

**INFLUENCE OF MONEY TRANSFER TECHNOLOGICAL
INNOVATIONS ON PERFORMANCE OF AGRICULTURAL
PROJECTS: A CASE OF GREENHOUSE FARMING IN KIAMBU
SUB - COUNTY, KENYA**

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**A Research Project Report Submitted in Partial Fulfillment of the
Requirements for the Award of Degree of Master of Arts in Project
Planning and Management of the University of Nairobi**

2017

DECLARATION

This research project report is my original work and has not been presented for the award of any degree in any other university.

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DEDICATION

This research report is dedicated to the memory of my beloved mother, Jane Njeri, for being my pillar, source of strength and for molding me to be the person I am today, my father, Prof. Kang'ethe and to my brothers Daniel, Joel and Paul for the great encouragement and support they gave me during my studies.

ACKNOWLEDGEMENT

I would like to thank my supervisor, Mr. Augustine Mwangi, for his guidance, advice, endless support and encouragement to successfully complete this research report.

My heartfelt appreciation goes to all my lecturers and colleagues who have journeyed with me through the entire study period and offered invaluable contribution in my studies. Also, I acknowledge the Department of Extramural Studies under the guidance of Prof. Charles M. Rambo and the University of Nairobi at large for providing me with all the necessary resources to undertake my studies.

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ABBREVIATIONS AND ACRONYMS

ATM	Automated Teller Machine
CBK	Central Bank of Kenya
EFT	Electronic Funds Transfer
GDP	Gross Domestic Product
M- Banking	Mobile Banking
ICT	Information and Computer Technology
POS	Point-Of-Sale

ABSTRACT

Technology keeps changing as the world evolves into a global village. This has led to technological innovations that have made life easier by bringing convenience to day to day needs. Technological innovations in the financial sector have made sending money affordable, fast and increased accessibility of funds. These improvements of technology in sending money have benefited the agriculture sector in improving financial inclusion for farmers. The study therefore aimed at establishing the influence of money transfer technological innovations on performance of agricultural projects and examined a case of greenhouse farmers in Kiambu Sub-county. The objectives of the research were: To determine the influence of Internet Banking, Mobile Banking, Agency Banking and Electronic cards on performance of agricultural projects. The study employed descriptive survey design and focused on greenhouse farmers in Kiambu Sub-county. The target population was greenhouse farmers in Kiambu Sub-county who use technology to transfer money. A sample of 149 respondents was used in the study out of a target population of 81 greenhouse farmers in Kiambu sub-county. The main data collection instrument was questionnaires and secondary data was collected from books, published reports, journals and the internet. The data collected was analyzed through descriptive statistics and correlation analysis using statistical package for social science (SPSS). The findings of the study indicated that a strong positive correlation existed between mobile banking and performance of agricultural projects with $r = .803$ and significant at $p = 0.00 < \alpha (0.005)$, there was a weak positive correlation between internet banking and performance of agricultural projects with $r = .424$ and significant at $p = 0.00 < \alpha (0.005)$, agency banking and performance of agricultural projects had a positive correlation with an r value of $.651$ and a p value of $0.000 < \alpha (0.005)$ and lastly there was a moderate positive correlation between electronic cards performance of agricultural projects with $r = .510$ which was further significant at $p = 0.00 < \alpha (0.005)$. The study concluded that mobile banking had an influence on performance of agricultural projects due to the ease of use, internet banking is restrained by the high cost and lack of IT skills, agency banking has a major influence on the performance of agricultural projects mainly due to their easy accessibility and lastly electronic cards had a moderate influence on the performance of agriculture. The study recommended that there is need to come up with proper information systems and infrastructure and involve customers in the development stage of product development to better understand their needs, new technological channels should be priced fairly to encourage more users to adopt it and finally measures should be in place to ensure security of funds being sent so as to increase confidence in these technological innovations so that more people adopt them. The findings of the study may help farmers find cheaper and more convenient ways of transferring money through technology. It may also provide information to policy makers on financing agriculture and making payments to farmers using technological innovations and act as source of reference to the Government of Kenya in making improvements in the agricultural sector.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Technological advancements in the financial sector enhance financial deepening in a country. Through technological advancements, financial institutions are able to offer more products and enhance financial access (Wambua, 2014). Technology has changed how business is conducted in the financial industry by introduction of innovative solutions that have eased how we transfer money such as Automated Teller Machine (ATM), transfers from one account to another among many others.

Iran has made great advancements by improving interactions between the customer and the bank and ease of access to banking services through technology by introduction of Automated Teller Machines, Internet and Mobile Banking. Some Iranian banks have additional services such as stock market transactions and the submission of standardized accounting payment files for bank transfers to third parties. As technology advances continually in Iran, different kinds of online banking systems emerge, each bringing a new aspect to the interaction between customer and the bank (Soroor, 2005).

1.1.1 Mobile Banking

In Kenya, the unmatched growth in the mobile phone services on voice, data and Value Added Services (VAS) in Kenya has presented the opportunity for utilizing the available network platform and infrastructure for the purposes of mobile money transfer services. Through this trend, the economy has experienced an exponential growth in the transfer of funds through e-money hence increasing financial inclusion in the country (Murega, 2013).

Policy and regulation have been used to support technological innovations within the financial sector. In 2006, the Central Bank of Kenya, the Communications Commission of Kenya and the Ministry of Finance supported the launch of Safaricom's mobile phone based money transfer product – M-Pesa, which has revolutionized money transfer that has

changed the lives of millions of Kenyans and often used as a case study of money transfer by many other countries (Cracknell, 2012).

1.1.2 Internet Banking

Internet banking offers the capacity to automate transactions which allows for more receptive provision of service to customers. Many banks have adopted Internet Banking as more customers seek for more convenience in accessing and transacting from their accounts. Additionally, online banking is becoming a more feasible option for interaction between financial institutions and their customers. Banks have adopted Internet banking to offer their customers a variety of services including account balance inquiry, transfer funds, pay and receive bills, apply for loans so as to offer more convenience and improve the customer's banking experience (Lagoutte, 1996).

1.1.3 Agency Banking

More countries are adapting agency banking as a new strategy to improve financial inclusion in rural areas after seeing its success in several developing countries especially in South America such as Brazil which has implemented agency banking successfully with a network of agents that has covered 99% of municipalities in the country. Other countries that have implemented agency banking successfully include: Colombia, Peru, Mexico, Argentina, Pakistan, India, South Africa and Kenya among others (AFI, 2012).

As per the agency banking guidelines provided by the Central Bank of Kenya in 2010, financial institutions are allowed, to operate agencies through third parties which offer financial services to customers on behalf of the financial institution. This approach has been used successfully in Brazil, where shopkeepers offer agency banking services to millions of customers (Cracknell, 2012).

Money transfer refers to the act of transferring money from one place to another. Due to the need to increase the convenience, speed and lower the cost of transferring money, technological advancements have changed the monetary landscape. Technological innovations such as mobile money and electronic cards are some of the innovations that

have been invented to meet the customer needs. These innovations have changed how money is moved from the traditional ways of physical movement to the digital form of money transfer.

1.1.4 Electronic Cards

Electronic cards have evolved in to one of the most convenient and accepted financial products. It is accepted by millions of consumers and merchants globally as a regular means of payment for a variety of products and services. The rapid growth of the credit card industry evidences the importance of cards to consumers, merchants, issuing banks and other financial stakeholders (Credit Card Lending Comptroller's Handbook November 2015). According to Ngumi (2013), many banks have partnered with retail outlets like supermarkets, petrol stations, hotels and hospitals to enable consumers to use their cards at such outlets. Cards also offer a convenient opportunity for customers to transact cash-less leading to high growth in use of cards.

Money Transfer in Agricultural Projects

Access to finance for agricultural developments is a major challenge to commercialization in developing countries. Agricultural finance markets often fail for smallholder farmers due to the high transaction costs of lending such farmers. With the improvements in technology, this issue can easily be addressed (Kirui, 2011).

As highlighted by Patil (2016), In India, the government established agricultural banks which provide farmers with services such as cash credit, term loans, crop insurance, mobile and online banking. These banks help farmers to expand their farming area, buy machinery, build storage facilities for their crops and enables farmers to be economically stable and socially developed.

Little research has been done on micro-finance money transfer services in sub-Saharan Africa except in South Africa. This is astonishing considering the increased migration outside Africa and the exponential growth of diaspora remittance to households for domestic use across the continent (Bryceson, 1999).

Recently in Kenya, greenhouses have become very common. These structures are increasingly dotting our landscape. However, to construct one is costly and a farmer needs capital or security to get a bank loan to start off. For many small-scale farmers, both are not options they can pursue and hence the common belief that “Greenhouse farming is an issue of the middle class”. Quite often, greenhouse owners are often people with white collar jobs (The Organic Farmer, 2011).

1.2 Statement of the problem

For a long time, farmers in rural areas have been faced with challenges of transferring money since most financial institutions are located in urban areas making it difficult and inconvenient to access money. Also the high fees charged constrain low-income earners and small-scale farmers from accessing financial services.

According to the FinAccess household survey report (2016), the gap between rural and urban areas in financial inclusion is increasing. In the last century, use of formal channels to transfer money in urban areas has doubled as compared to rural areas. This has led to people transferring money through informal channels, delivering personally or using a third party. This causes delays, is not secure and cash may be stolen or misused.

With the surge of people buying land in the outskirts of Nairobi, many venture into small-scale farming so as not to leave the land idle and to have an extra source income. Most of them live in urban areas and leave a farm manager to manage the farm. Since they are not able to visit the farm on a frequent basis, many times the funds the farm owner sends is mismanagement or stolen. With the growth in number of people venturing into farming, improvement and increased efficiency in transferring money through adoption of new technology is welcomed and embraced.

Several studies have been done in relation to technological innovations and money transfer. Kirui et al. (2012), found that small-scale farmers are more responsive to mobile money transfer and that they used this as the main channels to send money for agricultural related

purposes (buying farm inputs, labor wages, equipment). Kamau (2013), found that technological innovation led to increased accessibility of bank services through mobile banking, internet banking and agency banking. This study investigated the influence of four money transfer technological innovations; mobile banking, internet banking, agency banking and electronic cards on the performance of agricultural projects; with a focus on greenhouse farming.

Limited research has been done on the influence of technological innovations on increasing money transfer in agricultural projects. With the insatiable need to make and receive various payments by farmers on a frequent basis and increased developments in ICT over the years, the study sought to determine what impact technological innovations have on increasing money transfer in agricultural projects specifically for greenhouse farmers in Kenya.

1.3 Purpose of the study

The study was intended to investigate the influence of money transfer technological innovations on performance of agricultural projects and used a case of greenhouse farming in Kiambu Sub-county.

1.4 Objectives of the study

The study was guided by the following objectives:

- i. To determine the influence of mobile banking money transfer on performance of agricultural projects
- ii. To investigate the influence of internet banking money transfer on performance of agricultural projects
- iii. To evaluate the influence of agency banking money transfer on performance of agricultural projects
- iv. To determine the influence of electronic cards money transfer on performance of agricultural projects

1.5 Research Questions

The study was guided by the following research questions:

- i. To what extent does mobile banking money transfer influence performance of agricultural projects?
- ii. What influence does internet banking money transfer have on performance of agricultural projects?
- iii. To what extent does agency banking money transfer influence performance of agricultural projects?
- iv. What influence do electronic cards have on influence performance of agricultural projects?

1.6 Significance of the study

The study may benefit greenhouse farmers by looking at more innovative ways of making it cheaper and easier to transfer money.

The study may help financial institutions to come up with more efficient ways of tapping into the potential market of rural farmers and improve financial inclusion across the country.

The study may benefit the Government of Kenya as a source of reference to make improvements in agriculture as one of the sectors identified with the potential to help achieve the goal of 10% GDP growth by 2030.

It may also provide information to policy makers on financing agriculture and making payments to farmers using technological innovations that have revolutionized payment systems.

The study may help project managers to manage their project better by being able to monitor all income and expenses on a farming project through checking statements from mobile wallet, bank accounts among others. It may also assist in providing solutions for disbursement of agricultural project funds while providing for transparency and accountability.

1.7 Basic assumptions of the study

The study assumed that the participants selected were willing to participate in the study and data collection. Also, that the respondents gave an honest and objective representation of facts

1.8 Delimitation of the study

The study was restricted to examine the influence of money transfer technological innovations on performance of agricultural projects in Kiambu Sub-County, Kenya.

1.9 Limitations of the study

The Greenhouse farms in the sub-county are sparsely located and the sub-county is large thus time was a major limitation. The researcher used questionnaires as the only method of data collection and in areas where the research assistants was not able to reach farmers; the agricultural officers were used to give support as they carried out their field visits.

The accuracy and truthfulness of the answers given by the respondents was another limitation to the study. The researcher assured the respondents that confidentiality and anonymity will be observed during the study.

1.10 Definition of key terms

Money Transfer	This refers to the act of moving money from one place to another.
Technological Innovations	These comprise of new products and processes and advancements in technology of products and processes
Performance of projects	This refers to successful delivery of agricultural projects within the specified duration and budget
Mobile Banking	A service whereby a customer interacts remotely with a financial institution and conducts financial transactions via a mobile device.
Internet Banking	A channel where clients use the internet as a delivery channel to make financial transactions via the institution's website.

Agent Bank	A commercial outlet contracted by a financial institution to process clients transactions on their behalf
Electronic Cards	Hard plastic cards such as credit, debit and pre-paid cards used instead of cash to transact
Green House Farming	A building, room, or area, in which the temperature is maintained within a desired range, used for cultivating tender plants or growing plants out of season.

1.11 Organization of the Study

This research study is sectioned into five chapters. Chapter one discusses the background of the study, purpose of the study, the research objectives and questions and significance of the study to various stakeholders. It also covers the scope of the study, the assumptions made, and limitations of the study and concludes with defining key terms used in the research project. Chapter two covers the literature reviewed relevant to the influence of technological innovations on increasing money transfer in agricultural projects and presents, the theoretical framework used and finally illustrates the variables through the conceptual framework. Chapter three explains the research design used, the target population, sample size and sampling procedure. It discusses the instruments used to collect data and their reliability and validity. The chapter is concluded with discussing the data analysis techniques used and ethical considerations and summarized with operational definition of variables. Chapter four explains the data collected through data analysis and interprets it into relevant information which is presented to show the relationship and differences from the research findings. Chapter five discusses the summary of the findings and a conclusion and recommendation was drawn based on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives an analysis on literature review of technological innovation and money transfer in the agriculture industry. Chapter two helped the researcher comprehensively review existing literature and theoretical issues then formulate a conceptual framework to interpret the research topic. It also assisted in determining if a knowledge or research gap exists in the area of study.

2.2 Technological innovations

In the early 1970s, the evolution of the online banking industry began. Banks started to look at online banking as a means to replace some of their traditional branch functions. This was because traditional branches incurred high costs to set up and large overheads to maintain. Also, online banking products or services like ATM and electronic funds transfer made banks that utilized them to stand out and have an edge over their competitors. Being in a competitive market and to be able to be profitable, the ability of banks to distinguish themselves based on price is limited. Therefore, technology has introduced alternative and more convenient methods of delivering banking services to the customer, such as ATMs and Internet Banking. For this reason, banks have had to be at the forefront of technology innovation and adoption for the past three decades (Sing et. al, 2002).

Technological solutions have been created to cater for this need with different countries coming up with innovative ways of addressing this need. Advancement in technology has increased the accessibility and affordability of remittances, thus promoting financial inclusion for ‘unbanked’ and marginalized people (OECD, 2010). Technological innovations have been identified to contribute to the distribution channels of Banks. The electronic delivery channels are collectively referred to as Electronic Banking. Electronic Banking is a merger of several different technologies. The banking industry has witnessed an evolution in their business, which can be accredited partly to the exponential growth in the use of technologies in the last several years globally (Porteous, 2006).

2.3 Mobile banking and performance of agricultural projects

M-banking can be defined as a channel whereby a customer interacts remotely with a financial institution and conducts financial transactions via a mobile device (Barnes & Corbitt, 2003). Mobile banking enables one to transact from wherever they are through the comfort of their mobile device.

Smart Communications in the Philippines, being the largest mobile phone company in the country, developed a remittance system that uses mobile text messaging to do cross-border money transfers. The system is affordable and secure with security measures such as an ID and different PINs to prevent fraudsters (Lubambu, 2014). Closer home, we have the e-ZWICH smartcard in Ghana. E-ZWICH is a platform that links all banks, savings and loans companies in Ghana. This has connected all people regardless of their institutions to allow electronic payments from any ATM or point of sale terminal within Ghana (Haruna, 2012).

Here in Kenya, we have M-Pesa. This was launched through a partnership between Vodafone and Safaricom. M-PESA allows mobile banking services and has extended its services by partnering with financial institutions to increase their reach. M-PESA is a great example of successful mobile banking with more than 7 million customers and transactions exceeding Kes 8 billion daily (UNCTAD, 2013).

M-PESA acts as a mobile account that allows customers to deposit, withdraw or pay utilities. Through partnerships with banks, their customers are also able to send money from bank account to M-PESA and vice versa. This is an affordable, convenient and instant service. However, users bear the risk if sending money to a wrong recipient (Lubambu, 2014). Mobile Money Transfer Service has advanced technologically and received greater market acceptance in the last few years in Kenya. The service, by its nature, has allowed users to surpass time and place, thus increasing accessibility and expanding business and social connections (Palen 2002).

Mobile banking has revolutionized the money transfer industry where a sender can send funds directly into the recipient's mobile wallet hence reducing the inconvenience of having

to go to a financial institution or outlet to collect the funds. According to the Global Findex Database by World Bank (2015), Kenya is a pace-setter among African countries in financial inclusion, with 62% of the population being banked. The World Bank credits this achievement to the use of mobile money especially the widely used M-Pesa-linked bank account models in giving previously unbanked populations access to banking services.

The service is inexpensive because cabling is not needed (Agrawal, Chari, and Sankar, 2003). Other benefits to both service providers and clients include; flexibility, lower support and maintenance costs, easier collaboration and improved business resilience (Cisco 2003). In 2012, Safaricom Ltd partnered with Commercial Bank of Africa and launched a service called M-SHWARI that acts as a bank account for M-PESA registered customers and allows them to save and borrow with interest. With such partnership, the society will also gain with more population included in the formal financial sector (Kabbucho & Coetzee, 2010).

2.4 Internet banking and performance of agricultural projects

Internet banking has attracted the attention of banks, securities trading firms, brokerage houses, insurance companies, regulators and lawmakers in developing nations since the late 1990s. With the rapid and significant growth in electronic commerce, it is evident that electronic banking and payments are likely to advance. Researches show that Internet banking has led to reduction in costs, increase in revenue and customer satisfaction and the impact on the financial industry is tremendous (Gupta, 2008). Recently, ICT developments have changed how financial institutions conduct their business and how they interact with their clients especially the Internet Banking revolution (Eriksson, Kerem, & Nilsson, 2005).

According to Essinger (1999), internet banking offers more flexibility and convenience to customers in that the customer has virtual control over their banking experience. Service delivery is informational and transactional where the customer gets information on bank products and services and is able to conduct transfers independently. Additionally, it eliminates the barriers of distance or time in that customers in different time zones and distant places are able to be served efficiently.

Internet banking, also referred to as online banking, refers to a channel where clients use the internet as a delivery channel to make financial transactions via the institution's website. Through internet banking, registered customers are able to access their accounts via the bank's website and carry out transactions (Hernado and Nieto, 2006). Many internet banking users have now shifted from using personal computers with an internet connection, to using their phones to do many if not all their banking transactions online. Using their cell phones they can connect to the banks website and access the banks application that allows them to transact (Njau, 2013). The advancement in Internet Banking has transformed how banking is conducted and increased convenience and affordability (Kardaras and Papathanassiou, 2001).

