illiterate and semi-literate users of mobile money in all four countries had a common preference. The subjects of the study all preferred menu options written in their home languages, with higher preference given to non-text but graphical menu options. This shows that even though the level of literacy might be regarded as a minor prerequisite, it still plays a role in the decision of mobile money adoption. This was reiterated by Thatcher et al (2006), where they discovered that icon comprehensibility amongst illiterate ATM users improved their confidence and ability to use ATMs.

2.7.5 The role of trust in technology adoption

Trust plays an integral role when consumers make decisions of incorporating new technologies in their financial activities. However, due to lack of complete information a consumer must make a 'leap of faith' when adopting a new innovation or technology (Bahmanziari et al., 2003). In the process of new technology adoption, privacy and security are the main factors, which consumers would normally cite as their priority concerns. Francisco and Swanson (2018); Srivastava et al. (2010), argue that this is because of recent developments in technology that have resulted in an increase the rate of identity theft and cybercrimes by those who exploit these technological advancements for ulterior motives, which has increased the resistance in early adoption of new systems.

In their study of the role of trust in consumer adoption of payment systems, Srivastava et al. (2010), also discovered that consumer adoption of mobile payment systems was relatively low when compared with 'the tried and tested' traditional forms of payments in Singapore. It is worth noting that this was contrary to their prior expectations that mobile payment systems would have a higher rate of adoption since this was an OECD economy. Trust of mobile payment systems is also dependent of perceived reputation of the mobile network operator (MNO) and its perceived opportunism. If consumers suspect that the MNO might behave

30

opportunistically, then the rate of adoption of the technology would be low in favour of available substitutes. Eswatini however only has one mobile network operator, leaving consumers with only the traditional banks as substitutes.

Trust therefore plays an integral role in new technology adoption as it averts perceptions of risk and uncertainty amongst consumers, motivating them to have a higher degree of acceptance of new technologies (Pavlou and Gefen, 2004). Previous research on technology adoption shows that the determinants of initial adoption differ from those of continued use. However, trust is the one determinant that remains in the model.

2.8 Chapter Summary

This chapter presented - the concept of mobile money as it to financial inclusion. It also categorised the three fundamental pillars of financial inclusion, namely: use, access and quality of financial services. Review of literature from previous studies on adoption of new technologies demonstrated the main technology adoption models of interest, namely the TAM and the IDM. These give insight on how decisions to adopt a new technology or innovation are made. The models were used to decide on variables of choice. These are further broken down further and discussed in the next chapter, which also presents the econometric model specification.

CHAPTER THREE

RESEARCH METHODS

3.1 Introduction

This section presents the research methods that were applied in the analysis of the data for this study. The first section provides a brief description of the study area as well as its governance structures. This is followed by a section on the sampling procedure that was employed and the discussion of the survey instrument, summing up with a breakdown of procedures on the survey implementation. The validity tests that were employed in verifying the robustness of the econometric model are described and discussed on the subsequent section. The last part of the concludes with a discussion of the empirical models that were applied for the econometric analysis together with a table grouping and summarizing the independent variables for which data was gathered.

3.2 Research Setting

Eswatini constitutes of four administrative districts, namely: Hhohho, Manzini, Shiselweni, and the Lubombo district. Each district is subdivided into constituencies locally referred to as "Tinkhundla" (Singular: Inkhundla). A single Inkhundla is the made up of several chiefdoms which are the local and immediate traditional governance structures. This study was carried out in the Lomahasha Inkhundla, which is in the Lubombo District. The area is under traditional governance as it is located on Swazi Nation Land (SNL). SNL is communal land under traditional governance, governed by chiefs in trust for the nation, under the primary custodianship of the King (Mkhabela, 2006). The Lomahasha Inkhundla comprises of two chiefdoms namely; Lomahasha under the custodianship of Chief Mlungeli Mahlalela and Shewula under the custodianship of the Chief Mbandzamane Sifundza clan.

32

The study area is located (32^0 0' 0" E, 25^0 58' 60" S) on the Eastern border of Eswatini, sharing borders with both South Africa and Mozambique. According to the available statistics from the 2007 Eswatini population census, the area had a total population of 22,239 in 2007. The area suffers one of the highest incidences of rural poverty recorded in the country, with only 8% of the working-class population that is formally employed and 46% of adults that are unemployed. Most households around the study area are dependent on subsistence agricultural activities for a livelihood. The level of unemployment in the area is way above the national average rate of unemployment. Formal financial institutions have been reluctant to provide services to populations with similar attributes, leaving many people in these rural areas without means of access to reliable formal financial services.

The district town that doubles as the administrative town is called Siteki, this is located 63,4 kilometres away from the constituency, the furthest amongst constituencies in the district. Due to the long distance between these two locations, access to several administrative services tends to be very costly for households and individuals living in the study area. Even with a well-developed network of tarred roads that connects this rural area to the nearest town, accessibility is still costly. The existing road network development can be attributed to the local border post that links Eswatini with the Republic of Mozambique. The border also facilitates some micro-business activities for the locals who occasionally sell fresh farm produce and some artifacts to tourists crossing the border gate on Wednesdays and Saturdays. Public transportation in the form of buses and taxis is also available, connecting the area to other distant towns and locations.

The selection of the study area was motivated by the lack of formal financial services in the area. The nearest ATM is 30.3 km away, located in the nearest sugarcane plantation settlement of Simunye. This makes it a challenge for households to access formal financial services timely, due to the long distance and high costs involved. Subsequently, several rural adults from Lomahasha have no access to a formal bank account. This has led to a high reliance on friends, relatives and other sources of informal finance like money lenders and loan sharks as the main sources for financial services in general, credit.

33

The primary reason for the choice of this study area is its population's demographics, namely; the high incidence of unemployment, the prevalence of rural poverty as well as the dependence on micro-business activities and subsistence agriculture. These factors jointly present an 'unsuitable' business environment for the formal financial institutions to operate at. Banks prefer being urban-centric and this leaves rural areas with poor access to no access to formal financial services. The increase in the rates of mobile phone ownership however presents an opportunity to render formal financial services remotely to previously unbanked individuals.

It is imperative to explore innovative approaches to assist under-served communities to access reliable formal financial services. The new developments in Fintech have made it possible for mobile phone users to access formal financial services without having to go to physical brick and mortar bank branches. Mobile money is one of those innovative approaches as it presents the opportunity for extending branchless banking services to previously unbanked rural households and communities. This has the potential to improve financial inclusion amongst underserved groups whilst reducing the cost of access and use of formal financial services

Figure 3.1 shows a map of Eswatini with all its 55 Tinkhundla, the Lomahasha Inkhundla is in the North-Eastly corner of the country, as highlighted.

TINKHUNDLA MAP OF SWAZILAND- 2018 EDITION
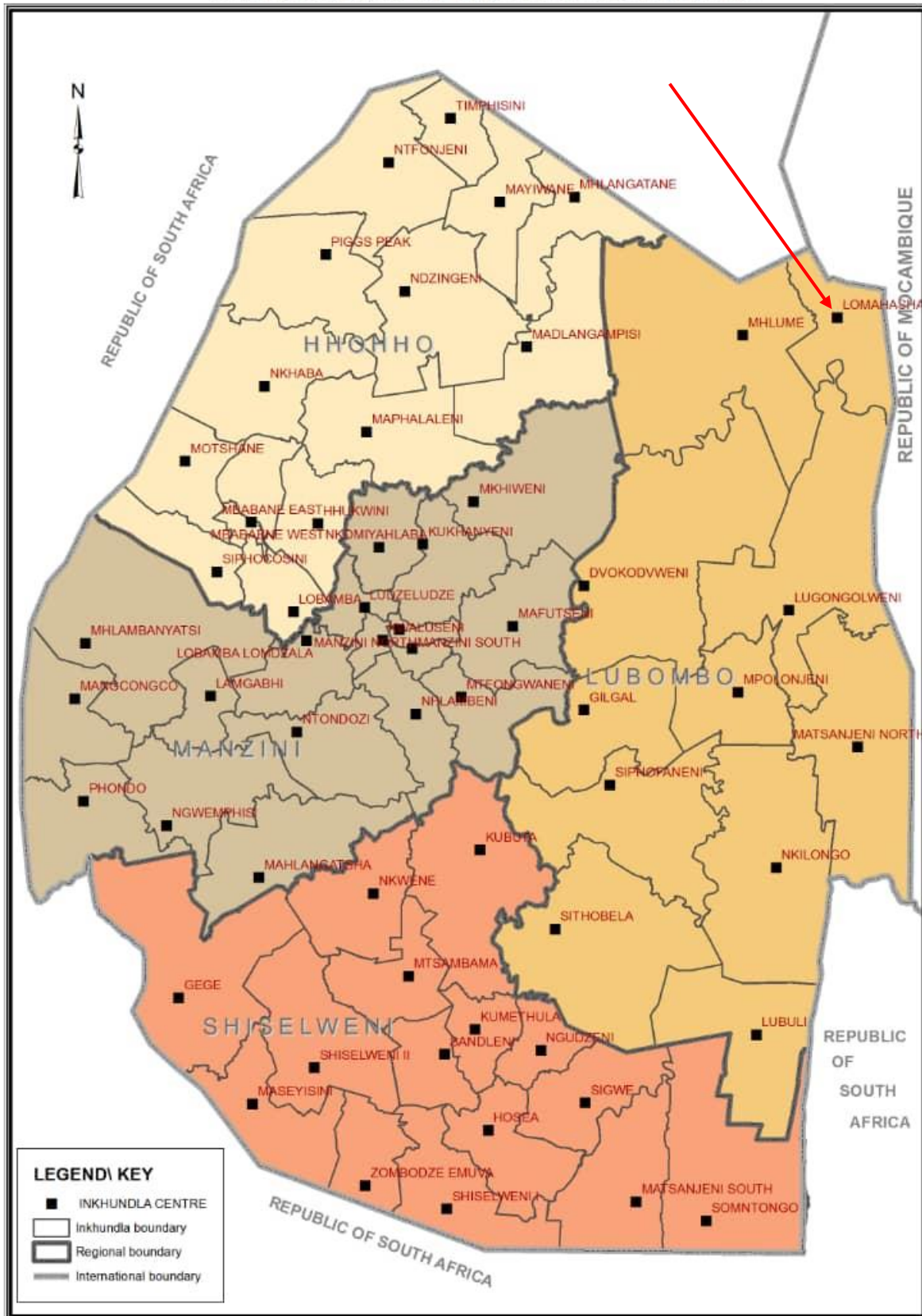
Figure 3.1 Eswatini's Tinkhundla Map and Location of Lomahasha

3.3 Sampling Procedure

The study employed purposive random sampling procedures to collect survey data from households in the study area Lomahasha Inkhundla. The area has a total population of approximately 22, 239 people, most depend on farming.as a livelihood and income generating activity. In determining the sample size, Simple random sampling (SRS) using a specified precision approach was used for obtaining the desired sample size. The selected formula is presented below;

$$n_{srs} = \frac{1.96^2 p_{srs} q_{srs}}{d^2}$$

$n_{srs} = Sample\ Size$

$p_{srs} = Estimated\ Population$

$q_{srs} = 1 - p_{srs}$

$d^2 = Desired\ absolute\ precision$
$(a\ value\ of\ 50\%)\ was\ used\ since\ 50\%\ gives\ the\ largest\ sample\ size)$

A 95% confidence interval was used for calculating the sample size, assuming the 1.96 value in the formula. The outcome sample size was found to be 381. Considering the nature of the study and the resources within disposal, it was agreed that this was quite a large sample. Collecting data this much would have required more time and more funds which both are limiting factors to this academic research. The verdict was that, since the data was collected at the same constituency under nearly similar conditions, we could assume homogeneity for the purposes of this study hence only 160 respondents were interviewed.

3.4 Survey Instrument and Development

A structured questionnaire with both open-ended and close-ended questions was developed in accordance with the objectives of the study. The instrument was first piloted amongst peers in the University of Pretoria to assess the ease of understanding of questions as well as the time

36

factor. The necessary adjustments were done, and the final questionnaire was used to collect household's demographic and socio-economic characteristics of respondents. Each questionnaire took a minimum of fifteen minutes extending to twenty-five minutes to complete depending on how elaborate the respondent was on the open-ended questions sections.

3.5 Survey Implementation

Face-to-face interviews were conducted to administer the questionnaire to respondents for the purpose of collecting primary data. Four students form the Agricultural Economics Department of the University of Eswatini were recruited for data collection as additional enumerators. Before the data collection process commenced, all enumerators were given a detailed briefing on the study, its objectives together with the purpose of the study to ensure that they had full understanding of what was expected of them in terms of the data required for addressing the objectives. At the time of data collection, the enumerators had already completed their Research Methodology module. This was very effective in reducing the time we required for working over the data collection techniques and procedures.

The questionnaire was piloted with the enumerators to test their understanding of the questions as well as to give them hints and advice on best approaches to questions. After successful piloting, each enumerator was given a set of questionnaires to use for capturing data while conducting the survey. The data collection process lasted for a maximum of three weeks.

3.6 Model Specification and Validity Tests

3.6.1   Introduction to model specification and validity

Three necessary validity tests are essential when using the binary logistic regression. These are, namely: the n quota, Multicollinearity and Normality. The n quota is a rule that is used to determine the minimum n require to run a logistic regression model. Multicollinearity tests help in identifying and correcting very highly correlated independent variables in the models.

37

Finally, normality tests used histograms to test that the data from the continuous variables was normally distributed.

3.6.2 Treatment of missing variables

The dataset had two categories of missing variables, namely; system missing values and user missing values. The system missing values are those values whose data is completely absent from the system. This is due to questionnaire routing, as respondents had to skip some questions that were not relevant to them judging by their previous responses. This set of missing values makes sense and therefore is not a problem in the data analysis. However, there is also the second set of missing values, the user missing values. Certain values were marked as missing and replaced with means after observing the graphical properties of the data, these were values that were outliers, falling far beyond the normal distribution curve. The Mean Imputation (MI) technique was applied using SPSS to replace outliers and missing variables. This was handled with caution ensuring that there was no correlation bias and that the variance remained stable and not overestimated.

3.6.3 Outlier detection and treatment

Extreme data points can have a disproportionate influence on the output results causing the conclusions drawn to be distorted from the real situation. Therefore, identification and treatment of outliers is of paramount importance. Data points which are far from the mean of normal distribution can have an undesirable influence on the estimated model as well as its parameters. Visual techniques were applied to identify outliers amongst continuous variables using scatter plots. The decision was to use mean values of the normal data points to replace the outliers in order to achieve normality. Even though removal of outliers is considered by a large body of researchers to be the ideal method of dealing with extreme data points (Orr, Sackett and Dubois 1991), this would not have worked well in our study considering that we had a small dataset. Removal of outliers would have invalidated our n-Quota.

3.6.4   n Quota

A minimum sample size is required before running the logistic regression model, this is determined by a sample size $n=10$ for every continuous variable in the model and the (number of categories-1) X 10 for the categorical variables, per variable. Due to the limitation of data availability, this criterion could not be fulfilled in the modelling. However, we ensured that the model conformed to all the other econometric standards to compensate for this weakness.

3.6.5   Normality

The data from the continuous variables was tested for normality, each of the continuous variables used in the model exhibited a normal distribution. For the binary logistic regression normality must be established before continuous variables can be included in the econometric model. An independent variable of interest, the log of total agricultural assets owned was excluded from the model because it exhibited a skewed distribution and thus proving to be unsuitable for analysis.

