DETERMINANTS OF TECHNOLOGY ADOPTION: THE CASE OF CBE EMPLOYEES

A Thesis Submitted to Addis Ababa University School of Commerce in Partial Fulfillment of the Requirements for the Degree of Masters of Arts in Marketing - -Management

By

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Declaration

I declare that this study is my original work towards Masters of Arts in Marketing Management and has not been submitted to any University. To the best of my knowledge, all source of materials used for the study have been properly acknowledged. I have undertaken the study independently with the guidance and support of the research advisor.

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This is to certify that the thesis prepared by Tizazu Teshome entitled **Determinants of Technology Adoption: The case of CBE employees** in Addis Ababa which is submitted in partial fulfillment for the Degree of Master in Marketing Management compiles with the regulation of the University and meets the accepted standard with respect to originality and quality.

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Tizazu Teshome

Table of Contents

Page

CHAPTER THREE

3. METHODOLOGY

CHAPTER FOUR

4. DATA PRESENTATION AND ANALYSIS

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

Abstract

The study aimed at measuring the determinants of technology adoption: The case of CBE employees. The study utilized descriptive and explanatory survey design based on the Technology Acceptance Model and Subjective Norm from Theory of Reasoned Action. A convenience sampling method was used to select three hundred eighty five respondents from twelve Commercial Bank of Ethiopia city branches in Addis Ababa. Four hypotheses were formulated to guide the study and a structured questionnaire was employed to collect data. The four hypotheses were analyzed using correlations and regression analysis. Major findings showed that perceived usefulness, perceived ease of use and subjective norm significantly contributed to behavioral intension surrounding the bank employees' use of new technology. In addition, subjective norm of employees and the two measures of employees': perceived usefulness and perceived ease of use significantly contributed to employees' behavior to use new technology. The result of this study implies that the independent variables that have been found to have significant contributions should be taken into consideration when commercial bank of Ethiopia's management desire to improve the adoption of new technology. The finding of this study recommended that management in commercial bank of Ethiopia should ensure that employees' are involved in the procurement and adoption of new technology.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The banking industry and its environment in the 21st century remain highly complex and competitive; therefore, there is a need for information and communication technology to take centre stage in the banking operations (Stevens, 2002). In the banking sector, information technology is one of the most important tools; as it provides many suitable alternative banking channels to the customers. It brings convenience, customer center, service quality and cost effective in the banking services (Vijay, 2012).

Given the significant role of e- banking in the developmental drive of banks, information technology has been found brining improvements in business efficiency and service quality and hence, attract customers as well as retains them (Kannabiran & Narayan, 2005). Information technology (IT) play a crucial role in banking industry by creating value for banks and customers, that it enables customers to perform banking transactions without visiting a brick and mortar banking system. On the other hand properly adopted E-banking has enabled banking institutions to compete more effectively in the global environment by extending their products and services beyond the restriction of time and space (Turban, 2008).

Information technology should be viewed as a collective term for a wide range of software, hardware, telecommunications, applications and other devices that are used to create, produce, analyze, and transform information (Shavinina, 2003). While the understanding appears comprehensive, how the psychology of adopters that categorically shapes the choice of adoption decision is divergent. Meaning, the successful diffusion of new technology is determined by whether potential users adopt the innovation (Wang & Fang, 2008).

According to Charles (2006), banks faced a situation where the functions of their employees and the traditional service delivery they offered were no longer their first interest; instead such banks are increasingly depending on technology with their attendant quality issues.

Subramanian (2006) observed that over the years, banks have embarked on technology for effective and efficient service delivery. However, technological changes in organizations have increased significantly over the past decade while acceptance of technology continues to lag.

For instance, the perception of employees towards adoption of new technology depends on employee's previous experience and the compatibility of new technology with existing organizational practices (Graham & Leonard-Barton, 1984). In addition, attributes of technological change also affect employee adoption rate and performance and finally affect the overall performance of an organization. It is, therefore, important to note that employee subjective norm influences the employee adoption towards new technology, implying that employees are faced with social pressures to either perform or not to perform the use of technology. Moreover, highly sophisticated technology in relationship with existing

technologies are likely to be unpredictable in effect (Rogers, 1983), difficult to communicate to users (Zaltman, Duncan & Holbeck, 1973) and complex to use and understand (Rogers, 1983). This, in turn, will determine an employee's perceived ease of use and perceived usefulness of the new technology. Similarly, according to Barker and Carey (1997), the recognition of technology as an innovative and cost effective method to boost competitiveness is very important. The study emphasized that employees were not only intended to use new technology affecting rendering of services in banks, but to have a working knowledge of them.

This study focuses on Commercial Bank of Ethiopia that remained one of the greatest pillars in the banking sector. This bank has a large customer base, deposit, branches and the services of the bank continue to be felt in every community in the country. Thus, there are a number of factors that banks in Ethiopia are facing during the adoption of technology. Therefore, the present study examined determinants of technology adoption: The case of CBE employees using Subjective norm and TAM model.

1.1.1. Organizational Background

The history of the Commercial Bank of Ethiopia (CBE) dates back to the establishment of the State Bank of Ethiopia in 1942. The functions were formally separated into the National Bank of Ethiopia (the central and issuing bank) and the Commercial Bank of Ethiopia in 1963 (Melese, 2006). In 1974, CBE merged with the privately owned Addis Ababa bank. Since then, it has been playing significant roles in the development of the country. In 1992 government-owned development banks expanded into commercial banking and licensing of new private banks intensified competition, but their success was endangered by inadequate banking legislation and central bank supervisory capacity (Melese, 2006).

1.2. Statement of the Problem

Banking sector is operating in an environment characterized by a complex and competitive climate in the world (Agbolade, 2011), which has resulted in pressure to develop and utilize alternative products/service delivery channels. The most recently delivery channel introduced is online or electronic banking also known as E-banking (Daniel & Storey, 1997). E-banking is critical in the transformation drive of banks in areas such as products and services and how they are delivered to customers. Thus, it is seen as a valuable

and powerful tool in the development, growth, promotion of innovation and enhancing competitiveness of banks (Gupta, 2008; Kamel, 2005).

In Ethiopia cash are still the most dominant medium of exchange, and electronic payment systems are observed late to move with rapid expansion of electronic payment systems throughout the developed and the developing world, Ethiopia's financial sector remain behind in expanding the use of the technology (Gardachew, 2010).

Maguire (2005) found out that despite the benefits technology offers; many employees are still hesitant to adapt new technology. One major problem regarding the use and success of technology lies in employee resistance to develop capacity for use of the new technology. Therefore, the inability of employees to adapt new technology will affect the performance of banks (Allen & Seaman, 2007).

The appearance of e-banking in Ethiopia goes back to the late 2001, when the largest state owned, commercial bank of Ethiopia (CBE) introduced ATM to deliver service to the local users. In addition to eight ATM Located in Addis Ababa, CBE has had Visa membership since November 14, 2005. Despite being the pioneer in introducing ATM based payment system and acquired visa membership, CBE Lagged behind Dashen bank, which worked aggressively to maintain its lead in e-payment system. As CBE continues to move at a snail's pace in its turnkey solution for Card based payment system, Dashen Bank remains so far the sole player in the field of E-Banking since 2006 (Gardachew, 2010).

Similarly, as compared to other African countries like Kenya where the e-banking services accessibility reach higher level, the level of adoption in Ethiopia is very low. For instance, the giant state owned Commercial Bank of Ethiopia's number of Visa Card holder (1.4 million), Mobile banking users (431,677), number of POS terminal (6,269) and Internet user (13,730) as per e-payment report on June 30, 2016 (CBE, 2016). This is a very small number compared to the population size of the country and very scattered physical branch of the bank.

Venkatesh and Davis (2000) proposed a Technology Acceptance Model that provided an explanation of the determinants of new technology acceptance that is capable of explaining user perception and behavior across a broad range of end user computing technologies and user populations. The model identified variables, Subjective norms, Perceived usefulness, Perceived ease of use and Behavior. The variables stated above are what happen in and around an employee in an organizational setting. Subjective norms are social influences that affect an employee's attitude towards the use of a new technology. Perceived usefulness and perceived ease of use are what makes up the actual attitude that an employee has towards technological change in an organization. The behavioral intention and usage behavior are what makes up the behavior of the employee in the actual use of new technology in an organization.

To sum up, understanding the determinants which affect the adoption of technology by employees is vital for the growth of banking industry; however, it is a gap in the case of Ethiopia. Despite the importance of

technology adoptions, very limited number of research has been done in developing countries like Ethiopia. Therefore, this research paper tried to fill research gap in the area about determinants of technology adoption in the case of CBE employees.

1.3. Research Questions

The study was raised and answered the following research questions:

- What is perceived usefulness of technology by CBE employees?
- How do employees perceive ease of use of technology in CBE?
- How does subjective norm influence the acceptance of technology by CBE employees?

1.4. Research Objectives

The general objective of the study was to examine determinants of technology adoption in the case of CBE employees.

Specific Objectives includes:

- To assess CBE employees perception on technology usefulness.
- To assess the extent to which employees in CBE perceive ease of use of technology.
- To examine employees subjective norm towards technology.

1.5. Significance of the Study

This study will be of significant to different stakeholders in the field. To the management of CBE, it will also inform effect of the adoption of technology on the performance of their institution. Through the findings of this study, the management will be able to strategize on how to realize maximum benefits from adopted technology. To the academicians and students of marketing, this study will help build the knowledge base in the discipline by adding on the existing literature related to technology adoption. The study will be used as a source of reference material besides suggesting areas where future research may be conducted. In addition, it will also assist students of marketing and information technology in gaining understanding of the current trends in the adoption of technology and their effects. To sum up, the finding will provide a framework for the bank to adjust their goals and objectives as per the determinants of technology adoption in the case of CBE employees.

1.6. Delimitation of the Study

This study mainly looked at determinants of technology adoption in the case of CBE employees' perspective in selected commercial bank of Ethiopia branches in Addis Ababa. The study used subjective

norm from Theory of Reasoned Action and Technology Acceptance Model. The study also examined independent variables effect on the dependent variable. In addition, the study used descriptive and explanatory research design. The study covered basically non-managerial level of employees of Commercial Bank of Ethiopia irrespective of age and gender in their various branches located in Addis Ababa. Non-managerial level of employees selected because studies show that they have difficulty in understanding technology and they feel that it is beyond them and waste of time (Gagnon & Dragon, 1998).

1.7. Limitations of the Study

The study conducted in selected Addis Ababa branches of CBE and the branches and sample respondents selected with convenience sampling technique. These might limit the representative of the research work. Hence, it may not be generalizable to the other banks and CBE branches outside Addis Ababa. In addition, problems such as the swearing of an oath of secrecy in the bank, indifference on the part of interviewees and respondents limit the objectives of the study. The study limited by the willingness of the employees to participate to share their experiences and exposures to technological changes. Assuming the respondents' truthfulness and biasness, the study's findings based on their perceptions and thoughts.
Furthermore, absence or inaccessibility of reliable records and reports on how technology adopted for the past years also limited the research investigation.

1.8. Organization of the Study

The research paper organized into five chapters: Chapter one presented with the introduction part of the paper. And second chapter discussed the review of related literatures about the subject matter followed by chapter three, with research methodology used in the research. In chapter four data analysis performed in the research. Finally, in chapter five of the document the summary, conclusion and recommendations of the research with recommendation for future research included.

CHAPTER TWO
REVIEW OF RELATED LITRATURE

2.0. Introduction

While there is a rich body of literature in technological innovation, little is known about determinants of technology adoption in the case of CBE employees. This chapter contained theories that cover the chosen subject. The theoretical frame highlight the concepts on adoption of technology, Theory of Reasoned Action, Diffusion of Innovation, Theory of Planned Behavior and Technology Acceptance Model that were deeply explained in previous researches, theories and these, in turn, could be the foundation for the empirical data collection. In addition, through reviewed of the literature we were comparing and identifying the differences between this study and previous studies.

2.1. Theoretical Review

2.1.1. Adoption of Technological Innovation

According to Rogers and Shoemaker (1971), consumers go through a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a product or service. So the stages through which a technological innovation passes are: Knowledge, persuasion, decision, implementation and confirmation.

A potential adopter passes through certain stages before decision is made on whether to adopt or reject an innovation. Rogers has been one of the number of researchers who has focused upon the adoption process, which he defines as the process through which an individual or other decision-maker unit passes from first knowledge of an innovation, to forming an attitude toward the innovation to a decision or rejection to implementation of the new idea, and to confirmation of this decision (Frambach, 1993). The innovation adoption process defined by Rogers is the process through which an individual or other decision making unit passes from knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

These are: Knowledge is socio-economic characteristics, Personality variables and communication behavior all relate to innovativeness. Innovativeness is the degree to which an individual or other adoption unit is relatively early in adopting new ideas compared to other members of a system (Rogers, 1995). According to Rogers early adopters have more formal education than later adopters and are more likely to be (socio-economic characteristics).

Persuasion is the potential adopter's attitude towards the innovation is formed in this stage. By anticipating and predicting future use satisfaction and risk of adoption, the potential adopter develop positive or

negative attitudes to the innovation, which play important role of modifying the final decision. Perceived attitudes of an innovation as its relative advantage, compatibility and complexity are especially important here (Rogers, 1995). Decision is occurs when an individual engages in activities that lead to adoption or rejection of the innovation. In this stage the adopter starts to actively seek out information about the innovation that assists the decision making.

Implementation stage is mental information processing and decision making come to an end, but the behavioral change begins. Confirmation stage is after the adoption of innovations, the adopter keeps evaluating the results of his/her decision. If the level of satisfaction is significant enough, the use of innovation will continue; however, it is also possible that the rejection occurs after adoption. In the latter case, the reverse of previous decision is called discontinuance.

Similarly, according to Rogers (2003), there are five different categories of adopters namely innovators, early adopters, early majority, late majority and laggards. Innovators are those people, who want to be the first to try the innovation, are interested in new ideas and are willing to take risks. Early adopters are people who represent opinion leaders; they enjoy leadership roles, embrace change opportunities and do not need convincing for them to change. Early majority adopt new ideas before the average person but they typically need to see the innovation work before they are willing to adopt it. Late majority are people who are skeptical of change and will only adopt an innovation after it has been tried by the majority. Laggards are bound by tradition and are very conservative; hence they fear innovation.

2.1.2. **Technology and Employees Performance**

The development of technology has an impact on firm performance (Mumford, 2000). Technological advancement comes from internal advancement (Pavitt, 1990), and internal advancement comes from employee capability. So there is a close relationship between technological advancement and employee performance (Huselid, 1995).

Technologies can only lead to increased productivity or improve performance when combined with other resources effectively by human resources or when done effectively, and use technology productively and ethically (Dauda & Akingbade, 2011).

Technological advancement has enormous influence on employee performance (Nohria & Gulati, 1996). It is important factor for influencing the improvement of performance (Hitt, Hoskisson & Kim, 1997). Most of studies have repeatedly shown a positive relationship between a firm's technological advancement and performance, and concluded that technological advancement is important for employee performance (Foster, 1986).

2.1.3. **Technology Products and Services**

According to Kamau (2009), e-banking is a form of banking service where funds are transferred through an exchange of electronic signal between financial institutions, rather than exchange of cash, checks, or other negotiable instruments. It is simply the use of electronic means to transfer funds directly from one account to another rather than by check or cash (Malak, 2007).The term e-banking often refers to online/internet banking which is the use of the internet as a remote delivery channel for banking services (Furst, Lang & Nolle, 2002). E-banking is the use of a computer to retrieve and process banking data (statements, transaction details, etc.) and to initiate transactions (payments, transfers, requests for services, etc.) directly with a bank or with other financial service provider remotely via a telecommunications network (Yang, 1997). It should be noted that electronic banking is a bigger platform than just banking via the internet.

E-banking uses the web browser for the user interface and the Internet for data transfer and download of software, and so has a potential for reducing maintenance costs. For users, e-banking provides current information, 24-hours-a-day access to banking. Customers access e-banking services using an intelligent electronic device, such as a personal computer (PC), personal digital assistant (PDA), automated teller machine (ATM) (Gio, 2005).

Lustsik (2004) explained multiple benefits to customers by e-banking services: Benefits from the bank point of view: The first benefits for the banks offering mobile banking services are better branding and better responsiveness to the market. Those banks that would offer such services would be perceived as leaders in technology implementation. Therefore, they would enjoy a better brand image (Lustsik, 2004). The second benefits to banks are cost savings, reaching new segments of the population, efficiency, enhancement of the bank's reputation and better customer service and satisfaction, the online banking strengthens the relationship between the service provider (e.g. bank) and the customer (Karjaluoto, 2002). The third benefits that online channel enables banks to offer are low-cost, high value added financial services and also benefit from the promotional opportunity to cross sell products such as credit cards and loans. The other benefits are possible to measure in monetary terms. The main goal of every company is to maximize profits for its owners and banks are not any exception. Automated e-banking services offer a perfect opportunity for maximizing profits (Lustsik, 2004).

The main benefit from the bank customers' point of view is significant saving of time by the automation of banking services processing and introduction of an easy maintenance tools for managing customer's money, reduced costs in accessing and using the banking services, increased comfort and timesaving transactions can be made 24 hours a day, without requiring the physical interaction with the bank, quick and continuous access to information, corporations will have easier access to information as, they can

check on multiple accounts at the click of a button, better cash management, e-banking facilities speed up cash cycle and increase efficiency of business processes as large variety of cash management instruments is available on Internet sites, speed: The response of the medium is very fast; therefore customers can actually wait till the last minute before concluding a fund transfer and funds management: Customers can download their history of different accounts and do a what-if analysis on their own PC before affecting any transaction on the web, this will lead to better funds management.

2.1.4. E-payment Services in Ethiopian Banking Industry

The appearance of E-banking in Ethiopia goes back to the late 2001, when the largest state owned, commercial bank of Ethiopia (CBE) introduced ATM to deliver service to the local users. In addition to eight ATM Located in Addis Ababa, CBE has had Visa membership since November 14, 2005. But, due to lack of appropriate infrastructure it failed to reap the fruit of its membership. Despite being the pioneer in introducing ATM based payment system and acquired visa membership, CBE Lagged behind Dashen bank, which worked aggressively to maintain its lead in E-payment system. As CBE continues to move at a snail's pace in its turnkey solution for Card Based Payment system, Dashen Bank remains so far the sole player in the field of E-Banking since 2006 (Gardachew, 2010).

For instance, Salehi and Zhila (2008) indicated that e-banking involves an electronic connection between bank and customer in order to prepare, manage and control financial transactions of the customer by the bank. Applications of ICT within the banking sector are enhancing development of products and service in the industry such as: networked branches, ATMs, internet banking, POS and Mobile Banking. Commercial Bank Ethiopia provides the following e-banking services (IT products).

Automated Teller Machines (ATM)

It is an electronic machine in a public place, connected to a data system and related equipment and activated by a bank customer to obtain banking services without going in to the banking hall. It allows customers to access banking services such as withdrawals, transfers, inquiries about account balances, requests for cheque books, account statements, direct deposits, foreign currency exchange etc. (Fenuga, 2010).

Point-of-Sale (POS)

The system allows consumers to pay for retail purchase with a check card, a new name for debit card. This card looks like a credit card but with a significant difference. The money for the purchase is transferred immediately from account of debit card holder to the store's account (Malak, 2007).

Mobile Banking (MB)

MOBILE BANKING

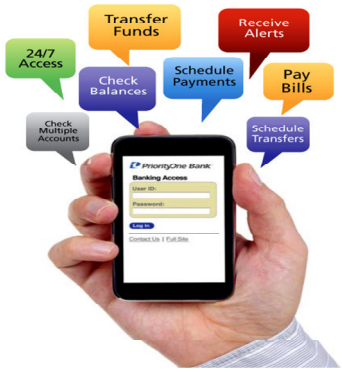


Figure 1: Mobile banking services provided by CBE. Source: E-payment user manual (CBE, 2016).

It is an occurrence when customers access a bank's networks using cellular phones, pagers, personal digital assistants, or similar devices through telecommunication wireless networks (Segun, 2011). It means performing banking activities which primarily consists of opening and maintaining mobile/regular accounts and accepting deposits; furthermore, it includes performing fund transfer or cash-in and cash-out services using mobile devices (NBE Directive, FIS-01-2012).

Internet Banking (IB)

According to Booz-Allen and Hamilton (1999), Internet banking refers to systems that enable bank customers to access accounts and general information on bank products and services through a personal computer (PC) or other intelligent device.

2.1.5. Technology Adoption Models

Technology Adoption models is the process of beginning to use new technology or different technology by customers, employees, organizations etc. As result of the dynamism of the information and communications technology innovative technological products are released. And the growth of nations, organizations and individuals is highly dependent on how best they adopt the technology in their operations. According to (Ho and Ko, 2008) four characteristics (Ease of use, Usefulness, Cost saved and Self-control) were suggested, determining the employees acceptance of new technology as follows:

Ease of use: Ease of use in the current context as a factor in which the self-service activity provides a clear interface and simple process to ensure customers can use it effectively. Davis (1989) also defined ease of use as the degree to which a person believes that using a particular system would be free of effort. Similarly, ease of use given that Internet-based transactions might seem complex and intimidating to many customers, it has often been termed usability in the online context (Zeithaml, Parasuraman & Malhotra, 2002).

Usefulness**:** Davis (1989) usefulness is the degree to which a person believes that using a particular system would enhance his or her job performance.

Cost saved: Automated e-banking services offer a perfect opportunity for minimizing costs (Lustsik, 2004). Costs saved relates to the amount of time and money saved when using an innovative self-service. Costs in terms of money and time are negative factors when customers assess the value of the service (Ho and Ko, 2008).

Attitudinal loyalty: Bennett and Rundle (2002), it is a psychological predisposition towards a particular brand. In order to understand how people can accept or adopt technology various models are developed and used. Researchers in information systems rely on acceptance theories to study implementation problems. A major focus of these studies has been how potential users' perception of an IT innovation influences its adoption. Generally, studies of adoption of information technology take one of two possible approaches, a diffusion approach and adoption approach.

Rogers (1995) describe the diffusion process as consisting of four elements: an innovation or new technology, a social system, the communication channels of the social system and time. Adoption approaches, on the other hand, typically describes and explain the acceptance decision of individual users applying different social theories of decision-making.

Four models, collectively called the Technology Acceptance Theories (TAT), stand out as the most widely applied explanation within the adoption approach. Four models are as follows:

1. Theory of Reasoned Action (TRA)
2. Diffusion of Innovation Theory (DOI)
3. