ADDIS ABABA UNIVERSITY
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Adoption and Challenges of Mobile Banking [Hello-Cash] System in Ethiopia: The Case of Cooperative Bank of Oromiya

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDUIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN INFORMATION SCIENCE.

By

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Addis Ababa, Ethiopia

Declaration

I declare that this thesis entitled "**Adoption and Challenges of Mobile Banking [Hello-Cash] System in Ethiopia: The Case of Cooperative Bank of Oromiya"** is my original work, has not been presented for degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

Declared by:

Ebisa Bayana Kumsa

Signature: _____

Date: _____

Certificate

This is to certify that this study, **"Adoption and Challenges of Mobile Banking [Hello-Cash] System in Ethiopia: The Case of Cooperative Bank of Oromiya"**, undertaken by Ebisa Bayana for the partial fulfillment of Masters of Science in Information Science at Addis Ababa University, is an original work and not submitted earlier for any degree either at this University or any other University.

Advisor: Ato Getachew Jemaneh

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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of The Requirements for the Degree of Master of Science in Information Science.

By

Ebisa Bayana Kumsa

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Acronyms

ATM – Automatic Teller Machine

BRICS – Brazil, Russia, India, China and South Africa

CBO – Cooperative Bank of Oromiya

ETAM – Extended Theory of technology acceptance model

GSM – Global System for Mobile Communication

ICT – Information Communication Technology

IDT – Innovative Diffusion Theory

IP – Internet Protocol

ITU – International Telecommunication Union

IVR – Interactive Voice Recording

LIB – Lion International Bank

MB – Mobile Banking

NBE – National Bank of Ethiopia

PEOU – Perceived ease of Use

PIN – Personal Identity Number

PR – Perceived Reliability

PU – Perceived Usefulness

SMS – Short Message Service

TAM – Technology Acceptance Model

TVET – Technical Vocational Educational Training

TOE - Technology, Organization and Environment

TPB – Theory of Planned Behavior

WAP – Wireless Application Protocol

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Abstract

The incorporation of information system into an organization for the purpose of getting competitive advantage, easing workload, providing intangible (soft) work place and coping up with technological advancement has became an indispensable for organizations. Due to these many companies (for example banks) are getting advantage of information communication technology implementation like Mobile banking, Internet banking, ATM, etc. Accordingly Ethiopian commercial banks have implemented mobile banking system into their service system. However, with increased demand of users and technological advancements, the adoption of the mobile banking system has some challenges. This thesis aims to examine adoption of mobile banking system in the Ethiopia focusing on Cooperative bank of Oromiya with respect to the challenges which can influence the bank from taking advantage and expected benefits of mobile banking system derived by adopting the system. The study was conducted based on technology acceptance model (TAM) and innovative diffusion theory (IDT). Both qualitative and quantitative (mixed) research approach was used to answer the research questions that emerge through the review of existing literature and the context of the mobile banking system in Ethiopia and statistically analyzed data obtained from the survey questionnaire. The result of the study indicated that, drivers of mobile banking adoption are relative advantage, perceived ease of use and perceived usefulness. The study also identified the major challenges Ethiopian banking industry faces in the adoption of mobile banking system which are perceived risks, trust reliability, lack of legal frame and government support, lack of ICT infrastructure, electricity and telecommunications. The study suggests a series of measures which could be taken by the bank and government to address various challenges identified in the study. These measures were establishing a clear set of legal frame work on the use of technology in banking industry, supporting banking industry by investing on ICT, etc.

Keywords: ***Mobile Banking, Technology Acceptance Model*** *and* ***Innovative Diffusion Theory.***

CHAPTER ONE

INTRODUCTION

1.1. Background

In modern economy, a strong and powerful financial system is a pillar of economic growth and development. The availability of banking facilities and unfolding banking service outreach are the major facilitators of developmental and expansionary activities (Sumanjet, 2010). In this regard, information technology plays a key role in promoting inclusive financial system as it is the only way to reduce the cost significantly and reach the masses. But all technologies are not suitable for financial inclusion due to affordability, accessibility, security and privacy. In the last decades, mobile phone technology has emerged as the most potential and well suited channel for financial inclusion and use of mobile phone for inclusive finance is very popular in countries where most of the population is unbanked or under-banked (Sumanjeet, 2010).

Most mobile banking also called m-banking systems in the developing world enable users to do three-things; first is to store value or currency in an account accessible via the handset. If the user already has a bank account, this is simply linking to a bank account, if the user does not have an account, then the process creates a bank account for him/ her or creates a pseudo bank account, held by a third party or the user's mobile operator. Second is to convert cash in and out of the stored value account. If the account is linked to a bank account, then users can visit banks to cash-in and cash-out. In many cases, users can also visit the GSM provider' retail stores. In the most flexible services, a user can visit a corner kiosk or grocery store, perhaps the same one where he or she purchases airtime and transact with an independent retailer working as an agent for the transaction system. Third is to transfer stored value between accounts. Users can generally transfer funds between accounts linked to two mobile phones, by using a set of SMS's or menu commands and PIN numbers (Donner, et al, 2008).

According to Henok (2015), the Ethiopian commercial banking system is composed of 2 state owned banks and 16 private banks. Though it is true that traditional banking has grown progressively over the years, in terms of technology based financial service or product the Ethiopian banking sector has not fully taken advantage of ICT in general and M-banking in

particular. Currently there are six commercial banks that commenced M-banking service in Ethiopia, however, the M-banking regulation directives were issued in January 2013 (Henok, 2015).

The customers of Ethiopian commercial banks have missed to enjoy with the technological advancement in banking sector which has been entertained elsewhere in Africa and the rest of the world. The modern e-banking methods like ATMs, Debit cards, Credit cards, Internet banking, mobile banking and others are new to the Ethiopian banking sector. E-banking is the use of modern technology that allows customers to access banking services electronically whether it is to withdraw cash, transfer funds, to pay bills, or to obtain commercial information and advices, which are not much known in Ethiopia.

In Ethiopia, it was impossible to withdraw money without presenting the pass book and money transfer as commercial banking service was allowed only in between branches of the same bank (Gardachew, 2010), but currently not. However, from the public and the economy, there is a strong need for strengthening linkages among banks in order to allow healthy flow of financial resources among financial institutions and optimize the contributions of the entire financial system to the development processes as a whole.

Some of the problems related with adoption of M-banking are low level of Internet penetration and poorly developed electricity infrastructure. According to Masinge (2010), most countries in Africa, except South Africa, have Internet infrastructure only in their major cities. Lack of suitable legal and regulatory framework for mobile banking transaction is another impediment for the adoption of new technology into banking industry. Ethiopia has not yet enacted legislation that deals with E-commerce concerns including enforceability of the acceptance of electronic contracts, digital signatures and intellectual copyright and restrict the use of encryption technologies and high rates of illiteracy (Gardachew, 2010). The researcher also identified as low literacy rate is a serious challenge for the adoption of E-banking in Ethiopia as it hinders the accessibility of banking services. He also said citizens should not only know how to read and write but also possess basic ICT knowledge to fully enjoy the benefits of E-banking.

Cooperative bank of Oromiya was established on October 29, 2004 and is one of private owned

(share company) commercial banks currently running in the country. Its mobile banking system application, commonly known as hello cash is a recently implemented way of transaction mobilization. Cooperative Bank of Oromiya implemented mobile banking with Lion International Bank, Wegagen bank and Somali Credit and Saving Microfinance.

According to Reyan (2011), mobile banking is a service provided by a bank or other financial institution that allows its customers to conduct a range of financial transactions remotely using a mobile device such as a mobile phone or tablet, and using software, usually called applications, provided by the financial institution for the purpose. Mobile banking is usually available on a 24-hour basis. But some financial institutions have restrictions on which accounts may be accessed through mobile banking, as well as a limit on the amount that can be transacted.

The types of financial transactions which a customer may transact through mobile banking including obtaining account balances and list of latest transactions, electronic bill payments, and fund transfers between a customer's or another's accounts. From the bank's point of view, mobile banking reduces the cost of handling transactions by reducing the need for customers to visit a bank branch for non-cash withdrawal and deposit transactions. Transactions involving cash are not handled using mobile banking and a customer needs to visit an agent, ATM or bank teller for cash withdrawals or deposits.

1.2. Statement of the Problem

Mobile phones have increasingly become tools that consumers use for banking, payments, budgeting, and shopping (USBG, 2014) and banks strive to understand customers' e-behaviors worldwide (Alsajjan and Dennis, 2009). Since mobile banking is a service offered by banks or other financial institutions for non-cash transactions through mobile telecommunication devices for their customers, assessing the adoption and challenges of the system is required.

The role of ICT in current banking system is unquestionable and critical to address mass customers with or without a branch and also to meet the competitive nature of the business. There are many reasons for the need and implementations of mobile banking in banking sectors on both bank and customer side. There are also challenges in customer relationship management

especially security. So the study also identifies problems that banks and customers face when they implement and use m-banking during their money transaction activities.

This research focuses to provide an insight into adoption and challenges of mobile banking for both customers and the bank. It also gives good customer reliance on the use of mobile banking system, assesses the security of the service and identifies challenges that affect the adoption of mobile banking system.

1.2.1 Research Questions

This study addresses the following research questions;

- ✓ What are the drivers of adoption of mobile banking system among customers and bank in Ethiopia?
- ✓ What are the challenges (barriers) that customers face in adopting mobile banking?

1.3. Objective of the Research

The research has both general and specific objectives.

1.3.1. General Objective

The general objective of the research is to investigate and analyze the adoption and challenges of mobile banking (hello-cash) system.

1.3.2. Specific Objectives

The specific objectives of the research are to:-

- Review literatures related to mobile banking system.
- Identify the adoption of mobile banking system from the bank and customers' side.
- Identify the challenges of mobile banking system from the bank and customers' side.
- Forward and propose opportunities for researchers and banks.

1.4. Significance of the Study

The output of this study will give an insight into the bank customer relationship management by identifying the adoption and challenges of its mobile banking systems through telecommunication devices. This will give the CBO a chance to improve its service giving, customer handling and identify its weakness and strength in order to compete with other banks and to cope up with the advancing technologies. This in turn, helps the CBO to address a broad customer base and increase its profit.

As improving customer service is one of the major priorities of CBO, the result of this study will help to know the various demands of customers with regard to the e-banking in general and mobile banking specifically, and finally address those demands. The study will give an opportunity to (re)structure its service delivery in a more effective way which will help the company to be more technological and get competitive advantage.

Additionally, the output of the study also can be one of tributaries to policy makers to make some adjustment to the indispensable technological progresses occur in different sectors of the country through by identifying the challenges in the sector. Finally, the result of the study become the foundation for the researchers those want to conduct a study related to the subject matter as it is the pioneer to our country context. Because, researches related to mobile banking are sparse in literature, especially in developing countries.

1.5. Ethical Conduct and Considerations

This study was approved by the ethical and academic representatives of the School of Information Science during proposal.

As of Bhattacherjee (2012), ethics is the moral distinction between right and wrong, and what is unethical may not necessarily be illegal. Moreover, with regard to the importance of research ethics, science has often been manipulated in unethical ways by people and organizations to advance their private agenda and engaging in activities that are contrary to the norms of scientific conduct.

Hence, the researcher would like to acknowledge all participants of this study and assures that the promised confidentiality has maintained. The researcher also confirms that the findings of this study certainly represent the response of the study participants. Furthermore, for this study the data collection, analysis and interpretation was done in an ethical manner of scientific procedures and the findings represents the real situation of the study unit of analysis.

1.6. Organization of the Study

This study is organized into five chapters. The ***first chapter*** is concerned with introduction which in turn contains background of the study, statement of the problem, objectives of the study, research questions and so forth. ***Chapter two*** presents and elaborates both theoretical literatures and empirical review which includes theory and types of risk, mobile banking system, empirical review and conceptual framework. Whereas, ***chapter three*** introduces the research approach and methodology which in turn includes research approach, research method, research design, data collection, unit of analysis, sampling design, research instrument, variables of the study, method of data analysis and validity and reliability of the study variables. ***Chapter four*** presents the data analysis and discussions [results] of the study which includes introduction, analysis and discussions of the study findings. And finally, ***chapter five*** presents the summary, conclusions and recommendations based on the study findings.

CHAPTER TWO

REVIEW OF LITERATURE AND RELATED WORKS

2.1. Overview

This section presents the overall review of literature and related works regarding to adoption of mobile banking system and its challenges. It also presents history and introduction of mobile banking system, research models, types of mobile banking services and mobile banking system in Ethiopia.

2.2. History of Mobile Banking

According to Sherpa (2015), mobile banking was first introduced in 1999 by the European company called PayBox which was supported by Deutsche Bank. Its mobile banking service was SMS at the time of evolution, due to the limitation of mobile phone functionality, expensive data cost and network problems. The modern mobile banking system was begun in 2010 with the success of Apple mobile phones like IPhone and other operating systems like Android.

2.3. Introduction to Mobile Banking

According to Reyan (2011), mobile banking is a system for the consumer to perform banking actions on his or her cell phone or other mobile device. It is also referred as M-banking or SMS banking. Mobile banking service is increasing among low income and unbanked populations; however, with over 1 billion mobile service users worldwide, many people still lack banking services. Banks do not reach out to the poor by simply branching their companies, because of the high operational costs involved. Scholars and industry practitioners have indicated that mobile phones could be an alternative channel for delivering financial services to the less advantaged and unbanked, without requiring a traditional bank with a branch network (Kanagwa, 2016).

Most banking companies categorize and administer the mobile banking system under electronic banking system. “Electronic banking (e-banking) is defined as the automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels. E-banking includes the systems that enable financial institution customers, individuals or businesses, to access accounts, transact business, or obtain

information on financial products and services through a public or private network, including the Internet. E-banking is sometimes called Internet banking, on-line banking or PC banking. E-Banking includes ATMs, wire transfers, telephone banking, electronic fund transfers and debit cards" (Mobarek, 2010).

2.4. Mobile Banking Adoption

The growing competition and increasing expectations led to increased awareness amongst banks on the role and implementation of technology in banking, forcing banks to go in for the latest technologies so as to meet the threat of competition and retain their customer base (Prema, 2010). There are a lot of benefits through adoption of mobile banking for the banks and their customers. Mobile banking increases operational efficiencies and reduce costs, besides giving a platform for offering value added services to the customer, thereby fulfilling all the essential prerequisites for flourishing banking industry.

However, different factors are responsible for fragile widespread and usage of mobile banking in the world, mostly infrastructures. As Wikipedia (2016), more than half of the populations of developed countries are mobile banking users including BRICS countries and Pakistan. But on the contrary, developing countries especially in Africa, the users of mobile banking are less than half of the population.

Many African countries implemented mobile banking system in their banks. Some of them are South Africa, Kenya, Botswana, Nigeria, etc. According to Githeko et al (2013), the Kenyan Communication Act has provided an environment that has seen reforms in the telecommunications sector. *"This has enabled mobile telephony to grow exponentially hence providing a basis for successful mobile banking (M-banking) technology. Despite this, there are still long queues in the banking halls implying that most customers do not use mobile banking".* This could be attributed to a high proportion of the banked population who either don't understand M-banking or have never heard about it (Porteous, 2007). In addition Githeko et al, (2013), argues that banked people still have strong disapproving attitude, with around one in five people doubting its trustworthiness.

According to Odumeru (2013), Nigeria has over 90 million active mobile subscribers, making the country a fertile ground for the use of m-banking. This perhaps informed the decision of the Central Bank of Nigeria (CBN) to license 16 mobile money operators to carry out a pilot of a mobile financial service system for a period of months to demonstrate and implement that the system can work in the country.

In Botswana (Mobarek, 2010), customer satisfaction assessment was conducted where customers were not entirely satisfied with the quality of service provided by commercial banks. Queuing time was considered reasonable at ATMs and in banking halls. Part of the dissatisfaction of customers' arises from the fact that customers were not aware and knowledgeable about the full range of e-banking services provided by banks. The decline in the quality of banking services may be attributed to the fact that there has been an increase in the volume of banking transactions. It is often reported that the complaint to the machinery in the banks were not adequate enough to address the issues to the full satisfaction of the customers. Therefore, it is a clear-cut indication that commercial banks have to put in more effort into e-banking services to improve the satisfaction of their customers. The problem presented was to identify where the delivery channels were lacking in providing satisfaction to customers and what can be done to resolve this problem (Mobarek, 2010).The implementation or adoption of mobile banking in developing countries are highly affected and follows many other basic infrastructures like electricity, telecommunication, education and perception of the users.

The use of mobile technologies is increasingly in widespread mode in developing countries in general and Africa in particular. Various applications can be observed among the users, which range from simple telephone conversation and short text messages to multimedia messaging services (MMS) and Internet access, depending on the capability of each mobile phone technology and services rendered. These applications have been made possible through various developments in the mobile telephone technology such as GPRS, WAP, the 3G and 4G standard.

The 3G telephone enables users to access data, voice and video, as well as Internet access through wireless application protocol (WAP) (Kraim, et al 2011). 4G is the fourth generation of wireless mobile telecommunications technology, which is developed succeeding 3G. A 4G system provides capabilities defined by ITU in IMT Advanced. Its potential and current

applications enables the users to have mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, and 3D television (Wikipedia, 2016).

According to Prema (2010), perceived reliability is proposed to enhance the understanding of an individual's acceptance behavior of Internet banking with respect to consumers' perceived security, privacy issues and the perceived risk of consumers. Consumer awareness of mobile banking is proposed as the precursor of forming positive attitudes with respect to usefulness, ease of use and reliability, and ultimately adopting mobile banking. Using PLS is successfully proved and it is found that Internet banking is influenced by its perceived reliability, perceived ease of use and perceived usefulness.

"Porteous (2014), classified M-banking into two; firstly, transformational M-banking, which is the provision of banking services using a mobile phone to reach the unbanked population. Secondly, additive M-banking, in which the mobile phone is simply an additional channel that is used to provide banking services to those already banked." These both categories are called financial inclusion and accessibility respectively in our country's M- banking system, especially hello cash mobile banking system.

2.5. Adoption of Mobile Banking System in Ethiopia

Banking in Ethiopia started in 1905 which was called Bank of Abyssinia by Emperor Menelik II. It was a private company controlled by the Bank of Egypt. In 1931 it was liquidated and replaced by the Bank of Ethiopia which was the bank of issue until the Italian attack of 1936. During the Italian control, Bank of Italy notes formed the legal tender. Under the subsequent British occupation, Ethiopia was briefly a part of the East Africa Currency Board (Leul, 2011). Since then Ethiopian banking industry tried many improvement measures to cope up with the increased competition and technology advancements.

Due to its modern and recent implementation, researches into the adoption and/or challenges of mobile banking are sparse in literature, especially in developing countries. This study was conducted to determine factors influencing the adoption of m-banking in Ethiopia using Diffusion of Innovation Theory and Technology Acceptance Model as a research model, that

relative advantage, PEOU, PU and reliability drive mobile banking usage, where as perceived risks of using m-banking are barrier to adoption.

Advances in information and communication technologies in general, the growing use of the mobile phone for business transaction in particular have had a profound effect on the banking industry. While this is a global phenomenon, creating a truly global marketplace, penetration of Internet banking into less developed countries lags behind that of the developed countries (Abinet, 2010). These all factors have positive and negative impact for the introduction of mobile banking into banking industry system.

In order to encourage further E-banking adoption in developing countries, a better understanding of the barriers and drivers impacting E-banking adoption is critical (Zhao *et al*. 2008). By gaining an in-depth understanding of the factors and conditions that influence developing country's ability to fully adopt and realize its benefits, strategic implications can be generated for the researchers and practitioners regarding how to promote the growth of M-banking in the developing countries. However, despite the importance of these adoptions, limited studies are currently available in developing countries, especially in Ethiopia. Therefore, more studies are still required to understand the relevance of M-banking in the country to identify areas in which the country lags behind that inhibit their M-banking adoption and diffusion. Additionally, to address the current gap in the literature, this study is designed to identify the M-banking adoption situation in Ethiopia and mainly focusing on the investigation of factors that affect adoption of M-banking system.

Several studies indicate that online bankers are the most profitable and wealthiest segment to banks (Robinson, 2000). On this basis, no bank today can underestimate the power of the E-banking. Luxman (1999) for instance, estimates that in the near future the online channel reinforces its importance especially in the countryside, where banks have could not open (many) branches.

As noted earlier, online banking offers many benefits to banks as well as to customers. However, in general terms the majority of private bank users are still not using online banking channel including CBO in Ethiopia, until this study is conducted. There exist multiple reasons for this. First, customers need to have an access to the Internet in order to utilize the service.

Furthermore, new online users need first to learn how to use the service like computer skills (Mols et al, 1999). Second, nonusers often complain that online banking has no social dimension, i.e. customers are not served in the way they are in a face-to-face situation at branch (Mattila et al, 2003). Third, customers have been afraid of security issues. However, this situation is changing as the online banking channel is getting acceptance and awareness among users.

Mobile banking applications are increasingly becoming more important than bank branches. A recent study done by Haileyesus (2016) showed that people visit branches at less than half the rate that they use mobile banking applications, but until this data is collected, in our country only commercial bank of Ethiopia has its own MB application in which its customers interact with the bank . The trend is only expected to accelerate, as banks continue to adopt new innovations and invest more heavily in technology. Not only do users demand functionality, but also companies increasingly demand better design and more intuitive interface (Clements, 2016).

The economic and technological improvements of Ethiopian commercial banks are not balanced. Even if it is the influence of government policy, for example commercial bank of Ethiopia is dominating in both cases over the rest of banks in the country.

2.6. Mobile Banking Implementation in Cooperative Bank of Oromiya

The hello-cash mobile banking system implemented banks, has partnered with BelCash Ethiopia for the installation of mobile banking technology known as Hello Cash tech platform. BelCash is owned by the Netherland's BelCash International, which provides technological solutions (especially platforms) for financial services using the Internet and mobile phones (CBO, 2016). This hello-cash system binds four financial institutions together; Cooperative bank of Oromiya, Lion International Bank, Wegagen Bank and Somali microfinance institution.

Belcash is an international company based in the Netherland, which is known by designing of automated solutions for mainly financial services by using the combination of infrastructures such as world wide web and mobile telephone. Belcash technology solutions plc is an Ethiopian licensed company owned by Belcash international. BCTS has obtained the necessary VAS licenses from Ministry of ICT and signed an agreement with Ethio-telecom to provide new

approaches to the Ethiopian market for interaction between end users and their mobile or online devices with main focus on the banking and payment services, health and education (CBO, 2016).

Mobile banking (hello cash in our case), is a subset of banking as it allows everyone easy access to their banking activities via mobile handsets (Khraim, 2011). According to Yemisirach, the E-banking service representative and bank officer of the CBO, mobile banking system is implemented in the Cooperative Bank of Oromiya in 2015, in cooperation with Lion International Bank, Somali Micro Finance Institution and Wegagen Bank which joined them later, by the common name of hello-cash or mobile and agent banking system.

Based on technology solutions those provide M-banking, mobile banking can be implemented through three different technology solutions: browser-based applications, messaging-based applications and client-based applications (Kim et al., 2009).

Browser Based Application: Browser based application mobiles basically needs wireless access point or Internet based access to access bank portals.

Message Based Application: in message-based applications, "the communication between the bank and the customer is carried out via text messages. For example, by using a registered mobile number, the customer sends a predefined command to the bank, and then uses text messages to conduct transactions with the bank. An example of messaging-based applications is the Unstructured Supplementary Service Data (USSD), which has compatibility with almost all mobile phones" (Masinge, 2010). Banks in some southern Africa like Tanzania, Kenya and South Africa uses such application for M-PESA.

Client Based Application: the third, client-based applications run through special software installed in the mobile phone. An example of a client-based application is what is called the SIM Toolkit standard (STK) (Masinge, 2010). For instance the M-PESA in Kenya uses the STK technical platforms which were designed for such specific purpose

Generally, mobile banking implementation in Ethiopia, even though many challenges faced hello cash mobile banking system, the bank with its partners have implemented and running the system through their branches and agents. Until this data is collected, there is no research

conducted on mobile banking system adoption and challenges in Ethiopian banks and this research contributes for the sector as well as for further studies.

2.7. Research Model

Since the study is focusing on the adoption and challenges of mobile banking in Cooperative Bank of Oromiya, the research model on which the research bases inherit from the technology acceptance model (TAM) and innovative diffusion theory (IDT). In addition to these, theories of planned behavior and extensions of these theories used to support and make the study more comprehensive.

The reason for the selection of the following research models are;

- ✓ First, they are information system theory models,
- ✓ Second, they are most widely used and continuously studied by scholars, and
- ✓ Third, however, they were developed many years ago they are relevant to the scope of the study on adoption and challenges of mobile banking system in Ethiopia.

2.7.1. Adoption [Acceptance] of Technology

According to Morris and Dillon (1996), user acceptance is defined as "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support. Thus, the concept is not being applied to situations in which users claim they will employ it without providing evidence of use, or to the use of a technology for purposes unintended by the designers or users". For the adoption and acceptance of newly introduced information communication technology into one system, the willingness of the user groups and well understanding of the factors influencing the acceptance is a major one.

2.7.2. Adoption Models for Mobile Services

Predominantly mobile devices were used for communication services, but with the technological improvements their functions/ services, size, operating systems, etc with other supplements; mobile service is not limited to only communication purpose. Mobile phone is serving in bank,

health, transport, commerce sectors and others. This means, the penetration of mobile phone service system in any sector is becoming an indispensable service.

Mobile banking is used in many parts of the world with little or few infrastructures, especially remote and rural areas (Khraim, et al, 2011), having electricity and telecommunication only. This aspect of mobile banking is also popular in countries where most of their population is unbanked, where banks can only be found in big cities, and customers have to travel hundreds of kilometers to the nearest bank.

According to Rao and Troshani (2007), mobile services are ubiquitous, portable and can be used to receive and disseminate personalized and localized information. Users who adopt mobile services for personal purposes incur both data transmission charges and charges for using the service, which may limit mobile services usage and affect motivation to use them. In addition, earlier users may adopt mobile services to easily and pervasively fulfill their everyday life needs across distinct aspects of their life including work, home, and leisure. With improvement nature of the mobile phone service system, the service giving part should advance in providing readily applicable mobile services adoption technologies and/or applications.

According to Andrew (2009), models of branchless banking can be classified into three broad categories, namely; bank focused, bank led and nonbank led.

Bank Focused Model: *"*This model emerges when a traditional bank uses non-traditional low-cost delivery channels to provide banking services to its customers. It can be automatic teller machines (ATMs), Internet banking or mobile phone banking to provide certain limited banking services to banks' customers.

Bank Led Model: bank led model offers a different alternative to conventional branch based banking in that customer conducts financial transactions at a whole range of retail agents (through mobile phone) instead of at bank branches or through tellers. This model promises the potential to substantially increase the financial service outreach by using a different delivery channel (retailers/ mobile phones), a different trade partner having experience and target market distinct from traditional banks, and it is significantly cheaper than the bank based alternatives. The bank led model may be implemented by either using correspondent arrangements or by

creating a joint venture between bank and telecommunication/non-bank. In both of bank focused and bank led models, customer account rests with the bank.

Nonbank Led Model: this model is where a bank does not come into the picture (except possibly as a safe keeper of surplus funds) and the non-bank (like telecommunication) performs all the functions". A good example of this model in our country (Ethiopia) is a cloud-funding short message services.

Drawing from technology acceptance, innovation diffusion and others, the adoption and challenges of new mobile banking system was analyzed in our study and the result was showed.

2.7.3. Technology Acceptance Model (TAM)

The technology acceptance model is an information systems theory that models how users can accept and use a technology (Davis 1989). It is modeled by Fred Davis in 1989 and it suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. These factors are perceived usefulness and ease of use.

- **Perceived Usefulness** (PU) – PU was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). This means if the user believes as the system usage would increase his work /job performance he/she is willing to use it. The user's perception toward the usage of the system for the improvement of his task is the major factor. Perceived usefulness have the measurements of accomplishment of the work in a more quick, about the productivity rate, efficiency, etc. Because these issues are also the major factors for the adoption of new system in a current real world.

- **Perceived Ease of Use** (PEOU) – Davis (1989) defined this also as "the degree to which a person believes that using a particular system would be free from effort". PEOU is the level of understanding of the user about the system that it could be employed on his/her task with less or minimal effort, unless it would be not usable anymore. PEOU has also some measurement of scales like flexibility to interact, making user skillful, clarity, etc.

The following diagram shows the technology acceptance models of perceived ease of use, perceived usefulness and technology acceptance (Davis et al, 1989).

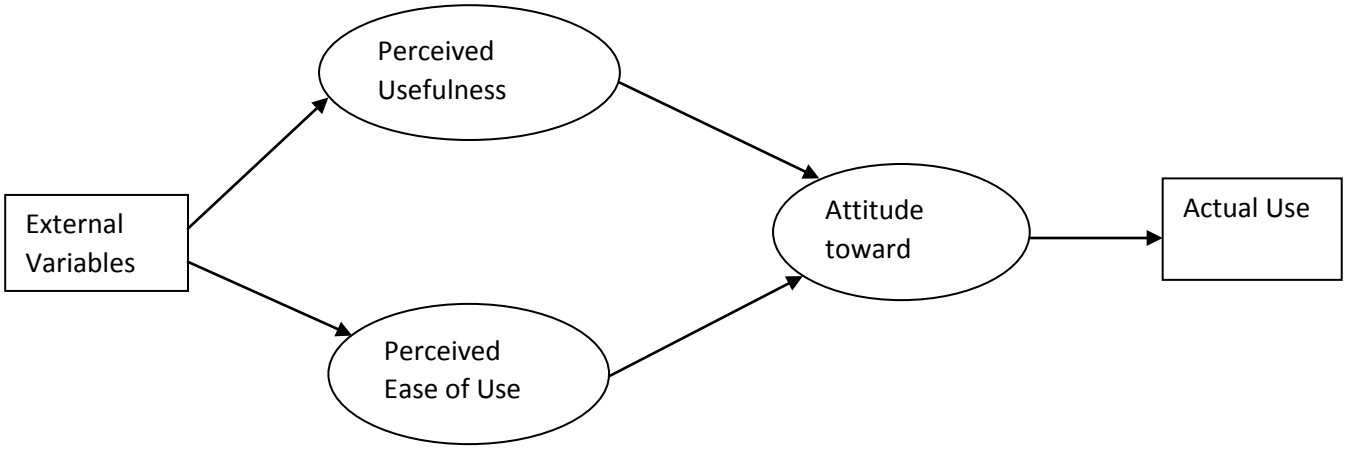

Figure: 2.1. Technology Acceptance Model (TAM) (Source: Davis, 1989)

There are many scholars who have extended the study of Davis (1989) continuously and added some upgrades to TAM (Venkatesh and Davis, 2000 and Venkatesh, 2000), Extended theory of technology acceptance model, and Unified Theory of Acceptance & Ease of Use of Technology.

2.7.4. Extended Theory of Technology Acceptance Model

Extended theory of technology acceptance model is the theoretical extension of technology acceptance model that explains the perceived usefulness and perceived ease of use (Baraghani, 2007). TAM was criticized for its very little investigation targets at the study of factors (like external factors) that could affect the PU and PEOU (Gefen and Keil, 1998). It explains TAM in terms of external factors like social influence processes (subjective norm, voluntariness and images) and cognitive instrumental processes (job relevance, output quality, result demonstrability and perceived ease of use). By concluding some such determinant Venkatesh and Davis, 2000, developed TAM2, Extended Technology Acceptance Model.

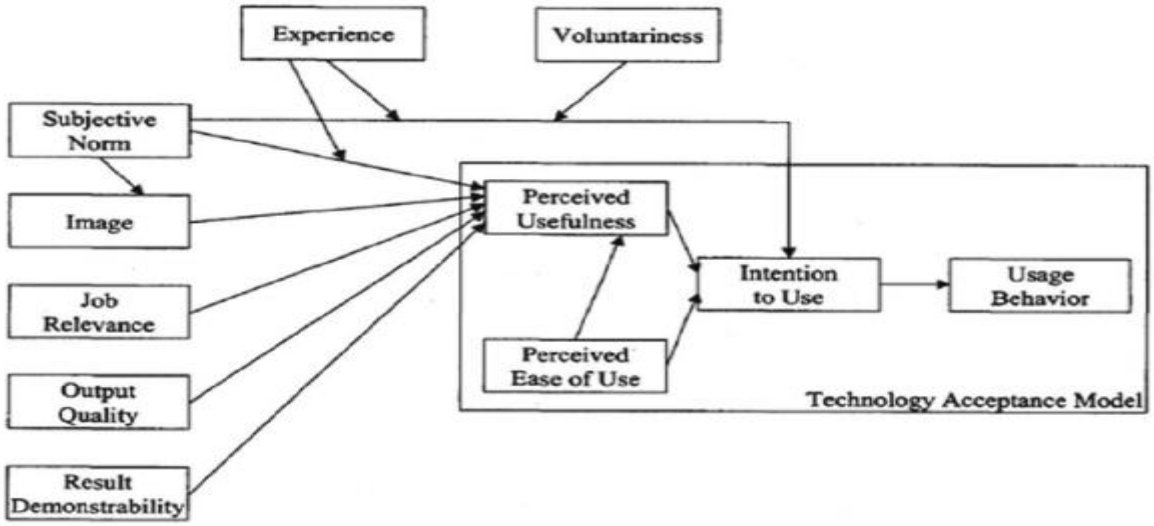

Figure: 2.2. Technology Acceptance Model 2, (Source: Venkatesh and Davis, 2000)

2.7.5. Unified Theory of Acceptance and Use of Technology (UTAUT)

According to Venkatesh et. al. (2003), UTAUT is a theory that explains user intention to use an information system and subsequent usage behavior. The theory holds that four key constructs (performance expectancy, effort expectancy, social influence, and facilitating conditions) are direct determinants of usage intention and behavior (Venkatesh et. al., 2003). Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior. The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information system usage behaviour (technology acceptance model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, and innovation diffusion theory). The following diagram shows the determinants of unified theory of acceptance and use of technology model.

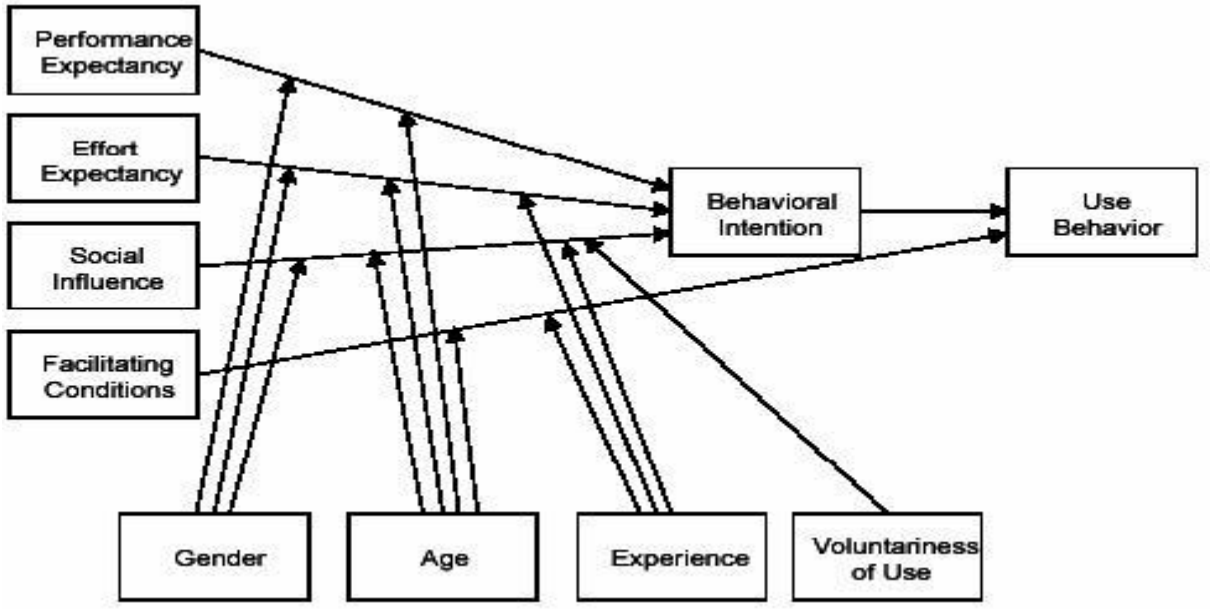

Figure: 2.3. Unified Theory of Acceptance and Use of Technology (Source: Venkatesh, et al, 2003)

2.7.6. Innovative Diffusion Theory (IDT)

Innovative diffusion theory is a theory that seeks to explain how, why and at what rate new ideas and technology spread (Rogers, 2003). The researcher also defined diffusion as the process by which an innovation is communicated over time among the participants (user) in a social system. The origins of the diffusion of innovations theory were varied and span multiple disciplines.

According to Geroski (2000), innovative diffusion model is not a fantastic story of how people become aware of a new thing rather it is the technology adoption often takes an order of magnitude longer than it takes for information to spread. However, the diffusion of new technologies often depends upon the interrelations between social and technical aspects (Silverberg and Cantono, 2009). Rogers (2003) identified five determinants of rate of adoptions; relative advantage, compatibility, complexity, trialability and observability. The researcher also defined the rate of adoption as "the relative speed with which an innovation is adopted by members of a social system" , Relative advantage as "the degree to which an innovation is perceived as being better than the idea it supersedes" , "compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of

potential adopters" , complexity as "the degree to which an innovation is perceived as relatively difficult to understand and use", trialability is "the degree to which an innovation may be experimented with on a limited basis", observability as "the degree to which the results of an innovation are visible to others".