3.6.6   Multicollinearity

The problem of multicollinearity arises when very highly correlated independent variables have been contemporaneously included in an econometric model Dohoo et al. (1997). The Pearson correlation coefficient and the Variance Inflation Factor (VIF) are both methods used to test and verify for the presence of multicollinearity. The problem of multicollinearity is more likely to occur when using multiple regression analysis. This might be a sign that the researcher has some redundant data. In the case that certain independent variables exhibit multicollinearity, the researcher either has to drop one of the variables alternatively transform them if they are to be added to the model. In this study, the log of total agricultural assets was initially a predictor variable in the model, however, due to multicollinear effects it had to be dropped. Regression analysis is meant to estimate the parameters of dependency, not an interdependency relationship hence we eliminate interdependent continuous variables.

39

Cortina (1993) argued that the least squares regression equation is one of the most trusted in econometrics owing to its reliability and robustness. The presence of multicollinearity undermines the statistical significance of the independent variables due to joint-effects (Mansfield and Helms, 1982). Standard errors are inflated whilst the beta coefficients are underestimated thus making it less likely to get statistically significant outcomes in the regression. Multicollinearity can also be detected whereby removal of one independent variable significantly affects the magnitude of the coefficients of the remaining variables in the model (Makhura, 1994).

We used the Variance Inflation Factor (VIF) technique to detect multicollinearity amongst the continuous variables in the in the model. A threshold VIF score of 10 is considered a sign for the presence of serious multicollinearity. The continuous variables; age and number of years in farming (a proxy for faming experience) were found not to have any multicollinear effects. Their VIF was below 6. To further validate these continuous independent variables of interest, we applied the Pearson Correlation Coefficient, and this was below the .7 threshold for presence of multicollinearity.

3.7 Empirical Model

3.7.1   Model estimation

This section presents the estimation of the econometric model for the determinants of mobile money adoption. The outcome variable to be estimated is a binary hence the probability of adopting mobile money is estimated as a latent variable. The choice of whether to adopt mobile money cannot be explicitly observed is assumed dependent on the observable socioeconomic characteristics of the farmer. The data that we analyze is mainly cross-sectional in nature for each specific farmer with multiple socioeconomic characteristics at a specific location at one point of time. The analysis is undertaken using these socioeconomic characteristics to determine the mobile money adoption decisions of the sampled farmers in the study the methodology is discussed into detail in the subsequent subsections of this chapter.

40

The model has seven categorical variables and two continuous variables. For the significant variables it is where $p \leq .05$. However, some independent variables are quasi-significant, these are variables with a significance level where $p \leq .10$. They are indicated in later chapters with a single asterisk (*) in the results table, for the purpose of this study we only discussed those that are significant at the 5% level of significance i.e. $p \leq .05$.

3.7.2 Modelling mobile money adoption

In the first model we identify which factors significantly influence whether farmers adopted mobile money. This is modelled by in a binary choice framework as depicted on the equations below. The dependent variable; Mobile money adoption takes a value of 1 if the farmers adopted mobile money and a value of zero if the farmers did not adopt the service. It is worth mentioning that the binary logistic regression model does not evaluate the decisions of an individual farmer in isolation, however it evaluates the collective decisions of each of the two groups, i.e. adopters or non-adopters.

$$Money_i (X) = \beta_1 X_j + \varepsilon_j \qquad\qquad (1)$$

$Money_i$ is a dummy dependent variable that takes a value of one if the respondent is a registered mobile money user (equation 2) and zero if otherwise (equation 3). The value X_j is a vector of socioeconomic, household and contextual characteristics, while ε_j is a random error term, accounting for all other factors that influence mobile money adoption that might have been excluded from the specified model.

$$Money_1(X) = \beta_1 X_i + \varepsilon_1 \qquad \text{for adoption} \qquad\qquad (2)$$

$$Money_0(X) = \beta_0 X_i + \varepsilon_0 \qquad \text{for non-adoption} \qquad\qquad (3)$$

Equation 4 below is the model specification with all the independent variables that were used in the model specification included. The detailed description of these independent variables is discussed in table 3.1 at the end of this section.

Model 1

$$Money_1^* = \delta + \beta_1 SACCO\_MBRSHP + \beta_2 GENDER + \beta_3 AGE + \beta_4 MARR\_STS + \beta_5 LVL\_EDU + \beta_6 OCCUPATION + \beta_7 FARM\_XP + \beta_8 BANK\_ACC + \beta_9 INC\_SRC + u \qquad (4)$$

$Money_1^*$ is a dependent variable for overall mobile money adoption in the study area. It takes a value of 1 if mobile money has been adopted, otherwise zero (0). Beyond mobile money adoption for the overall group of respondents, the study seeks to determine factors affecting adoption when respondents have already adopted pre-existing formal or semi-formal financial services. To achieve this, we used selective data of respondents with formal bank accounts and non-adopters of mobile money and applied equation 5 below. This model is similar to the original model, in structure, with the same binary dependent variable which is mobile money adoption ($Money_2^*$). However, bank account ownership has been removed as a predictor variable here as it is utilised as a data splitting variable. Using the second model, equation 5, we first analyzed the data of those farmers who had bank accounts together with non-adopters. Using a similar approach, data from the non-adopters of pre-existing financial services was also analyzed using Model 2.

Model 2

$$Money_2^* = \delta + \beta_1 SACCO\_MBRSHP + \beta_2 GENDER + \beta_3 AGE + \beta_4 MARR\_STS + \beta_5 LVL\_EDU + \beta_6 OCCUPATION + \beta_7 FARM\_XP + \beta_8 INC\_SRC + u \qquad (5)$$

The decision to incorporate the data of non-adopters in the selective groups was made in order to achieve at least a 60/40 percentage balance in the number of non-adopters and adopters of

42

mobile money being analyzed. This was due to the high incidence of mobile money adoption in the study area, which made the overall data to only have 20% of non-adopters.

The binary logistic model also employed from the initial model of mobile money adoption was applied to the third model to determine the adoption decisions of SACCO members. The data split variable being farmers' membership to a semi-formal financial institution, SACCOs in this context. We first analyzed the data for farmers that were members of SACCO together with non-adopters of mobile money and concluded with farmers who were not members of SACCOs together with non-adopters of mobile money. The model that was employed is illustrated in equation 6 below. $Money_3^*$ represents mobile money adoption for the SACCOs group, assuming a value of one (1) if the respondent adopted mobile money otherwise zero (0).

Model 3

$$Money_3^* = \delta + \beta_1 GENDER + \beta_2 AGE + \beta_3 MARR\_STS + \beta_4 LVL\_EDU + \beta_5 OCCUPATION + \beta_6 FARM\_XP + \beta_7 BANK\_ACC + \beta_8 INC\_SRC + u \ (6)$$

3.7.3 Description of independent variables

The table 3.1 below provides the descriptions of the independent variables in the models above. It also provides the description of those variables that are not in the econometric models but have been used in the descriptive analysis in chapter 4.

Table 3.1 The Variables in the Adoption Models and their Hypothesized Signs

Variable Name	SPSS Code	Expected Sign
Mobile Money Adoption -*Money₁* (1 if using mobile money, 0 otherwise) -*Money₂* (1 if bank account holder adopts mobile money, 0 otherwise) -*Money₃* (1 if SACCO member adopts mobile money, 0 otherwise)		
Bank Account Ownership (1 if has a bank account)	*BNK_ACC*	-
SACCO Membership (1 if member, 0 otherwise)	*SACCO_MBRSHP*	-
Bank Account Ownership (1 if has a bank account, 0 otherwise)	*BNK_ACC*	-
Age (years)	*AGE*	-
Gender of Respondent (1 if male, 0 otherwise)	*GENDER*	-/+
Marital Status - Single = (0) - Married = (1) - Divorced = (2) - Widowed = (3)	*MARR_STS*	-/+ + -/+ -/+
Level of Education - No formal education = (0) - Primary education = (1) - Secondary education = (2) - Tertiary education = (3)	*LVL_EDU*	- + + -
Occupation - Unemployed = (0) - Farmer = (1) - Wage earner = (2) - Self-employed = (3) - Salaried worker = (4) - Pensioned = (5) - Student = (6) - Other = (7)	*OCCUPATION*	- + + + + - + -/+
Farming Experience (Years)	*FARM_XP*	+
Primary Source of Income - Salary = (1) - Wages = (2) - Crop sales = (3) - Remittance = (4) - Grants = (5)	*INC_SRC*	-/+ + + + +

44

3.8 Chapter Summary

This chapter presented the research methods that were used in the study. From designing the data capturing instrument to the validation of the econometric models and analysis of the data. The subsequent chapter presents the descriptive statistics results of the study that came from the methods that have been discussed in this chapter.

CHAPTER FOUR

CHARACTERISTICS OF FARMERS IN THE STUDY AREA

4.1   Introduction

The research methods discussed in chapter three were utilized in producing the descriptive, statistical and empirical results of the study. This chapter is a presentation and discussion of the descriptive statistics. The subsequent section, section 4.2 discusses the socioeconomic characteristics of the households, which participated in the study. Section 4.3 lays out economic and financial attributes of respondents. A discussion on mobile money knowledge, perceptions and trust in Lomahasha is presented in section 4.4. The state of accessibility and use of formal and semi-formal financial services amongst sampled farmers is detailed in section 4.5. The subsequent sections, Section 4.6 discuss user preferences for mobile money. Section 4.7 is a further discussion on preferences for mobile money. Results on the reasons for non-adoption are discussed in section 4.8. The chapter is concluded with a brief summary of the discussions presented in the chapter sections.

4.2 Socioeconomic Characteristics of Sample Households

4.2.1 Household decision making

Household decision makers make economic and financial decisions based largely on their socioeconomic status and demographic characteristics. The financial and economic endowments that a household has within their disposal implicitly determines the nature of consumption choices they make. The role that socioeconomic factors play in economic decision-making can never be overemphasized. The subsequent sub-sections present descriptive results of such socioeconomic and demographic characteristics of the households that were sampled in the study and discuss the results to better understand the sample. The respondents' socioeconomic information is presented here as a collective of multiple factors

46

each discussed in detail with the supporting data. These are household position, gender, age and level of education.

4.2.2 Position in household

The position in the household is the variable for the household economic decision maker, in ideal cases this is also the household head, however in other cases the economic decision maker is not necessarily the head of the household. Therefore, the economic decision maker is what we normally refer to as a breadwinner, someone who makes the economic decisions however, leaving the rest of the decision-making prerogative with the household head. This is an important independent variable when dealing with extended families, as the structure of households is very different than what is typical in other parts of the world. The country predominantly has extended families emanating from its tradition and popular culture of polygamy. Nevertheless, economic and financial decisions are independent and generally left upon the breadwinners to execute and for this variable, we focused on the economic decision maker who might not essentially be the traditional household head.

The sampled respondents show that household economic decision makers are predominantly the husbands who accounted for 32.5% of the overall sample as presented in table 4.1 below. The second largest group of economic decision-makers were the wives. The role of decision making in the household is normally relinquished to the wife, in cases where their husbands are not staying with them. The absence of the husband may be due to social causes like divorce, separation and sometimes polygamy or natural occurrences like death. In cases where the husband is not living in the household, the wife is the household head and decision maker.

Another significant group was found to be that of child-headed families, where the eldest sons and daughters were responsible for the welfare of their younger siblings. This can be attributed to the high incidence of the HIV/AIDS pandemic in the country; 27.2% of the population is infected with the virus. This led to a lower life expectancy, with the average life expectancy being 57.7%. The premature mortality of household's heads continues to negatively affect household structures, creating a new category of households headed by children, mostly of

school-going age. Some extended families are headed by grandparents. Where they are still financially fit, they are the ones that make the financial and economic decisions of the household. Such elders normally have extensive land holdings and livestock as assets. These two groups of households' financial decision makers are likely not to adopt mobile money due to them being the groups with the lowest literacy rates in the country.

Table 4.1 Position of Household's Decision Maker

Household Position	*Frequency*	*Percent*
Husband	52	32.5
Wife	45	28.1
Son	29	18.1
Daughter	13	8.1
Grandfather	10	6.3
Grandmother	4	2.5
Uncle	3	1.9
Aunt	2	1.3
Granddaughter	1	0.6
Total	160	100.0

4.2.3 Demographic characteristics of respondents

Gender, age and the highest level of education that one has attained are external factors that one has no absolute control over, regardless they still affect the economic decisions that individuals make on a day-to-day basis. The Swazi culture perceives women to be of less social status than their male counterparts and as such woman generally come second to men in several instances. Such a system leads to inequitable distribution of resources between males and

48

females and thus economic decision-making will differ between the two groups. The results of this are the heterogenous effects on mobile money adoption decisions of the two groups. The privileged group i.e. males, might adopt mobile money services at a high rate than the less privileged group. Age also is also a major factor as Swazi culture tends look upon youths as subordinates and this often excludes them from participating in economic generating activities.

Nonetheless, technology is breaking those cultural barriers as the elders are beginning to seek the youths' opinions pertinent to technology adoption and use. Thus far, education has been the one factor that levels the ground for all genders and age groups - as equitable access to education tends to remove the imposed cultural barriers. Education allows a higher degree of access to various forms of information and thus allows individuals to have a broader scope of things as opposed to the conservative way of thinking. The a-priori expectation is that, the more education that one acquires allows them to make rational economic decisions. However, rural areas in the country are popular for low literacy rates, so decision making is more likely to depend upon information dissemination and peer-to-peer influence.

Gender, level of education, marital status and age of respondents

The majority of the sample was male respondents, with 98 (61.3%) of the 160 respondents being male. The results are presented in table 4.2. This is in line with the a-priori expectation that males are the main economic decisions makers in Swazi households. The respondents were required to indicate their level of education as a proxy for literacy, the largest group of respondents, 65 (40.6%) had a attained a certificate in secondary school. Only 27 (16.9%) respondents had not received any formal education. Therefore 83.1% of the respondents can read and write, making them better able to interpret written information. The results are presented in table 4.2 below. The data on education depicted a standard normal distribution.

A majority of the farmers who participated in the study were married farmers (58.8%), the second largest group was that of single farmers (31.3%). The age of respondents ranged between 15 to 79 years. The typical respondent was an adult male with the average age being 43 years and a standard deviation of about 16. The data tested statistically significant for

49

skewness at the 95% confidence interval with the test statistic being 2.44, which is greater than the Z score of 1.96, however it still qualifies to be utilized in parametric tests since the level of skewness is low.

Table 4.2 Gender, Level of Education and Marital Status

Demographic Attributes	*Frequency*	*Percent*
Gender		
Male	98	61.3
Female	62	38.8
	160	**100.0**
Level of Education		
Secondary	65	40.6
Primary	42	26.3
No formal education	27	16.9
Tertiary	26	16.3
	160	**100.0**
Marital Status		
Single	50	31.3
Married	94	58.8
Widowed	12	7.5
Divorced	4	2.5
	160	**100.0**

4.3 Economic and Financial Attributes of Respondents

4.3.1 The role of economic and financial attributes in adoption

Economic attributes like the status of employment play a significant role in the use of financial services. Individuals who are employed generally have access to financial endowments and thus a need for frequent use of financial services. The value or amounts transacted also have an influence on the choice of financial system, which a user prefers. Employed individuals who

50

earn salaries are more inclined towards formal financial services whilst the unemployed might opt for semi-formal and the much more relaxed informal financial services. This section presents the results from the study capturing the economic and financial attributes such as; employment status, access to a formal bank account, membership to Savings and Credit Cooperative (SACCO), access to information, knowledge of various banking methods and other finance related information. These results form a foundation for better understanding of the data as it relates to the economic and financial position of the respondents in the study area.

4.3.2 Employment status

The largest proportion of respondents 56 (35%) had no stable and sustainable source of income since they are unemployed. This is above the national unemployment rate of 25.7%, however it is worth noting that the sample has been drawn from a rural area. Previous studies have found unemployment coupled with poverty to be more prevalent in rural areas around the country. Fully employed respondents accounted for only 21.9% of the sample. The results are presented in table 4.3 below.

Table 4.3 Respondents' Main Source of Income

Income Source	*Frequency*	*Percent*
Unemployed	56	35.0
Salaried worker	35	21.9
Pensioned	22	13.8
Farmer	17	10.6
Wage Earner	15	9.4
Self-employed	15	9.4
Total	160	100.0

51

4.3.3 Membership to a Savings and Credit Cooperative (SACCO)

Savings and Credit Cooperative Organizations (SACCO's) are helpful in terms of extending access to finance when well-managed. These provide members with various financial services at relatively low cost compared to other external sources of finance. In the sample only 64 (40%) of respondents were members of a SACCO. The remaining majority were not affiliated with such organizations, the data is presented in the Figure. 4.1 below.
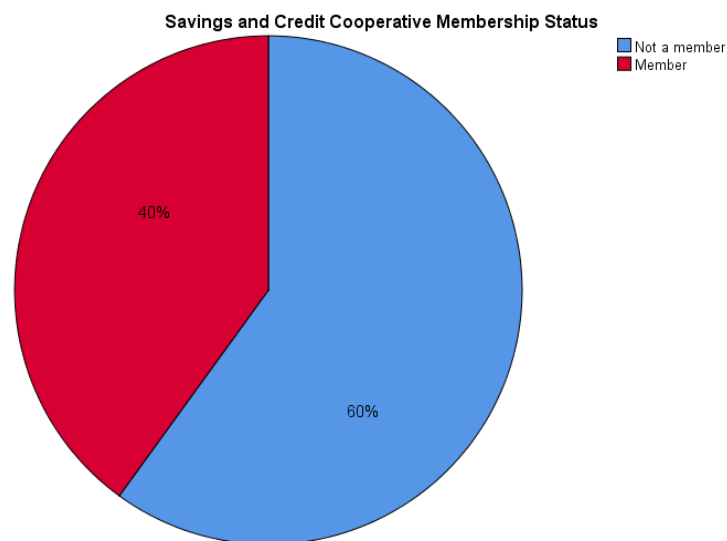
Figure 4.1 Farmers' Savings and Credit Cooperatives Membership Status

4.3.4 Access to a formal bank account and frequency of account use

Table 4.4 below presents the data on respondents' access to a formal bank account, which is the key barometer for quantifying financial inclusion. The data shows that 58.8% of respondents have bank accounts with formal financial institutions. Since having an active bank account may not always guarantee use, it is imperative to evaluate the frequency of use. Such information is crucial to understanding the real depth of financial inclusion. Table 4.4 below presents the results of bank account use frequency per month. The results show that only 28.6% of bank account holders use their bank accounts more than five times each month. However, 22% of the respondents with active bank accounts indicated that they only use these accounts just once in a month.

52

Table 4.4 Bank Account Access and Frequency of Use

	Frequency	*Percent*
Bank Account Access		
Have a bank account	94	58.8
No bank account	66	41.3
	160	**100.0**
Frequency of use per Month		
More than five times	26	28.6
A least once	20	22.0
Three times	16	17.6
Four times	16	17.6
Twice	13	14.3
	91	**100.0**

4.3.5 Reasons for not having a bank account

Financial exclusion is a global challenge as such it is the core of the global agenda on financial inclusion. This study is meant to ensure equitable access to formal financial services for all. Therefore, it is important to first establish the reasons why the financially excluded remain unbanked, as this would shed some light on what challenges to tackle towards creating a financially inclusive economy. The major reason cited by most of the respondents 30 (46.2%), as a bottleneck was that conventional banking was expensive. About a quarter of the non-banked respondents cited that they do not meet banks minimum requirements for opening an account. This can be tied to high rates of unemployment as discussed earlier in this section. Other reasons that were also cited are also presented in table 4.5 below.

53

Table 4.5 Respondents' Reasons for not having Formal Bank Accounts

Reasons for not having a Bank Account	*Frequency*	*Percent*
Banking is too expensive for me	30	46.2
Do not meet minimum requirements	13	20.0
I keep my money at home	11	16.9
Bank is too far	9	13.8
I do not trust banks	2	3.1
Total	65	100.0

4.4 Awareness, Perceptions and Trust in the Mobile Money Value Chain

4.4.1 Mobile money awareness and access in rural areas

Information dissemination is a key element in all decision-making processes. The more people are informed about the benefits of a new technology the higher the expected rate of uptake. However, where there is lack of information individuals might shy away from adopting helpful technologies due to an element of skepticism that might be dominant. Table 4.6 shows that 149 (93.1%) of the respondents have some knowledge about the existence of mobile money though at this point it is not ascertained whether they have the correct knowledge, or they are misinformed. Their various sources of information are presented and discussed further in subsequent sections.

The use of mobile phones has rapidly increased in the developing world, creating an opportunity for fintech to reach more people than before. This also created the opportunity for the previously unbanked populations to finally access formal bank accounts using fintech. Mobile Money was launched in Eswatini in 2011. However it has only recently gained traction and thus became very popular.

Mobile money has several advantages for low-income earners when compared with traditional bank accounts. It is able to provide quality services at a low relatively low cost since it does not operate in brick and mortar structures like banks hence its low transaction costs. Because mobile money uses cellular phones, accessibility is much easier for most people.

Table 4.6 below shows the accessibility of mobile money by the respondents that were sampled for the study. The results show that 80% of the respondents have access to mobile money accounts. This is a significant portion of the sample. Figure 4.2 further shows that, of the 20% non-mobile money users, 68.8% is interested in signing up for a mobile money account. Most respondents highlighted their satisfaction with mobile money because of the convenience it brings.

Table 4.6 Mobile Money Awareness and Account Access

	Frequency	*Percent*
Mobile Money Awareness		
Not Aware	11	6.9
Aware	149	93.1
	160	**100**
Access to a Mobile Money Account		
No account	32	20
Has account	128	80
	160	**100**

Unregistered Farmers' Willingness to Register for Mobile Money
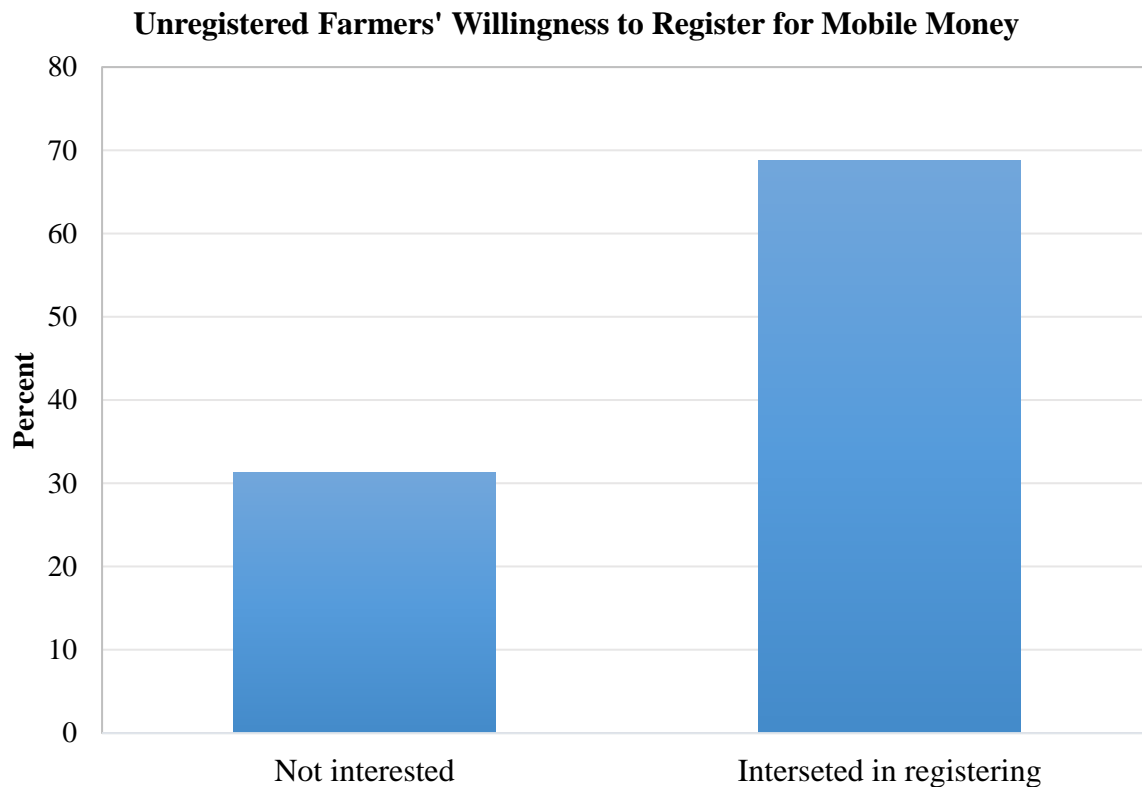
Figure 4.2 Unregistered Farmers' Willingness to Register for Mobile Money

4.4.2 Perceptions and trust in mobile money

Trust is present between two parties, if one party believes that the other party is honest or benevolent and is not likely to exercise some opportunistic behaviour that might harm the other party (Masuku and Kirsten, 2004). Trust and security are very important determinants in choosing banking systems to adopt and helps minimize risk. Users require the assurance that their hard-earned money will be in safe hands and that it will be readily accessible whenever they need to reach out for it. Therefore, for mobile money to be well received in rural areas, the target population should have unwavering confidence in this innovative branchless banking method.

56

4.4.3 Previous loss experience and perceived security of mobile money

A previous bad experience in principal-agent relationships affects the level of trust in the relationship. The party which has been previously treated opportunistically is likely to remain skeptical in the short-run, until confidence is built up again. Most of mobile money users, 94.2 percent have never lost money using this financial tool. The remaining 5.8 percent claimed to have at least lost money once while using mobile money. The results in Table 4.7 below show this data.

Safety and security are very important elements when dealing with and handling money. Customers of financial services will only adopt those services, which they deem safe and secure. Above ninety percent mobile money users reported that they consider the system to be safe and secure, however, 8.9 percent are no confident of the system's safety and security. Hence they think it is to some extent prone to cyber-attacks. The summary of these results is presented in Table 4.7 below.

Table 4.7 Previous Loss Experience and Perceived Security

	Frequency	*Percent*
Previous Loss Experience		
No Previous Loss	147	94.2
Experienced Some Loss	9	5.8
	156	**100.0**
Perceived Mobile Money Security		
Yes	143	91.1
No	14	8.9
	157	**100.0**

4.4.4 Perceptions of mobile money in rural areas of Eswatini

Individuals' decisions to adopt new technology over other existing substitute methods depend on several factors (Negatu and Parith, 1999). Perception of the new technology is one of the

57

factors that play a major role in making the decision to adopt a particular banking technology over other existing technology. In the case of mobile money, several factors affect the perceptions of individuals, i.e. previous experiences with the mobile network operator, the source of information about mobile money, experiences of peers and many other factors. Perception and trust are closely related in this case. Customers who have enjoyed satisfactory services of the MNO are more likely to have a positive perception of mobile money than those that have experienced awful occurrences before. This subsection presents and discusses the results on respondents' Perception of the MNO, mobile money agents and mobile money services.

4.4.5 Level of trust for the mobile network operator

Most mobile money users trust the mobile network operator (MNO) MTN Eswatini. Above 46 percent users reported that they have somewhat moderate trust for the on the company, and above 35 percent hold the company's level of trust at high regard. Only five percent revealed a high level of skepticism in the company and claimed that they don't trust the MNO at all. This is possibly based on previous experiences of customers while utilizing the mobile network's other telecom services over the years. Customers who have previously had pleasant experiences are likely to put more trust in the company than those that have had bad experiences. The summary of the respondent's results is presented below in Table 4.8

Table 4.8 Level of Trust for the Mobile Network Operator

	Frequency	*Percent*
Moderate	73	46.8
High	34	21.8
Very high	22	14.1
Low	16	10.3
Does Not Trust MNO	8	5.1
Very low	3	1.9
Total	156	100.0

58

4.4.6 Level of trust between users and mobile money agents

Interpersonal trust is important in principal-agent relationships is it safeguards against opportunistic behavior of moral hazard and adverse selection. More than sixty percent of respondents agreed that mobile money agents are trustworthy. About thirty percent of the respondents however said that they were not certainly sure that the agents are trustworthy as there is no rigorous training or selection criteria for one to be a mobile money agent. Therefore, anyone who can operate a cell phone can register and be a mobile money agent. Only two percent were adamant that mobile money agents are not trustworthy at all. Table 4.9 below presents the results.

Table 4.9 Level of Trust for the Mobile Network Operator

	Frequency	*Percent*
Agree	82	53.6
Not sure	45	29.4
Strongly agree	17	11.1
Don't know	6	3.9
Disagree	2	1.3
Strongly disagree	1	.7
Total	153	100.0

4.4.7 Degree of fairness on reimbursements by MNO as perceived by respondents

The degree of fairness in this regard is the mobile network operator's (MNO) commitment to reimburse users for money lost due to technical glitches in the MNOs system. Most mobile money users; 38.5 percent, think that the MNO is moderately fair when it comes to reimbursing its customers in cases of loses. However, 18.6 percent claims that the MNO denies claims. This is also supported by 16 percent of customers who also think the level of reimbursement is very low. The summary of the results is presented in the Table 4.10 below.

59

Table 4.10 Perceived Degree of Fairness on Reimbursements by MNO

	Frequency	*Valid Percent*
Moderate	60	38.5
MNO is not fair (Denies Claims)	29	18.6
Low	25	16.0
High	25	16.0
Very high	15	9.6
Very low	2	1.3
Total	156	100.0

4.4.8 Likelihood to recommend mobile money

The results show that mobile money has had a good reception despite the minor challenges discussed in previous subsections. Many mobile money users, 83.2 percent said that they are highly likely to recommend mobile money to a friend or family member. Only 2.6 percent said that they are less likely or wouldn't recommend mobile money to the next person. Table 4.11 below presents the results of the likelihood to refer mobile money to another person.

Table 4.11 Likelihood to Recommend Mobile Money

	Frequency	*Valid Percent*
More likely	129	83.2
Moderately	17	11.0
Not Likely	5	3.2
Less likely	4	2.6
Total	155	100.0

4.4.9 Perceived level of transparency of mobile money agents

Transparency here refers to an unhindered level of honesty in the way agents do business with mobile money users. More than 70 percent of the respondents said that their local mobile money agents are transparent when doing their business; 64.5 percent agreed that agents are transparent, and 7.2 percent strongly agreed. Transparency is one of the critical factors when handling money that is not your own, as it helps builds consumer confidence. The summary of the results is presented on Table 4.12 below.

Table 4.12 Perceived Transparency of Mobile Money Agents

	Frequency	*Valid Percent*
Agree	98	64.5
Not Sure	36	23.7
Strongly Agree	11	7.2
Don't Know	5	3.3
Disagree	1	.7
Total	152	100.0

4.5 Accessibility and Use of Formal and Semi-formal Financial Institutions

4.5.1 Access to a formal bank account

The results presented in Table 4.13 below indicate that 65.3% of males who participated in the study have formal bank accounts, against only 48.4% of their female counterparts. More than fifty percent, (51.6%) of adult females that participated in the study do not have a functional bank account. This might be due to the nature of the Swazi culture and custom, that adorns the household's financial decisions to the head of the household, which is generally the man. Married respondents were more likely to have a formal bank account than their divorced, single and widowed counterparts respectively. This might because of joint financial decision making

within the households of married farmers. Divorced respondents (75%) were the most likely to have no access to a formal bank account.

Respondents with a tertiary education qualification are the most likely to access a formal bank account. The results show that 96.2% of respondents with tertiary education use bank accounts. This can be attributed to employment since employers pay salaries through the bank. This is further supported by the results that follow, which indicate that 97.8% of those respondents earning salaries had bank accounts. It can also be attributed to accessibility to various sources of information related to finance. Respondents with no formal education are the least likely to have bank accounts, as 85.2% of those who have never received formal education had no bank account.

A majority of respondents who relied on SACCO's for contingency funds had no access to a bank account, 92.9% indicated that they held no bank account. In this case SACCOs act as a substitute for formal bank accounts for the people in rural areas. Most interesting is that 86.7% respondents who have access to a bank account rely on informal finance for contingency funds. This group might prefer informal moneylenders because processing of funds is swift and there is generally no bureaucracy and paperwork, however interest rates are normally very high. This however can be attributed to the agency problem.

Table 4.13 Attributes for Bank Account Access

Socioeconomic Characteristics		*N*	*% Users*	*% Non-users*
Gender	Male	98	**65.3** (4)	34.7
	Female	62	48.4	51.6
Marital Status	Single	50	56	44
	Married	94	**61.7** (5)	39.3
	Divorced	4	25	75
	Widowed	12	58.3	41.7

Level of Education	No formal Education	27	14.8	85.2
	Primary	42	50	50
	Secondary	65	67.7	32.3
	Tertiary	26	**96.2** (2)	3.8
Source of Income	Salary	45	**97.8** (1)	2.2
	Wages	37	45.9	54.1
	Crop Sales	15	46.7	53.3
	Remittances	36	50	50
	Elderly Grants	27	29.6	70.4
Contingency Funds	Savings	49	79.6	20.4
	Family/Friends	75	49.3	50.7
	SACCO	14	7.1	92.9
	Informal Credit	15	**86.7** (3)	13.3
	Formal Credit	7	57.1	42.9

4.5.2 Membership to a savings and credit cooperative organization (SACCU)

Table 4.14 below presents descriptive statistics of the outcome variables on access to financial services, i.e. membership to a savings and credit cooperative organization in this case. We discuss the differences in socioeconomic characteristics between respondents who are members of a SACCO and respondents that are non-members. There are more non-members than members of SACCO, only 40.8% males and 38.7% females were affiliated with some form of a SACCO. Married respondents account for the largest proportion, 46.8% married respondents participate in SACCO. Respondents with tertiary education have an equal proportion of members and non-members. The subsequent and lower levels of education status have more non-members than members. This might be due to cooperative policy that states that all members should have a duty or role to play in the cooperative.

Table 4.14 Membership to a Savings and Credit Cooperative Organization (SACCU)

Socioeconomic Characteristics		N	% Members	% Non-Members
Gender	Male	98	40.8	59.2
	Female	62	38.7	61.3
Marital Status	Single	50	28	72
	Married	94	46.8	54.2
	Divorced	4	25	75
	Widowed	12	11.1	88.9
Level of Education	No formal education	27	11.1	88.9
	Primary	52	36.5	63.5
	Secondary	65	44.6	65.4
	Tertiary	26	50	50
Source of Income	Salary	45	43.3	56.7
	Wages	37	37.8	62.2
	Crop Sales	15	20	80
	Remittances	33	39.4	60.6
	Elderly Grants	27	37	63

4.5.3 Access to mobile money accounts

Mobile money is by far the mostly accessible form financial service in rural areas of Eswatini. Table 4.15 below shows that there is a considerably large proportion of respondents in rural areas that have access to a mobile money account. Typically, males still have a higher representation as users of financial services than female; 94.6% of males interviewed had a mobile money account, against 64.6% of females that had access to a similar account. However, it is worth noting that this is by far the largest proportion of females with access to any form of formal financial service.

64

Non-married respondents have a proportion of 84% that is using mobile money, followed by 75% divorced respondents and subsequently married respondents, with widowed respondents having the lowest rate of mobile money account access. Secondary school certificate holders have the largest proportion of users by level of education acquired, 95.4% use mobile money. The lowest representation is that of farmers without formal education, understandably this might be due to their inability to read. Access in terms of the respondents' source of income is almost equally distributed across all income streams. Nevertheless, those with consistent incomes are more likely to use mobile money than those that do not.

Table 4.15 Access to Mobile Money Accounts

Socioeconomic Characteristics		N	% Users	% Non-users
Gender	Male	74	94.6	5.4
	Female	78	64.1	35.9
Marital Status	Single	50	84	16
	Married	94	79.8	20.2
	Divorced	4	75	25
	Widowed	12	66.7	33.3
Level of Education	No formal education	27	48.1	51.9
	Primary	49	83.3	16.7
	Secondary	65	95.4	4.6
	Tertiary	26	69.2	30.8
Source of Income	Salary	45	86.7	13.3
	Wages	37	78.4	21.6
	Crop Sales	15	80.0	20
	Remittances	36	83.3	16.7
	Elderly Grants	28	66.7	33.3

Contingency Funds	Savings	49	75.5	24.5
	Family/Friends	75	84	16.0
	SACCO	7	14.3	85.7
	Informal Credit	21	95.2	4.8
	Formal Credit	6	83.3	16.7

4.6 Preferences and Attitudes towards Mobile Money Services

4.6.1 Effects of tastes and preferences on adoption of new technologies

Adoption of new technologies also depends on user tastes and preferences, as discussed in the Technology Adoption Models (TAM) in chapter two. It is therefore imperative for fintech firms to assess the needs of their target market as well as understand their preferences for these technologies in order to achieve optimal rates of adoption. In a quest to improve the rate of financial inclusion in rural areas in Eswatini, the respondents' preferences for mobile money were documented during the study and their results are discussed in this subsection of the chapter. Understanding users' preferences helps in creating a service that is consumer centric, and hence achieve higher rates of adoption thus improving financial inclusion. The Likert (1932) scale was used to present the results of the survey.

4.6.2 Preferences for mobile money services in rural areas in Eswatini

The purpose of this section is to determine and present the respondents' attitudes and preferences for mobile money services in rural areas in Eswatini. Knowing the users' preferences is important because they determine the rate of adoption and success of mobile money in rural areas. A higher rate of adoption improves financial inclusion since it allows previously financially excluded individuals to have access to a formal account. Table 4.16 shows the question codes used in obtaining the results presented in table 4.17.

Table 4.16 Question Codes

Question (Variable)	Code
Would you like to see the distribution of elderly grants through mobile money?	1
Would you prefer buying more goods that can be purchased through mobile money?	2
Should MTN develop product services for the needs of small savings groups?	3
Would you be like your transaction history from mobile money to be used as basis for extension of credit by other providers?	4
Would you access mobile money on an ATM?	5
Would you like to have mobile money credit cards?	6

The respondents were asked these questions in order to ascertain their preferences for mobile money use in rural areas. A six-point Likert scale was used to capture their responses and weight of agreement to the questions, with 1 indicating "Strongly disagree", 2 "Disagree", 3 "Not sure", 4 "Agree", 5 "Strongly agree", and 6 "Don't know". The results of the analysis are presented in Table 4.7 below.

Table 4.17 Respondents' Preferences for Mobile Money Services

Variable	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree	Dont Know
1	10 (6.4%)	27 (17.3)	20 (17.3%)	40 (25.6%)	58 (37.2%)	1 (0.6%)
2	2 (1.3%)	4 (2.6%)	30 (19.2)	63 (40.4%)	50 (32.1%)	7 (4.5%)
3	4 (2.6%)	3 (1.9%)	24 (15.4%)	77 (49.4 %)	44 (28.2%)	4 (2.6%)
4	8 (5.1%)	20 (12.8%)	31 (19.9%)	58 (37.2%)	27 (17.3%)	12 (7.7%)
5	4 (2.6%)	2 (1.3%)	15 (9.6%)	64 (41%)	64 (41.7%)	6 (3.8%)
6	4 (2.6%)	5 (3.2%)	36 (23.1%)	47 (30.1%)	56 (35.9%)	8 (5.1%)

The summary of results in Table 4.17 above shows that most respondents have positive attitudes towards improved mobile money services. Above 50% of the respondents would like the government to use mobile money for the distribution of elderly grants. At the time of the data collection period, it was not possible to use mobile money directly to purchase goods 'moneyless' using mobile money. More than 72% of respondents stated that they would like such a facility to be incorporated into mobile money. To date, the MNO has launched MOMO-Pay, a payment service, which uses a unique mobile money customer QR code that can be scanned at most points of sales to pay for goods and services purchased.

The attitude towards getting mobile money statements was also positive. Respondents mentioned that this would make it easier for them to track their transactions in retrospect. More respondents indicated that they would be happy to have mobile money credit cards introduced and to be able access their mobile money through ATM's. The mobile network operator MTN Eswatini has since implemented a system whereby mobile money users are now able to make withdrawals from their electronic purse at all Swazi Bank ATM's.

4.7 Perceptions of the Services That Currently Offered Through Mobile Money

4.7.1 User perceptions on services currently offered

The mobile network operator has prioritised certain basic financial services and facilities that it has made available through mobile money. These include payment and transactional services however not only limited to these. The services that were currently available at the time of gathering the data used for this study are listed in the table below. Respondents were asked to rank their perceived level of utility for each of the services that the MNO provides through mobile money using a Likert scale ranging from 1 where farmers think the particular service might not be useful to them at all to 5 a level of highest utility where the service is deemed very useful.

The results from the survey are presented in the three radar charts that follow below. Each radar chart has grouped services that are similar, this was to ultimately achieve three categories, namely; Individual services, Tools for deposit and transfers and lastly Payment services. This

68

was done to avoid the clutter that would come with combining ten maps under one radar chart. Splitting the services into categories made the visualization clearer and the comparison much easier than it would have been had they been kept under one radar. Nevertheless, the ultimate purpose was to evaluate farmers' preferences of all the services as well to make a comparison of the levels of utility that the farmers attach to these services. Therefore, the concluding paragraph is an address this, fulfilling the third objective of the study.

4.7.2 Farmers perceptions of individual services' utility

Figure 4.3 below shows farmers' perceived utility of using three mobile money services, namely cash withdrawals, airtime recharges and the reception of remittances. The three services are ranked on each of the five parameters of utility. The services are colour-coded to help visually correlate and compare the services over their diverse aspects. The radar chart shows that most farmers derive maximum utility in mobile money withdrawal and reception of remittances respectively. Nevertheless, all three maps fall on to the "useful" region. This means that farmers value all the three mobile money services in this category.

69

Perceptions of Individual Services' Utility
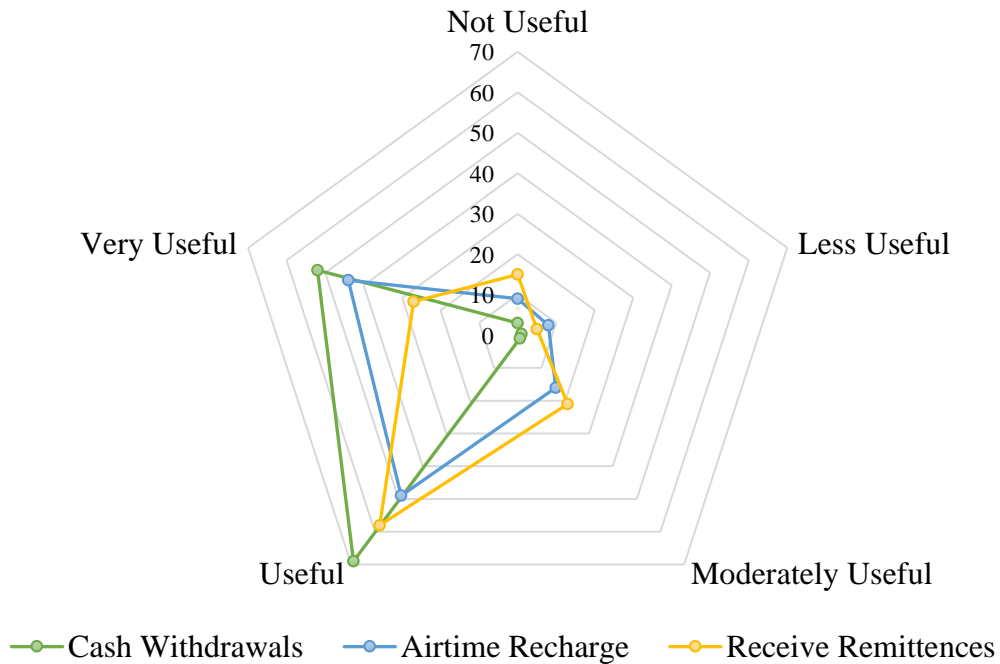
Figure 4.3 Farmers Perceptions of Individual Services' Utility

4.7.3 Perceptions of mobile money

The multiple uses of mobile money as a tool for inclusive finance have already been established and discussed in previous chapters.to give direction to the purpose of this study. This sub-section analysis and discuss farmers' perceived utility of mobile money as a tool for depositing, transferring and saving money. The results from the radar chart below indicate that farmers do not perceive mobile money as a useful tool for keeping savings, this cannot be far from the truth since previous results on chapter four indicated that most farmers keep their saving at home. Making small and sending small deposits however are services perceived to be of very high utility amongst smallholder farmers at Lomahasha. There is a need for stakeholders particularly the MNO to make mobile money attractive for savings as this is safer than piggy banking.

**Perceptions of Mobile Money as a Tool for Deposits,
Transfers and Savings**
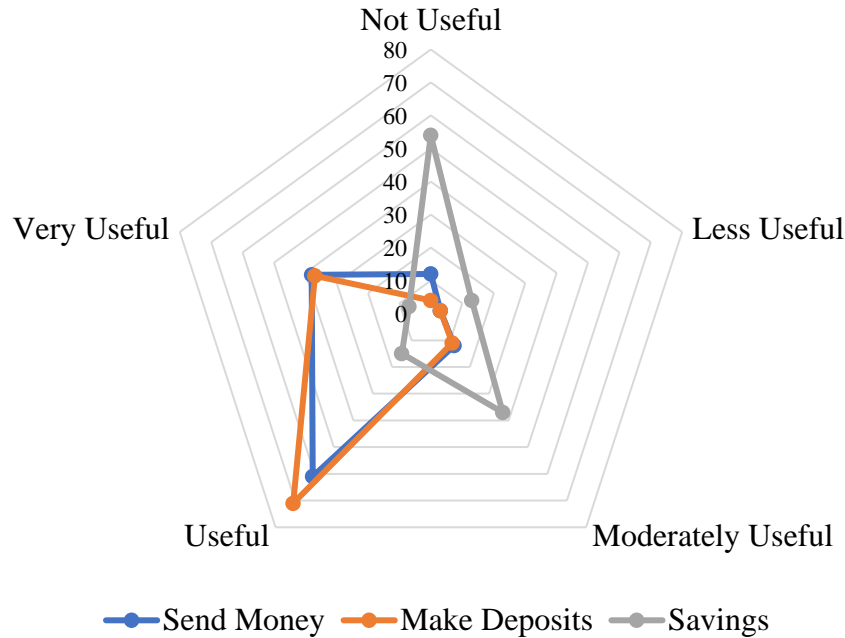
Figure 4.4 Mobile Money as a Tool for Deposits, Transfers and Savings

4.7.4 Perceptions of mobile money's utility on paying for services and amenities

Payment of goods and services is one of the widely utilized tool in digital financial inclusion. Not only because digital transactions are safe and secure, they are quick, convenient and create a history of transactions record automatically, which allows one to monitor their expenditure. The introduction of mobile money in Eswatini came with an increase in the use of digital payments. Citizens can buy electricity coupons and pay water and telephone bills through mobile money. The radar chart below shows the perceived usefulness of the payment service on various amenities. The output shows that, none of the farmers thinks that mobile money is useful for paying any form of insurance, and a great proportion also perceive mobile money to be not useful when purchasing farm inputs. Some indicated that the reason for this is that agro-dealerships and hardware shops have no provision for accepting mobile money payments. Farmers however find mobile money very useful in buying electricity coupons and paying off water bills.