Lagoutte (1996), described Internet banking as a "one stop service and information unit" that promises great benefits to both banks and consumers. Customers can perform a variety of financial services by using transactional websites such as account balance inquiry, transfer funds, pay and receive bills, apply for loans, all from the comfort of their homes or business places conveniently (Njogu, 2013). According to Srivastava (2008), a customer can check balance by logging into the bank's website through a user name and password. In this way he can inquire balance, status of cheques, perform funds transfers, order drafts, request issue of cheque books among accessing other services. Internet banking provides customers convenience and flexibility at a lower cost than traditional branch banking (Williamson, 2006). The convenience of internet banking helps people manage and control their finances better and contributes to changing habits in cash withdrawal and day to day money management (Beer, 2006).

Santomer and Seater (1997), carried out an investigation on the impact of use of internet on financial services in Europe, a cross sectional survey was conducted out in 55 micro finance institutions; data analysis was carried out using a regression model which showed a positive correlation between use of internet and increased accessibility of financial services. Electronic banking system differentiates from traditional banking operation through more rapid delivery of information from the customer and bank and vice versa. In addition, the banking operations do not transfer physical currencies instead it transfers the information

about the value for currencies. Internet banking enables transfer of information more swiftly online (Salawu et.al, 2007).

According to Njau (2013), Internet banking has totally revolutionized the banking industry. Internet banking enables clients to save time by minimizing visits to banks physical locations (Brick mortar building). Internet Banking eliminates the geographical barriers and boundaries since it can reach clients of different countries. Internet banking users say that convenience is one of the most important factors that influence their use of online banking as it allows them to access their accounts from anywhere and at any time (IAMAI's, 2006). Electronic banking has become an essential channel in the banking industry and is perceived to be necessity in order to stay profitable in the current times (Christopher et al. 2006).

More customers are adopting the use of internet banking in money transfer because it saves time and is more convenient (Beer, 2006). Furthermore, banks can avail information of products and services on their site hence a potential customer can gather all the information from the website and thus if he or she comes to the branch with queries it will be very specific and will take less time of the employee (Srivastava, 2006). If customers are to adopt new technologies, the technological innovation must be reasonably priced in comparison to other alternatives available. Otherwise, the adoption of the new technology may not be feasible from the point of view of the customer In Internet banking there are two types of costs involved. First, the normal costs associated with internet access fees and connection charges and secondly the bank fees and charges for services offered online. These two types of costs shape the perception of the customers (Suganthi et. al, 2001).

2.5 Agency banking on performance of agricultural projects

Despite the fact that banks continue to open more branches to increase their networks and launching more alternative channels to compliment the branches, they are still hindered by the lack of access to formal financial services especially in remote areas. Customers in rural areas have to travel long distances, spend a lot of money and time commuting to and fro in order to access a branch. To curb these challenges, the Central Bank of Kenya introduced a

new law that allows commercial banks to contract third party retail networks as agents (Aduda, 2013)

An agent bank is a commercial outlet contracted by a financial institution to process clients' transactions on their behalf. The owner or an employee of the commercial outlet conducts the client's transaction such as cash deposit, cash withdrawal, transfer money, pay bills, account balance inquiry rather than an employee of the Bank such as a teller (Kithuka, 2012). In a growing number of countries, banks are finding new ways of delivering financial services to "unbanked" people. Instead of using bank branches and their own staff, they offer banking and payment services through retail outlets, including grocery stores, pharmacies, seed and fertilizer retailers and gas stations among others. For people in rural areas, agency banking through retail agents may be far more convenient and efficient than going to a bank branch (Lyman, Ivatury and Staschen, 2006).

According to Mwangi (2011), agency banking has brought benefits which include reduction in cost, enhanced efficiency in the financial sector by availing financial services at much lower cost to customers and increasing the ease of banks' expansion hence reaching more people in remote areas. Therefore, agency banking can act as a great channel for financial deepening and inclusion.

According to AFI (2012), 12 financial institutions had contracted more than 9,000 banking agents in Mexico in 2010. Kenya, having implemented agent banking in 2010, already has almost 9,000 bank agents. In comparison to Mexico, this amounts to nearly four agents per every 10,000 adults in Kenya. In United States, agency banking is commonly used by foreign banks to enter the US market and engage in financial activity on US soil. People in the United States who would like to do business with the parent bank can do so through the agent, with representatives at the agency bank taking care of issues like currency exchange, transfer of funds, and deposits among others. In Africa, agency banking is a new notion, with the model being highly implemented in Kenya and South Africa. In South Africa, the first agency banking was implemented in 2005 (Mwangi, 2011).

Agency banking has provided an opportunity to increase formal financial inclusion to the un-banked and under-banked at an affordable rate. In Kenya, agency banking was introduced in 2009 and enshrined in the Finance bill of 2009. Agency banking has taken banking services from the banking halls to where the customer is (Mulupi, 2011).

The government had to make some banking reforms in order to make it possible for the introduction of agent banking into the country. The new law allowed commercial banks to contract agents who could be able to offer financial services to majority of the unbanked population. The Central bank of Kenya issued rules and regulations to govern the rolling out of agent banking in May 2005 and this marked the beginning of a new era in Kenya's banking industry (Njuguna, 2010).

According to Njuguna (2010), the agent banking model was introduced in Kenya to alleviate the problem of low financial inclusion and the high costs of banking incurred by customers. Pagani (2004), states that accessibility is one of the main reasons why small and medium enterprises have embraced mobile payment services. The small and medium-sized businesses operators visit the bank less often and spend more time running their businesses. More unbanked Kenyans can now receive or send money wherever they are in the country (Omwansa, 2009). Agency banking in commercial banks has encouraged economic growth and overall social well-being of a larger population. Domestic resources have been easily mobilized leading to efficient allocation of resources in societies in Kenya (Kambua 2015).

2.6 Electronic cards on performance of agricultural projects

Electronic cards are the hard plastic cards such as credit, debit, pre-paid cards used instead of cash to transact. According to Mani (2013), in the past, plastic money and electronic payment was used by only higher income group. However, today, with development of banking and trading activity, the fixed income group or salaried classes are also start using the debit card money and electronic payment systems and particularly Debit card. Debit cards are one of the innovations through which the customers can make use of banking services by the owning the card issued by the bank without restricting themselves to the

official banking hours. Payment by cards is now becoming a much preferred mode for making retail payments (Senthilkumar, 2015).

According to FSD (2015), use of credit and debit cards in Kenya has grown substantially over the years with more people moving towards card-based payments. While use of both debit and credit cards has grown exponentially, uptake of debit cards remains higher than that of credit cards. The number of active cards has risen from 10.1 million users and 12.1 million transactions in 2011 to 13.2 million users and 20.1 million transactions in 2015. Payment cards, including debit, credit and charge cards usage has grown significantly as users now embrace initiatives by CBK and the Kenya Credit and Debit Card Association to adopt plastic money as well as the move to cash-lite.

Plastic money has revolutionized traditional banking systems as it has made sending money cheaper, efficient, improved financial services and the customer relationship (Sathye, 1999). The increased number of Automated Teller Machines (ATMs) and Point-Of-Sale (POS) have improved the accessibility of funds and convenience of money transfer.

2.7 Theoretical Framework

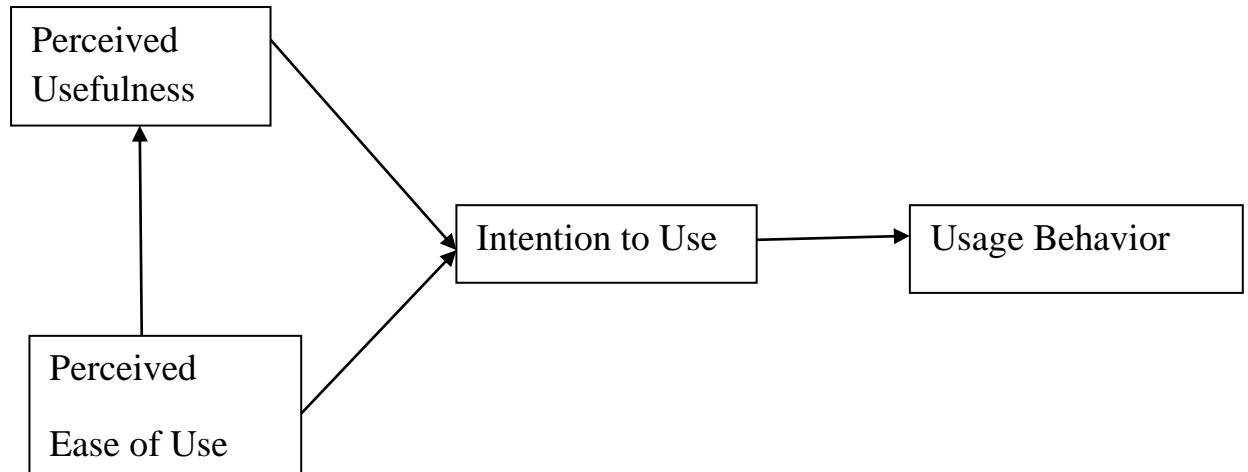
Technology once invented, it has to be adopted by people for it to be effective. User acceptance of technology is the willingness within a user group to employ IT for the tasks it is designed to support (Dillon 2001). Several theories have been developed to not only look at the technical angle of technology but the behavioral angle of the person who will adopt it. Some of the theories are Technology Acceptance Model (TAM) and Diffusion Innovation Theory (DIT) among others.

2.7.1 Technology Acceptance Model (TAM)

TAM posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system with the intention to use serving as a mediator of actual system use. Perceived usefulness is also seen as being directly impacted by perceived ease of use (Samaradiwakara & Gunawardena, 2014). Perceived ease of use refers to the extent to which a person believes that using new technology or system would be free from mental effort (Davis, 1989) Perceived usefulness and perceived ease of use determine the attitude

towards using a particular information system or adopting IT, which in turn determine the intention to use and then generate actual usage behavior (Marchewka, Liu & Kostiwa, 2009).