Generally, Rogers (2003) suggested that innovations that provide better relative advantage, compatibility, simplicity, trail ability, and observability will be adopted much faster than others. The decision of innovation has five phases; knowledge, persuasion, decision (either to accept or reject), implementation and confirmation or approval of the usage the new system for implementation.

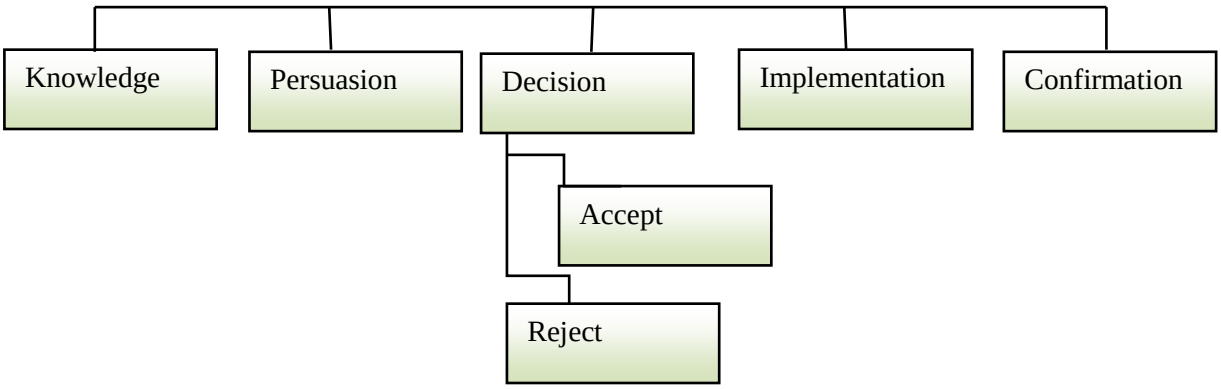

Figure: 2.4. Stages in decision of innovation process (IDT); (Source: Rogers, 2003)

2.7.7. Theory of Planned Behavior (TPB)

According to Azjen (1991), theory of planned behavior hypothesizes that individual behavior is driven by behavioral intentions. Behavioral intentions are a function of an individual's attitude toward the behavior, the subjective norms surrounding the performance of the behavior and the individual's perception of the ease with which the behavior can be performed (behavioral control). Perceived behavioral control is the people's perception of their ability to perform a given behavior in a controlled manner. Attitude toward the behavior is defined as the individual's positive or negative feelings about performing a behavior. It is determined through an assessment of one's beliefs regarding the consequences arising from a behavior and an evaluation of the desirability of these consequences. Theory of planned behavior is a modified theory of reasoned action that means it is TRA plus perceived behavioral control.

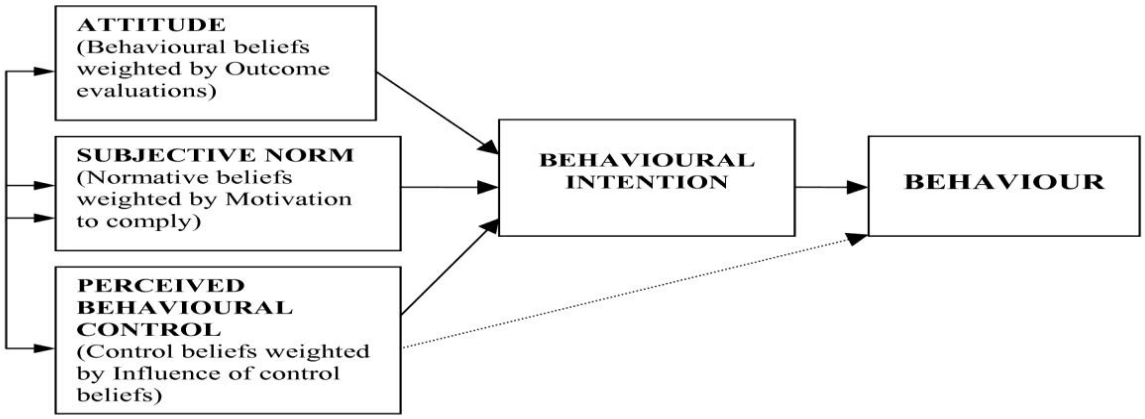

Figure: 2.5. Theory of Planned behavior; (Source: Azjen, 1991)

The behavioral intention of an individual arises from attitude, subjective norm and perceived behavioral control which in turn yields the behavior (Azjen, 1991). A control belief refers to the perceived presence of those factors that may facilitate or impede the performance of behavior.

A subjective norm refers to an individual's perception of other's opinion about his / her particular behavior, if he/she should perform a particular behavior or no. Perceived behavioral control in TPB refers to one's perception of whether a behavior is under his control and has access to resources and opportunities required to facilitate a behavior.

Similarities of Selected Theories

Even though TAM, TPB, IDT and ETAM focuses on different determinants to explain different consumer behavior in technology adoption they share some similarities in common (Baraghani, 2007).

- TAM and TPB models assume an attitude behavior relationship of cognitive and normative beliefs form attitude which in turn has influence on behavioral intention and actual usage of behavior.
- Perceived usefulness in TAM is similar to relative advantage in IDT.
- Constructs of perceived ease of use in TAM is highly related with complexity construct in IDT.

2.7.8. Consequences of Adoption

During the adoption of new innovation especially technology into one system, both positive and negative outcomes are possible when an individual or organization chooses to adopt a particular innovation. According to Rogers (2003), adoption of innovation needs further research because of the biased positive attitude that is associated with innovation. The researcher also identified three categories for consequences: desirable or undesirable consequences, direct or indirect consequences, and anticipated or unanticipated consequences, while Wejnert (2002), categorizes consequences into two: public versus private and benefits versus costs consequences.

2.8. Challenges of Mobile Banking System

According to Yemisirach, CBO E-banking officer, factors affecting the implementation of mobile banking in developing countries in general and Ethiopian in particular are the challenges that banks are facing in a current operation of the system. These challenges are mobile banking agents, technology, awareness, trust, risks, environment (organization), educational level, government directives etc.

2.8.1. Mobile Banking Agents

A wide spectrum of mobile/branchless banking model is evolving in almost all countries of the world (Andrew, 2009). The hello cash of CBO is one of branchless or mobile banking system which runs on this way in Ethiopia. However, no matter what business model, if mobile banking is being used to attract low-income populations in most rural locations (financial inclusion), the business model will depend on banking agents, i.e. retail shops, pharmacies or others that process financial transactions on behalf of banks [branches]. The banking agent is an important part of the mobile banking business model since customer care, service quality and cash management will depend on them. For example, Andrew (2009) said banks in South America; like Colombia, Brazil, Peru, and other markets use pharmacies, bakeries, etc. Not only banks but also many telecommunications work through their local airtime resellers in the world. Working with such agents has a great impact on the reliability, security and attitudes of the customers. In Ethiopia mobile and agent banking is significantly influenced by availability of basic infrastructures of

electricity and telecommunication networks, in addition to agents, especially in rural areas of the country where these infrastructures are highly in a fragile occurrence.

2.8.2. Awareness

The level of awareness of consumers' about mobile banking influences the adoption of mobile banking system. Sathye, et al (1999), stated knowledge factor has a great impact on consumer's adoption of Internet banking. The researcher suggested that many users were simply unaware of Internet banking and its unique benefits. In this study, knowledge refers to the users' awareness of mobile banking and the benefits associated with mobile banking and their knowledge of how to use basic technologies associated with it.

According to Prema (2010) when consumers make decisions for different alternatives in the market place, the awareness of the existing alternatives was a determinant for consumers to stay with their banking provider. Sathye et al (1999), found that lack of awareness about electronic banking and its benefits contribute to the non-adoption of electronic banking. Furthermore these researchers stated that "*the more knowledge and skills a consumer possessed about electronic banking, the easier it was for the consumer to utilize electronic banking. Therefore consumers who are more aware of E-banking are more likely to perceive E-banking as more useful, easy to use and more reliable, thereby influencing adoption of E-banking"*.

2.8.3. Trust and Reliability in Mobile Banking

Customer's trust is considered as a critical factor for the success of mobile banking. With the surge of both electronic commerce (e-commerce) and mobile commerce (m-commerce) and there are some studies have been conducted on the conceptual structure, formation of the mechanisms of trust and effects of trust (Abadi, et al, 2013). As cited in Abadi et al (2013), researchers like Gerrard and Cunningham (2003) defined perceived risk as the uncertainty about the outcome of the use of the innovation. Customers are in a dilemma in adoption of mobile banking system in Ethiopia, because the great fear of them arises from the dimension that new system may lead them in to loss of their money.

According to Prema (2010), reliability explains "the degree to which Internet banking is perceived to be safe and reliable" in the offering and securing transmission of financial transactions. If the potential adopter of Internet banking perceives that the new technology is not safe and believes that mistakes are likely to occur, the user is not willing to adopt (Sathye, eta al, 1999). So in mobile banking the customers' perception toward mobile banking security reliability is also another factor for adopting the mobile banking system.

According to Andrew (2009), organizational factors like lack of interoperability, regulatory barriers, slow speed in customer adoption, data quality, security, personalization, application updating are a great barriers of the customer adoption of M-PESA service system in Kenya. In addition to these, the attitude or perception of the customer toward adoption of mobile banking is also another factor.

2.8.4. Perceived Risks of Mobile Banking

Perceived risk refers to the user's level of uncertainty (Lee, 2009) regarding the outcome of acceptance decision. The researcher identified five risks that can be described for mobile banking, which are discussed as follows;

- ✓ **Performance risk:** refers to losses incurred by deficiencies or malfunctions of mobile banking servers.
- ✓ **Security/privacy risk**: is defined as a potential loss due to fraud or a hacker compromising the security of a mobile banking user.
- ✓ **Time/convenience risk:** this refers to a loss of time and any inconvenience incurred due to the delays of receiving payments or the difficulty of navigation.
- ✓ **Social risk:** refers to the possibility that using mobile banking may result in disapproval by one's friends, family, work group, etc.
- ✓ **Financial risk:** it is defined as the potential for monetary loss due to transaction errors or bank account misuse.

2.8.5. Technology, Organization and Environment

These technology, organization and environment are also other determinants that influence the adoption of mobile banking. Tornatzky and Fleischer (1990) identified the process of technology innovation; technology, organization and environment. As stated earlier, since there is the scarcity of researches done on mobile banking systems in developing countries (especially in Ethiopia), we took the factors affecting adoption of mobile banking from factors identified E-banking. However, the degree of impacts of factors differs from that of E-banking in general.

Ayana (2014) identified the Technology-Organization-Environment factors affecting E-banking in Ethiopian context; three basic factors environmental factors (legal framework, national ICT infrastructure, competitive pressure and government support), organizational factors (financial and human resources) and technological factors (perceived risks or relative disadvantage and perceived benefits or relative advantage) for the adoption of technological innovation and challenges of adoption success of technology innovations.

Technology-Organization-Environment framework was proposed originally by Tornatzky and Fleischer (1990) and it is designed for study of the likelihood of adoption success of technology innovations. This framework is a comprehensive and well received framework in the context of innovation adoption by organizations and has been used in many studies.

The framework indicates technology adoption within and outside of an organization is influenced by factors pertaining to the technological context, the organizational context and the external environment. Technological factor refers to adopter's perception of E-banking attributes, the organizational factor refers to the organization's characteristics that influence its ability to adopt and use of E-banking system and the environmental factor refers to the external environment in which an organization operates and its condition for supporting the development of E-banking services. Hence TOE factors identified by Tornatzky and Fleischer (1990) was also applicable for mobile banking of our study, because the impact of TOE on the customer (user) of mobile banking is similar but the degree of its impact varies.

2.9. Mobile Birr (Mbirr)

Not only banks in Ethiopia, which implemented mobile banking, there are also other regional micro financial institutions, which have implemented mobile banking system (called M-birr and Hello-cash) in to their respective operational regions.

The following table shows both Mbirr which is also called mobile money, and Hello-Cash service giving regional micro-financial institutions which shares different platforms.

No.	Name of Financial Institution	M-banking Platform	Region
1	Addis Credit and Saving Institution	M-Birr	Addis Ababa
2	Amhara Credit and Saving Institution	M-Birr	Amhara
3	Dedebit Credit and Saving Institution	M-Birr	Tigray
4	Omo Microfinance	M-Birr	SNNP
5	Oromiya Credit and Saving Share Company	M-Birr	Oromiya
6	Somali Micro Finance	Hello-Cash	Ethio-Somali

Table 2.1; Regional finance institutions and their mobile banking systems in Ethiopia

The mobile banking and mobile birr (m-birr or mobile money) use different platform and implemented by different companies. However, many of their terminologies are common and both M-banking and M-birr are banking transactions through mobile phone. Terms used in both mobile banking and M-birr are similar but uses different platform applications of different financial institutions in the country.

2.10. Related Works

The related work section consists of researches conducted in the world (developed and developing) in general and in Ethiopia in particular to get a benchmark for our study, the way they did it, the gap with our study and improvements (like technologically, economically, socially, etc). But there is scarcity of study on the area in Africa, especially in Ethiopia. Most of

them reviewed under this topic, due to their objective were technology acceptance and mobile banking focused works.

Internet banking acceptance model: Cross-market examination [London]

This research is conducted by Alsajjan and Dennis (2009) in both United Kingdom and Saudi Arabia countries consumer's acceptance of Internet banking, proposing Internet Banking Acceptance Model (IBAM). The researchers implemented technology acceptance model to measure the consumer's acceptance of Internet banking in both countries. Even though products in Saudis and Britons' have difference in terms of duration, qualities, etc, the results of the study suggest the importance of attitude; attitude and behavioral intentions emerge as a single factor, denoting as attitudinal intentions. The study was conducted by taking a sample of 955 students from Saudi Arabia and UK. The researchers justified as attitude and a behavioral intention toward acceptance of the system is a great determinant factor. Structural equation modeling confirms the fit of the model (Internet banking acceptance model), in which perceived usefulness and trust fully mediate the impact of subjective norms and perceived manageability on attitudinal intentions in both countries. The research also has limitations of analysis on cultural dimensions and nature of the businesses differences in both countries.

Consumers and Mobile Financial Services 2014 [**United States]**

This is a research conducted by Federal Reserve Board of United States on consumers' use of mobile financial services from 2011 up to 2013, a survey research. The study examines trends in adoption and use of mobile banking and payments, and how the emergence of mobile financial services affects and how consumers interact with financial institutions. The research has found that 87 percent of the US adult population has a mobile phone, 61 percent of mobile phones are smart phones and Internet enabled. Thirty three percent of all mobile phone owners have used mobile banking, 51 percent of smart-phone owners have used mobile banking, mobile phone users who are not using mobile banking thinking that they will probably use it in the future. The most widely used mobile banking service is checking account (93%) followed by account transfer (57%).

Generally, the study for two years has found and concluded with the following findings;

- Mobile phones and mobile banking were in widespread use.
- The ubiquity of mobile phones was changing the way consumers access financial services
- Mobile phones were also changing the way consumers make transactions.
- Among consumers who do not use mobile financial services, the principal reasons cited for not using the services were perceptions of limited usefulness and benefits, and security.
- Smart phones are changing the way people shop and make financial decisions.
- Mobile phones are prevalent among unbanked and under banked consumers.

Does Screen Size Matter for Smart phones; Utilitarian and Hedonic Effects of Screen Size on Smartphone Adoption [**South Korea]**

This researcher was done by Kim and Sundar (2014) and has explored the adoption of psychological impacts of screen size of smart phones in South Korea by proposing extended technology acceptance model with comparison of large and small screen phones. The researchers modeled the extended technology acceptance model that integrates an empirical comparison between large and small screens with perceived control, affecting quality, and the original TAM constructs mobile phone on users. They have found that a large screen, compared to a small screen, is likely to lead to higher smart phone adoption by simultaneously promoting both the utilitarian and hedonic qualities of smart phones, which in turn positively influence perceived ease of use and attitude toward the device respectively with some insignificant determinants like performance and effort expectancy, voluntariness, experience, and social influence. This research is considered relevant that it primarily focuses on technology adoption that screen size of mobile matters in using mobile phone services. However this study have limitations of considering small sample size (130) and controlling individual differences like gender and age impact in adopting smart phones.

Mobile Banking Adoption and Consumer Behavior in Nigeria

This study was conducted by Adesinasi (2012), where the researcher used both qualitative and quantitative approaches to assess the level of consumer knowledge about mobile banking in

Nigeria in comparison with the present or current adoption rate. The study have shown that, consumers used mobile banking system due to many factors; like business factors (place strategies, promotional strategies, selection criteria, pricing strategies and product strategies) and technological factors (good coverage, improved mobile device, effective application, security and interface design). Generally, behavioral intentions to adopt the service and good customer awareness holds big percent in wider adoption of mobile banking in the country (Nigeria).

Similarly this study also identified, the factors that were a critical success factors for Nigerian case are also factors of mobile banking adoption in our country (Ethiopia).

Mobile Banking in Developing Countries (A Case Study on Kenya)

This study was done by Wambari Andrew (2009), on M-PESA to establish the importance of overall mobile banking in the day to- day running of small businesses in developing countries in general and Kenya in particular, where most of the populations are unbanked. The researcher also analyzed the impacts of infrastructures like electricity, telecommunication, etc on penetration of mobile banking in the developing countries. The researcher employed qualitative research method in which survey method is used to gather information from small/medium enterprises and the survey respondents were small but informative and accurate. The researcher also analyzed different sectors (like business, transport, business consultancy, fashion and information technology) that greatly affected by mobile banking (M-PESA) system implementation. Finally the study have shown the adoption and use of mobile phones is product of a social process, embedded in social practices such as micro enterprises practices which leads to some economic benefits.

Factors influencing the adoption of Internet banking: An integration of TAM and TPB with perceived risk and perceived benefit [Taiwan]

This study was conducted by Lee (2009) on factors affecting both success factors (positive factors) and resistance factors (negative factors) of the penetration of Internet (online) banking in Taiwan. The researcher explored and integrated various advantages of online banking to form a positive factor (perceived benefit). In addition, drawing from perceived risk theory, five specific risk facets like financial, security/privacy, performance, social and time risk were synthesized with perceived benefit. By integrating technology acceptance model (TAM) with the theory of

planned behavior (TPB) model, the researcher proposed a theoretical model to explain customers' intention to use online banking. The result indicated that the intention to use online banking is negatively affected mainly by the security/privacy risk, as well as financial risk and is positively affected mainly by perceived benefit, attitude and perceived usefulness. These factors similarly affect our country's online banking system negatively and/or positively.