71

Perceptions on Mobile Money's Utility in Payment for Goods and Utilities
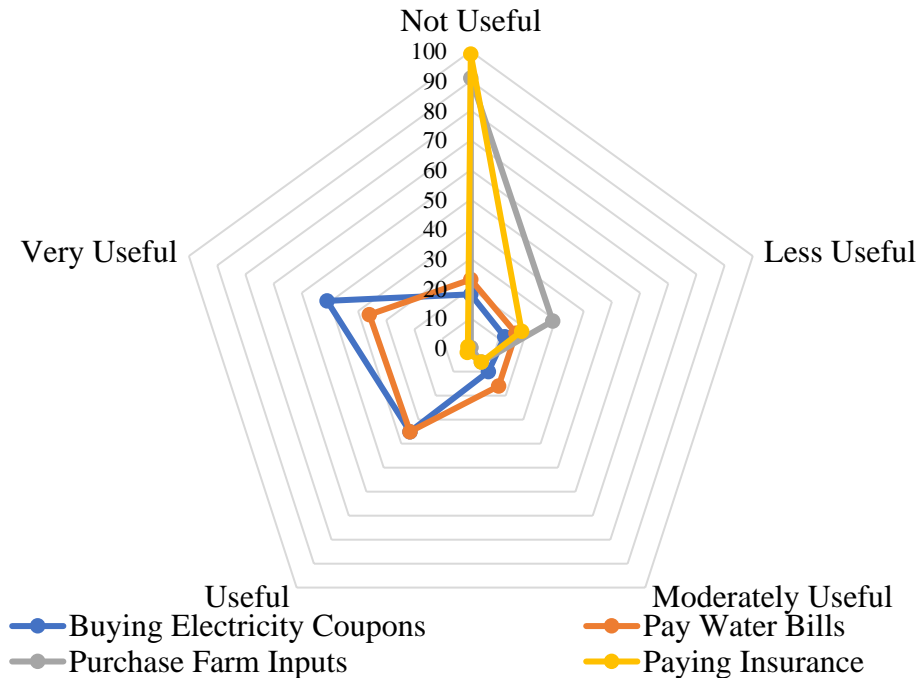
Figure 4.5 Mobile Money's Utility on Payment for Services and Amenities

The farmers in the study area do use mobile money services. Nonetheless, they do have a biased inclination towards those services, which they deem more useful to them. Services from what is categorised as Individual services (Cash withdrawal, Airtime recharge, receiving remittances) are perceived to be of high utility and very useful to farmers. Other mobile money services perceived to be useful are (Making deposits, sending money, buying electricity coupons and Baying water bills). Savings, Insurance and Buying farm inputs were found to be perceived as not useful or less useful to farmers at Lomahasha.

4.8 Reasons for Not Adopting Mobile Money

The demand of services is driven by several factors. The five fundamental drivers of consumer demand are: the income of consumers, the cost of the service, consumer preferences, the cost

of alternative services as well as expectations. These five factors' influence cut across all goods and services, and mobile money is no exception. Therefore, after establishing the drivers of mobile money adoption, it is also imperative to investigate the inhibitors of adoption and understand why 20% of the respondents have no mobile money account. This section presents the reasons that farmers stated for non-adoption of mobile money services.

The results presented in figure 4.6 below show that most farmers (46.7%) who do not have a mobile money accounts actually prefer keeping their petty cash at home. Even though keeping money at home is not recommended due to the risks that the money is exposed to, but for smaller amounts of money it makes sense for the farmers to store their cash at home free of fees. However, there is also a risk of theft and other uncertainties that might occur which mobile money provides safeguards upon. Other farmers (26.7%), stated that they do not see the service as useful to them, hence the abstinence from early adoption, such might be because farmers are already using substitute mobile banking services like e-wallet. Individual farmer's preferences might also be the reason why some farmers think that the service is not useful to them. Worth noting however is the fact that more than 20% of farmers cited lack of adequate information on how the mobile money service works as well as what the service offers.
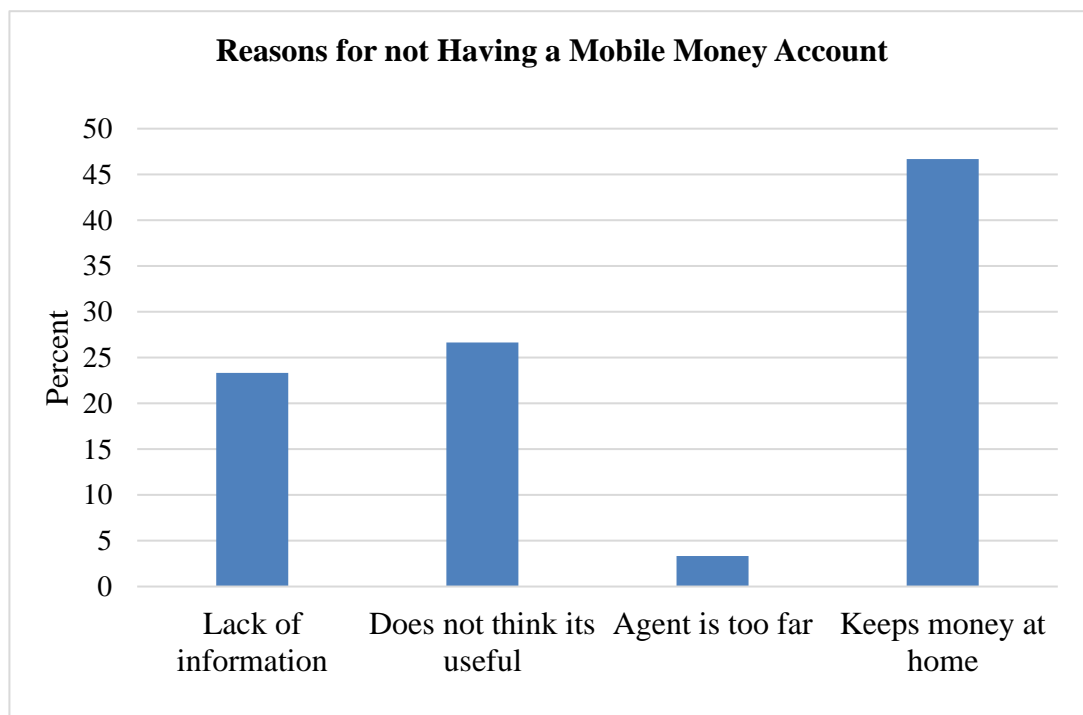
Figure 4.6 Farmers Reasons for not having Mobile Money Accounts

4.9 Chapter Summary

This chapter presented mainly descriptive statistics of this study. The results show that most of the participants in the study were male farmers, who accounted for 61.3% of the population sample. Only 16.9% of the farmers had never received any form of formal education. The literacy rate of participants is almost equal to the overall national literacy rate, which is impressive considering that the study was done in a rural area. Formally banked farmers accounted for 58.8% of the participants which is higher than the national average

Most farmers in the Lomahasha area are knowledgeable about mobile money, 93.1% are aware of the Fintech. Interpersonal trust between mobile money agents and mobile money customers is strong, 83.2% of mobile money users stated that they believe the service is secure thus they would recommend it to another person. The results show a positive sentiment towards mobile money adoption in the area, users find the service to be useful and several non-users are willing to adopt the service. A full-scale adoption, mobile money has the potential to improve the rate of financial inclusion and extend formal financial service to remote rural areas in the Kingdom of Eswatini.

CHAPTER FIVE

EMPIRICAL RESULTS

5.1 Introduction

This chapter addresses the fourth specific objective of the study. It presents the results of the binary logistic regression model from the estimation of the magnitudes of the factors that influence farmers' decisions of mobile money adoption in the Lomahasha constituency of the Lubombo region in Eswatini. The previous chapter detailed farmers' characteristics to provide better understanding of the study and the data analysed. The predictor variables applied in the model are picked based on reviewed literature from previous relevant studies together with those that have been specifically contextualized to the study area. These predictors have been subjected to rigorous statistical tests to ensure their credibility and reduce bias in the results. The detailed procedures and iterations undertaken have been laid out in detail in the third chapter, with additional tables added in the appendices.

The dependent variable, Mobile Money Adoption, is a dichotomous dependent variable. It captures whether or not farmers would adopt mobile money given the set of socioeconomic independent variables. The most suitable model to assess this choice decision is the binary logistic regression model. The logit model has been used to estimate the magnitude of the independent variables' coefficients in order to establish which of these significantly influence the farmers decisions for mobile money adoption.

Prior to the model estimation, the continuous independent variables were subjected to validity tests, a normality test using the histogram and the normal distribution curve. The only continuous independent variables that were included in the models are those that exhibited a normal distribution curve. This led to other continuous independent variables of interest being left out from the model because they could not conform to the normal distribution principle which is critically essential in logistic regression.

75

A multicollinearity test was also done to establish whether multicollinearity was a problem in the sample. This was done through running the Variance Inflation Factor (VIF) test and a Pearson Correlation Matrix. This have been done to ensure that there are no highly crenellated independent variables included in the model. This is because highly correlated predictor variables provide little independent explanatory ability; hence the decision was to remove continuous variables that had a relationship of more than .70 on the Pearson Correlation Matrix. Olivia and Ilie (2013) stated that a VIF that is greater than 10 is a sign that multicollinearity is present amongst the independent variables. All the predictors in the models have a VIF score that is less than 6, which is a good signal since it is quite far from the threshold.

This initial binary logistic regression model, Model 1 was run to estimate the coefficients of the independent variables and their effect on the decision for mobile money adoption. The dependent variable is a dichotomous variable for mobile money adoption assigned one (1) if the farmer adopted mobile money and assigned zero (0) if the farmer had not adopted the fintech. The discussion of the logistic regression results begins by explaining the various model specification and validity tests results and then proceeds to discuss only the significant predictors.

In logistic regression the R^2 is referred to as a Pseudo R^2. The two forms of R^2 used in logistic regression are the Cox and Snell R^2 and the Negelkerke R^2, the latter being the one that is preferred by most researchers over the Cox and Snell R^2. The Negelkerke R^2 in Table 5.1 indicates that model 1 accounts for 47.4% of the variability in mobile money adoption amongst farmers. The Hosmer and Lameshow Goodness of Fit is 14.580, with a significance level of .068. Since this value is greater than .05, it is an indication that the model is justifiable, hence, we proceed to the discussion of the significant predictor variables in the model.

Three models are presented, namely;

Model 1: Factors influencing farmers' decisions to adopt mobile money; This is a binary logistic regression model with all the predictor variables of interest included in the model and used to predict their magnitudes and statistical significance. All the participants (n= 160), are being subjected to this model, as discussed in the third chapter.

Model 2: Factors influencing farmers' decisions to adopt mobile money using bank account ownership as a split variable. Model 2 consists of two samples, Sample A is that of farmers with bank accounts together with non-adopters of mobile money, the total variables included in the analysis is n=113. Sample B is farmers without bank accounts together with non-adopters of mobile money, n=79. This was to establish the factors influencing mobile money adoption when farmers had formal banking as an alternative.

Model 3: Factors influencing farmers' decisions to adopt mobile money using membership to a SACCO as a split variable. Model 3 is categorized into two samples, Sample A is that of farmers who are SACCO members together with non-adopters of mobile money, the total variables included in the analysis is n= 87. Sample B is farmers who are not SACCO members together with non-adopters of mobile money, n= 105. This was also to determine the factors influencing mobile money adoption when farmers had access to semi-formal financial services.

5.2 Model 1: Factors Influencing Farmers' Decisions towards Mobile Money Adoption

The results of the logistic regression are presented in Table 5.1 below. The model correctly predicted 80% of the observations. The results show that female farmers have 9.009 times the odds of adopting mobile money compared to male farmers, this result is highly significant at 1% level of significance. Previous studies on adoption of financial services in rural areas concur with this result as it has been proven that most ROSCA's and SACCO's in remote rural areas constitute mostly of women than men. In contrast, a study focusing on the behavioural intention to adopt mobile money in Ghana by Osei-Assibey (2015) found that males were more likely to adopt mobile money than females, nonetheless the out was not statistically significant. The results of this study are consistent with results of a number of similar studies on the subject. The level of formal education attained also significantly affects farmers decisions for mobile money adoption. Farmers who have attained primary education have 5.489 times the odds of adopting mobile money than farmers with no formal education at all (95% C.I. 1.002, 30.064). This implies that the higher one's educational level, the more compatible the individual will perceive the usefulness of mobile money and thus have a positive intention to adopt. This result

is consistent with other previous studies (Osei-Assibey, 2015; Myeni et al., 2020). The odds for mobile money adoption are even higher when the farmers have attained secondary education have 23.606 times the odds of adoption than farmers with no formal education (95% C.I., 3.125, 178.362).

Albeit mobile money being a tool that was targeted at the poor and low-income earners as the main target market, lower literacy rates amongst these two groups is a challenge that hampers adoption. A minimum level of literacy is required to operate a mobile phone and follow commands and menus in order to be able to use mobile money. The number of years in farming, a proxy variable for farming experience is significant at 5% level of significance. For every additional year of farming experience, the odds of adopting mobile money increase by 12.4% (95% C.I. 1.006, 1.256).

The results show that farmers with formal bank accounts have 4.959 times the odds of adopting mobile money than farmers with no bank accounts (95% C.I. 1.180, 20.835). Even though this relationship shows that the two formal financial services are complimentary, other studies have shown non-bank account holders to have a higher rate of uptake. However, Kalba (2016) found that uptake was easier amongst new entrants into mobile money, than becoming an active user. In their case study, bank account holders who were also users of mobile money had more activity in the system than mobile money only users. This might be because formal bank account holders are already familiar with the experience of using formal financial services. Therefore, their response towards mobile money adoption and use is highly positive relative to their counterparts who do not have any formal bank accounts. The source of income also affects the decision of mobile money adoption, farmers who earn a monthly salary proved to have 3.448 times higher the odds of mobile money adoption than farmers who earn wages. This might be due to the consistency of earnings, since farmers who earn salaries receive them regularly, they will be more likely to have an overarching need for financial services and thus they tend to adopt mobile money more.

Table 5.1 Factors Influencing Farmers' Decisions to Adopt Mobile Money Model 1

Independent Variables	B	Sig.	Odds Ratios	95% C.I. for EXP(B)	
				Lower	Upper
SACCO Membership Status [0= Not a Member 1=Member]	.014 (.635)	.983	1.014	.292	3.518
Gender of Farmer [0=Female 1=Male]	-2.202*** (.744)	.003	.111	.026	.475
Farmers Age	-.055 (.040)	.173	.947	.875	1.024
Marital Status [Single]		.248			
Marital Status [Married]	1.316 (.848)	.121	3.728	.707	19.646
Marital Status [Widowed]	.599 (2.062)	.771	1.820	.032	103.586
Marital Status [Divorced]	-.776 (1.364)	.570	.460	.032	6.671
Education attained [No Formal Education]		.003			
Education attained [Primary]	1.703** (.868)	.050	5.489	1.002	30.064
Education attained [Secondary]	3.162*** (1.032)	.002	23.606	3.125	178.326
Education attained [Tertiary]	.447 (1.104)	.686	1.564	.180	13.620
Occupation [Unemployed]		.557			
Occupation [Farmer]	-2.054 (1.428)	.150	.128	.008	2.106
Occupation [Wage earner]	.643 (1.208)	.595	1.902	.178	20.276
Occupation [Self-employed]	.693 (1.197)	.563	2.000	.191	20.885
Occupation [Salaried worker]	-2.945* (1.746)	.092	.053	.002	1.610
Occupation [Pensioned]	-.949 (1.307)	.468	.387	.030	5.020
Number of years in farming	.117** (0.57)	.039	1.124	1.006	1.256
Formal bank account [0 = No Bank Account 1= Has a Bank Account]	1.601** (.732)	.029	4.959	1.180	20.835
Primary source of income [Salary]		.181			

Primary source of income **[Wages]**	-3.533** (1.806)	.050	.029	.001	1.007
Primary source of income **[Crop Sales]**	-.721 (1.606)	.653	.486	.021	11.311
Primary source of income **[Remittances]**	-2.018 (1.670)	.227	.133	.005	3.510
Primary source of income **[Grants]**	-2.902* (1.650)	.079	.055	.002	1.393
Constant	3.726 (1.791)	.038	41.530		
Hosmer and Lameshow Test =.068			**Df =8**	**Chi-Square=14.580**	
Percentage Correctly predicted = 80%			**n=160**		
Negelkerke R Squared = .474 **-2 Log Likelihood = 103.054**					

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.3 Role of Bank Accounts in the Adoption of Mobile Money

The initial model, Model 1 was split into two selective samples using the independent variable bank account ownership. Model 2 Sample A constitutes farmers with formal bank accounts as well as farmers who did not adopt mobile money. Model 2 Sample B constitutes of farmers without bank accounts as well as farmers who did not adopt mobile money. This was to establish the factors that influence mobile money adoption when farmers' access to formal banking is different. As such the variable bank account ownership is eliminated from the initial model, Model 1 since it is a split variable.

5.4 Factors Influencing Mobile Money Adoption amongst Farmers with Bank Accounts and Non-Adopters of Mobile Money Model 2 Sample A

Table 5.2 presents the results of the logit model where the dependent variable mobile money adoption is determined by predictor variables of the initial model 1 except for bank account ownership. The model correctly predicted 71.7% of the observations. The Negelkerke R^2 indicates that this model accounts for 56.3% of the variability mobile money adoption. The Hosmer and Lameshow Goodness of Fit is 5.774, with a significance level of .673. Since this value is greater than .05 it also indicates that the model fits.

The results in Table 5.2 show that farmers with secondary education as the highest form of academic qualification attained have 113.052 times the odds of adopting mobile money compared to farmers who have no formal education at all (95% CI 10.043, 1272.583). Primary education is also quasi-significant however with lower odds of mobile money adoption. This goes on to show that mobile money adoption requires some level of literacy though this might be minimal. The primary source of a farmer's income was also found to significantly affect their decision of mobile money adoption. Since the odds ratios of the test groups under the 'primary source of income' category is all less than one, the reporting will assume the flipped approach using; **1/Exp(B)** to get the odds ratios of the reference group and then swap the variable labels in the sentence.

Farmers with a monthly salary have 250 times the odds of adopting mobile money compared to farmers who depend on wages as a primary source of income and this is significant at the 5% level of significance. The result makes sense, since a person who receives a consistent earning is more likely to use financial services than one who earns on irregular basis. Farmers with a monthly salary also have 111.11 times the odds of adopting mobile money than farmers who depend on remittances as the main source of income. This result is also resonating, since remittances can be sent to recipients using other forms of money transfer, therefore allowing the liberty for remittance recipients to substitute mobile money for other alternative means of remittance receipt. However, for those farmers earning salaries, their rate of adoption of mobile money is higher because they may perhaps have more than one remittance recipient, and this makes mobile a convenient way to transfer remittances to several recipients in different

81

locations using mobile money thus increasing the rate of adoption amongst this particular category.

It was also gathered during the interviews that even though some farmers don't personally have mobile money accounts, they benefit from mobile money services. A number of participants stated that they often receive remittances from family members in town that are meant for their neighbours who do not have mobile money accounts. They then go and withdraw this money from the agents and give it to those neighbours whom it was meant for. Therefore, the result showing that salary earners have higher odds of mobile money adoption than remittance recipients is a plausible result.

Farmers who are earning salaries as primary source of income have 166.67 times the odds of adopting mobile money than farmers who receive grants as their primary source of income. Grant recipients in Eswatini are the elderly, who are above the age of sixty, adults with disabilities as well as extremely poor individuals. These grants are paid quarterly. Hence, groups that are dependent on government grants are less likely to adopt formal financial services. Nevertheless, this does not necessarily mean that the need for the service is not prevalent amongst these groups.

82

Table 5.2 Factors Influencing Mobile Money Adoption amongst Farmers with Bank Accounts and Non-Adopters of Mobile Money Model 2 Sample A

Independent Variables	Coefficients	Odds Ratios	95% C.I. for EXP(B)	
			Lower	Upper
SACCO Membership Status [0= Not a Member 1=Member	-.056 (.748)	.946	.218	4.094
Gender of Farmer [0=Female 1=Male]	-1.028 (.815)	.358	.072	1.768
Farmers Age	.019 (.048)	1.019	.928	1.119
Marital Status [Single]				
Marital Status [Married]	1.517* (.882)	4.560	.810	25.673
Marital Status [Widowed]	1.905 (4.589)	6.717	.001	54081.716
Marital Status [Divorced]	.930 (1.503)	2.534	.133	48.211
Education attained [No Formal education]				
Education attained [Primary]	2.669* (1.041)	14.423	1.874	111.023
Education attained [Secondary]	4.728*** (1.235)	113.052	10.043	1272.589
Education attained [Tertiary]	1.854 (1.215)	6.385	.590	69.123
Occupation [Unemployed]				
Occupation [Farmer]	-3.767* (2.245)	.023	.000	1.883
Occupation [Wage earner]	.432 (1.502)	1.541	.081	29.237
Occupation [Self-employed]	-.344* (1.444)	.709	.042	12.010
Occupation [Salaried worker]	-4.001 (2.512)	.018	.000	2.515
Occupation [Pensioned]	1.690	.384	.014	10.555
Number of years in farming	-.014 (.067)	.986	.866	1.124
Primary source of income [Salary]				
Primary source of income [Wages]	-5.478** (2.500)	.004	.000	.561
Primary source of income [Crop Sales]	-4.155* (2.444)	.016	.000	1.887
Primary source of income [Remittances]	-4.750** (2.383)	.009	.000	.924
Primary source of income [Grants]	-5.051*** (2.314)	.006	.000	.597
Constant	2.530 (2.314)	12.554		

Hosmer and Lameshow Test	.673	Df = 8	Chi-Square = 5.774
Percentage Correctly Predicted = 71.7%		n = 113	
Negelkerke R Squared = .563			
-2 Log Likelihood = 78.497			

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.5 Factors Influencing Mobile Money Adoption amongst Farmers Without Bank Accounts and Non-Adopters of Mobile Model 2 Sample B

Assessing only the participants without bank accounts and non-adopters of mobile money, we discovered that the independent variables Gender and Farming Experience were the only two that had a significant influence in the decision to adopt mobile money as the 5% level of significance. The model correctly predicted 59.5% of the observations. Unlike in the initial model, the independent variable Highest level of education acquired is not significant in this selective model. The bank account ownership variable was the only variable not added in this model. This was because it was used in selecting cases.

For the farmers without bank accounts and non-adopters of mobile money, Females have 19.231 times the odds of adopting mobile money than their male counterparts. This is significant at the 5% level of significance. These odds are higher than those of the initial model, which showed that the odds for females had 9.009 the odds of mobile money adoption than females. This result is acceptable since we expect those without bank accounts to respond more positively to mobile money adoption. Every additional year in farmers experience increases the odds of adopting mobile money by 25% this result is twice as higher than that of the initial model. Similarly, we expect farmers without bank accounts to be attracted to mobile money. The results are presented in table 5.3 below.

84

Table 5.3 Factors Influencing Mobile Money Adoption amongst Farmers without Bank Accounts and Non-Adopters of Mobile Money Model 2 Sample B

Independent Variables	Coefficients	Odds Ratios	95% C.I. for EXP(B)	
			Lower	Upper
SACCO Membership Status [0= Not a Member 1=Member]	.363 (1.218)	1.438	.132	15.642
Gender of Farmer [0=Female 1=Male]	-2.962** (1.144)	.052	.005	.487
Farmers Age	-.015 (.056)	.985	.882	1.101
Marital Status [Single]				
Marital Status [Married]	.686 (1.692)	1.986	.072	54.759
Marital Status [Widowed]	-.105 (2.462)	.900	.007	112.325
Marital Status [Divorced]	-2.460 (2.454)	.085	.001	10.481
Education attained [No formal Education]				
Education attained [Primary]	1.328 (1.260)	3.772	.319	44.616
Education attained [Secondary]	2.900* (1.609)	18.173	.775	426.034
Education attained [Tertiary]	-.770 (2.551)	.463	.003	68.707
Occupation [Unemployed]				
Occupation [Farmer]	-2.977 (2.290)	.051	.001	4.534
Occupation [Wage earner]	2.712 (1.707)	15.057	.531	427.200
Occupation [Self-employed]	-.277 (1.520)	.758	.039	14.908
Occupation [Salaried worker]	-20.297 (14704.913)	.000	.000	.
Occupation [Pensioned]	-3.963* (2.165)	.019	.000	1.324
Number of years in farming	.223** (.092)	1.250	1.044	1.495
Primary source of income [Salary]				
Primary source of income [Wages]	-1.468 (3.579)	.230	.000	256.458
Primary source of income [Crop Sales]	2.268 (3.539)	9.662	.009	9945.855
Primary source of income [Remittances]	1.765 (3.388)	5.843	.008	4474.629
Primary source of income [Grants]	-.830 (3.585)	.436	.000	490.671

Constant	-1.218 (3.987)	.296	
Hosmer and Lameshow Test	**.438**	**Df = 8**	**Chi-Square = 7.950**
Percentage Correctly Predicted = 59.5%		**n = 79**	
Negelkerke R Squared	**.662**		
-2 Log Likelihood	**53.352**		

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.6 Comparison of the Selective Results, Model 2 Sample A and Model 2 Sample B Results

The initial model, Model 1, was split into two selective samples using the independent variable bank account ownership. Model 2 Sample A constitutes farmers with formal bank accounts as well as farmers who did not adopt mobile money. Model 2 Sample B constitutes of farmers without bank accounts as well as farmers who did not adopt mobile money. This was to establish the factors that influence mobile money adoption when farmers' access to formal banking is different. As such the variable bank account ownership is eliminated from the process since Model 2 Sample A only contains one selected value: 1 and Model 2 Sample B only contains one selected value: 0.

Only Odds ratios of the significant variables are presented in Table 5.4 below, and only those significant at the 5% and 1% level of significance will be discussed/compared. Those that are significant at 10% level of significance are only mentioned where they are of notable interest. The results show that, even though gender plays no significant role in the adoption of mobile money amongst farmers with bank accounts, it does play a significant role amongst the farmers that have no formal bank accounts. It shows us that unbanked female farmers have higher odds of mobile money adoption than their male counterparts.

Formally banked farmers with secondary education have significantly higher odds of mobile money adoption, 113.052 times the odds of adopting mobile money than farmers without formal education, significant at 1% level significance. However, the odds for unbanked farms with the same level of education are 18.173 when compared with farmers without formal education in the same group, and this result is only quasi-significant at the 10% level of

86

significance. Therefore, we can predict that a good combination for mobile money adoption would be a farmer, who has acquired secondary education and has a formal bank account. This shows that the two financial services are complimentary as we have seen in earlier results from the chapter.

A higher farming experience significantly increases the odds for mobile money adoption by 25% for farmers who have no bank accounts. However, the same cannot be said for their formally banked counterparts. Unbanked farmers with more years in farms would be an ideal target for promotion of mobile money adoption in order to improve financial inclusion. Lastly, the odds of adopting mobile money are low when farmers with bank accounts are dependent on: Wages, Remittances or Grants as a primary source of income than when they are earning salaries. For unbanked farmers, the primary source of income has no effect on adoption.

Regardless of whether a farmer has a bank account or not, formal education has remained an essential determinant in mobile money adoption. Even though the odds of adoption are relatively higher when the farmer has a bank account this doesn't take away the value of literacy in technology adoption. This outcome concurs with literature.

Table 5.4 Comparison of the Selective Results, Model 2 Sample A and Model 2 Sample B Results

Independent Variables	Model 2 Sample A		Model 2 Sample B	
	Coefficients	Odds Ratios	Coefficients	Odds ratios
SACCO Membership Status **[0= Not a Member 1=Member**	-.056 (.748)		.363 (1.218)	
Gender of Farmer **[0=Female 1=Male]**	-1.028 (.815)		-2.962** (1.144)	.052
Farmers Age	.019 (.048)		-.015 (.056)	
Marital Status **[Single]**				
Marital Status **[Married]**	1.517* (.882)	4.560	.686 (1.692)	
Marital Status **[Widowed]**	1.905 (4.589)		-.105 (2.462)	
Marital Status **[Divorced]**	.930 (1.503)		-2.460 (2.454)	
Education attained **[No formal education]**				
Education attained **[Primary]**	2.669* (1.041)	14.423	1.328 (1.260)	
Education attained **[Secondary]**	4.728*** (1.235)	113.052	2.900* (1.609)	18.173
Education attained **[Tertiary]**	1.854 (1.215)		-.770 (2.551)	
Occupation **[Unemployed]**				
Occupation **[Farmer]**	-3.767* (2.245)	.023	-2.977 (2.290)	
Occupation **[Wage earner]**	.432 (1.502)		2.712 (1.707)	
Occupation **[Self-employed]**	-.344* (1.444)	.709	-.277 (1.520)	
Occupation **[Salaried worker]**	-4.001 (2.512)		-20.297 (14704.913)	
Occupation **[Pensioned]**	1.690		-3.963* (2.165)	.019
Number of years in farming	-.014 (.067)		.223** (.092)	1.250
Primary source of income **[Salary]**				
Primary source of income **[Wages]**	-5.478** (2.500)	.004	-1.468 (3.579)	
Primary source of income **[Crop Sales]**	-4.155* (2.444)	.016	2.268 (3.539)	
Primary source of income **[Remittances]**	-4.750** (2.383)	.009	1.765 (3.388)	

88

Primary source of income **[Grants]**	-5.051*** (2.314)	.006	-.830 (3.585)	
Constant	2.530 (2.314)	12.554	-1.218 (3.987)	.296

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.7 Factors Influencing Mobile Money Adoption amongst Farmers Who are SACCO Members Model 3 Sample A

This model is adopted from the initial model (Model 1), it is a selective sample constituting of data from participants that are members of Savings and Credit Cooperatives (SACCO's) together with non-adopters of mobile money. Like the previous model, SACCO membership has been removed from the initial logistic regression model since it was used as a split variable. Like the initial model, only the independent variables Gender and Level of Education significantly influence the decision of mobile money adoption amongst farmers who are SACCO Members.

The results of this logistic regression model are presented in Table 5.5 below. The model correctly predicted 63.2% of the n=87 sample observations. Female farmers who are members of SACCO's have 17.857 times the odds of adopting mobile money than their male counterparts, this is significant at 1% level of significance. Participants who are members of SACCO's and have acquired secondary education have 301.276 times the odds of adopting mobile money than farmers without formal education who also participate in SACCO's (95% C.I. 8.480, 10703.943)

Table 5.5 Factors Influencing Mobile Money Adoption amongst Farmers Who Are SACCO Members Model 3 Sample A

	Coefficients	Odds Ratios	95% C.I. for EXP(B)	
			Lower	Upper
Gender of Farmer [0=Female 1=Male]	-2.887*** (1.062)	.056	.007	.447
Farmers Age	-.115* (.068)	.891	.780	1.019
Marital Status [Single]				
Marital Status [Married]	1.870* (1.017)	6.488	.884	47.615
Marital Status [Widowed]	2.891 (15.702)	18.016	.000	417924675162855.200
Marital Status [Divorced]	2.767 (2.112)	15.905	.253	998.223
Education attained [No formal Education]				
Education attained [Primary]	2.817* (1.542)	16.732	.815	343.379
Education attained [Secondary]	5.708*** (1.822)	301.276	8.480	10703.943
Education attained [Tertiary]	.981 (1.849)	2.666	.071	100.033
Occupation [Unemployed]				
Occupation [Farmer]	-.219 (1.949)	.803	.018	36.634
Occupation [Wage earner]	.904 (1.750)	2.470	.080	76.206
Occupation [Self-employed]	.368 (1.925)	1.445	.033	62.866
Occupation [Salaried worker]	-1.831 (2.193)	.160	.002	11.780
Occupation [Pensioned]	3.184 (2.344)	24.143	.244	2387.732
Number of years in farming	.087 (.076)	1.091	.940	1.266
Primary source of income [Salary]				
Primary source of income [Wages]	-4.079* (2.183)	.017	.000	1.222
Primary source of income [Crop Sales]	-3.457 (2.264)	.032	.000	2.665
Primary source of income [Remittances]	-3.536* (2.036)	.029	.001	1.574
Primary source of income [Grants]	-2.029 (2.142)	.131	.002	8.746

Formal bank account ownership [0 = No Bank Account 1= Has a Bank Account]	2.203* (1.319)	9.054	.682	120.132
Constant	3.265 (2.485)	26.188		
Hosmer and Lameshow Test	**.053**	**Df = 8**	**Chi-Square = 15.311**	
Percentage Correctly Predicted = 63.2%		**n = 87**		
Negelkerke R Squared	**.687**			
-2 Log Likelihood	**53.710**			

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.8 Factors Influencing Mobile Money Adoption amongst Farmers Who are Not SACCO Members Model 3 Sample B

Assessing only the group of farmers who are not members of SACCOs, we discovered that the results still show female farmers to have higher odds of mobile money adoption than male farmers who are also not SACCO members. Female Non-SACCO members have 10.638 times the odds of adopting mobile money than male farmers who also are Non-SACCO members, (95% C.I. 0.016, 0.544). Farmers with secondary education also have 21.428 times the odds of adopting mobile money that their counterparts who have not received formal education (95 C.I. 2.496, 183.948). Farming experience is also quasi-significant, whereby an additional years of farming experience improves the odds of mobile money adoption. The model correctly predicted 69.5% of the observations, its results are presented in Table 5.6 below.

Table 5.6 Factors Influencing Mobile Money Adoption amongst Farmers Who Are Not SACCO Members Model 3 Sample B

	Coefficients	Odds Ratios	95% C.I. for EXP(B)	
			Lower	Upper
Gender of Farmer [0=Female 1=Male]	-2.365*** (.896)	.094	.016	.544
Farmers Age	-.017 (.043)	.983	.903	1.070
Marital Status [Single]				
Marital Status [Married]	.903 (.959)	2.467	.376	16.176
Marital Status [Widowed]	.370 (1.898)	1.447	.035	59.777
Marital Status [Divorced]	-1.306 (1.574)	.271	.012	5.919
Education attained [No formal Education]				
Education attained [Primary]	1.397 (.920)	4.044	.666	24.541
Education attained [Secondary]	3.065*** (1.097)	21.428	2.496	183.948
Education attained [Tertiary]	-.202 (1.154)	.817	.085	7.849
Occupation [Unemployed]				
Occupation [Farmer]	-2.475 (1.630)	.084	.003	2.053
Occupation [Wage earner]	1.088 (1.389)	2.967	.195	45.157
Occupation [Self-employed]	.099 (1.297)	1.104	.087	14.013
Occupation [Salaried worker]	-1.735 (1.986)	.176	.004	8.646
Occupation [Pensioned]	-1.931 (1.459)	.145	.008	2.532
Number of years in farming	.107* (.063)	1.113	.983	1.261
Primary source of income [Salary]				
Primary source of income [Wages]	-3.045 (1.992)	.048	.001	2.363
Primary source of income [Crop Sales]	.238 (1.713)	1.268	.044	36.397

Primary source of income [Remittances]	-1.271 (1.830)	.280	.008	10.137
Primary source of income [Grants]	-2.793 (1.802)	.061	.002	2.094
Formal bank account ownership [0 = No Bank Account 1= Has a Bank Account]	.957 (.852)	2.605	.490	13.835
Constant	2.169 (1.935)	8.745		
Hosmer and Lameshow Test	**.164**	**Df = 8**	**Chi-Square = 11.718**	
Percentage Correctly Predicted = 69.5%		**n = 105**		
Negelkerke R Squared	**.488**			
-2 Log Likelihood	**84.593**			

Source: Author's elaboration

*Note: *, **, ***, denotes statistical level of significance at 10%, 5%, 1% respectively*

5.9 Chapter Summary

The logistic regression models used in the analysis all conformed to the desired econometric standards. The Hosmer and Lameshow statistic used to test validity was above 0.05 in all the five models, which is ideal. Continuous variables that were employed exhibited no multicollinearity, their Pearson Correlation values were all below the threshold of 0.7 and the VIF values all below VIF level 6, which is also desirable as it is further from the threshold VIF value of 10. All continuous variables that were used as predictor variables exhibited a normal distribution curve on the histogram. These provide the confidence to report the results of the study as valid and reliable.

From the results of the logistic regression models presented in this chapter several inferences can be drawn. First, is that there is enough evidence that socioeconomic characteristics of farmers do influence their decisions for mobile money adoption. Gender, Education, Ownership of a formal bank account and farming experience were found to significantly influence the decision for mobile money adoption. Female farmers had higher odds for mobile money adoption than male farmers, similarly, farmers with Primary and Secondary education, respectively had higher odds for mobile money adoption than farmers without formal

93

education. An additional year of farming experience also showed to improve the odds of farmers to adopt mobile money. Interestingly, farmers with bank accounts also show higher prospects of mobile money adoption than the unbanked farmers.

It is intriguing to realize that farmers with formal bank accounts have higher odds for mobile money adoption than those farmers who are unbanked. This result lead to the decision to have the selective samples and determine the outcome when only farmers with bank accounts are studied and similarly only those without bank accounts are studied. For the first selective group of farmers with bank accounts, education remained significant and the source of income was significant as well, showing that farmers with salaries are more responsive to mobile more than those earning grants, remittances and wages. The model for unbanked farmers showed Education and farmer's gender to significantly influence the decision to adopt mobile money.

The third model also contained selective samples of; Farmers who are a member of SACCOs and the other model Farmers who are not members of SACCOs. For both models, Gender and Education influenced the decision for mobile money adoption unidirectionally. The results from these models are further discussed in the last chapter, chapter six, where implications for policy as well as recommendations to stakeholders in Fintech Eswatini are also made.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This study employed the binary logistic regression model to estimate the socioeconomic factors that influence farmers' decisions for mobile money adoption at the Lomahasha area of the Lubombo region in the Kingdom of Eswatini. The data was collected from a random sample of 160 participants around the Lomahasha constituency through a survey using some semi-structured questionnaires. An initial model of the overall data on the socioeconomic factors influencing mobile money adoption was ran to identify independent variables of significance. The data was then split into samples according to the financial services other than mobile money that respondents were using. This was to also identify the independent variables of significance in mobile money adoption when the respondents had access to other financial services.

The study determined farmers' knowledge, attitudes, perceptions, use and preferences towards mobile money adoption. It also studied the level and the role of trust in mobile money adoption concluding with the identification of the factors that influence adoption. This chapter summarizes the study's key conclusions, recommendations policy implications and also highlights the study's limitations and lastly makes suggestions for further research.

6.2 Conclusion

The results provide sufficient evidence that mobile money has the potential for improving financial inclusion in rural areas of Eswatini. The results showed that the initial financial inclusion rate in the area without mobile money was at 61.3%. For this we consider those that have access to financial services, participants with formal bank accounts as well as those

95

participants that are members of SACCO's. With mobile money, this value improves to 80% rate of financial inclusion for participants in the area.

Secondly, a considerable number of people in the area own mobile phones and they are aware of mobile money. Of the farmers that were interviewed who are not mobile money users, some indicated that they benefit from the service through using close friends and relatives accounts to do some transactions. Such kinds of transactions are a barrier in the diffusion of mobile money services, thus they hinder the improvement in the documented rate of financial inclusion, since such people never see the need to register their own mobile money accounts. Knowledge of mobile money and being a registered mobile money user was higher amongst male participants.

Thirdly, interpersonal trust was very strong amongst mobile money users and mobile money agents. At the initial stages of adoption farmers tend to trust agents more than they trust the MNO, with continued use, there is a shift of trust towards the MNO. As such, more users stated that they were willing to recommend mobile money to their close friends and relatives as they found the service secure, convenient and useful. This showed perceptions and attitudes that are more receptive towards mobile money in the area.

Lastly, this study has been able to show that a number of socioeconomic factors significantly influence the decision for mobile money adoption. These were gender, education, farming experience and ownership of a bank account. Female farmers had higher odds of adoption than males, educated farmers had higher odds of adoption than farmers without formal education, an additional year of farming increased the odds of adoption and lastly farmer with formal bank accounts had higher odds of mobile money adoption than unbanked farmers. A complementary relationship exists between mobile money and formal banking.

Contrary to the a-priori expectation that mobile money was a substitute to conventional banking, the study has shown evidence that mobile money compliments formal banking. There is a need for literacy rates to be improved. However, this is because the level of education has

a significant influence on mobile money adoption. As part of their corporate social responsibility, MNOs can consider teaching financial literacy in rural areas in order to empower farmers. Such programmes may have a significant impact in reducing financial exclusion amongst the people in the mass market.

6.3 Recommendations and Policy Implications

Fintech is relatively new and therefore it will take time and effort to perfect it and make everyone comfortable with its adoption and use. Nonetheless, the future of banking is digital and branchless and this means with advancements in blockchain and data mining, service providers will be able to provide personalized services to their customers with convenience. As a country, Eswatini cannot afford to miss out on this opportunity as it pursues its grandeurs mission of attaining first world status by 2022. In order to achieve this mission, the modalities for the country's development strategy must align with inclusive finance measures in order to improve from the status quo of financial exclusion. Preceding the information, the research has provided, the study makes the following recommendations:

- First, the Mobile Network Operator should re-think the project design of mobile money and re-strategize it in a manner that would allow for the accommodation of financial self-help groups like ASCAs, ROSCAs and SACCOs. Merging/Formalizing these semi-formal financial services with mobile money will improve the sustainability and efficiency in the utilization of mobile money services.
- The Mobile Network Operator should allow for long term savings in mobile money and provide a savings account that yield interest on savings over time. This would develop and promote the culture of saving amongst mobile money users.
- The Mobile Network Operator needs to consider developing an image/visual based mobile money interface that would use, emoticons, images or even video to indicate options. This would be beneficial in accommodating the less literate who are willing to adopt mobile money but are hindered by lack of education. Such has proven to work in similar situations form other countries.
- There is an overarching need for the MNO to provide a capacity development programme for mobile money agents in order for them to be able to better assist mobile

money users at mobile money booths. This would also incentivize the agents since they only earn meagre earnings from their activity.

- The MNO needs to make provision that allows mobile money users to make direct purchases from agro-dealerships and shops without having to withdraw the cash prior. This can be successfully achieved through the provision of unique QR Code stickers to clients that they can scan at the Point of Sale (POS) and make payments.

- Formal financial institutions must collaborate with the MNO in the provision of financial services. The study has shown that most mobile money adopters are holders of bank accounts, therefore it is evident that these two financial services are not substitutes but are compliments in the financial services spectrum. Since mobile money agents personally know their clients, this would also allow for information sharing and ultimately eliminate the agency problem therefore reducing transaction costs.

- The was a major lack of awareness and knowledge about insurance and its benefits. Insurance companies and formal financial institutions need to design financial literacy programmes that would be targeted at people in rural areas in order to create awareness and improve the uptake of mobile money and its use for payment of insurance premiums.

- Finally, government must play its role in removing legislature that imposes barriers to entry in the formal financial service market. However, this must be done observing internationally acceptable standards that the state is a signatory of.

6.4 Limitations of The Study and Areas of Further Research

This study is limited to determining farmers socioeconomic characteristics and their influence on mobile money adoption. The findings of this study should not by any means be widely generalized as our sample of smallholder farmers in Lomahasha constituency may not be a true representation of all smallholder farmers in the Kingdom of Eswatini. The transferability of the insights that are shared here to other contexts need to be approached with caution. The outcomes of the study are based on the analysed conditions of farmers in the Lomahasha Inkundla and as such, these may not be applicable in other geographical contexts even those within Eswatini's borders.

98

The study focused on the initial adoption of mobile money i.e. whether farmers were registered mobile money users. It does not study into detail the continual use of mobile money services once they have been adopted. Therefore, it leaves and gap to be explored by other researchers in to the use of mobile money after adoption. Subject to resources within disposable, a similar study may be carried out at the national level, this would help in the evaluation of the real impact of mobile money adoption on Eswatini's financial inclusion. Lastly, it would be interesting to study the impact of mobile money adoption on the welfare of adopters as well as mobile money's impact on remittance inflows.

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103

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APPENDIX A: LETTER OF ETHICS APPROVAL

Faculty of Natural and Agricultural Sciences
Ethics Committee

E-mail: ethics.nas@up.ac.za

12 July 2018

ETHICS SUBMISSION: LETTER OF APPROVAL

Mr TL Dlamini
Department of Agricultural Economics Extension and Rural Development
Faculty of Natural and Agricultural Science
University of Pretoria

Reference number: 180000010
Project title: Mobile Money Adoption Among Small-Scale Farmers in Rural Areas: A Case Study of Lomahasha Constituency in Swaziland

Dear Mr TL Dlamini,

We are pleased to inform you that your submission conforms to the requirements of the Faculty of Natural and Agricultural Sciences Ethics committee.

Note that you are required to submit annual progress reports (no later than two months after the anniversary of this approval) until the project is completed. Completion will be when the data has been analysed and documented in a postgraduate student's thesis or dissertation, or in a paper or a report for publication. The progress report document is accessible on the NAS faculty's website: Research/Ethics Committee.

If you wish to submit an amendment to the application, you can also obtain the amendment form on the NAS faculty's website: Research/Ethics Committee.

The digital archiving of data is a requirement of the University of Pretoria. The data should be accessible in the event of an enquiry or further analysis of the data.

Yours sincerely,

Chairperson: NAS Ethics Committee

109

APPENDIX B: LETTER OF CONSENT

Informed consent for participating in an academic research study;

Department of Agricultural Economics, Extension and Rural Development

Research Conducted By;

TL (Theophilus) Dlamini (u17247650)

Cell RSA: +27 721001333

Cell Eswatini; +268 76193026

Dear Respondent,

You are hereby invited to participate in an academic study conducted by Theophilus Dlamini, a Masters student in the Department of Agricultural Economics, Extension and Rural Development of the University of Pretoria. The purpose of this research is to establish the benefits and the potential impact of mobile money adoption in promoting financial inclusion for unbanked farmers in remote rural areas in Swaziland. The objectives of the study are as follows;

1. To describe users and non-users of mobile money at Lomahasha Eswatini according to their socioeconomic characteristics
2. To establish farmers' knowledge, perceptions, use and preferences for mobile money adoption and use in rural areas in Eswatini.
3. To determine the level of interpersonal trust between mobile money agents and customers and the level of trust between customers and the Mobile Network Operator
4. To determine the socioeconomic factors that influence the decision to adopt mobile money by small-scale farmers in rural areas in Eswatini.

Please note that;

- The study abides by the faculty Research Ethics, you may or may not choose to give your name to the interviewer and the answers will be held with utmost confidentiality.
- Your participation in the study is valued, however you may choose not to participate, or rather withdraw at any point without any negative consequences.
- I request that you answer the questions in the questionnaire honestly and precisely.
- The results of the study will strictly be used for policy formulation, academic purposes as well as publication in an academic journal. These results will not be used for any commercial purposes.

Kindly sign below to indicate that;

- You have read and understand the information provided above
- You give you your consent to voluntarily participate in the study

Respondent' Signature…………………..   **Date………………………**

APPENDIX C: SURVEY INSTRUMENT

Factors Influencing the Adoption of Mobile Money by Farming Households in

Lomahasha Inkhundla of the Lubombo Region, Eswatini

Date: ___/___/<u>2018</u> Constituency (Inkhundla):_____

Sub-constituency (Sigodzi): _____ Identification Number: ☐

1. Savings & Credit Co-operative Membership 1=Yes ☐ 0=No ☐

2. How many years have you been a member? _____ (Years)

3. Position in household: _____

4. Farming Experience (Proxy): ____Years

Section A: (General Farmer's Household Information)

5. Family members **(a)**	**6.** Gender **(b)**	**7.** Age **(c)**	**8.** Marital status **(d)**	**9.** Education level **(e)**	**10.** Employment Status **(f)**	**11.** Monthly Off-farm Income **(g)**	**12.** Mobile Phone Ownership **(h)**	**13.** Type of account owned **(i)**
1=Husband								
2=Wife								
3= Aunt								
4= Uncle								
5=Daughter								
6=Son								
7=Grandmother								
8=Grandfather								
9=Granddaughter								
10=Grandson								

111

CODES (Q5-Q13)

Code (a) Family members in the household:

Husband= (1)   Wife= (2)   Aunt= (3)   Uncle= (4)   Daughter= (5)

Son= (6)   Grandmother= (7)   Grandfather= (8)   Granddaughter= (9)

Grandson= (10)

Code (b) Gender of household member:

Male = (1)   Female= (0)

Code (c) Age of family member
- Use given absolute value in years

Code (d) Marital status:

Single = (0)   Married= (1)   Divorced= (2)   Widowed= (3)

Code (e) Highest education attained;

Illiterate= (0)   Primary= (1)   High school= (2).   Tertiary= (3)

Code (f) Occupation of household member by sector of the economy:

Unemployed= (0)   Farmer= (1)   Wage earner= (2)   Self-employed= (3)

Salaried worker= (4)   Pensioned= (5)   Student= (6)   Other= (7)

Code (g) Number of years in Maize Production
- Use given absolute value

Code (h) Ownership of a registered mobile phone:

Yes= (1)   No= (0)

Code (i) Type of transaction account owned:

No Account= (0)   Mobile money= (1)   Bank account = (2)

Both Mobile money and Bank account= (3)

112

Income Details	Code
14. Primary Source of Income **(a)**	
15. Monthly Off-farm Income **(b)**	
16. Monthly Expenditure **(c)**	
17. Monthly Savings **(d)**	
18. Purpose of Savings **(e)**	
19. Source of contingency funds **(f)**	

CODES (Q14-Q19)

Code (a) Primary Source of Income
Salary= (1)   Wages= (2)   Crop Sales= (3)   Remittances= (4)   Grants= (5)

Code (b) Monthly Off-farm Income
$\leq$ E500= (1)   E500-E1000= (2)   E1000-E1500= (3)   E1500-E2000= (4)

E2000-E2500= (5)   E2500-E3000= (6)   E3000-E3500= (7)   E3500-E4000= (8)

$\geq$ E4000= (9)

Code (c) Monthly Expenditure
$\leq$ E500= (1)   E500-E1000= (2)   E1000-E1500= (3)   E1500-E2000= (4)

E2000-E2500= (5)   E2500-E3000= (6)   E3000-E3500= (7)   E3500-E4000= (8)

E4000= (9)

Code (d) Monthly Savings
Farmer Does Not Save= (0) $\leq$ E500= (1)   E500-E1000= (2)   E1000-E1500= (3)

E1500-E2000= (4)   E2000-E2500= (5)   E2500-E3000= (6)   E3000-E3500= (7)

E3500-E4000= (8) $\geq$ E4000= (9)

Code (e) Purpose of Savings
Settle Debts= (0)   Pay School Fees= (1)   Business/Investment= (2)

Save for Retirement= (3)   Emergencies= (4)   Farming Inputs= (5)

Code (f) Source of contingency funds
Personal Savings= (1)   Friends/Family= (2)   SACCO= (3)

Informal Credit= (4)   Formal Credit= (5)   Other= (6)

113

Section B: Respondent's Awareness and Use of Mobile Money

20. Do you have a bank account?
   1=Yes   (*proceed to Q22*)   0 =No   (*proceed to Q21*)

21. What best describes your reason for not having a banking account?

   1= I do not meet minimum requirements   2= Banking is too expensive for me
   3= Bank is too far   4= I don't trust banks   5= I keep my money at home

22. Is the bank account active?
    1= Yes   (*proceed to Q23*)   0= No (*proceed to Q24*)

23. How often do you use your bank account per month?
   1=At least once   2=Twice   3=Three times
   4=Four times   5= More than five times

24. Are you familiar with mobile money banking?
   1=Yes   (*Proceed to Q25*)   0=No   (*proceed to Q28*)

If the answer is in Q.22 NO, give a brief definition of mobile money:

Mobile money is a service whereby customers use their mobile device (cell phone) to transfer money electronically from one person to another using a mobile phone. Through the mediation of network service provider agent who changes conventional cash into e-money. Both domestic transfers as well as international, or cross-border, remittances are money transfer services. The service also allows for the payment of utility bills (Electricity, Phone, Water), using your phone without having to go to the service centre.

NB: This information is specifically in the context of Eswatini at the time period of the interview

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25. How did you learn about the service?
   1=Through an agent   2=Receiving Money   3= Advertisement
   4=Radio   5=Posters   6=Through MNO SM
   7=Newspaper   8=TV   9=Extension officer   10=Friends

26. Do you have a Mobile Money account?
   1=Yes   (*proceed to Q27*)   0=No (*Proceed to Q28*)

27. How often do you use your mobile money account per month?
   1=Once   2=Twice   3=Three times   4= Four times
   5= At least five times

28. What is your reason for not using mobile money?
   1= I don't have enough information   2= I don't think it is useful
   3= Agent is too far   4= I don't trust the Agent   5= I keep my money at home

29. Would you like to register for the service?
    1=Yes   0=No

30. Distance to mobile-banking agent:
    (1) =0-1km   (2) =1-2km   (3) =3-4km   (4) =Above 5km

31. Distance to the closest bank branch:
    (1) =5-10km   (2) =11-15km   (3) =16-20km   (4) =Above 20Km

Section C: Mobile Money Use, Distribution of Agents (*Mobile Money Users Only*)

32. Is the agent always available during work hours?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

33. How far is the nearest agent?
    (1)=2km radius   (2)=5km radius   (3)=10km radius
    (4)=15km radius   (5)=20km radius

34. How much does it cost to travel to the nearest agent?
    (1)= E0.00   (2)= E5.00-10.00   (3)=E11.00-15.00
    (4)=E16.00-20.00   (5)=E25.00-30.00

35. Do agents sometimes ration the amount of cash you can withdraw from your account?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

Transaction types:

36. Do you normally use mobile money to buy airtime?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

37. Do you normally use mobile money send Money:
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

38. Do you normally use mobile money receive remittances?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

39. Do you normally use mobile money receive payments?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

40. Do you use mobile money pay insurance?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

41. Do you perform any cash withdrawals at mobile money agents?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

42. Do you deposit money with the mobile money agents?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

43. Do you normally use mobile money to pay electricity and water bills?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

44. Have bought any farm inputs using mobile money?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

45. Do you save money through mobile money account?

    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree

    5= Strongly Agree   6=Don't Know

46. If you were to rank the above uses in order of their importance to you, how would you rank them in terms of their usefulness to you?

CODE:

1= **Not Useful**   2=**Less Useful**   3=**Moderately Useful**
4=**Useful**   5= **Very Useful**

Mobile Money Uses	Rank	47. Willingness to pay for service
Buy Airtime		
Send Money		
Receive Remittances		
Receive payments		
Pay Insurance		
Withdrawal at mobile money agent		
Deposit at banking agent		
Pay Electricity and Water (Utility) Bills		
Buy Farm Inputs		
Savings		

(45. Are you willing to pay what MTN charges for this service? 1= YES   0= NO)

Section D: Agricultural Production, Consumption and Sales *(Both users and Non-users)*

Please indicate the following regarding maize cropping information and other available crops:

Crop	Area planted (ha)	Actual yield (AY)	Amount consumed at home (kg)	Amount sold (kg)	Price per unit	Income per crop
48.	49.	50.	51.	52.	53.	54.
1= Maize						
2=Vegetables						
3=Sweet potato						
4= Beans						
5= Pumpkins						
5=Other						
Crops grown; Maize= (1); Vegetables= (2); Sweet potato= (3) Beans= (4) Pumpkins (5) Other= (6)		Actual yield after harvesting 100kg= 1 bag	Amount sold 100kg=1 bag	Number of 100kg bags sold	Price received for 1 bag=100 kg	
Total Value of Agricultural Output sales (Farm Income)					E_____	

117

Section E: Farmers Preferences for Mobile Money Use

55. Would you like to see the distribution of elderly grants through mobile money?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

56. Would you prefer buying more goods that can be purchased through mobile money?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

57. Should MTN develop product services appropriate for the needs of small savings groups?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

58. Would you be like your transaction history from mobile money to be used as basis for extension of credit by other providers.
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

59. Would you use a mobile money ATM?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

60. Would you like to have mobile money credit cards?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

Section F: Household Asset Ownership

61. Household assets owned.

Item	Value of Asset (E)
1=Tractor	
2= Plough	
3= Planter	
4= Livestock (Equine, Cattle, Goats and sheep)	
5= Bakkie	
6= Other	
Total Value of Assets (E)	

Type of Asset: Code		
Tractor= (1)	Plough= (2)	Planter (3)
Livestock = (4)	Bakkie= (5)	Other= (6)

118

Section G: The Role of Client-Agent Trust and Network Provider Reputation

(a)Network Service Operator/Provider

62. Do you think that mobile money is a safe way of doing financial transactions?
    1=Yes   0=No

63. For how long have you been using your current network service provider? _____Years

64. Have you ever lost money mysteriously with the network service provider?
    1=Yes   0=No

65. How much trust would you say you have for the network service provider?
    (0)= None   (1)=Very low   (2)=Low   (3)= Moderate
    (4)=High   (5)=Very High

66. How would you describe the network service provider's level of transparency with its customers?
    (0)= None   (1)=Very low   (2)=Low   (3)= Moderate
    (4)=High   (5)=Very High

67. How would you describe the network service provider's level of fairness in reimbursing?
    (0)= None   (1)=Very low   (2)=Low   (3)= Moderate
    (4)=High   (5)=Very High

68. How likely are you to recommend mobile money to those close to you?
    (0)= Not likely   (1)=Less likely   (2)=Moderate   (3) More likely

69. What other services would you like to see added in mobile money that would make you satisfied with using the service?
_____
_____
_____
_____
_____

(b) Mobile Money Agents

70. Do you think that mobile money agents are trustworthy?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

71. For how long have you known your local mobile money agent?_____Years/Months/Weeks

72. How much trust would you say you have for your local mobile money agent?
    (0)= None   (1)=Very low   (2)=Low   (3)= Moderate
    (4)=High   (5)=Very High

73. Do you think that the local mobile money agent is transparent?
    1= Strongly Disagree   2=Disagree   3=Not Sure   4=Agree
    5= Strongly Agree   6=Don't Know

119

74. Are you related to the local mobile money agent?
    1=Yes   0=No

75. What other improvements would you like to see improve to enhance your relationship and safe transaction with the agents?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Thank you for taking your time to participate in this survey.

Independent Variable	Description	Independent Variable SPSS Code
Household Characteristics		
Age	A continuous variable that captures the age of the respondent	*AGE*
Gender	A binary categorical variable for the gender of the respondent	*GENDER*
Household Position	Categorical variable for the position of the respondent's household	*HH_POS*
Marital Status	Categorical variable for civil/marital status	*MARR_STS*
Level of Education	Highest level of education attained by the respondent	*LVL_EDU*
Occupation of Household head	Field of primary employment of respondent	*OCCUPATION*
Financial Characteristics of Farmer's Household		
Primary source of income	Respondent's primary source of income	*INC_SRC*
Monthly expenditure	Respondents' monthly expenses	*EXP_MTH*
Monthly savings	Respondents' monthly savings	*SAV_MTH*
Use of savings	Respondents' primary use of savings	*SAV_USE*
Source of contingency funds	Respondents' source of contingency funds	*SRC_FNDS*
Bank account ownership	Categorical variable for respondents' bank account ownership status	*BNK_ACC*
Membership to a Savings and Credit Cooperative	Binary categorical variable for respondents' membership to a Savings and Credit Cooperative	*SACCO_MBRSHP*
Reasons for not having a bank account	Categorical variable for reasons why respondent does not have bank accounts	*RSN_XACC*
Log of household's agricultural assets	Continuous variable for log of the total value of assets owned by respondent	*TOT_VAL*
Household Mobile Money Information		
Respondent's knowledge of mobile money	A binary categorical variable for respondents' mobile money awareness	*MM_KNW*
Mobile money account ownership	A binary categorical variable for respondents' mobile money account ownership	*MM_ACC*
Primary source of mobile money information	A categorical variable for where respondents first heard about mobile money	*MM_INFO*
Reason for not having a mobile money account	A categorical variable consisting of the common reasons why respondents do not have accounts	*RSN_XMM*

Willingness to register for mobile money	A binary categorical variable for the willingness to register for mobile money by currently non-registered respondents	MM_REG
Distance to the nearest mobile money agent	A Likert scale categorical variable for distance from respondent's place of abode to the nearest MOMO booth	MM_DIST
Cost of travelling to the nearest agent	A Likert scale categorical variable for the total costs of travelling to the nearest MOMO booth	TRL_CST
Credit rationing by mobile money agents	A binary categorical variable capturing whether or not respondents are sometimes limited on the amount they can withdraw	CDT_RTN
Farmers Preferences for Mobile Money		
Preferences for distribution of elderly grants through mobile money	A categorical variable, capturing the sentiment of respondents about using mobile money for elderly grants payments.	PREF_EG
Preferences for purchasing goods using mobile money	A categorical variable, capturing the sentiment of respondents about using mobile money at retail point of sales	PREF_GD
Preferences for Savings Group Product on Mobile Money	A categorical variable, capturing the sentiment of respondents' about introducing an interest earning account for MOMO	PREF_SAV
Preferences for Transaction Statement Issuance	A binary categorical variable, capturing the sentiment of respondents about having a statement of accounts/transactions for MOMO	PREF_ST
Preferences for Mobile Money ATM's	A binary categorical variable, capturing the sentiment of respondents about incorporating MOMO into ATM's	PREF_ATM
Preferences for Mobile Money Credit Cards	A binary categorical variable, capturing the sentiment of respondents about having credit cards for MOMO.	PREF_CRD
Farmers Trust and Security Perceptions of Mobile Money		
Farmer thinks mobile is secure	A binary categorical variable capturing farmers sentiments about mobile money safety and security	MM_SAF
Lost Money Mysterious While Using Mobile Money	A binary categorical variable, capturing whether mobile money users' lost money using the service before	MM_LOS
Level of Transparency shown by MNO	A Likert scale categorical variable, capturing the sentiment of respondents pertaining to the transparency of the MNO	MM_TRNSP
Level of Fairness in Reimbursements by MNO	A Likert scale categorical variable, capturing the sentiment of respondents about the whether the MNO reimburse customers during losses	MM_FAIR
Likelihood to Recommend Mobile Money to another person	A binary categorical variable capturing whether respondents would be willing to recommend mobile money to their friends	MM_REC