Figure 1: Technology Acceptance Model



Source: Davis et. al (1989)

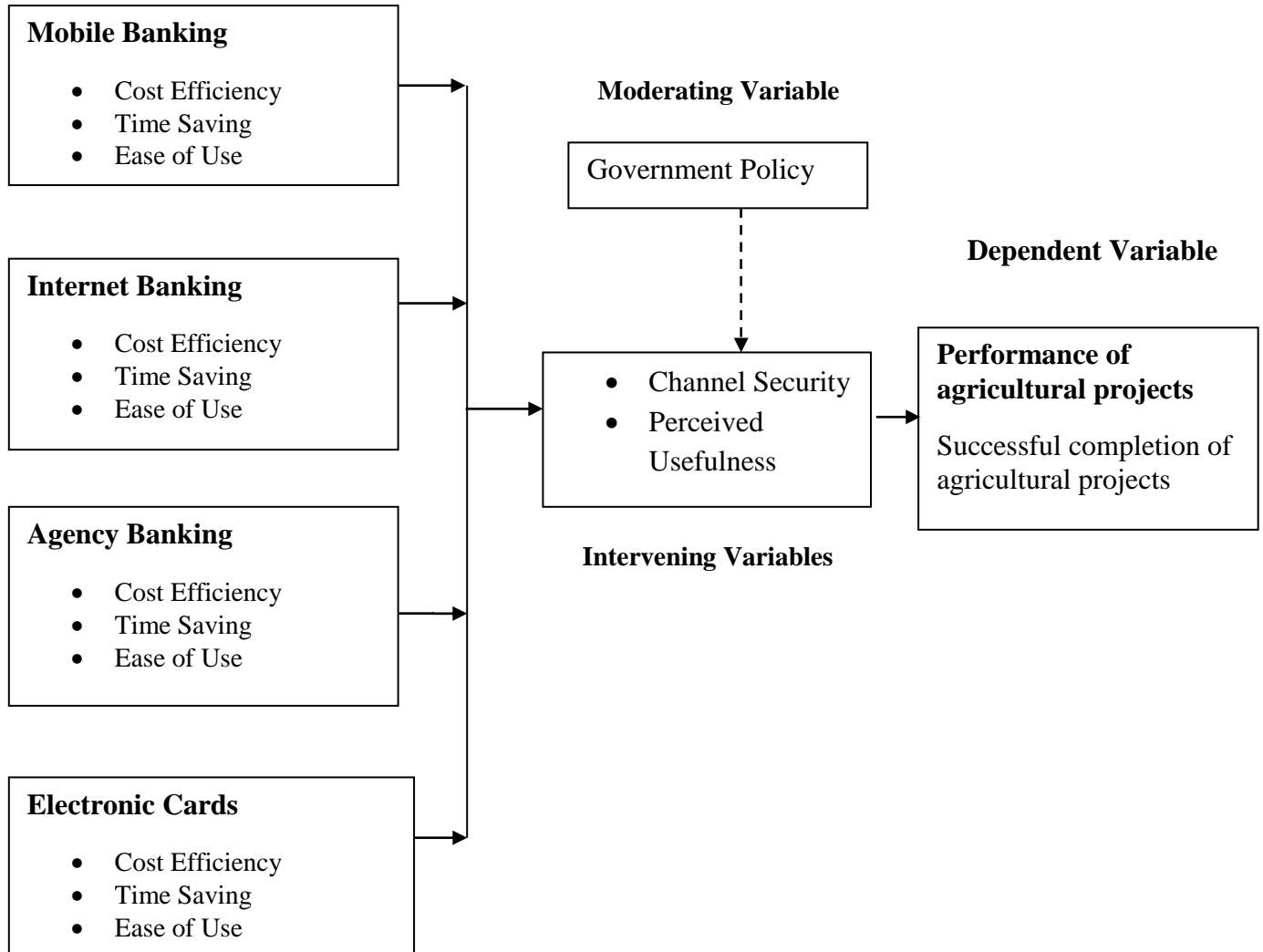
2.7.2 Innovation Diffusion Theory (IDT)

According to the IDT Model, there are five attributes of innovation that influence adoption. First is compatibility. This is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. Secondly is the complexity. This is the degree to which an innovation is perceived as complicated to understand and use. Third, is the observability, which is the degree to which the results of an innovation are visible to others. Fourth, is the relative advantage. This is the degree to which an innovation is perceived as being better than its precursor. Lastly, there is trialability, which is the degree to which an innovation may be experimented with on a limited basis. The model was developed to be used in terms of potential adopters use, trial or observation of the innovation rather than focusing on the innovation itself (Alubia, 2010).

2.8 Conceptual Framework

This study was based on the conceptual framework below.

Independent Variables



Author: Ruth Mbugua (2017)

Figure 2: Conceptual Framework

2.9 Knowledge Gap

Author(s)	Study Title	Findings	Knowledge Gap
Aduda J. (2013)	The Relationship Between Agency Banking and Financial Performance of Commercial Banks in Kenya	Commercial Banks that adopted agency banking improved their performance	The study only looked at the relation of agency banking and financial performance of commercial banks. There is a need to look at the impact of other technological innovations in other sectors such as agriculture
Kamau (2013)	Effects of Technological Innovations at Equity Bank on Accessibility of Banking Services to Small Business Ventures in Nakuru Sub-county	Technological innovation led to increased accessibility of bank services through mobile, internet and agency banking	The study focused on the effect of technological innovations on small businesses. There is a need to look at the impact of technological innovations in other sectors such as agriculture
Kirui et. Al, (2012)	An Assessment of The Use and Impact of Mobile Phone-Based Money Transfer Services in Kenyan Agriculture	Small – scale farmers are more responsive to mobile money transfer and that they used this as the man channels to send money for agricultural related purpose	The study only looked at mobile money transfer in relation to agriculture. There is therefore a need to look at other forms of money transfer such as internet banking and agency banking

2.10 Summary

Chapter two has analyzed various literature from studies conducted in Kenya and other countries and concluded that there exists a knowledge gap in comprehending the influence of technological innovations in increasing money transfer in agricultural projects. The main technological innovations discussed are Internet Banking, Mobile Banking, Agency Banking and Electronic Cards. The chapter concludes with looking at various theoretical frameworks and illustrates the conceptual framework.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on the methodology within which the study was conducted. This chapter discusses the research design, location of study, targeted population, sampling design, data collection tools and data analysis.

3.2 Research Design

The study was based on a descriptive survey design. This design was chosen as the study was mainly collecting facts as they are and descriptive survey describes the state of affairs as they exist and the researcher does not control the variables and reports only what exists (Kothari, 2004). According to Glass and Hopkins (1984), descriptive research involves collecting data that describe events and then organizes, tabulates, depicts, and describes the data collected.

This design was appropriate for the study topic since it allowed for obtaining factual information, data collection and analysis, relation of research variables and enabled the researcher to generalize the findings to a large population. A sample of respondents was selected from greenhouse farmers in Kiambu Sub-county and questionnaires administered to them to gather information on the influence of technological innovations on improving money transfer in the agriculture industry. The findings were generalized to the population that the sample represented.

3.3 Target Population

The target population for the study was greenhouse farmers in Kiambu Sub-county who use technology to transfer money. From data collected from the department of Agriculture, Livestock and Fisheries at the Kiambu County Government office, there are 81 registered greenhouse farmers in Kiambu Sub-county. The study made use of sampling technique out of the target population of 81 greenhouse farmers in Kiambu Sub-county. The researcher administered questionnaires to three workers per greenhouse; the project manager,

supervisor and one employee. This gave a total of 243 workers from the 81 registered greenhouses.

Number of registered greenhouses	Number of questionnaires administered to workers per greenhouse	Total number of workers in the target population
81	3	243

3.4 Sample size and sampling procedure

Sampling is a process of selecting a small group of individuals or objects from a population such that the selected group contains elements representatives of characteristics found in the entire population (Orodho, 2004). According to Acharya et.al (2013), a sample is a subset selected to be representative of the larger population.

3.4.1 Sample Size

Sample size is a selected part of the population to be studied and sampling procedure is the process by which samples are selected in a study (Kothari, 2007). The total sample size was 149 respondents and was selected as per the below sampling procedure

The sample size was calculated using the formula that gives representative number of respondents as described by Godden (2004).

$$SS = \frac{Z^2 \times P(1-P)}{C^2}$$

Where:

SS = Sample size for infinite population,

Z = Z value of 1.96 for 95% level of confidence. ,

P = Percentage of population expressed as decimal assumed to be 0.5 (50%) since it would provide the maximum sample size.

C = Confidence Interval expressed as a decimal = 0.05 or 5%

This produces maximum possible sample size

$$SS = \frac{Z^2 \times P(1-P)}{C^2}$$

$$SS = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2}$$
$$= 384$$

The following below formula was then used for a finite target population sample size.

$$Ss = \frac{SS}{\frac{(1 + (SS - 1))}{Pop}}$$

Where:

SS= required sample size for infinite population,

Ss = sample size for finite population,

Pop = finite population (known as target population)

$$Ss = \frac{384}{\frac{(1 + (384 - 1))}{243}}$$

Ss = 149 greenhouse workers

3.4.2 Sampling procedure

A sampling frame is a list, directory or index of cases from which a sample may be selected.

A sampling frame is important in probability sampling to ensure proper representation (Mugenda and Mugenda, 2003). For the purpose of this study; the sampling frame was all greenhouse farmers operating within Kiambu Sub-county of Kiambu County.

A sample design is a specific plan for obtaining a sample from a given population. It refers to the technique or procedure the researcher will use in selecting objects for the sample (Kothari 2004). The study used the multistage probability sampling to ensure the study

results can be generalized to the target population since the law of Statistical Regularity states that if the sample chosen is a random one, the sample will have the same composition and attributes as the larger population. Also, according to Kothari (2004), under this sampling design, every item of the universe has an equal chance of being selected in the sample.