Analysis of Factors Influencing Customers' Intention to the Adoption of E-Banking Service Channels in Bahir Dar City: An Integration of TAM, TPB and PR – [Bahir Dar]

This study was conducted by Yitbarek and Zeleke (2013). The researchers aimed to examine the determinants of customers' intention to adopt e-banking service channels in Bahir Dar city by deriving factors (six factors i.e. TPBs namely; attitude, subjective norm, perceived behavioral control, perceived usefulness, perceived ease of use and perceived risk) from the technology acceptance model (TAM), theory of planned behavior (TPB) and perceived risks (PR). The related work was considered related for this study, because of the variables in it is relevant to this study. It shows their research framework developed to analyze the overall study conducted on the intention of the electronic banking users in the city.

Automatic Teller Machine Adoption of Customers in Commercial Bank of Ethiopia (CBE), Mekelle Branch

This study was conducted by Fyery Abreha (2015) on Automated Teller Machine (ATM) adoption of users in commercial bank of Ethiopia in Mekelle branch. The researcher has identified that ATM adopters in the bank use only limited types of services, predominantly cash withdrawals. Using Rogers model, the researcher also identified that overall five attributes (relative advantage, compatibility, complexity, trialability, and observability) determine the adoption of a new technology became small (means respondents were not sure to agree on the attributes of the technology), which indicates there is no strong agreement of the users on each attributes of ATM technology. In addition, the attitude of ATM adopters (users) towards ATM was found to be positive and hence the researcher recommended the bank has to increase its promotion by focusing on improving customers' awareness towards the technology and the different types of services it provides.

Customers' Perception towards Mobile Banking Security: The Case of Commercial Bank of Ethiopia in Addis Ababa

This research was conducted by Haileyesus (2016), to investigate and determine the customers' perception toward mobile banking security on government owned bank, Commercial Bank of Ethiopia, by using the protection motivation theory (PMT) and two basic constructs of the technology acceptance model (TAM) that are perceived ease of use and perceived usefulness with trust belief and structural assurance.

The study indicated that, customers were truly affected by the factors like structural assurance, perceived vulnerability, perceived risk, self-efficacy, perceived ease of use and trust belief. Similarly the research result clearly shown that there exists relationship between factors that affect the customers' perception towards mobile banking security. Among these factors the main important factors were mainly five, those are perceived vulnerability, perceived risk, self-efficacy, perceived ease of use and trust belief. The researcher have enlightened these factors can be utilized to formulate good promotional strategies in enhancing the use of mobile banking among the customers of the bank.

These researches which were conducted in Ethiopia, analysis of factors influencing customers' intention to the adoption of E-banking service channels In Bahir Dar city: An integration of TAM, TPB And PR, Automatic Teller Machine adoption of customers in commercial bank of Ethiopia Mekelle branch, and customers' perception towards mobile banking security: The case of commercial bank of Ethiopia in Addis Ababa have contributed to our study in that they were comparatively related (similar) with our work. Because, all these researchers were aimed to investigate and analyze the positive and negative impacts of technology (mobile) adoption in Ethiopian banking industry.

The difference in this work and these previous studies were first they were conducted on government owned commercial bank of Ethiopia, second they were limited to one city only like Bahir dar, Mekelle and Addis Ababa, and in scope our study covers wide parts of the country. However, the research conducted by Haileyesus in 2016 is the latest, only study in Ethiopia on mobile banking security and relevant to this study. In general, their objectives were also similar to our study like security risk of the user as one challenge of technology practices in Ethiopian banks. Our study additionally assessed the overall aspects of mobile system (like IVR, SMS, etc) for banking service in Ethiopia.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Overview

The research methodology section of this study outlines how an investigation has taken place and a research method and design typically including how data has been collected, what instruments employed, how the instruments used and the intended means for analyzing data was conducted. In addition to these, sample selection, populations of the study and the procedures of data collections were presented.

3.2. Research Approach

The decision of whether to carry out a quantitative or qualitative approach lies in the researcher's assumption (Kanaan, 2009), in order to achieve the objectives of this study, the research method followed was both quantitative and qualitative, mixed research approach.

According to Johnson et al (2007), mixed research method is a research practice and recognized as the third major research approach or research paradigm along with qualitative research and quantitative research methods. The researchers also tried to prove that there might not be a single criterion of demarcation for mixed research methods.

For this study, quantitative research was used to provide numerical measurement and analysis of the adoption dynamics. Survey questionnaires were used for standardisation purposes to allow for aggregation of the results. The investigation aimed to identify whether the variables were influence factors in the adoption of mobile banking. The research established the effect of independent variables, which included perceived risk, trust, perceived cost, perceived usefulness, and perceived ease of use on dependent variables, i.e. the adoption and challenges of mobile banking.

The research approaches that could be a benchmark for conducting any research at all were; like quantitative and /or qualitative, and also inductive and/ or deductive approaches of research.

But the approach preferred for this study was the first, mixed approach as discussed in the earlier section.

Creswell (2010), defined mixed research approach as,

"A mixed methods approach is one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centered, and pluralistic). It employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problem. The data collection also involves gathering both numeric information (e.g., on instruments) as well as text information (e.g. on interviews) so that the final database represents both quantitative and qualitative information". Accordingly, the research approach used for this study was both quantitative and qualitative or mixed approach. This was caused by the assumption of getting the required data that could not be obtained by only one approach or triangulation.

3.2.1. Qualitative versus Quantitative

According to Saunders, et al. (2009), qualitative research was primarily an exploratory research and used to gain an understanding of underlying reasons, opinions, and motivations. It provides an insight into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative research is also used to show trends in thought and opinions, and go deeper into the problem. Qualitative data collection methods include using unstructured or semi-structured (interview) techniques, focus groups (group discussions), individual interviews, and participation/observations. This approach is good when sample size is typically small, to get timely data and respondents are selected to fulfill a given quota.

In order to have a better understanding and detailed information, quantitative approach was mainly used in this study, as it provides respondents to answer or explain their feelings without fear. This research approach was used to quantify the problem by way of generating numerical data or data that can be transformed into useable statistics. It is used to quantify attitudes, opinions, behaviors, and other defined variables and generalize results from a larger sample population. Kanaan (2009) stated, quantitative research uses measurable data to formulate facts and show patterns in research. Its data collection methods are much more structured than

qualitative data collection methods. According to Johnson, et al (2001), quantitative data collection methods include various forms of surveys like online surveys, paper surveys, mobile surveys and kiosk surveys, telephone interviews, website interceptors, online survey and systematic observations.

3.3. Research Method

This study employed the survey research which has defined by Bhattacherjee (2012), as research method involving the use of standardized questionnaires or interviews to collect data about people and their preferences, thoughts, and behaviors in a systematic manner.

Survey method can be used for descriptive, exploratory, or explanatory research. It has also shown that the method best suited that have an individual people as the unit of analysis, other unit of analysis such as groups, organizations or pairs of organizations, such as buyers and sellers, are also studied using surveys, such studies often use a specific person from each unit as "key informant" or a "proxy" for that unit.

Hence, in this study based on sources of data, primary and secondary sources of data collection was performed. The primary data was collected by distributing a structured questionnaire to respondents (the bank's officers and customers). As the study is at national level, the adoption and challenges of mobile banking system were asked their view on a series of questionnaires distributed to them. Besides, secondary data collection means has also been used.

3.4. Research Model and Hypotheses

3.4.1. Research Model

As discussed earlier, since the study was focusing on the adoption and challenges of mobile banking in Cooperative Bank of Oromiya, the research model on which the research bases adopted from the technology acceptance model (TAM) and innovative diffusion theory (IDT). In addition to these, theories of planned behavior and extensions of those theories used to support and make the study more comprehensive. The reasons for the selection of these models were their relevance to the topic of study the researcher has conducted. Their relevance was the nature of acceptance of technology (adoption of mobile banking system in our case) and distribution of the technology (dissemination of innovation among users) with some other concepts.

Technology Acceptance Model (TAM) was proposed by Fred Davis in 1986. Davis (1986) defined perceived usefulness as "the degree to which an individual believes that using the particular system would enhance his / her performance" and perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort". According to him, attitude of the user toward the acceptance of new technology or information system is determined by perceived usefulness and perceived ease of use.

The innovative diffusion theory (Rogers, 2003) on the other hand, is the innovation process that will be spread over time among the members of the social system. In information communication technology it could be also the dissemination of information technology in an organization or environment (Rogers, 2003). Both models' relevance to the research is the first deals with the customers' perception toward using IT while the second measures the implementation of the system among users. So the hypotheses arise from these research models which contribute to the determinant factors of the adoption and challenges of mobile banking system.

3.4.2. Hypotheses

For this study, the following hypotheses were proposed in the context of the adoption and challenges of mobile banking by users and bank. These hypotheses were from TAM, IDM, trust and perceived risks, which were hypothesized as follows;

Hypotheses of Mobile Banking Adoption

According to Ayana (2014), relative advantage or perceived benefit as a technological factor for the adoption of technological innovation and challenges, influences positively the adoption success of technology innovations or adoption of E-banking than traditional banking system. So this hypothesis could be applicable for our study, and we hypothesize it. Online banking offers relative advantages; lower transaction costs, faster transaction speed, and better information transparency as well as allow customers to enjoy some free services such as news and 24-hour services (Lee, 2009). **So;**

H1: Relative advantage positively influences mobile banking adoption by customers.

Behavioral intention of a user to accept innovation is analogous to the adoption of mobile banking (Davis, 1989; Venkatesh & Davis, 2000). This means that PU and PEOU with other

factors will have a significant impact on a user's adoption of mobile banking. The relationship between PU and PEOU is that PU mediates the effect of PEOU on attitude and intended use. This means while PU has a direct impact on attitude and use, PEOU influences attitude and use indirectly through PU and the adoption intention of a technology determines actual usage.

According to (Davis, 1989), they are very important factors affecting the adoption of new innovation. There exist a positive relationship between perceived usefulness and perceived ease of use and they are very important factors on the use of mobile banking. Therefore, an innovation perceived to be useful to customers which is equally easy to use is more likely to be better accepted by customers. So we **hypothesize both as**;

H2: Perceived ease of use (PEOU) positively influences mobile banking adoption.

H3: Perceived usefulness (PU) positively influences adoption of mobile banking.

According to Bhattacherjee (2002), trusting intention represents users' willingness to engage in subsequent transactions with the service provider. Trust belief or reliability of a product or service provided by a provider, especially in nongovernmental companies, have a great implication on the user's intention. The higher levels of trust in a service provider will therefore lead to a greater intention on the part of user to engage in mobile banking transactions (Lee *et al.*, 2007). Haileyesus (2016), since mobile banking is at its initial adoption stage, customers were unclear about the technical capabilities of their banks to provide the service and about the reliability and security of Internet and wireless communication about their financial data, so we hypothesize as;

H4: Trust reliability influences adoption of mobile banking positively.

Hypotheses of Challenges of Mobile Banking (Perceived Risks)

According to Yousafzai et al. (2003) perceived risk is defined as "the potential of loss in the pursuit of a desired outcome from using electronic banking services". Workman et al. (2008), suggest when a risk is perceived, individuals will change their behavior based on how much risk they are willing to accept for the particular threat. Lee (2009) categorizes these perceived risks into five; performance risk, security or privacy risk, time risk, social and financial risk**.**

Performance risk refers to losses incurred by deficiencies or malfunctions of mobile banking servers (Lee, 2009). This notion depicts that the responsive deficiency or non functionality of banks associated with other factors greatly influences customers to adopt the newly implemented mobile banking system. This greatly affects (negatively) the customer adoption of the system, therefore we hypothesize it;

H5: Performance risk negatively influences the adoption of mobile banking.

Security or privacy risk is defined as a potential loss due to fraud or a hacker compromising the security of an online bank user (Lee, 2009). "Phishing is a new crime skill by which phishers attempt to illegally acquire sensitive information, like usernames, passwords and credit card details, by hiding themselves as a trustworthy entity in an electronic communication" (Reavley, 2005). A phishing attack takes place when a user receives a fraudulent email (often referred to as a spoof email) representing a trusted source that leads them to an equally fraudulent website that is used to collect personal information (Entrust, 2008). Both fraud and hacker intrusion not only lead to users' monetary loss, but also violate users' privacy, a major concern of many Internet users. Many consumers believe that they are vulnerable to identity theft while using online banking services (Littler and Melanthiou, 2006, as cited in Lee, 2009). Since all facet of this hypothesis applies to mobile banking, we hypothesize this;

H6: Security risk negatively influences the adoption of mobile banking.

Time risk which is also called convenience risk refers to "the loss of the time and inconvenience incurred due to the delays of receiving the payment or the difficulty of navigation" (including finding appropriate services and agents). The most causes of dissatisfying mobile banking experiences that may be thought of as a time or convenience risk which are delays due to telecom network and too much time to get agents as they are mostly at a distance, especially not too far from branches. Online banking risk is also related to "the length of time involved in waiting the website or learning how to operate online banking website" (Lee, 2009). This may also works when it comes to mobile banking server's response delay in responding to financial transaction of customer, so we hypothesize this;

H7: Time risk influences mobile banking adoption negatively.

Social risk refers to the possibility that using online banking may result in disapproval of one's friends/family/work group (Lee, 2009). According to the researcher, one's social member's satisfaction may enhance or diminish online banking, as this hypothesis also works for mobile banking adoption. Because the satisfaction of friend/family/work group greatly impacts the individual's acceptance of mobile banking, hence we hypothesize it.

H8: Social risk positively influences the adoption of mobile banking.

Financial risk implies to two dimensional major factors which influences customers' adoption of new technology. Firstly, financial risk as defined by Lee (2009) is "the potential for monetary loss due to transaction errors or bank account misuse". The other aspect of the hypothesis goes to a study conducted by Wu and Wang (2005) on mobile commerce acceptance showed that perceived cost (transaction cost, in our study) had a significant effect on the adoption of mobile banking. This study is conducted on the bottom of pyramid (BOP) market segment; a segment characterised with lower disposable income. According to Karnani (2009), people at the bottom of pyramid have a very low purchasing power and are price sensitive. It is hypothesized that the perceived cost (transaction cost) of mobile banking services is more likely to negatively influence the adoption of mobile banking, so we hypothesize;

H9: Financial risk negatively influences the adoption of mobile banking.

The diagram below shows summary of all hypotheses and the model proposed for this study after review of literatures from different sources for the adoption and challenges of mobile banking system.

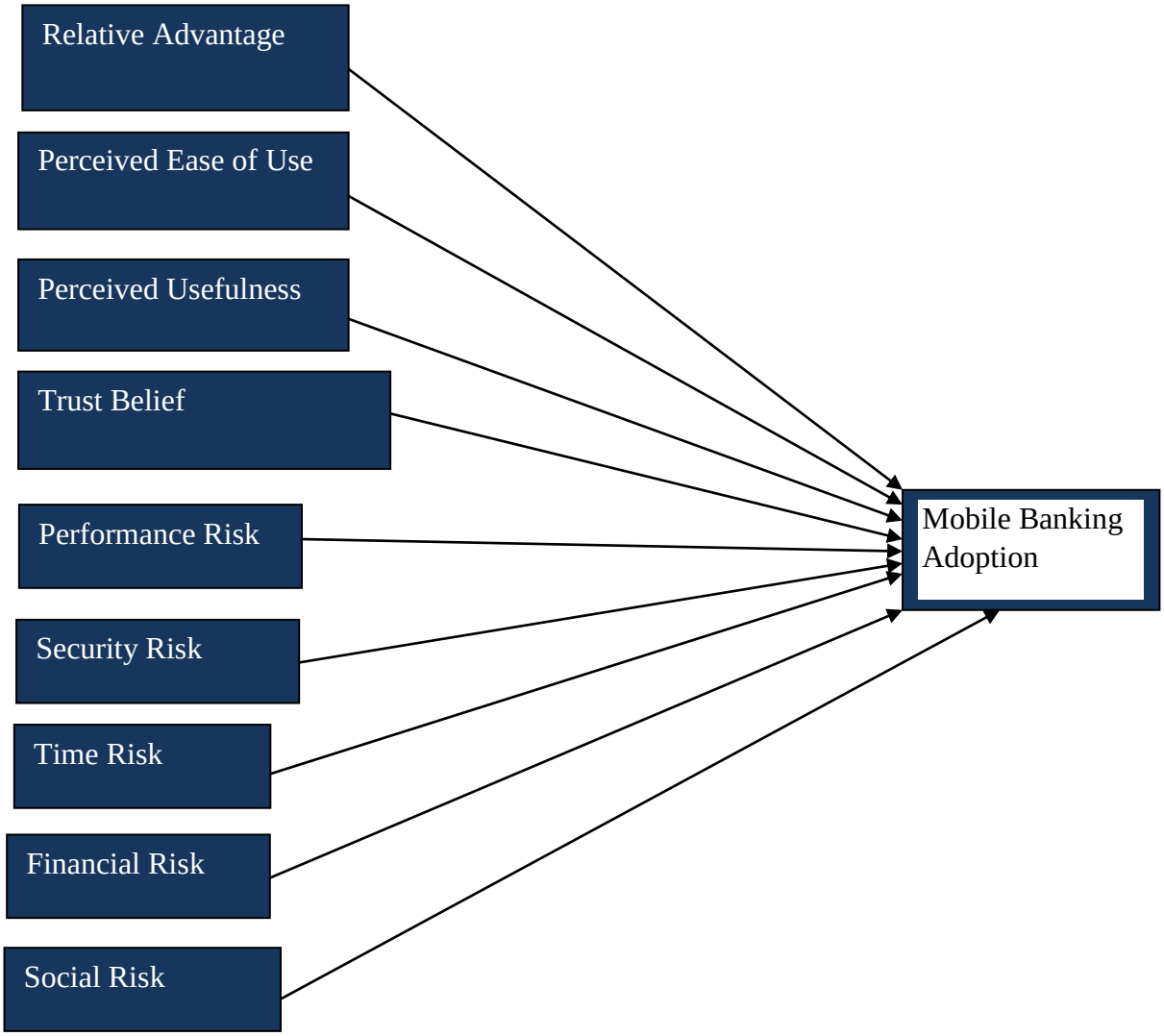

Figure 3.1: Model of the study

Population of the Study

Zikmund (2003), defined a population as any complete group of people, companies, hospitals, stores, college students or the like, that share some set of characteristics. For the purposes of this study, the populations of interest are defined as a group of customers and officers of cooperative bank of Oromiya found in the country those are mobile phone users and mobile banking system users. Even though CBO implemented the mobile banking system called hello-cash service with others like Lion International Bank, Wegagen Bank and Somali Micro Finance, the study was limited to Cooperative Bank of Oromiya only. These respondents are bank workers and

customers (users). The population was individuals with a mobile phone and a bank account in Ethiopia, without any limitations attached with.