3.5 Data collection Instruments

Questionnaires were the main instrument used in primary data collection. Secondary data however was obtained from various books, published reports, journals and the internet.

According to Kothari (2004), sound measurement must meet the tests of reliability, validity and practicality. This section therefore outlines the measures taken by the researcher to enhance data collection accuracy by ensuring that the instruments used collected data that is valid and reliable.

3.5.1 Pilot Study

A section of the targeted population was chosen to participate in a pilot study whose objective was to ensure clarity, gauge understandability and comprehensiveness of the questions and identify modifications needed in the design of the questionnaire. The pilot study was carried out on 10% of the sample size as recommended by Baker (1994) who found that 10 – 20% of the sample size for the actual study is a reasonable number of participants to consider enrolling in a pilot. The pilot study therefore involved administering 20 questionnaires to respondents which was 13% of the sample size hence meeting the threshold of 10 – 20% of the sample size. On completion of the pilot questionnaires, they were reviewed and changes made to improve it.

3.5.2 Reliability

Reliability is the extent to which any measuring procedure yields the same results on repeated trials (Mugenda & Mugenda, 1999). Reliability of the instruments was determined by use of the test – retest method where same instrument was administered twice to the same group of subjects. The Cronbach's coefficient was calculated to ensure consistency of the instruments with the threshold of 0.7 as the level of acceptance.

3.5.3 Validity

Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested (Kothari, 2004). The validity of the data collection instrument was established by comparing the instrument with the research objectives to ensure relevance, accuracy and non-ambiguity in collection of data. The content validity was established by ensuring that the sample is a true representation of the whole population by using the appropriate sampling technique. The researcher consulted with the supervisor to ensure that the data collection instrument used was relevant to the objectives of the study.

3.6 Data Analysis Technique

Once data was collected, it was analyzed using descriptive statistics using tools such as cross tabulation, frequencies and percentages to give descriptive explanations to the attributes of the variables being studied. Correlation analysis was used to determine the relationship between the independent and dependent variables. The data collected was analyzed using the statistical package for social science (SPSS).

3.7 Ethical Consideration

The study respected the autonomy of persons and treated all people with courtesy. The participants had the freedom to choose whether or not to participate in the study without any threats or undue inducement and given adequate information before deciding to participate. The privacy and identity of the respondents was protected by ensuring the data collection instrument did not have identifiers that would provide information that was indicative of which person or institution provided what data. Confidentiality was observed by informing the participants that the information obtained from them will be used only for the purpose of the research alone and would be kept confidential and private from unauthorized access or use. The researcher obtained a research permit from the National Commission for Science, Technology & Innovation (NACOSTI) and a letter from the University of Nairobi as proof that the data collected will only be used for academic purposes. A brief introduction to the questionnaire gave the respondent information on what the study is about for them to make an informed decision when choosing whether or not to participate in the study.

Table 3.1: Operational Definition of Variables

Variable	Type of Variable	Indicator	Measurement Scale	Method of data collection	Instrument/Data collection tool	Data Analysis Technique
Mobile Banking	Independent	- Increased number of Mobile Banking transactions	Nominal Scale	Administering questionnaires	Questionnaire	Descriptive Statistics Correlation analysis
Internet Banking	Independent	- Increased number of Internet Banking transactions	Nominal Scale	Administering questionnaires	Questionnaire	Descriptive Statistics Correlation analysis
Agency Banking	Independent	- Increased number of Agency Banking transactions	Nominal Scale	Administering questionnaires	Questionnaire	Descriptive Statistics Correlation analysis
Electronic cards	Independent	- Increased number of electronic card transactions	Nominal Scale	Administering questionnaires	Questionnaire	Descriptive Statistics Correlation analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATIONS AND INTERPRETATIONS

4.1 Introduction

This chapter presents the analyzed data, its presentation and interpretations of the findings of the study. The chapter was sectioned into Questionnaire Return Rate, demographic information of the respondents and presentation, analysis and interpretation of the objectives of the study. The analysis was based on descriptive and correlation statistics. The findings were presented in tables and interpreted and were based in the questionnaires administered and the objectives of the study.

4.2 Questionnaire Return Rate

Out of the 149 questionnaires administered, 149 were filled and returned representing a questionnaire return rate of 86% which was considered sufficient for the study and could be used for generalization of the total population and similar studies.

Table 4.1: Questionnaire Return Rate

	Issued	Returned	Percent
Administered Questionnaires	149	128	86

4.3 Demographic Information of Respondents

The section presents data analysis from the background information collected from the respondents. These include gender, age, level of education, employment status and income level.

4.3.1 Gender of respondents

The study sought to establish the classification of respondents by gender. The findings obtained are shown in Table 4.2.

Table 4.2: Classification of respondents according to gender

Gender	Frequency	Percentage (%)
Male	68	53
Female	60	47
Total	244	100

The findings in Table 4.2 indicate that 47% of the respondents were female representing 60 respondents while 53% of the respondents were male accounting for 68 of the respondents. The difference between the male and female respondents is 8 and represents a gap of 3%. This may be due to the availability of men during the study or that men adapt technological innovations faster than women.

4.3.2 Age of respondents

The study sought to establish the distribution of respondents by age. The findings obtained are shown in Table 4.3.

Table 4.3: Classification of respondents according to age

Age Bracket	Frequency	Percentage (%)
18 – 25	27	21
26 – 35	53	41
36 – 40	34	27
41 - 50	11	9
Above 50	3	2
Total	128	100

The findings as obtained in Table 4.3 indicate that 21% of the respondents were aged between 18 - 25 representing, 41% were aged between 26 – 35 years, 27% were aged between 36 - 40 years, 9% were aged between 41 – 50 years and 2% were aged above 50 years. This indicates that majority of the respondents were in the youthful bracket (18 - 40). This may probably be due to the fact that the youth are the ones with more energy to participate in farming than the older generations.

4.3.3 IT Proficiency

The study sought to find out the level of proficiency of the respondents and the results were as shown below in Table 4.4.

Table 4.4: Classification of respondents according to IT skills

IT Skills	Frequency	Percentage (%)
Basic Skills	82	64
Proficient	27	21
Professional	19	15
Total	128	100

From the findings of the study, 64% of the respondents had basic IT skills, 21% had proficient skills and 15% professional skills. This meant that most of the respondents had adequate IT skills and could therefore use technological devices to transact.

4.4 Influence of mobile banking on performance of agricultural projects

The first objective of the study was to find out the extent to which mobile banking influences the performance of projects. To this effect, there was need to establish how many respondents were signed up for mobile banking. A presentation of the findings has been given in Table 4.5.

Table 4.5: Registered users for mobile banking

	Frequency	Percentage (%)
Yes	107	84
No	21	16
Total	128	100

From the study, 107 respondents were registered for mobile banking while 21 of the respondents were not registered for the service. This infers that mobile banking is a widely used channel in money transfer with more than half of the respondents using it. This may be due to the fact that it is easy to use hence more people had adopted the technology at a faster rate than other channels.

4.4.1 Influence of cost efficiency on mobile banking

Cost efficiency is one of the factors influencing the adoption of mobile banking in agricultural projects. There was need to determine the effect of cost efficiency in mobile banking and how it influences the performance of projects. The results were obtained as shown in Table 4.6.

Table 4.6: Cost efficiency in mobile banking

Cost Efficiency in Mobile Banking	Affordability	Increased number of transactions	Farmers using mobile banking
Strongly Agree	16	8	9
Agree	78	80	73
Neutral	4	10	12
Disagree	2	2	4
Strongly Disagree	0	0	2
Total	100	100	100

From the study, it was observed that 94% of the respondents agreed that mobile banking had made money transfer more affordable. This is further confirmed by the observation

that 88% of the respondents agreeing that the low cost of money transfer had increased the number of transactions completed through mobile banking. The low cost of money transfer and the increased number of transactions is evidenced through the increased number of people using mobile banking in projects and business. It was observed that 82% of the respondents agreed that the low cost of money transfer had increased the number of greenhouse farmers using mobile banking. It can be inferred that the cost of transactions has a major influence on whether people will use mobile banking to transfer money.

4.4.2 Influence of time - saving on mobile banking

Time saved is one of the factors influencing the adoption of mobile banking in agricultural projects. There sought to determine the effect of time - saving in mobile banking and how it influences the performance of projects. The results were obtained as shown in Table 4.7.

Table 4.7: Time saving on mobile banking

Time saved in Mobile Banking	Time saved	Increased number of transactions	Farmers using mobile banking
Strongly Agree	25	13	4
Agree	70	71	59
Neutral	3	14	31
Disagree	2	2	2
Strongly Disagree	0	0	4
Total	100	100	100

On the time saved or spent, it was established that 95% of the respondents agreed that mobile banking significantly reduced the time spent when sending money. It can be inferred that this is because mobile banking increases accessibility in that it allows a sender to send money within minutes from wherever they are by using their mobile phone. It was observed that 84% of the respondents agreed that time saved during money transfer has influenced the number of transactions completed using mobile banking and 63% of the respondents agreed that time saved during money transfer had influenced the increase in the number of greenhouse farmers using mobile banking. The further the money transfer agent was from the farmers, the lower the likelihood of usage.

4.4.3 Influence of ease of use on mobile banking

Ease of use influences the adoption of mobile banking in agricultural projects. The study sought to determine the effect of ease of use in mobile banking and how it influences the performance of projects. The results were obtained as shown in Table 4.8.

Table 4.8: Ease of use on mobile banking

Ease of use in Mobile Banking	Ease of use	Increased number of transactions	Farmers using mobile banking
Strongly Agree	22	14	12
Agree	78	70	73
Neutral	0	13	7
Disagree	0	3	6
Strongly Disagree	0	0	2
Total	100	100	100

The results in Table 4.8 showed that 100% of the respondents agreed that mobile banking is very easy to use, 84% agreed that the ease of use had increased the number of transactions completed using mobile banking. 85% of the respondents agreed that the ease of transferring money has influenced the increase in the number of greenhouse farmers using mobile banking.

This is further validated by the findings that 54% of the respondents stated that ease of use was a major influence in adoption of technological innovations in money transfer as was shown in Table

4.5 Influence of internet banking on performance of agricultural projects

The second objective of the study was to investigate the influence of Internet Banking on the performance of agricultural projects. The study first established how many respondents had been registered for Internet Banking as shown in Table 4.9.

Table 4.9: Registered users for internet banking

	Frequency	Percentage (%)
Yes	24	19
No	104	81
Total	128	100

From the findings as shown in Table 4.9, it was observed that 29% of the respondents had registered for internet banking while 81% of the respondents had not registered for the service. This implied that most respondents did not use internet banking because it was difficult to use, more expensive to use as one requires internet connectivity or the respondents lacked the IT skills to use the channel.

4.5.1 Influence of cost efficiency on internet banking

Cost efficiency is one of the factors influencing the adoption of internet banking in agricultural projects. There was need to determine the effect of cost efficiency in internet banking and how it influences the performance of projects. The results were obtained as shown in Table 4.10.

Table 4.10: Cost efficiency on internet banking

Cost Efficiency in Internet Banking	Affordability	Increased number of transactions	Farmers using internet banking
Strongly Agree	8	5	9
Agree	81	73	59
Neutral	9	20	26
Disagree	2	2	4
Strongly Disagree	0	0	2
Total	100	100	100

The study found that 89% of the respondents agreed that internet banking had made money transfer more affordable, 78% agreed that low cost of money transfer had influenced the increase in the number of transactions completed through internet banking and 68% agreed that low cost of money transfer had influenced the increase in the number of greenhouse farmers using internet banking. These numbers are lower than for mobile banking. It may be assumed that internet banking is more costly than mobile banking as one needs an internet enabled device and also data connectivity to be able to use this service.

4.5.2 Influence of time - saving on internet banking

Time saved is one of the factors influencing the adoption of internet banking in agricultural projects. The study sought to determine the effect of time - saving in internet banking and how it influences the performance of projects. The results were obtained as shown in Table 4.11.

Table 4.11: Time saving on internet banking

Time saved in internet Banking	Time saved	Increased number of transactions	Farmers using internet banking
Strongly Agree	9	4	7
Agree	56	43	44
Neutral	33	46	38
Disagree	2	7	9
Strongly Disagree	0	0	2
Total	100	100	100

It was observed that 65% of the respondents agreed that internet banking reduces time spent when sending money, 47% agreed that time saved during money transfer had influenced the number of transactions completed using internet banking and 51% of the respondents agreed that time saved during money transfer has influenced the increase in the number of greenhouse farmers using internet banking. This infers that time spent had a moderate influence on the use of internet banking by greenhouse farmers.

4.4.3 Influence of ease of use on internet banking

Ease of use influences the adoption of internet banking in agricultural projects. The study sought to determine the effect of ease of use in internet banking and how it influences the performance of projects. The results were obtained as shown in Table 4.12.

Table 4.12: Ease of use on internet banking

Ease of use in Internet Banking	Ease of use	Increased number of transactions	Farmers using internet banking
Strongly Agree	4	5	2
Agree	58	32	43
Neutral	34	48	31
Disagree	4	15	22
Strongly Disagree	0	0	2
Total	100	100	100

The results in Table 4.12 show that 62% of the respondents agreed that internet banking is very easy to use, 37% agreed that the ease of transferring money had influenced the number of transactions completed using internet banking and 45% of the respondents agreed that the ease of transferring money has influenced the increase in the number of greenhouse farmers using internet banking. This implies that internet banking is easy to use however it does not have a major influence on the number of transactions or the number of greenhouse farmers using internet banking.

4.6 Influence of agency banking on performance of agricultural projects

The third objective of the study was to evaluate the influence of agency banking on the performance of projects.

4.6.1 Influence of cost efficiency on agency banking

Cost efficiency is one of the factors influencing the adoption of agency banking in agricultural projects. There was need to determine the effect of cost efficiency on agency banking and how it influences the performance of projects. The results were obtained as shown in Table 4.13.

Table 4.13: Cost efficiency on agency banking

Cost Efficiency in Agency Banking	Affordability	Increased number of transactions	Farmers using agency banking
Strongly Agree	13	12	9
Agree	65	45	59
Neutral	16	41	26
Disagree	6	2	4
Strongly Disagree	0	0	2
Total	100	100	100

From the findings of the study, it was observed that 78% of the respondents agreed that agency banking had made money transfer more affordable, 57% agreed that low cost of money transfer had influenced the increase in the number of transactions completed through agency banking and 68% agreed that low cost of money transfer had influenced the increase in the number of greenhouse farmers using agency banking.

4.6.2 Influence of time - saving on agency banking

Time saved is one of the factors influencing the adoption of agency banking in agricultural projects. The study sought to determine the effect of time - saving in agency banking and how it influences the performance of projects. The results were obtained as shown in Table 4.14.

Table 4.14: Time saving on agency banking

Time saved in agency banking	Time saved	Increased number of transactions	Farmers using agency banking
Strongly Agree	9	6	7
Agree	66	41	57
Neutral	23	44	28
Disagree	2	49	4
Strongly Disagree	0	0	4
Total	100	100	100

On agency banking, it was observed that 75% of the respondents agreed that agency banking reduces time spent when sending money, 47% agreed that time saved during money transfer had influenced the number of transactions completed using agency banking and 64% of the respondents agreed that time saved during money transfer has influenced the increase in the number of greenhouse farmers using agency banking. Although many respondents agreed that agency banking reduced time spent in money transfer, it did not lead to a matching increase in number of transactions. This may be due to the fact that one has to visit an agent to send or receive money and the agents available may be at quite some distance from the greenhouse farms.

4.6.3 Influence of ease of use on agency banking

Ease of use influences the adoption of agency banking in agricultural projects. The study sought to determine the effect of ease of use in agency banking and how it influences the performance of projects. The results were obtained as shown in Table 4.15.

Table 4.15: Ease of use in agency banking

Ease of use in agency banking	Ease of use	Increased number of transactions	Farmers using agency banking
Strongly Agree	16	7	8
Agree	57	43	55
Neutral	21	41	23
Disagree	6	9	14
Strongly Disagree	0	0	0
Total	100	100	100

The results in Table 4.15 show that 62% of the respondents agreed that internet banking is very easy to use, 37% agreed that the ease of transferring money had influenced the number of transactions completed using internet banking and 45% of the respondents agreed that the ease of transferring money has influenced the increase in the number of greenhouse farmers using internet banking. This implies that internet banking is easy to use however it does not have a major influence on the number of transactions or the number of greenhouse farmers using internet banking.

4.7 Influence of electronic cards on performance of agricultural projects

The final objective of the study was to determine the influence of electronic cards on the performance of projects.

4.7.1 Influence of cost efficiency on electronic cards

Cost efficiency is one of the factors influencing the adoption of use of electronic cards in agricultural projects. There was need to determine the effect of cost efficiency on electronic cards and how it influences the performance of projects. The results were obtained as shown in Table 4.16.

Table 4.16: Cost efficiency in use of electronic cards

Cost Efficiency in use of electronic cards	Affordability	Increased number of transactions	Farmers using electronic cards
Strongly Agree	8	3	2
Agree	55	42	40
Neutral	23	38	40
Disagree	14	17	16
Strongly Disagree	0	0	2
Total	100	100	100

From Table 4.16, the study found that 63% of the respondents agreed that electronic cards had made money transfer more affordable, 45% agreed that low cost of money transfer had influenced the increase in the number of transactions completed through electronic cards and 42% agreed that low cost of money transfer had influenced the increase in the number of greenhouse farmers using electronic cards. Use of electronic cards had the least percentage of respondents agreeing that it is affordable. It may be inferred that electronic cards is costly as it is more expensive to provide this service as financial institutions need to have an ATM to dispense cash, maintain the ATM, provide the user with the electronic cards among other expenses. Hence these charges are passed on to the customers in form of costly fees when transacting.

4.7.2 Influence of time - saving on electronic cards

Time saved is one of the factors influencing the adoption of electronic cards in agricultural projects. The study sought to determine the effect of time - saving on electronic cards and how it influences the performance of projects. The results were obtained as shown in Table 4.17 below.

Table 4.17: Time saving on use of electronic cards

Time saved in use of electronic cards	Time saved	Increased number of transactions	Farmers using electronic cards
Strongly Agree	10	5	2
Agree	63	38	54
Neutral	27	50	34
Disagree	0	7	7
Strongly Disagree	0	0	3
Total	100	100	100

It was observed that 73% of the respondents agreed that use of electronic cards reduces time spent when sending money, 43% agreed that time saved during money transfer had influenced the number of transactions completed using electronic cards and 56% of the respondents agreed that time saved during money transfer has influenced the increase in the number of greenhouse farmers using electronic cards. This implies that most of the respondents agree that electronic cards reduce the time spent as one only has to find the nearest ATM to transact. However, the time saved did not lead to an equivalent increase in either the number of transactions completed using electronic cards or greenhouse farmers using electronic cards. It may be assumed that this may be due to the cost implications or the unavailability of ATMs in rural areas.

4.4.3 Influence of ease of use of electronic cards

Ease of use influences the adoption of use of electronic cards in agricultural projects. The study sought to establish the effect of ease of use in of electronic cards and how it influences the performance of projects. The results were obtained as shown in Table 4.18 below.

Table 4.18: Ease of use of electronic cards

Ease of use of electronic cards	Ease of use	Increased number of transactions	Farmers using electronic cards
Strongly Agree	2	4	37
Agree	42	37	43
Neutral	48	51	18
Disagree	8	8	2
Strongly Disagree	0	0	0
Total	100	100	100

The results in Table 4.18 show that 44% of the respondents agreed that electronic cards are very easy to use, 41% agreed that the ease of transferring money had influenced the number of transactions completed using electronic cards and 80% of the respondents agreed that the ease of transferring money has influenced the increase in the number of greenhouse farmers using electronic cards. This implies that electronic cards are not as easy to use however it does not have a major influence on the number of greenhouse farmers using electronic cards once they adopt it.

4.8 Money transfer technological innovations and performance of agricultural projects

The main objective of the study was to determine the influence of technological innovations on performance of agricultural projects. The findings of the study were as shown below in Table 4.19.

Table 4.19: Influence of Money Transfer Technological Innovations on performance of agricultural projects

Projects completed	Mobile Banking	Internet Banking	Agency Banking	Electronic Cards
Strongly Agree	9	4	9	5
Agree	76	39	49	32
Neutral	13	50	36	57
Disagree	2	7	6	4
Strongly Disagree	0	0	0	2
Total	100	100	100	100

It was shown in Table 4.19 that indeed money transfer technological innovations influenced the performance of projects as seen by the responses given with 85% agreeing, 43% on internet banking, 58% on agency banking and 37% on electronic cards. There was further need to determine the extent of influence of money transfer technological innovations on performance of agricultural projects as shown in Table 4.20.

Table 4.20: Extent of influence of Money Transfer Technological Innovations on performance of agricultural projects

	Frequency	Percentage (%)
No Extent	0	0
Small Extent	47	37
Moderate Extent	70	55
Great Extent	11	8
Total	128	100

From Table 4.20, it was observed that money transfer technological innovations influenced the performance of projects with 37% of the respondents stating that it influenced to a small extent 55% stated to a moderate extent and 8% to a great extent. This implies that money transfer technological innovations have a major part to play in the performance of projects.

Table 4.21: Correlation Analysis

		Performance of agricultural projects	Mobile banking	Internet Banking	Agency Banking	Electronic cards
Performance of agricultural projects	Pearson Correlation	1	.803**	.424**	.651**	.510**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	128	128	128	128	128
Mobile banking	Pearson Correlation	.803**	1	.238**	.436**	.440**
	Sig. (2-tailed)	.000		.007	.000	.000
	N	128	128	128	128	128
Internet Banking	Pearson Correlation	.424**	.238**	1	.607**	.601**
	Sig. (2-tailed)	.000	.007		.000	.000
	N	128	128	128	128	128
Agency Banking	Pearson Correlation	.651**	.436**	.607**	1	.653**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	128	128	128	128	128
Electronic cards	Pearson Correlation	.510**	.440**	.601**	.653**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	128	128	128	128	128

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

Table 4.21 presents the correlation values of the variables. On mobile banking as a money transfer technological innovation, there was a strong positive correlation between mobile banking and performance of agricultural projects $R = .803$ which is significant at $p = 0.00 < \alpha (0.005)$ implying an increase in the use of mobile banking in money transfer leads to an increase in performance of agricultural projects. It was deduced that mobile banking had an influence on the performance of agricultural projects.

The study established that there was a weak positive correlation between the use of internet banking as a money transfer technological innovation and performance of agricultural projects. $R = .424$ significant at $0.00 < \alpha (0.005)$ which implied that an increase in the use of internet banking in money transfer leads to an increase in performance of agricultural projects. The weak positive correlation could further be interpreted that the cost of using internet banking and the IT skills required hindered the use of internet banking in money transfer.

On agency banking, the study established that there was a positive correlation between the use of agency banking as a money transfer technological innovation and performance of agricultural projects. With an R value of $.651$ and a p value of $0.000 < \alpha (0.005)$, this implied that an increase in the use of agency banking in money transfer leads to an increase in performance of agricultural projects. It was concluded that agency banking had an influence on the performance of agricultural projects.

Lastly on electronic cards, the study determined that there was a moderate positive correlation between the use of agency banking as a money transfer technological innovation and performance of agricultural projects. $R = .510$ which was further significant at $p = 0.00 < \alpha (0.005)$ implying a reduction an increase in the use of agency banking in money transfer leads to an increase in performance of agricultural projects.

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND
RECOMMENDATION

5.1 Introduction

This chapter summarizes the study, makes conclusions based on the findings and gives a recommendation. Suggestions on areas of further study are also presented.

5.2 Summary of Findings

Out of the 149 questionnaires administered, 128 were filled and returned representing a questionnaire return rate of 86% which was considered sufficient for the study and could be used for generalization of the total population and similar studies. About half of the respondents were males (53%) and aged between 26 and 35.

On influence of use of technology, 64% of the respondents had basic IT skills. Ease of use was the major influence on the use of technological innovations in money transfer while system failure was the most common factor that prevented adoption of money transfer technological innovations.

5.2.1 Influence of mobile banking on the performance of agricultural projects

Mobile banking (62%) was the channel used mostly to transfer money followed by cash (21%). Majority of the respondents identified mobile banking as the leading channel in affordability (94%) and the most easy to use (100%). It was also time – saving with 95% of the respondents agreeing that mobile banking significantly reduced the time spent when sending money.

5.2.2 Influence of internet banking on the performance of agricultural projects

On internet banking, the study found that 89% of the respondents found it affordable. 65% of the respondents found it time - saving. This was the lowest percentage in comparison with mobile, agency and electronic cards in determining the time saved. It was not as easy to use as compared to mobile banking with only 62% agreeing that internet banking is easy to use as compared to 100% in mobile banking.

5.2.3 Influence of agency banking on the performance of agricultural projects

Agency banking had made money transfer more affordable and reduced the time spent when saving money. It was the most affordable after mobile banking with 78% of the respondents agreeing on the same. However, it was not very easy to use in comparison to mobile banking with only 62% of the respondents agreeing. However, it was easier to use than internet banking and electronic cards.

5.2.4 Influence of electronic cards on the performance of agricultural projects

Electronic cards were found to be the most expensive to use with only 63% of the respondents finding them cost - efficient. They were also not as easy to use as compared to mobile banking and agency banking with only 44% of the respondents agreeing that electronic cards are easy to use. 73% of the respondents agreed that electronic cards were time – saving.

The study established that money transfer technological innovations influenced the performance of agricultural projects with 37% of the respondents stating that it influenced performance of projects to a small extent and 55% stating that it influenced to a moderate extent.

5.3 Discussion of Findings

The study found that mobile banking was the most affordable money transfer channel which leads to increased transactions and more greenhouse farmers using mobile banking to transfer money. Ngarari (2015) also determined that the cost had an influence on the frequency of use of the mobile banking service. This implies that cost is a major influence on the use of an innovation.

5.3.1 Influence of mobile banking on the performance of agricultural projects

Mobile banking was time – saving as one can send money easily from wherever you are by using a mobile device. These findings resonate well with Kirui (2011) who found that distance to a money transfer agent (which affects transport cost and opportunity cost of time spent) had an inverse relationship with the decision to use mobile phone-based money transfer service. This led to increased transactions and green house farmers using this service as it is easily accessible. Kamau (2013) also determined that mobile banking

had increased the accessibility of banking services. Mobile banking is also easy to use. This had a major influence on the number of greenhouse farmers using mobile banking to transfer as it was perceived to be easy to use hence more people adopt it faster.

5.3.2 Influence of internet banking on the performance of agricultural projects

Internet Banking was found to be costly since the user has to have an internet enabled device and data connectivity which may not be readily available. It was found to be time – saving as one can transfer money from wherever they are. However, internet banking was not easy to use as it requires higher IT skills to be able to transact and more complex devices such as a smart phone. This negatively affected the number of greenhouse farmers using internet banking to transfer money.

5.3.3 Influence of agency banking on the performance of agricultural projects

Agency banking is more costly than mobile banking as one has to visit an agent's outlet to transact incurring transport costs. This also makes one spend more time going to an agent especially when an agent is not easily accessible. Therefore less people adopt agency banking in money transfer due to these challenges. However, agency banking is easy to use as one only gives the money to be sent to the agent who completes the transaction on your behalf.

5.3.4 Influence of electronic cards on the performance of agricultural projects

Electronic cards are costly due to the costly machinery required, that is, ATMs, and complexity involved which leads to most financial institutions charging high fees for sending money. They are time – saving as one can easily access an ATM to transact. This concurs with Wafula (2015), who found that the unlimited accessibility of plastic money through round the clock services led to customer retention. However, this may be difficult in rural areas since most ATMs are located in town centres. Electronic cards are also not as easy to use as one is required to have the knowledge of how to use the ATM which may be complex especially in rural areas where farmers may not have the required skills due to their level of education.

5.4 Conclusion

The main purpose of the study was to find out the influence of money transfer of technological innovations on performance of agricultural projects. The objectives of the study were to find out to what extent mobile banking, internet banking, agency banking and electronic cards influence the performance of projects. Based on the findings of the study, several conclusions were made. First, it was concluded that most of the greenhouse farmers had basic information technology skills. Secondly, the mostly used technological innovation used in money transfer was mobile banking since it was easy to use while the major deterrent to adoption of technological innovation was fear of system failure. Several factors influenced the use of various channels in money transfer, namely, affordability, time saving and ease of use, which contributed to the performance of agricultural projects. Affordability increased the number of transactions completed in that it was now cheaper to send money using any preferred channel rather than moving money physically. Time was saved in that through technology, one can receive money faster by using a technological channel thus more people used technology to send funds. These channels are also easy to use and only require basic IT skills to be able to transact. This led to more people adopting these channels as they are more convenient and easy to use. All these factors have directly influenced money transfer technological innovations in that there were increased transactions due to technological innovations in money transfer that directly contributed to supporting the performance of agricultural projects, in particular, greenhouse projects in Kiambu sub-county in this case.

5.4 Recommendations

From the research findings, the researcher recommends the following:

1. On technology, the study recommends that there is need to come up with proper information systems and infrastructure and have them upgraded regularly to keep up to date with technological innovations to reduce the fear of system failures that hinders the adoption of money transfer technological innovations.

2. There is need to involve customers in the development stage of product development to be able to get a more holistic view of the customer's needs and how to best provide a solution. This is evidenced by having more customers adopting technology that is easy to use such as mobile banking as compared with internet banking which many customers find it difficult to use.
3. Costs of sending money through technological channels should be priced fairly to encourage more users to adopt it and to also increase the number of transactions completed via these channels. Since new methods of doing something take time before adoption, fair pricing or incentives help to convince new customers that the innovation is more cost efficient than the traditional methods.
4. Security measures should be in place to mitigate against loss of funds. This will help in building confidence in the innovations and increase the chances if more people adopting them.

5.5 Suggestions for Further Research

In view of the important role of money transfer technological innovations, the study recommended suggestions for further research as below:

1. The influence of money transfer technological innovations in increasing diaspora remittances. Financial institutions have a great opportunity in this sector as there exists a need for diaspora customers to remit funds back into the country but are however faced with the challenge of distance. Thus an opportunity of finding an affordable, fast and convenient way of sending money exists.
2. The influence of money transfer technological innovations on increased fraud risk. As more technological innovations come up, there is increased insecurity of online platforms where clients can easily be hacked or make errors in payment and lose money. Therefore an opportunity arises to find a solution where clients can adapt new technological innovations and still be financially secure so as to build confidence and credibility in the new innovations.

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APPENDICES

Appendix I: Letter of Transmittal

Appendix II: Questionnaire

PURPOSE OF THE STUDY

I am a student at University of Nairobi currently pursuing my Masters Degree in Project Planning and Management at the University of Nairobi. I am conducting a research project on: The influence of money transfer technological innovation on performance of agricultural projects: A case of greenhouse farming in Kiambu sub-county, Kenya. Participation in the study is voluntary. Whatever information you provide will be treated with confidentiality and will not be used for any other purpose other than the objectives of the study.

Respondent Declaration

I hereby declare that I agreed to participate in the study voluntarily on the agreement that the information provided will be treated as confidential and that anonymity will be guaranteed.

Respondent signature:

Date:

INSTRUCTIONS:

Kindly answer all questions by ticking or writing down your answer as appropriate.

Section A: Basic Information

1. Gender

Male

Female

2. Age bracket

18 - 25 years

41 – 50 years

26 - 35 years

Above 50 years

36 – 40 years

3. Level of education

No schooling

College

Primary

Undergraduate

Secondary

Postgraduate

Tertiary

Other:

4. Employment Status

- | | | | |
|--------------------------|---------------|--------------------------|-------------|
| <input type="checkbox"/> | Employed | <input type="checkbox"/> | Contractual |
| <input type="checkbox"/> | Self-employed | <input type="checkbox"/> | Student |
| <input type="checkbox"/> | Casual | <input type="checkbox"/> | Unemployed |
| <input type="checkbox"/> | Other: | | |

5. Monthly basic income range

- Below 10,000
- 10,001 – 30,000
- 30,001 – 50,000
- 50,000 – 70,000
- Above 70,000

6. How would you rate your IT skills?

- Basic skills
- Proficient
- Professional skills

7. What factors would influence you to adopt technology in money transfer?

- | | | | |
|--------------------------|---------------|--------------------------|---------------|
| <input type="checkbox"/> | Ease of use | <input type="checkbox"/> | Convenience |
| <input type="checkbox"/> | Affordability | <input type="checkbox"/> | Accessibility |
| <input type="checkbox"/> | Security | <input type="checkbox"/> | Other: |

8. What factors would prevent you from adopting technology in transferring money?

- | | | | |
|--------------------------|---------------------------|--------------------------|---|
| <input type="checkbox"/> | Cost | <input type="checkbox"/> | I do not have the necessary skills |
| <input type="checkbox"/> | It is not secure | <input type="checkbox"/> | Makes spending money very easy
since it is easily accessible |
| <input type="checkbox"/> | System failure | | |
| <input type="checkbox"/> | I don't find it necessary | | |
| <input type="checkbox"/> | Other: | | |

9. Which channels do you mostly use to transfer money?

- | | | | | | |
|--------------------------|-----------------|--------------------------|----------------|--------------------------|------------------|
| <input type="checkbox"/> | Cash | <input type="checkbox"/> | Mobile Banking | <input type="checkbox"/> | Internet Banking |
| <input type="checkbox"/> | Electronic card | <input type="checkbox"/> | Agency Banking | <input type="checkbox"/> | Other: |

Section B: Influence of Mobile Banking on performance of agricultural projects

KEY

- S.A. Strongly Agree
- A Agree
- N Neutral
- D Disagree
- S.D. Strongly Disagree

No.	Cost Efficiency	S. A.	A	N	D	S. D.
1	Mobile Banking has made money transfer more affordable.					
2	Low cost of money transfer has influenced the increase in the number of transactions completed through mobile banking.					
3	Low cost of money transfer has influenced the increase in the number of greenhouse farmers using mobile banking.					

No.	Time Saving	S. A.	A	N	D	S. D.
1	Mobile Banking reduces time spent when sending money.					
2	Time saved during money transfer has influenced the number of transactions completed using mobile banking.					
3	Time saved during money transfer has influenced the increase in the number of greenhouse farmers using mobile banking.					

No.	Ease of Use	S. A.	A	N	D	S. D.
1	Mobile Banking is very easy to use					
2	The ease of transferring money has influenced the number of transactions completed using mobile banking					
3	The ease of transferring money has influenced the increase in the number of greenhouse farmers using mobile banking.					

10. Are you a registered user of Mobile Banking?

Yes

No

If no, give a reason.

.....

.....

11. Why would you prefer/not prefer using this channel to transfer money?

.....

.....

Section C: Influence of Internet Banking on performance of agricultural projects

No.	Cost Efficiency	S. A.	A	N	D	S. D.
1	Internet banking has made money transfer more affordable.					
2	Low cost of money transfer has influenced the increase in the number of transactions completed through internet banking.					
3	Low cost of money transfer has influenced the increase in the number of greenhouse farmers using internet banking.					

No.	Time Saving	S. A.	A	N	D	S. D.
1	Internet banking reduces time spent when sending money.					
2	Time saved during money transfer has influenced the number of transactions completed using internet banking.					
3	Time saved during money transfer has influenced the increase in the number of greenhouse farmers using internet banking.					

No.	Ease of Use	S. A.	A	N	D	S. D.
1	Internet Banking is very easy to use					
2	The ease of transferring money has influenced the number of transactions completed using internet banking					
3	The ease of transferring money has influenced the increase in the number of greenhouse farmers using internet banking.					

12. Are you a registered user of Internet Banking?

Yes

No

If no, give a reason.

.....
.....

13. Why would you prefer/not prefer using this channel to transfer money?

.....
.....

Section D: Influence of Agency Banking on performance of agricultural projects

No.	Cost Efficiency	S. A.	A	N	D	S. D.
1	Agency banking has made money transfer more affordable.					
2	Low cost of money transfer has influenced the increase in the number of transactions completed through agency banking.					
3	Low cost of money transfer has influenced the increase in the number of greenhouse farmers using agency banking.					

No.	Time Saving	S. A.	A	N	D	S. D.
1	Agency banking reduces time spent when sending money.					
2	Time saved during money transfer has influenced the number of transactions completed using agency banking.					
3	Time saved during money transfer has influenced the increase in the number of greenhouse farmers using agency banking.					

No.	Ease of Use	S. A.	A	N	D	S. D.
1	Agency Banking is very easy to use					
2	The ease of transferring money has influenced the number of transactions completed using agency banking					
3	The ease of transferring money has influenced the increase in the number of greenhouse farmers using agency banking.					

14. Why would you prefer/not prefer using this channel to transfer money?

.....

.....

Section E: Influence of Electronic Cards on performance of agricultural projects

No.	Cost Efficiency	S. A.	A	N	D	S. D.
1	Electronic cards have made money transfer more affordable.					
2	Low cost of money transfer has influenced the increase in the number of transactions completed through electronic cards.					
3	Low cost of money transfer has influenced the increase in the number of greenhouse farmers using electronic cards.					

No.	Time Saving	S. A.	A	N	D	S. D.
1	Electronic cards reduce time spent when sending money.					
2	Time saved during money transfer has influenced the number of transactions completed using electronic cards.					
3	Time saved during money transfer has influenced the increase in the number of greenhouse farmers using electronic cards.					

No.	Ease of Use	S. A.	A	N	D	S. D.
1	Electronic cards is very easy to use					
2	The ease of transferring money has influenced the number of transactions completed using electronic cards.					
3	The ease of transferring money has influenced the increase in the number of greenhouse farmers using electronic cards.					

15. Why would you prefer/not prefer using this channel to transfer money?

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Section F: Influence of Intervening Variables on performance of agricultural projects

No.	Channel Security	S. A.	A	N	D	S. D.
1	Technological Innovations have increased the risk of money being stolen or lost.					
2	Technological Innovations run the risk of system failure.					
	Regulations by CBK					
3	Technological Innovations in money transfer need to be regulated by CBK.					
	Perceived Usefulness					
4	Adoption of technological innovations is greatly influenced by the perceived usefulness of the new technology.					
5	Perceived usefulness of technological innovation greatly influences the intention to use and then generates actual usage behavior.					

Section G: Influence of Money Transfer Technological Innovations on performance of agricultural projects

No.	Number of agricultural projects completed	S. A.	A	N	D	S. D.
1	Mobile Banking influences performance of agricultural projects					
2	Internet Banking influences performance of agricultural projects					
3	Agency Banking influences performance of agricultural projects					
4	Electronic Cards influence performance of agricultural projects					

16. To what extent do you feel that money transfer technological innovations influence performance of projects?

- No extent
- Small Extent.
- Moderate Extent
- Great Extent

17. Do you think the greenhouse project will still be in existence in the next 5 years?

- Yes
- No

Explain your answer.

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18. What other money transfer technological innovations can improve performance of agricultural projects and why?

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Appendix III: Research Permit