As stated earlier, until this data is collected, of eighteen commercial banks running currently in the country, there are only six banks those implemented mobile banking. Among them, hello cash mobile banking system is implemented in CBO, Wegagen Bank and LIB as well as Somali Micro Finance and there is no researches conducted on the area in Ethiopia. So these all conditions motivated the researcher to study on the area and the organization.

3.5. Research Instruments

The research instruments mainly used for this study were interview and questionnaire. Both interview and questionnaire were adopted from literatures conducted on the area in all developed countries, developing countries and in Ethiopia, focusing on the statement of problems, objective and research questions of the study.

The instruments of the study (interview and questionnaire), were employed to collect sufficient data for the research. The semi structured interview was intended for the selected bank officers responsible for M-banking, in which mobile banking is administered, and some bank branch managers. The process and output of this semi structured interview disclosed in the next chapter.

The questionnaire (mainly used instrument) was used for bank customers and bank officers (workers) as they are both officers and mobile banking users. The overall procedures of the questionnaire were discussed in the following section. (See appendix 1 for questionnaires).

3.5.1. Pre-Testing of Questionnaire

The questionnaire was tested on some individuals (both bank officers and users), those have actual information and knowledge at hand on the area, before it was finally distributed to the respondents. The pre test which was done mainly for validating content of the items and constructs performed for many reasons. The first is since it is adopted from a literature, checking the content validity (relevance) of the items is important. Second the questionnaires were tested in order to identify errors and ambiguity of ideas in the questions, length of the questions. Third, it was also used to limit the length of the questionnaire which might be difficult to understand

and vague terminologies to respondents and also the questionnaires were evaluated as not to be too small to make clarity on behalf of the respondent. After all these individuals commented on it and required adjustments were made to the overall questionnaire, it was distributed to each respondent of both the bank workers and mobile banking users.

The questionnaires were distributed personally by the researcher to the respondents. The questionnaires have distributed to the customers of the banks, found in eastern part of the country, north-western and central parts of the country. The directions were selected, because even though the bank aims to include the unbanked population of the society, the mobile banking systems implementation follows the distribution pattern of bank branches in the country. So the researcher followed these directions in order to get customers through branches.

3.5.2. Sampling and Size of Sample

According to Zikmund (2003), sampling is the act of selecting some of the elements (portion) in a population and conclusions can be drawn about the entire population. For this study, the sampling method used was purposive sampling in order to focus on informal settlements, rural areas or towns of selecting respondent of customers found in Ethiopia. The other reason of selecting purposive method is no other best option (like probability sampling) since the respondents or users of mobile banking system are distributed informally as well as the number of them varies within a fraction of second. The researcher chose all mobile banking implemented banks as a sample, eight respondents from each branch; hence samples are chosen to represent the relevant attributes of the whole population. In this respect I note the caution by Graziano and Raulin (1997) as cited in Ayana (2014), suggesting the samples are not perfectly representative of the population from which they are drawn, therefore the researcher purposively selected the respondents.

In order to calculate the appropriate sample size for the study, Cochran's (1997, cited in Gill & Johnson, 2010: 128) sample size formula was used.

The formula is:

$$N = \frac{P*(1-P)*Z^2}{E^2}$$

Where, N = Required sample size

P = Percentage picking a choice, expressed as decimal (0.5 is used for the sample size needed). Percentage of occurrence of a state (condition)

E = Percentage of maximum error required (e.g. 0.09, ± 9), this is the margin of error. (Mostly 0.1(10%) is used as margin of error), however, below 0.1(10%) can be used as far as the required initial sample size is determined. So for our case we use 0.085 margin of error, which is 8.5%.

Z = Z value corresponding to level of confidence required (e.g. 1.96 for 95% confidence level, because most researchers use the 95% confidence level).

There are many rules of sample size selection and the decision of the appropriate confidence level and percentage of error is not fixed, but a review of the literature related to the problem area could be used as a base line. For this study sample size was calculated with 95% confidence and 4-5% maximum error. Based on this the calculated sample size becomes:

$$N= \frac{0.5*(1-0.5)*(1.96)^2}{(0.085)^2}$$ this gives approximately 133

Final sample size (N1) = Design effect*initial sample (No).

N1=1.5(default value)*133 = 1.5*133, so this gives us approximately 200 sample size. Additionally, this sampling method was selected based up on related works conducted, in this way and using same technique.

3.5.3. Distribution of the Survey and Data Collection Procedure

The questionnaire was used as a survey instrument for this research work by collecting data from different aspects of the respondent on mobile banking adoption and challenges in the country. Zikmund (2003), a survey questionnaire is a powerful and effective tool that can be used to collect data about human attitudes, behaviors and characteristics.

Data was collected via personally administered questionnaires from different sources such as customers and bank workers as they are also customers. This strategy was selected due to many assumptions. First, this method was both less expensive than enumerator involvement and the time required was less. Second, the questionnaire was prepared for all level educational

background which includes the uneducated those needs interpretation to vernacular (into Amharic and Afan Oromo), so the researcher performed these.

Data was collected from all mobile banking implemented branches of the bank, in which eight respondents were selected from each branches. The questionnaire was distributed in three phases, following the distribution pattern of the Cooperative bank of Oromiya in the country; Eastern, Central and Western part of Ethiopia. These directions were selected because of the distribution of branches which was followed by customers are identified many, when compared with other directions of the country. In all branches eight respondents per branch were selected, because during this data collection only twenty five branches have implemented mobile banking. On the first phase questionnaires were distributed in Eastern part of the country branch areas of CBO (Shashamane, Adama and Asella).

On the second phase, questionnaires were distributed and data was collected in Addis Ababa city branch areas of Asko, Ya'i Gullele, Churchill, Finfinne (HQ), 22Mazoria, Megenagna, Ferensay Legasiyon, Kazanchis and Lamberet and the Addis Ababa surrounding branch areas of Burrayu, Laga-Tafo and Sandafa. The last phase of data collection was conducted on the western part of the country (Ambo, Nekemte and Shambu) branch areas of the bank, in which questionnaire were distributed. All data collection phases was conducted personally by the researcher in face to face with the respondents.

The survey questionnaire was distributed in eastern, central and western parts of the country administered by a researcher. Prior to the distribution of the survey to respondents, the bank informed the branches about the research, through its official acceptance of the study (given for the researcher) by stamping on the official letter sent to it from the university. So the agreement on the acceptance was able to confirm the respondents, especially bank workers, in completing the survey

The researcher requested and introduced the objective and purpose of the study to the respondents by going to the place of respondents. If they accept the request (willing to respond), questionnaires would be given to them otherwise, they would not be given. All questionnaires

were filled anonymously then collected by the researcher over a period ranging from one day to two week.

The respondents were the CBO workers and its customers found around the selected branch areas of the bank in the country. The reason of the selection of the bank was as described above, there are few banks those implemented mobile banking system in the country of which the CBO was one of them. The mobile and agent banking (Hello cash) system binds two other banks and one micro financial institution. Since there was no similar research conducted in the country and other banks except the perception of mobile banking security on CBE, the researcher selected the bank for the study organization. Since the distribution of the bank branches covers some parts of the country and the researcher tried to address the customers found in mostly distributed areas, the sample of the study is expected to represent most of the population.

3.5.4. Questionnaire

The survey questionnaire consisted of two parts. The first section focused on the respondent's demographic details (information). The demographic variables include: gender, age category, monthly income, educational qualifications, occupation and marital status.

The second part (part two) constitutes the detail analyses of variables of the study, mobile banking system adoption and challenges among respondents; relative advantages of mobile banking, perceived ease of use, perceived usefulness, perceived risks, trust reliability, transaction cost (perceived cost) and technology compatibility with overall perceptions of the respondents based on the variables in the research model using the 5-point Likert scale from 1 ("strongly agree") to 5 ("strongly disagree"), as found in Appendix 1.

The questionnaire aimed at identifying whether the variables were related factors, influencing the adoption and challenges of mobile banking. The variables are: the adoption of mobile banking and challenges of mobile banking those are identified for this study (identified through the literature review) are: relative advantages, perceived usefulness, perceived ease of use, perceived risk (including the five facets of risks), trust belief, and perceived / transaction cost.

3.6. Data Analysis Tools and Techniques

Data collected from the respondent was checked and inserted into statistical package for social sciences (SPSS) version 20.0 software which was used to analyze the responses from the collected data.

Descriptive statistics (such as frequency) analysis was conducted on the demographics data. The data was sorted to group questions according to applicable constructs of hypotheses analysis. In this study the target populations were mobile banking users and non users. The non users were only treated only to identify the factors challenged them for not using the system. A question within the questionnaire was included to enable the categorisation of respondents into these user and non user groups of mobile banking.

Descriptive analysis and Pearson correlation was used to analyze (determine) variables' relationship with adoption and challenges of mobile banking system. Various combinations of variables, which included perceived usefulness, perceived ease of use, perceived risk, trust reliability, and perceived cost, was tested to establish the best combination of predictors.

In addition to these, statistical hypothesis testing that is a method of statistical inference was conducted on proposed hypotheses to confirm data analysis. Hypothesis is proposed for the study that statistical relationship between the two data sets or relationship between variables (variables and mobile banking system) were analyzed. For this study hypothesis test that is also called confirmatory data analysis, was conducted statistically based on significance values/ significance level. Because, as a rule of thumb majority of researches advocate that significance value 5% or less (5 times in 100 or less, in other word, 0.05) is used to justify a hypothesis test or significant to accept (support) while above it is used to reject a hypothesis. This level of statistical significance is often expressed as the so-called probability value (p-value), see table 4.12 statistical hypothesis test.

3.7. Limitations of the Methodology

This section consists limitations of methodology of this study. These were the following;

Sample selection locations: since the study covers the representative of users of CBO, the study was mainly conducted in the areas where the number of bank branches, agents and mobile bank customers were widely available. This led the researcher to the Eastern, Central and Western parts of the country (as discussed earlier) and limited geographical coverage of the study.

The survey questionnaire was in English: even though during the completion of the questionnaire providing some translation into vernacular was not so much challenging, the respondents (especially those were uneducated and at lower educational level) may have some unidentified understanding of the language. This could might have led to misinterpretation and misunderstanding on the content of some questions. During analysis, some respondents without mobile bank accounts were included in the results due to the necessity of understanding of the challenges of the mobile banking system.

Sample size: The sample size considered was based on the consideration of its too much and too small selection of the population, to manage it at its considerable level. This is estimated as it could give full generalization for the overall study.

Recourses: since the study was state level, resources like; time, human power and cost allocated for this study also may had an influence on the researchers' decision to pick a sample size, locations, other costs like telephone calls, transportation, Internet, copies and other related costs.

3.8. Quality of the Research

The most widely used measures of quality of research are reliability and validity. During selection of instruments of data collection like questionnaire and interview, detail discussions was made with both bank officers and some researchers. Accordingly, ambiguous or vague wording was avoided to ensure that respondents would read and answer the question consistently on different occasions in the same context. Additionally, constructs and items of the instruments were adopted after deep analysis of theoretical and experimental literature was conducted and modified as a context of the country. So the reliability and validity of the study was considered

from crosschecking of data from different sources. Greenfield et al (2002) as cited in Haileyesus (2016), defined reliability as "the consistency or repeatability of the measure". This suggestion could be supported by Cronbach's alpha value for the model factors and the questionnaire items determined (see reliability measure in the next chapter).

Additionally, according to Greenfield et al (2002) as cited in Haileyesus (2016), validity is defined as a way of checking that the study is "measuring what was intended to measure". There are different types of validity measurements including content validity and construct validity. The content validity could be assured during preparation of questionnaire based on extensive reading of literature review. According to Kumar (1999, cited in Haileyesus, 2016), construct validity is "a data reduction technique and principal component analysis method which explains the relationship between variables". The researcher also indicated construct validity could be determined by checking the item loadings using principal component analysis and by reducing items having low loadings.

3.9. Summary of Methodology

The research methodology (approach, instruments, data collection techniques and tools for analysis, and all hypotheses) for this study followed is selected after a deep literature reviews were conducted on researches which are relevant to the research title, objective and relevance to the context of our country because there is no similar or exact research conducted on the area in Ethiopia.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION [RESULTS]

4.1. Introduction

This data analysis and discussion section presents a description of the results of the statistical analyses that were revealed on the demographic profile of survey results, the results of the scale of hypotheses and provides aggregate information about the survey study. Since the objective of the study was identifying and investigating the adoption and challenges of mobile banking system in the country, the study analyzed data obtained from both bank officers and customers. In addition, the finding outline of the study was also discussed in accordance with the questionnaires, interview, hypotheses and literature.

4.2. Response Rate and Statistical Tools Used

A total of 200 questionnaires were distributed to the respondents in three phases (discussed earlier). Of these, fifteen (15) responses had been discarded due to invalid or incomplete data entries and a total of 185 responses were qualified. Thus the sample comprising of a total of 185 respondents' feedback was used for analysis. This means the qualified data comprises 92.5% of sample size. From the received questionnaire feedbacks, many meaningful results were found and documented.

The statistical tools employed in this study were Pearson correlation and descriptive statistics like simple frequency distribution, reliability and validity tests for analysis; SPSS version 20.0 was used to perform statistical analysis. The reliability of the questionnaire data was carried out by using Cronbach's Alpha value. Since the study focuses on adoption and challenges of mobile banking, the adoption part was analyzed by Pearson correlation while the challenges are descriptive statistics. The models of adoption of MB hypotheses are associational so correlation analysis among the variable relationship was done.

4.3. Fitness of the Questionnaire

Fitness of the questionnaire is the quality (in terms of reliability and validity) of the questionnaire of the study, and they were discussed below.

4.3.1. Reliability and Validity

Reliability is one of the characteristics and /or quality of measure of constructs. As of Bhattacherjee (2012), reliability is the degree to which the measure of a construct is consistent or dependable. EDURS (2016) also defined reliability as the consistency of measure and test is considered reliable if the tester gets the same on repeated trails. There are many types of reliability: internal consistency reliability, test retest reliability, internal reliability (Cronbach's alpha), parallel form reliability and inter rater reliability. For this study we have used internal reliability (Cronbach's alpha) to justify reliability and internal consistency of the questionnaire.

Cronbach's Alpha	N of Items
.848	24

Table 4.1: Reliability of the questionnaire (Cronbach's alpha); Source: SPSS result

As we can see from this table, the Cronbach's alpha (internal consistency) of the questionnaire displayed for all 24 items of the questionnaire of hypotheses was 0.848, which indicates high internal reliability of items of the questionnaire. A rule of thumb that has been advocated in the literature (Nunnally, 1998) is to require Cronbach alpha (**α)** to equal 0.70 or exceed it before the items are considered internally consistent. So, this result indicates there is strong internal consistency among all items of the constructs (because, Cronbach's alpha result 0.848 is greater than 0.7). This means that respondents who tended to select high scores for one item also tended to select high scores for the others; similarly, respondents who selected low scores for one item tended to select low scores for the other items.

Additionally, validity according to Bhattacherjee (2012) refers to the extent to which a measure adequately represents the underlying construct that it is supposed to measure. Hence, to make measurement approach or instrument robust thorough analysis of both theoretical and empirical literatures were performed and consequently the study variables were developed. Validity also can be defined as the extent to which data collection methods or methods accurately measure what they were intended to measure.

Generally, to make sure the validity and reliability of the questionnaire repeated discussions were held with some of the bank officer experts to have depth insight in order to contextualize the study variables. Moreover, the pilot test was made at bank and some other individuals those have knowledge of research to obtain the respondents' feedbacks, which were ultimately used in the final preparation of the questionnaire.

The model selected for the study was chosen after deep analysis and examining of related literatures based on the context of the objective of the research were conducted. In our research we attempted to explore the main barriers and drivers of adopting mobile banking system in Ethiopia. It also analyzes challenges both the bank and customers were experiencing during adoption and implementation of mobile banking (hello cash) system in the country by adopting some constructs from technology acceptance model (TAM) and innovative diffusion theory (IDT) in terms of factors like environmental, organizational and technological factors.

4.4. Demographic Characteristics

This section outlines the findings on the demographic characteristics of the respondents, which includes gender, age, educational level, work status/occupation, income level and marital status of the respondent (bank officers and customers). The table 4.2 below shows the demographic representation of the respondents.

Variable	Classification of Variables	Frequency	Percentage
Sex	Male	128	69.2%
	Female	57	30.8%
	Total	**185**	**100.0**
Age	From 18-27	91	49.2
	From 28-37	69	37.3
	From 38-47	16	8.6
	From 48-57	8	4.3
	57+	1	.5
	Total	**185**	**100.0**
Educational Level	Masters/above	26	14.1
	Bachelor	125	67.6
	Diploma/Equivalent	22	11.9
	High School	10	5.4
	Elementary	2	1.1
	Illiterate	0	0
	Total	**185**	**100.0**
Occupation	Governmental	57	30.8
	Non Governmental	114	61.6
	Pensioner	1	.5
	Student	11	5.9
	Other	2	1.1
	Total	**185**	**100.0**
Monthly Income	Less than 2000	9	4.9
	From 2000-3999	13	7.0
	From 4000-5000	13	7.0
	From 5001-10000	88	47.6
	10000+	62	33.5
	Total	**185**	**100.0**
Marital Status	Married	69	37.3
	Divorced	2	1.1
	Widowed	1	.5
	Unmarried	113	61.1
	Total	**185**	**100.0**

Table 4.2: Demographic Representation of the Respondents (Source: Own SPSS Data)

The frequencies were used to determine how often respondents made a certain response in answering questions, and this allow general information about the information collected to be

analyzed. Accordingly, the table 4.2 above shows 128 (69.2%) of the respondents were male and 57 (30.8%) were female. This means the majority of the respondents are male. Similarly, it indicates the highest percentage age of respondents were adults, between the age group of 18 to 27 years 91 (49.2%), followed by age group between 28 to 37 years 69 (37.3%), the third largest age group was between 38 to 47 years 16 (8.6%) while the fourth age group was in between 48 to 57 years 8 (5%) and only 1 (0.5%) above 57.

Even if, there is no clear or minimum age limit on the policy directives or guidelines of bank, for the user to open a bank account (both in hard copy and mobile banking), in Ethiopia an applicant needs to be 18 years old or above to have both bank accounts without their parents' consent; so, the researcher directed all questions to the customers those are 18 years old and above. However, youths under-aged (less than 18 years) in the country especially those migrated from rural to the capital are engaging in different work categories and earn money to help themselves and their families lack such opportunity.

The other variable in the table 4.2 was educational level and the majority of the respondents were bachelor of degree holders 125 (67.5%), the second is Masters / above 26 (14.1%), the third is Diploma or other TVET certificates equivalent with the level which were 22 (11.9), fourth is those had some high school education 10 (5.4) and the last 2 (1.1%) were those have Elementary level education. From this figure we can understand that, even though more than 40% of population of the country is uneducated (USDE, 2016), there was no uneducated mobile banking user among the respondents.

The table also shows the occupation or work status of the respondents. It indicated that the most dominant work category of the respondents are Non-governmental 114 (61.6%), which includes job categories of business men/women, self-employed, NGO's, housewives, etc in this study. The second was Governmental jobs 57 (30.8%), the third was Student 11 (5.9%), fourth was other job categories not listed in the option 2 (1.1%) and fifth was pensioner 1 (0.5%), and lastly unemployment respondent that had no response which means no unemployed respondent.

The table 4.2 additionally shows the monthly income of the respondents, in which the majority of the respondents 88 (47.6%) were those who earn from 5000 to 10000 birr per month followed by higher earnings 62 (33.5%) which is above 10000 birr per month. Thirdly respondents those

get monthly income from 2000 to 3999 and from 4000 to 5000 birr per month were equally 13 respondents (7%) each, and the last 9 (4.9%) respondents earning was less than 2000birr per month.

The last variable in the table above was the marital status of respondents, in which the majority of respondents were unmarried 113 (61.1%) and 69 (37.3%) of them were married. There were 2 (1.1%) divorced and 1 (0.5%) widowed respondent in the study.

4.5. Analyses of Mobile Banking Adoption and Challenges

In order to assess the challenges of mobile banking adoption system in the country on both the bank and customers' side, questions were derived from analysis of different related literatures organized in our country context, which was distributed to the respondents were analyzed with their corresponding hypothesis as follow. They were prepared according to Likert scale responses. The hypotheses testing and analysis was conducted by Pearson Correlation coefficient in order to assess the association or relationship among the two variables, mobile banking adoption and the determinants. As discussed earlier, the detail preparation and relevance of the hypotheses disclosed in the previous chapter (three), now the study described the analyzed data in the following section.

I. Relative Advantage

Hoppee *et al.* (2001) suggested that relative advantage has a positive influence on the adoption of Internet Banking and it is compatible with their values to be adopted by users, and also the concept is applicable to mobile banking system.

Table 4.3; Correlation between Relative advantage and mobile banking adoption

Correlations			
		Mobile Banking Adoption	**Relative Advantage**
Mobile Banking Adoption	Pearson Correlation	1	**.613****
	Sig. (2-tailed)		**.000**
	N	175	175
Relative Advantage	Pearson Correlation	**.613****	1
	Sig. (2-tailed)	**.000**	
	N	175	175
****. Correlation is significant at the 0.01 level (2-tailed).**			

As depicted on the table 4.3, there is relatively strong association between both variables (relative advantage and mobile banking adoption) having 0.613 and significance value of 0.000, which is less than 0.05. Hence, it justifies the existence of significant correlation between the two variables.

The correlation coefficient is evident as most mobile banking offers more advantage than conventional banking system as it allowed them to manage their financial transaction better. And also mobile banking made them more comfortable with the bank to carry out their banking activities. Therefore, mobile banking enabled the customers manage their finance and made them comfortable to interact with the bank than traditional banking system where many procedures were reduced.

Therefore, this is in support of the hypothesis that relative advantage influences positively mobile banking adoption. This research finding shows that comfortability and enabling to manage their finance through mobile banking system positively influence MB adoption. This shows that relative advantage have a positively influence on consumers adoption and usage of mobile banking service. This work is in line with Beatty et al. (2001) indicated that relative advantage has a positive influence on the company e-banking adoption. Therefore, it is

reasonable to assume that relative advantage positively influence user adoption of mobile banking system.

II. Perceived Ease of Use

Table 4.4: Correlation between Perceived ease of use and mobile banking adoption.

Correlations			
		Mobile Banking Adoption	**Perceived Ease of use**
Mobile Banking Adoption	Pearson Correlation	1	**.698****
	Sig. (2-tailed)		**.000**
	N	175	175
Perceived Ease of use	Pearson Correlation	**.698****	1
	Sig. (2-tailed)	**.000**	
	N	175	175
****. Correlation is significant at the 0.01 level (2-tailed).**			

From table 4.4 above, the Pearson correlation values shows there is strong correlation between the variables (mobile banking adoption and perceived ease of use) by considering correlation coefficient 0.698 and significance value of 0.000. Hence, the correlation value of 0.698 means that there is relatively strong positive association between the variables. This means mobile banking system program easiness and simplicity as well as easily remembrances of PIN, USSD and Login numbers are positively influencing mobile banking adoption. Easily navigation of MB menu, easily making payment, money transfer and viewing balance, MB platform application and menu provided for the service was also easily operable and the processes to be followed for banking transaction are very easy to the users. This all factors are identified as they positively influence a MB adoption. As qualitative data indicated, this simplicity is caused primarily by alternative languages the customer can prefer during and after his/her mobile banking subscribing time. Until this research was conducted, the Cooperative Bank of Oromiya was providing the service in five languages (English, Amharic, Afan Oromo, Tigrigna and Somali). So customer can choose one when registered as a hello cash m-banking user and can change later up on his/her request.

Nowadays, most of customers have many passwords in their hand at once; like phone password, ATM password, personal computer password, mobile banking passwords (which in turn have PIN, USSD and Login number codes in itself), etc. Remembering all these passwords at every phase of their operation is expected from every customer. So making such passwords to be easily understood, memorable and amendable (for the lost password) is one of the greatest tasks to the bank. However, according to interview data obtained from few customers (especially the less educated) remembering of these codes are a great challenge, but the maximum digit (number) expected to encode for password is four. Since the system is identified as easy to use (not complex), this is a great pleasure to the bank that aims to attract many customers, and customer that does not want to face complex steps during their financial transaction and it positively influences customer adoption of the system.

This hypothesis shows that, when an innovation is easy to use consumers will adopt it confirming that perceived ease of use is important for their decision to adopt mobile banking service (Adesinesi, 2012). This implies one of the basic benefits related with the use of mobile banking system is the perceived ease of use. Our research finding is consistent with Giglio (2002) as cited in Adesinasi (2012) that suggested adopting online banking services reduce the workload over the banking staff and it is easy to have more satisfied customers. This statement is very compromising for mobile banking system.

III. Perceived Usefulness

Perceived usefulness is a good factor to measure the success and failure of mobile banking adoption and it is hypothesized as follow.

Table 4.5: Correlation between Perceived usefulness and mobile banking adoption

Correlations			
		Mobile banking Adoption	**Perceived Usefulness**
Mobile Banking Adoption	Pearson Correlation	1	**.695****
	Sig. (2-tailed)		**.000**
	N	175	**175**
Perceived Usefulness	Pearson Correlation	**.695****	1
	Sig. (2-tailed)	**.000**	
	N	**175**	175
****. Correlation is significant at the 0.01 level (2-tailed).**			

According to this table, perceived usefulness has also a significant association or relationship with the mobile banking adoption at correlation 0.695 and significance value of 0.000. Hence, the correlation coefficient value is a strong evidence for the presence of moderately strong positive association between the two variables. This means perceived usefulness such as using mobile banking makes it easier to do customers' banking activities, using mobile banking improves their performance of banking activities, using mobile banking increase the quality and output of banking transaction, and customers found that mobile banking is useful for their banking activities. Similarly clients can simply perform their banking activities like checking their balance, transferring funds, money withdrawing and paying their bills through their mobile with just a limited effort.

This research finding is in line with Ayana *(*2012) suggestion; one of the implications of E-banking is that it should reduce the need to visit bank branches to get services in our country. This is also applicable for mobile banking systems in which majority of the activities are accomplished outside of bank branches, without physical contact and agents, unless cash withdraw. The respondents' feedbacks on the questions were mainly on their actual utilization of the system. However, according to Masinge (2010) the perception of perceived usefulness was not only based on actual utilization, but also on the behavioral intention of the respondents.

IV. Trust Reliability

Trust reliability is the belief of the system (mobile banking) customers has on their service providing bank and the mobile banking system. And also the hello cash mobile banking system name and platform is shared by four companies; CBO, LIB, Wegagen Bank, and Somali micro finance institution, so the assessed customers' perception toward these concepts are presented as follow.

Table 4.6: Correlation between Trust reliability and adoption of mobile banking

Correlations			
		Mobile banking Adoption	**Trust Reliability**
Mobile banking Adoption	Pearson Correlation	1	**.499****
	Sig. (2-tailed)		**.000**
	N	175	175
Trust Reliability	Pearson Correlation	**.499****	1
	Sig. (2-tailed)	**.000**	
	N	175	175
****. Correlation is significant at the 0.01 level (2-tailed).**			

It is visible that, there is a significant correlation present between the two variables (mobile banking adoption and trust reliability) as justified by correlation 0.499 and significance value of 0.000. Thus, it shows there is a relatively strong positive association between the two variables.

Hence, it's a strong indication that trust belief and reliability influences the mobile banking adoption positively. Since there are many other nongovernmental banks running in Ethiopia including CBO, having customer confidence and reliability on themselves and the product they provide for their consumers makes them profitable. Along with this profit maximization, customer handling (including having many customers) is the heart of their existence as an entity, unless the competitive pressure that comes from other banks puts their wellbeing into danger. This finding is in consistent with Ayana (2012), suggested that lack of trust on the use of technological facility provided by bank as a factor that can hinder adoption of technological innovation by Ethiopian banking industries.

Along with trust, the interoperability of the banks those share the same platform of hello cash system, users have no fear for future inter banking system. CBO, LIB, Wegagen bank and SMFI shares the hello cash mobile banking system platform provided by other company 'Belcash' (see chapter 2). During this data collection, financial transactions between banks like cash deposit, fund transfer, cash withdrawal and making payments are at a pilot test level. After few times, this activity would be operational and hence customers' confidence on it is a pivotal for their interoperability. So this study has a great input for their (banks) proposal and customers having different branch accounts as well as financial transaction among different bank customers.

This research work is in line with Andrew (2009), who suggested ensuring the trustworthiness of banks and agents is a pivotal in establishing the integrity of the mobile banking product. The integrity and efficacy of agents in managing the transactions; deposit taking process, transfers and cash distribution is critical to manage some of the range of risks inherent in a mobile banking product, including reputational risk.

Challenges (Perceived Risks)

One of the basic barriers (challenges) companies face during adopting technological innovation is the perceived risks. Perceived risk is the potential of loss in the pursuit of a desired outcome from using electronic banking services (Yousafzai et al, 2003). According to Lee (2009), there are five types of perceived risks; performance, security, time, social and financial risks. The analyses of the challenges of mobile banking was done by descriptive statistics using the mean and mean of mean values in order to describe the determinants' influence on the mobile banking, now let we see them in detail as follows.

V. Performance Risk

Performance risk refers to losses incurred by deficiencies or malfunctions of mobile banking servers (Lee, 2009), and the statistical result was discussed in the below section.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean	Std. Deviation
Malfunction (deficiency) of bank server occurs during MB	31	37	65	26	16	175	**2.29**	**1.17**

Table 4.7; Performance risk (source: SPSS Result)

Result reported in the above table indicates the mean value 2.29, for malfunctioning or deficiency of bank server that occurs during mobile banking and the majority of the respondents agreed with the occurrence of the problem. However, this hypothesis was not supported by qualitative data (interview) collected that the bank officers strongly disagree with the issue. According to interviewees, "*the bank have extra server that automatically substitutes the running mobile banking server"* and said the company did not agrees with this.

According to quantitative and qualitative data, the conflicting feedback in between the customers and bank arises due to many reasons; one was the environmental factor like the infrastructure problems of electricity and telecommunication that strongly influence their response. Customer's justification of whether the failure in bank server and mobile telecommunication should be clearly grounded. Interruption of electricity system around the users (especially rural area where this problem frequently happens) during mobile banking transaction also might be a cause for such misconception. Secondly, customer's technological skills like mobile usage know-how have also an impact on their response. Thirdly educational level of the respondent matters, as properly remembering the passwords, PIN, USSD, etc of the system has an influence on their mobile banking activities. In all these factors affecting mobile banking, customers or respondents have no / minimum justification whether the bank server or other factors interrupted their banking activities.

By and large, the server deficiency or malfunction during mobile banking negatively influence mobile banking usage critically (sometimes loss of finance) on the adoption of mobile banking. This finding is consistent with Lee (2009) who suggested sudden breakdown of web servers may lead to unexpected losses while conducting online transactions.

VI. Security Risks

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean	Mean of Mean	Std. Deviation
Mobile banking is safe or secure	48	66	41	11	9	175	**2.24**	**2.41**	**1.08**
I prefer MB to do my banking activities for security reason	32	32	49	46	16	4175	**2.00**		**1.24**
If I lose my phone, my banking service will be interrupted	14	43	44	44	30	175	**3.00**		**1.22**

Table 4.8; Security Risk (source: SPSS Result)

Mobile banking safety, especially security of ownership of mobile banking usage in Ethiopia has an impact whether the system is compatible with privacy need of the customer. The above table (4.8) shows the mean 2.24 for mobile banking safety/security, which means majority of the respondents, has agreed up on the privacy protection of the mobile banking.

Customer privacy in mobile banking is the secured customer of cyber crimes like hackers, crackers, phishing, etc that could harm the customer and finances. It is also the protection of customer's passwords, financial transactions, etc of the users. So respondents agreed as CBO keeps their privacy according to their willingness. According to qualitative data obtained from the bank officers, *'since Internet banking is not implemented (until this interview conducted) and mobile banking service is not linked with it and the tendency of cyber attackers like hacker, theft, cracker, etc to affect their data is very low'.* However, there is no generalization of safe future because the angle of the risk is unexpected. Additionally, according to data collected from bank officers about mobile banking security, "*identity verifications like passwords and identity cards asked frequently at every stages of the transaction at bank and agent level, to proof the ownership of the users. And also the system has many physical protective measures from unauthorized user that enables the bank to protect its products and customers*".

The table 4.8 also indicates statistical result mean 2 (agreed) for whether the customers prefer MB to do banking activities for security reason, and 3 (neutral) for questions of interruption of their banking activities if they once lose their mobile phone. On the second statement, the

respondent needs some additional clarification to further justify either agree or disagree as they are in the middle.

The mean of mean for the respondents' responses of statements on security risk is equal to 2.41 which are indicating that the respondents on average have agreed to some level on the security of mobile banking system. The loss of one feature of them leads to security risk, which in turn led to negatively influence on MB. This finding is in line with Ayana (2012), suggested that one of the barriers in the adoption of electronic banking is fear of security risks. Moreover, in case of mobile banking proper insertion of appropriate passwords, numbers and PIN codes highly reduces this problem.

VII. Time Risk

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean	Mean of Mean	Std. Deviation
Using MB enables me to accomplish my banking activities more quickly	56	82	30	5	2	175	**1.94**	**2.0**	**.84**
Due to poor network signal of mobile network it takes lots of time to do transactions	64	61	28	22	-	175	**2.05**		**1.02**

Table 4.9; Time risk (source: SPSS Result)

One feature of mobile banking is proper usage of banking time in a reasonable way. Customers want to reduce extra time wasted due to unwanted delay of delivery of fund transfer and paying utility bills, and getting of the associated agents to withdraw money. According to their response in the table 4.9, the mean is 1.94 for mobile banking enabling customers accomplish their banking activity more quickly. This shows, majority of the respondents were agreed on mobile banking helped them to accomplish their banking activity within short period of time than conventional banking. The table also indicates the mean of 2.05 for poor network signal's impact on mobile banking as it consumes lots of time to perform transaction.

The result of the analysis in above table has also indicated that the mean of mean of the statements regarding the attitude of the time risk of users is 2.0. From this we can infer that

missing one feature of these (that leads to time risks) have generally a negative influence toward the mobile banking system. According to data collected through interview this factor affecting mobile banking adoption arises from insufficient infrastructures (electricity and telecommunication) in the country. This fragile or infrequent appearance of telecommunication leads customers to unsuccessful transaction, delay (time consuming) in m-banking activity, loss of finance and as well as loss of trust and reliability on technology generally and mobile banking specifically.

According to qualitative data gained from CBO, the bank has more number of subscribers around the rural area than in cities, towns, etc, because these cities and township dwellers have other alternatives. The main objective of mobile banking is financial inclusion that is aimed to arrive at non-banked population of the country especially the rural population. As a result, lack of such infrastructure in the majority of unbanked area of population, is a great barrier to meet their objective specifically and adoption of all aspects of technology generally. This research finding is consistent with the work of Lee (2009), who suggested harried consumers were more likely to purchase over the Internet in order to save time and consumers are very time oriented and concerned about potential risks of wasting time spent implementing, learning how to use and troubleshooting of a new system.

VIII. Social Risk

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Total**	**Mean**	**Mean of Mean**	**Std. Deviation**
Mobile banking suits my life style and technology	62	79	21	11	2	175	**1.93**	**2.07**	**.91**
Using MB to do my banking business fits to my work style	43	77	41	14	-	175	**2.15**		**.89**
Using mobile banking makes my life style more convenient	45	79	37	10	4	175	**2.14**		**.94**

Table 4.10; Social risk (source: SPSS Result)

Mobile banking is making a users' life style more suitable, compatible with all work categories and convenient. So in order to assess respondents' reaction toward all these aspects, questions

like mobile banking suitability, its matching with their job and convenience which indicates the social standing of the customer, were directed to them. Consequently, the above table shows mean of 1.93, 2.15 and 2.14 for suitability of MB in life style, work style and more convenient to customers respectively. This indicates customers were agreed with all these factors as it enabled them to cope up with some technology aspects (because all results very close to 2 or agreed).

Mean of mean of these statements on social risk of MB to the customers has indicated that it is two (2.07). This shows that the mean of the responses on all the statements can be taken as the customers have agreed on using mobile banking system has no social risk and it is compatible to their work styles.

In addition to this, qualitative data obtained from the bank and few customers indicates, some features of mobile banking like programmes, menu, languages, etc are adjusted when the need arises from the customers, so these forms of bilateral communication facilitated for the compatibility of mobile banking according to social aspect of the customer. On the contrary, the failure occurs during mobile banking activities like delay in delivery of finance to the receiver, unavailability of agents, lack of branch follow up, etc that have a negative impact on compatibility of the system to social circle of the customer creating distrust among them.

This research output is in line with Adesinasi (2012), the impact of social influence on the users who were either influenced by friends, relatives or parents as well as by people they know, and Lee (2009) concern about the opinion of referents (friends, family, co-workers) with regard to one's actions has been referred to as subjective norm that influence his/her attitude toward technology acceptance (like e-commerce).

IX. Financial Risk

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Mean	Mean of Mean	Std. Deviation
I afraid MB that leads me to erroneous losses	9	27	52	45	22	175	**2.88**	**2.4**	**1.03**
The cost (service charge) incurred for MB is considerable	18	95	30	18	14	175	**2.01**		**1.07**

Table 4.11; Financial risk (source: SPSS Result)

Regarding to this table, descriptive statistics result for mean of customers' afraid of erroneous losses due to MB was 2.88, which mean majority of them remains neutral. The neutral respondents' feedback shows fear of mobile banking that could lead them to loss is unjustifiable within available condition or information. The table also shows mean result 2.01 for question the cost or service charge that is incurred for mobile banking as considerable. This means respondents agree as it is proportional to services they get from mobile banking system.

Mean of mean for both statements on MB financial risk to the customers has also indicated that it is above two (2.4). This shows that the mean of the responses on all the statements can be taken as the customers have agreed on using MB than using teller based banking may led them to loss. As few officers and customers said, "*the bank has made service charge (cost) adjustment for users up on the feedback from the customers"*. On the contrary, the bank pays for the agent that ranges from 3.00 to 7.50 ETB for both cash deposit and withdrawal for transactions from 25 to 6,000 ETB respectively (CBO, 2016). The minimum registration amount for customers is 10 ETB which has no service charge and maximum withdrawal and transfer is 6,000ETB.

This hypothesis implies to two dimensional major factors which influences customers' adoption of new technology. Firstly, financial risk as defined by Lee (2009) is "the potential for monetary loss due to transaction errors or bank account misuse". The other aspect of the hypothesis goes to a study conducted by Wu and Wang (2005) on mobile commerce acceptance that showed perceived cost or transaction cost had a significant effect on the adoption of mobile banking. The later study was conducted on the bottom of pyramid (BOP) market segment; a segment

characterized with lower disposable income. According to Karnani (2009) as cited in Masinge (2010), people at the bottom of pyramid have a very low purchasing power and are price sensitive. So it is hypothesized that the transaction cost of mobile banking services is more likely to negatively influence the adoption of mobile banking.

Generally, assessment of respondents' adoption and challenges of mobile banking system in the country in general and in CBO specifically analyzed in the context of technological, organizational and environmental aspects (factors) categorizing into nine hypotheses with associated twenty four questions.

To conclude all the relations, hypothesis test that is also called confirmatory data analysis was conducted statistically based on significance values/ significance level. Accordingly, of nine hypotheses eight of them supported (relative advantage, trust belief, perceived ease of use, perceived usefulness, security risk, time risk, social risk and financial risks) while performance risk is not supported, based on significance values of variables. See the correlation coefficient and significance values of H5-H9 on Appendix 5.

Hypotheses	Significance	Supported/ Not Supported
H1	0.001	Supported
H2	0.000	Supported
H3	0.003	Supported
H4	0.000	Supported
H5	0.204	Not Supported
H6	0.003	Supported
H7	0.024	Supported
H8	0.003	Supported
H9	0.013	Supported

Table 4.12 Summaries of the hypothesis tests.

4.6. Qualitative Data Analysis

Qualitative data (interview) was used in this study to more clarify data obtained from the quantitative data. The interview was conducted by the researcher after relevant questions to the objective of the study were prepared. Cooperative bank of Oromiya implemented mobile banking system since June 2015 that was centrally administered from the head quarter of the bank in Addis Ababa. In order to get appropriate data, the researcher interviewed mobile and agent banking officers of the bank. The schedule and place of the interview was arranged by

officers in their offices. The topics or idea of the interview was about the adoption and challenges of mobile banking and some complaints of the users (see appendix 2).

According to Yemisirach Taye, E-banking service officer, (E-banking is where mobile banking /SMS banking, ATM and Internet banking are administered), '*CBO have begun implementation of mobile banking in 2015 and currently have more than half million subscribers'.* The main objective of its implementation were two; accessibility and financial inclusion. Accessibility is providing alternative banking system for the customers those have bank account in the bank or other banks. This is especially for urban dwellers (customers) those have many options where as the later (financial inclusion) was for unbanked populations of rural. Along with this, mobile banking is cost effective and efficient than branching, so it was highly accepted in rural areas than urban area.

According to interview feedback, *"challenges of mobile banking can be grouped into internal (management and cost issues) and external factors. The external factors are; lack of clear and flexible policy directives or guidelines that could be upgraded as new technology emerges, criteria of agent registrations like forensic; the need of finger prints, clearance from crime and business license that is only given at Addis Ababa".* So the bank agents must have to come to Addis Ababa and fulfill these requirements from very distant areas of the country. Financial intelligence rule, fear of money laundering and terrorism fighting rules were also other factors. As GBAF (2013) stated, banks are some of the most complex, heavily regulated organisations in the world, and security is paramount, especially with sensitive data being sent over the internet. Similarly, rules and regulations of Ethiopian banking industries are firm. The government officers of NBE always want black and white guideline to give decisions and accept new technology, but the existing rules or policy directives were prepared once and not amended (upgraded) very easily, so they could not give immediate solutions for sudden technological innovations brought into the industry.

In addition to these, the maximum transaction limit which is 6,000ETB to withdraw and 25,000ETB to deposit per day was also another factor, that the customers always raise as complain especially merchants, businessmen, etc. Awareness about the product among the

customers, and infrastructures like electricity and telecommunications in the country are also other external barriers to the adoption of mobile banking.

Interview respondents' also responded on the system and customer's security of mobile banking as it has no link with Internet banking, awareness is given on customer's vague perception of crowd funding and MB during registration and after through SMS. Additionally customers get anytime information through IVR (interactive voice recording) that is given in five languages (English, Amharic, Afan Oromo, Tigrigna and Somali) through dialing 8140.

According to the respondents' *"mobile commerce as a paying bill services, saying there is still no legal framework for it, but risk mitigation mechanisms depending on the crimes and system related features. The actual cash (paper money) transfer conducted at branches or agents that are managed by nearest branches"*. Until this data is collected the bank provides Debit card and POS cards only.

The respondents also argued about the political instability (domestically and internationally) impacts. Since the awareness about mobile banking and cyber security system in the country is less, the impact of political instability is on the perception of the customers, degrading their trust. In addition, the nature of the product itself is also susceptible to problems of trust and reliability.

The interview respondents also indicated that mobile banking is more important in developing countries than developed countries, because it needs less infrastructure (electricity and telecommunication), do not need sophisticated (application) technology, it is user friendly (especially for less educated) and not much opportunities of banking in developing than developed countries.

During the interview about adoption of mobile banking, another point raised was competitive pressure of the industry. They agreed as it has positive and negative impacts; positive impact is companies modify features as innovation happen in one of the competitor, while negative impact was it reduces market share they have.

4.7. Major Findings and Discussions

This section provides the overall findings and discussions of the study done on drivers of adopting MB and barriers of mobile banking system in our country focusing on cooperative bank of Oromiya. Since the Ethiopian telecommunication corporation is the only telecom service provider in our country all banks and customers will be forced to deal through it for their mobile banking system. This in itself has have advantage and disadvantage on adoption of new ICT system into banking industry in general and mobile banking system in particular. Its advantages are it can be easy for administration centrally, less cost, few procedures for modification if happens, etc. The disadvantages are difficulty of getting alternative service, difficulty of amendment if some parts (like eastern district working when western is not operational which has impact on transaction among users), etc.

4.7.1. Adoption of Mobile Banking System

This study have identified and analyzed drivers of mobile banking system adoption like relative advantage MB than traditional banking system by the customers, perceived ease of use, perceived usefulness and trust belief of users on the system. The relative advantage of mobile banking system is comfortability and compatibility of mobile banking system with users' values and interests to be adopted by them. It also implies its enabling the users manage their financial system and interaction with the company than the conventional banking system. And it was found (majority of respondents agreed) that mobile banking made them more comfortable with the bank to carry out their banking activities. The Pearson correlation analysis approved that the relative advantage has strong relationship with mobile banking adoption, positively.

Perceived ease of use of mobile banking was identified as it drives the mobile banking adoption positively. Easily remembering mobile banking PIN, USSD and Login numbers, as well as easiness to navigate, understand and customize mobile banking menu, alternative languages and also simplicity to make payment, money transfer and checking their balance have found as positive influence on customers to adopt mobile banking systems. Mobile banking platform application and menu provided for the service, easy operation and the processes to be followed for banking transaction facilitates the users to adopt mobile banking. As qualitative data indicates

this simplicity was caused primarily by alternative languages the customer could prefer during and after his/her mobile banking subscribing time.

Perceived usefulness is also one of drivers of mobile banking adoption. Pearson correlation analysis proved the perceived usefulness has strong relationship with mobile banking adoption. The finding also shown that using mobile banking made customers do banking activities easier, using MB improved their performance of banking activities, increased the quality and output of banking transaction, and customers found that using mobile banking is useful for their banking activities. This research output also have identified as it highly reduced the need to visit bank branches to get services.

Trust reliability or beliefs is also another driver that have positive influence on the customer adoption of mobile banking as the majority of the respondents strongly agreed with the bank's reliability and trust. They also agreed as they have no any fear on the bank even if the bank aimed to work financial transactions with other banks (inter banking system).

Generally, drivers of mobile banking adoption (like relative advantage, perceived ease of use, perceived usefulness and trust belief) are identified as they positively influence the adoption and they have got conformity with other researchers' findings.

4.7.2. Challenges of Mobile Banking System

In addition to drivers of mobile banking adoption system, this study also have identified and analyzed the challenges (barriers) of mobile banking system in Ethiopia. In regard to this, the study took the Lee's (2009) model of risks those follow the adoption of mobile banking. So perceived risks like performance risk, security risk, time risk, social risk and financial risks are identified and analyzed.

The performance risk is a bank server's deficiency or malfunction problem when mobile banking. On this performance risk customers' were agreed on server deficiency or malfunction occurrence during mobile banking. However, this concept was not supported by qualitative data obtained from the bank officers' reaction.

Security risk is a potential loss due to fraud or a hacker compromising the security of a mobile banking user as it influences negatively mobile banking adoption and majority of the respondents agreed as mobile banking was safe and secured. However they respond neutral for both loss of their mobile phone could lead them into interruption of mobile banking and their preference of going to bank than mobile banking for security reason. So they are in need of further awareness (information) about security risk (privacy protection) of the system to be confident.

The time/convenience risk is a loss of time and any inconvenience incurred due to the delays of receiving payments or the difficulty of navigation and it was identified as it negatively influences adoption of mobile banking. This concept was analyzed through users' response of mobile banking enabling them to accomplish banking activities more quickly than traditional banking system and poor network signal of mobile network takes lots of time to do transactions. The respondents agreed with the first idea that MB enabled them do bank activities quicker than traditional banking and strongly agreeing with the second idea of due to poor network signal of mobile network it takes lots of time to do transactions, especially around rural areas of the countries.

Social risk refers to the possibility that using mobile banking may result in disapproval by one's friends, family, work group, etc. This was expressed as suitability, compatibility and convenience of mobile banking system to life style, all work categories and social aspects of the customers. This was agreed by the respondents as it was suitable to their life style, compatible to every work category and convenient with all social circles of users. So this positively influences mobile banking adoption.

Financial risk negatively influences adoption of mobile banking, was also analyzed through assessment on customers' fear of erroneous losses due to MB where majority of them responded neutral, and considerability of service charge that is incurred for mobile banking. Majority of them agreed because the bank made service charge adjustment upon customers' feedback.

Generally the perceived risks (security or privacy risk, financial risk and time risk) influences MB negatively and identified as they are challenges of mobile banking system in Ethiopia.

4.8. Summary of the Chapter

This chapter analyzed demographic details, mobile phone usages and mobile banking usages, and hypotheses were also analyzed with their associated questions measured through Likert scale. The research employed both quantitative and qualitative data collection methods, and quantitative data obtained from both customers and bank officers were analyzed through statistical SPSS.

Descriptive statistical analyses like frequency (for demographic detail analysis), Pearson correlation coefficient and mean (for hypotheses analysis) and Cronbach's alpha (for reliability of questionnaire) were used to analyze data obtained from quantitative data. The result of the hypothesis analysis, except performance risk, supported the variables in the research model and also supported by other research findings of related works.

Finally, qualitative data was also used in support of the quantitatively collected data and report of the collected data was discussed in detail. Both data collected through questionnaire and interviews were derived and supported the intended objective of the study.

CHAPTER FIVE

CONCLUSION, SUMMARY AND RECOMMENDATIONS

5.1. Introduction

The study was intended to analyze and investigate the adoption and challenges (drivers and barriers) of mobile banking system in Ethiopia, focusing on Cooperative bank of Oromiya using both quantitative and qualitative (mixed) research approaches. This chapter presents the summary and conclusion of the findings, recommendation of future works and limitations of the study. The contributions and recommendations given in this research work could be used for future research, policy making and adjustment to service of banks and enhance further implementation of technology in banking industry.

5.2. Summary and Conclusion

This research was conducted on adoption and challenges of mobile banking system in Ethiopia by using mixed research approach and employing technology acceptance model and innovative diffusion theory as a research framework on technological, organizational and environmental contexts. In addition to this, the concepts of trust and reliability and risk were also used to conduct the study.

Factors affecting MB adoption identified in this study were analyzed after grouping in to nine such as relative advantage, perceived ease of use, perceived usefulness, trust reliability, performance risks, security risks, financial risks, time risks and social risks.

Relative advantage influences positively mobile banking adoption. This is comfortability and compatibility of mobile banking system with users' values and interests to be adopted by them. It also implies its enabling the users manage their financial system and interact with the company than the conventional banking system. And it was found (majority of respondents agreed) that mobile banking made them more comfortable with the bank to carry out their banking activities. This result is similar with the findings of (Beatty et al. (2001) who indicated relative advantage has a positive influence on the company e-banking adoption and user attitude and intention was influenced by relative advantage to adopt mobile banking.

Similarly, perceived ease of use was identified as it positively influences the mobile banking adoption. Simplicity of remembering mobile banking PIN, USSD and Login numbers, as well as easiness to navigate, understand and customize mobile banking menu, alternative languages and also simplicity to make payment, money transfer and checking their balance have found as positive influence on customers to adopt mobile banking systems. Mobile banking platform application and menu provided for the service easy operation and the processes to be followed for banking transaction facilitates the users to adopt mobile banking. This simplicity was caused primarily by alternative languages the customer could prefer during and after his/her mobile banking subscribing time. The finding has got similarity with (Adesinesi, 2012) that suggested perceived ease of use is important for their decision to adopt mobile banking service in Nigeria.

In addition to these, perceived usefulness influences positively mobile banking adoption. The finding also shown that using mobile banking made customers do banking activities easier, using MB improved their performance of banking activities, increased the quality and output of banking transaction, and customers found that using mobile banking is useful for their banking activities. This research output also have got conformity with Masinge (2010) who said PU of MB depends on behavioral intention of the users, and Ayana (2012) who suggested E-banking should reduce the need to visit bank branches to get services.

Trust reliability or beliefs have positive influence on the customer adoption of mobile banking as the majority of the respondents strongly agreed with the bank's reliability and trust. They also agreed as they have no any fear on the bank even if the bank aimed to work financial transactions with other banks (inter banking system). This result is similar with Andrew's (2009) suggestion of ensuring the trustworthiness of banks and agents is a pivotal in establishing the integrity of the mobile banking product, and Haileyesus (2016) who said that trust belief has been found helpful in explaining how customers may overcome perceived risk and engage in mobile transactions.

The study also indicated that perceived risks (like security risk, performance risk, time risk, social risk and financial risk) have some level of significant effect (positive and negative) on customer adoption of mobile banking in Ethiopia. For example security risk influences negatively mobile banking adoption and majority of the respondents agreed as mobile banking was safe and secured. However they respond neutral for both loss of their mobile phone could

lead them into interruption of mobile banking and their preference of going to bank than mobile banking for security reason. So they are in need of further awareness (information) about security risk (privacy protection) of the system to be confident. This finding is in line with Ayana (2012), suggested that one of the barriers in the adoption of e-banking is fear of security risks.

The study also tried to show performance risk negatively influence adoption of mobile banking. On the performance risk customers' agreed on server deficiency or malfunction occurrence during mobile banking. However, this concept was not supported by qualitative data obtained from the bank officers' reaction.

The time risk negatively influences adoption of mobile banking. This concept was analyzed through users' response of mobile banking enabling them to accomplish banking activities more quickly than traditional banking system and poor network signal of mobile network takes lots of time to do transactions. The respondents agreed with the first idea that MB enabled them do bank activities quicker than traditional banking and strongly agreeing with the second idea of due to poor network signal of mobile network it takes lots of time to do transactions, especially around rural areas of the countries.

The research additionally found that, social risk positively influences mobile banking adoption. This was expressed as suitability, compatibility and convenience of mobile banking system to life style, all work categories and social aspects of the customers. This was agreed by the respondents as it was suitable to their life style, compatible to every work category and convenient with all social circles of users.

The last concept of perceived risk was financial risk. Financial risk negatively influences adoption of mobile banking, was also analyzed through assessment on customers' fear of erroneous losses due to MB where majority of them responded neutral, and considerability of service charge that is incurred for mobile banking. Majority of them agreed because the bank made service charge adjustment upon customers' feedback.

5.3. Recommendations

This research work has shown that mobile banking adoption in our country was low and too late to be implemented as compared to some developing and developed countries of the world, despite high number of banking customers in Ethiopia. The concept of mobile banking system is new to the bank and customer and it is not shown the expected progress. Still the number of customers those frequently visit bank branches and ATM queues are not much reduced. To overcome the existing challenges of mobile banking adoption, the researcher recommends the following points.

1. The distribution and performance of infrastructures like ICT, telecommunications and electricity that are priority to mobile banking especially around the rural area also needs immediate solution.
2. Government supports like providing clear and comprehensive laws on criteria of registration should be available. For example youths those are around 14 to 17 years engage in different job activities get money but cannot save and perform transactions through either bank or mobile banking because the law do not allow them without their parents' consent.
3. Policy directives regarding registration of agents (bank representatives) that perform cash payment, transfer, deposit and give any support for the customers where branches were not available. The need or requirements of forensic evidences from them that is only given at Addis Ababa; like giving this at regional level or related cities, etc.
4. The maximum limit of withdrawal (6,000 ETB) and deposit (25,000 ETB) was a challenging amount especially among agents, merchants, business men/women, etc. So this should be given due consideration.
5. The bank should give necessary awareness on the mobile banking for the customer through its officers, agents, SMS, etc for further clarity of the product.
6. The bank is also responsible to give immediate support for the customers in solving their difficulties of using mobile banking as required via SMS, IVR, direct calling, etc.
7. Mobile banking special application is also needed for mobile banking users that can easily operate on all types of phone (smart and non smart phones) to further initiate users.

8. Since mobile banking is widely accepted around rural populations, where branches are at far, they need agents those give immediate services like assisting in mobile payments, transfers and cash withdrawal (paper money). But majority of them were businessmen/women and they are sometimes absent to customers hence customer is needed to go and search the second nearest agent. So this needs solution.
9. The Bank should ensure safety measures such as firewalls, intrusion detection and other security related devices which are properly developed and incorporated in the mobile banking systems because the angle of cyber attack is unknown.
10. Even though mobile banking is most importantly applicable for the population of unbanked areas for financial inclusions, mobile banking system in our country follows the direction and patterns of branches. So agent banking like retail shops, pharmacies and other business centers should be given proper considerations rather than simply following branches.

5.4. Limitations of the Study

This research finding will be able to contribute to the existing literature on adoption and challenges of mobile banking system. The further research of this study's framework can be useful to advance knowledge about adoption and challenges of mobile banking system in general. However the study has some limitations.

The first is the population size that larger population size (in terms of location) could be considered in order to have a more generalized view and also the research could be expended to reach more regions in the country, nevertheless this research is still valid having analyzed the available sample size with questionnaires, observation and interview.

Secondly, further research could be conducted by looking at the respondents' demographic characteristics and the adoption of mobile banking in the country. This means that considering the impact of demographic characteristics of the respondent on mobile banking adoption. Thirdly, in this study the suggested constructs are nine to analyze bank and customers' challenges in adopting mobile banking. However, these constructs can be integrated with other concepts to provide a more comprehensive understanding of mobile banking adoption.

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Appendices

Appendix 1: Questionnaire

Addis Ababa University

College of Natural Sciences

School of Information Science

Dear sir/madam;

This research questionnaire is presented for both bank and customers to be filled for research project titled **Adoption and Challenges of Mobile Banking [Hello-Cash] System in Ethiopia: the case of Cooperative Bank of Oromiya.**

Mobile and agent banking is a service provided by a bank or other financial institution that allows its customers to conduct financial transactions (like balance enquiry, utility bill payment, internal account transfer, Cash withdrawal and cash deposit) remotely using a mobile phone.

In order to collect representative data, I would like to ask you the information that is filled anonymously (without name) and the information you provided will be treated confidentially. The aim of this research is to improve the Mobile and agent banking service to customers and for the fulfillment of the study. Thank you for your cooperation in advance.

Ebisa Beyene (MSc Student)
March, 2017
Address: Phone: 0928497775,
E-mail: ebisa.beyene@yahoo.com / ebisab09@gmail.com

General Instruction: Please indicate each statement by ticking (√) in the boxes that specify your choice from the options that are written below ***(from part I to part IV)***.

Part I. Demographic Details

1.1. Gender: Male ☐ Female ☐

1.2. Age Category: 18- 27 ☐ 28- 37 ☐ 38- 47 ☐ 48-57 ☐ Over 57 ☐

1.3. Monthly Income (in Eth. Birr):

Less than 2000 ☐ 2000 - 3999 ☐

4000 - 5000 ☐ 5001 – 10000 ☐ Over 10000 ☐

1.4. Educational Qualifications:

Masters /Above ☐ Bachelor Degree ☐ Diploma / Equivalent ☐

High School ☐ Elementary ☐ Illiterate ☐

1.5. Occupation:

Governmental ☐ Non Governmental ☐ Pensioner ☐

Student ☐ Unemployed ☐ Other _____

1.6. Marital Status:

Married ☐ Divorced ☐ Widowed ☐ Single/ unmarried ☐

Part II. Mobile Banking Adoption and Challenges

Instruction: Please read each statement and then put a tick mark (✔) in the box, that best indicates how strongly you agree or disagree with the statement for the statements in the table.

(1= Strongly Agree, 2= Agree, 3= Neither Agree nor Disagree (Neutral), 4= Disagree, 5= Strongly Disagree)

		Rating Scale				
		SA (1)	A (2)	N (3)	DA (4)	SD (5)
Adoption of Mobile Banking System						
	1. Relative advantages					
1	Mobile banking allows me to manage my finances better.	[ ]	[ ]	[ ]	[ ]	[ ]
2	Mobile banking makes me more comfortable to communicate with the bank.	[ ]	[ ]	[ ]	[ ]	[ ]
	2. Perceived Ease of Use					
3	Mobile banking programme and processes are easy and simple to manage my finances.	[ ]	[ ]	[ ]	[ ]	[ ]
4	Using Mobile banking is very complex.	[ ]	[ ]	[ ]	[ ]	[ ]
5	Remembering Mobile banking PIN, USSD, Login numbers, etc are easy.	[ ]	[ ]	[ ]	[ ]	[ ]
6	Mobile banking menu is very easy to navigate understand and customizable.	[ ]	[ ]	[ ]	[ ]	[ ]
7	It is easy to make payments, money transfer and check balance	[ ]	[ ]	[ ]	[ ]	[ ]
	3. Perceived Usefulness					
8	Using Mobile banking makes it easier to do my banking activities.	[ ]	[ ]	[ ]	[ ]	[ ]
9	Using mobile banking improves my performance of banking activities.	[ ]	[ ]	[ ]	[ ]	[ ]
10	Using mobile banking would increase the quality and output of banking transaction.	[ ]	[ ]	[ ]	[ ]	[ ]
11	I found that mobile banking is useful for my banking activities.	[ ]	[ ]	[ ]	[ ]	[ ]
	4. Trust Belief and Reliability					
12	The bank is reliable and trustworthy	[ ]	[ ]	[ ]	[ ]	[ ]
13	Even though the bank works mobile banking system with other banks and institutions, I have no fear	[ ]	[ ]	[ ]	[ ]	[ ]

Challenges of Mobile Banking System						
5. Performance Risk						
14	Malfunction (deficiency) of bank server occurs during mobile banking.	[ ]	[ ]	[ ]	[ ]	[ ]
6. Security Risk						
15	Mobile banking is safe / secure.	[ ]	[ ]	[ ]	[ ]	[ ]
16	I prefer going to the bank to do my banking business for security reason than mobile banking	[ ]	[ ]	[ ]	[ ]	[ ]
17	If I lose my mobile phone, my banking service will be interrupted.	[ ]	[ ]	[ ]	[ ]	[ ]
7. Financial Risk						
18	I am afraid that Mobile banking leads me to erroneous losses.	[ ]	[ ]	[ ]	[ ]	[ ]
19	The cost (service charge) that is incurred for mobile banking is considerable.	[ ]	[ ]	[ ]	[ ]	[ ]
8. Social Risk						
20	Mobile banking suits my life style and technology	[ ]	[ ]	[ ]	[ ]	[ ]
21	Using Mobile banking to do my banking business fits into my work style	[ ]	[ ]	[ ]	[ ]	[ ]
22	Using Mobile banking makes my lifestyle more convenient	[ ]	[ ]	[ ]	[ ]	[ ]
9. Time Risk						
23	Due to poor network signal of mobile in some areas it takes lots of time to do transactions.	[ ]	[ ]	[ ]	[ ]	[ ]
24	Using mobile banking enables me to accomplish banking activities more quickly.	[ ]	[ ]	[ ]	[ ]	[ ]

Part III. Please indicate your opinion on how the bank can improve the MB service (if any)

_____

_____

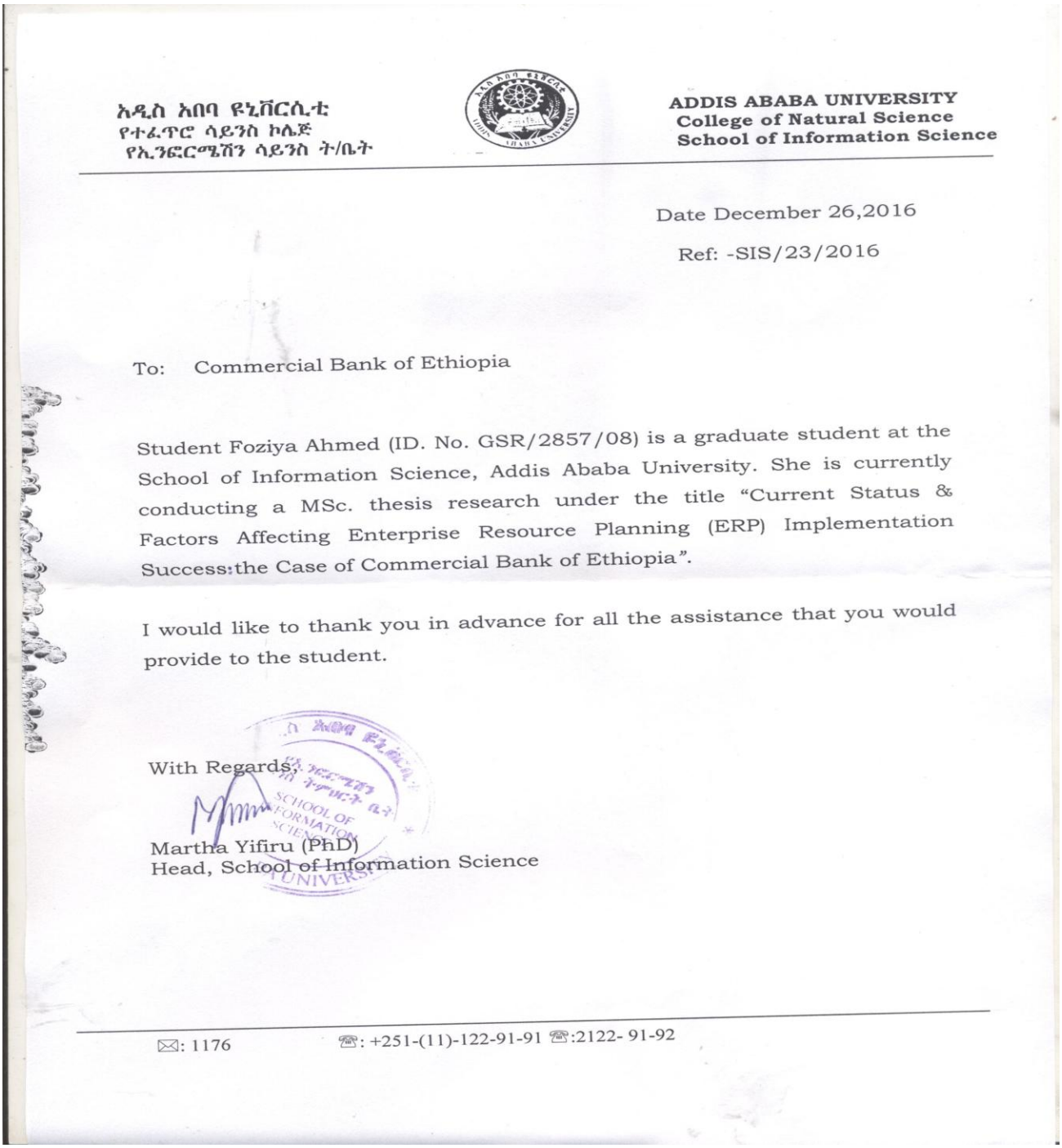
_____

_____

Appendix 2: Semi Structured Interview

1. What are legal framework and main objectives of mobile banking?
2. What is your view about the current adoption of mobile banking services of customers?
3. What are the challenges been faced by the bank(s) about mobile banking in Ethiopia?
4. What are the major challenges frequently raised by the customers in regards to mobile banking facilities?
5. What are the government (especially NBE) roles and supports in this mobile banking system?
6. What are impacts of strength of network signal, competitive pressure, transaction limits and perception of customer on mobile banking security?
7. What are risks and how do you protect it that could occur at any time?

Appendix 3: Letter of cooperation from University to the Bank.



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ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date December 26,2016

Ref: -SIS/23/2016

To: Commercial Bank of Ethiopia

Student Foziya Ahmed (ID. No. GSR/2857/08) is a graduate student at the School of Information Science, Addis Ababa University. She is currently conducting a MSc. thesis research under the title "Current Status & Factors Affecting Enterprise Resource Planning (ERP) Implementation Success:the Case of Commercial Bank of Ethiopia".

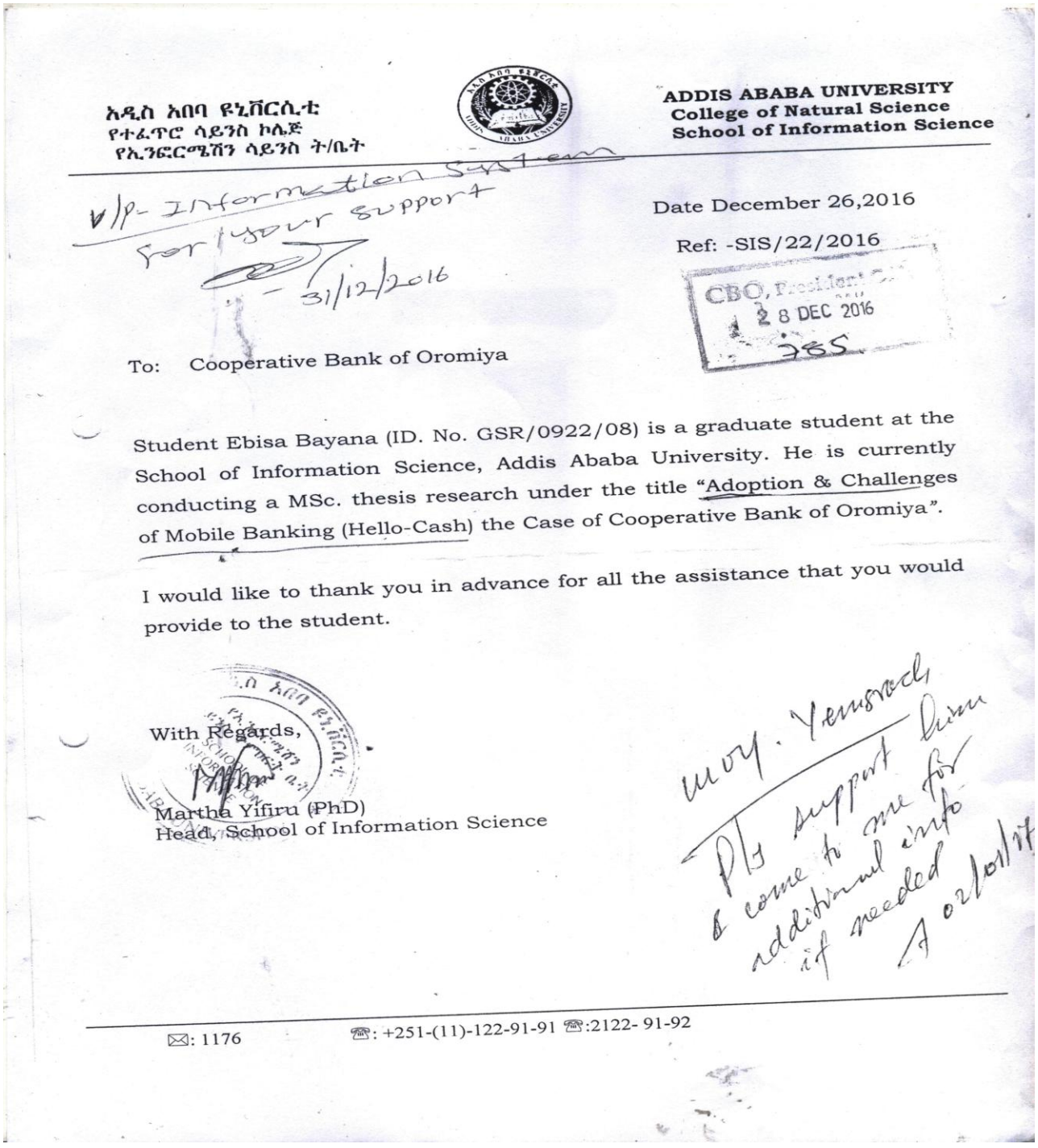
I would like to thank you in advance for all the assistance that you would provide to the student.

With Regards,

Martha Yifiru (PhD)
Head, School of Information Science

✉: 1176 ☎: +251-(11)-122-91-91 ☎:2122- 91-92

Appendix 4: Letter of Acceptance by CBO



አዲስ አበባ ዩኒቨርሲቲ
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ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

W/P- Information System
For your support
31/12/2016

Date December 26,2016

Ref: -SIS/22/2016

CBO, President's Office
28 DEC 2016
385

To: Cooperative Bank of Oromiya

Student Ebisa Bayana (ID. No. GSR/0922/08) is a graduate student at the School of Information Science, Addis Ababa University. He is currently conducting a MSc. thesis research under the title "Adoption & Challenges of Mobile Banking (Hello-Cash) the Case of Cooperative Bank of Oromiya".

I would like to thank you in advance for all the assistance that you would provide to the student.

With Regards,

Martha Yifiru (PhD)
Head, School of Information Science

W/o. Yemsrach
Pls support him
& come to me for
additional info
if needed
1 02/01/17

✉: 1176 ☎: +251-(11)-122-91-91 ☎:2122- 91-92

Appendix 5: Correlation Coefficient and Significance Values of MB Challenges

1. Performance Risk

Correlations			
		Mobile Banking Challenge	**Performance Risk**
Mobile Banking Challenge	Pearson Correlation	1	**-0.026**
	Sig. (2-tailed)		**.204**
	N	175	175
Performance Risk	Pearson Correlation	**-0.026**	1
	Sig. (2-tailed)	**.204**	
	N	175	175

2. Security Risk

Correlations			
		Mobile Banking Challenge	**Security Risk**
Mobile Banking Challenge	Pearson Correlation	1	**.391****
	Sig. (2-tailed)		**.003**
	N	175	175
Security Risk	Pearson Correlation	**.391****	1
	Sig. (2-tailed)	**.003**	
	N	175	175
**. Correlation is significant at the 0.01 level (2-tailed).			

3. Time Risk

Correlations: Time Risk			
		Mobile Banking Challenge	**Time risk**
Mobile Banking Challenge	Pearson Correlation	1	**.416****
	Sig. (2-tailed)		**.024**
	N	175	175
Time Risk	Pearson Correlation	**.416****	1
	Sig. (2-tailed)	**.024**	
	N	175	175
**. Correlation is significant at the 0.01 level (2-tailed).			

4. Financial Risk

Correlations			
		Mobile Banking Challenge	**Financial Risk**
Mobile Banking Challenge	Pearson Correlation	1	**.505****
	Sig. (2-tailed)		**.003**
	N	175	175
Financial Risk	Pearson Correlation	**.505****	1
	Sig. (2-tailed)	**.003**	
	N	175	175
**. Correlation is significant at the 0.01 level (2-tailed).			

5. Social Risk

Correlations			
		Mobile Banking Challenge	**Social Risk**
Mobile Banking Challenge	Pearson Correlation	1	**.396****
	Sig. (2-tailed)		**.013**
	N	175	175
Social Risk	Pearson Correlation	**.396****	1
	Sig. (2-tailed)	**.013**	
	N	175	175
**. Correlation is significant at the 0.01 level (2-tailed).			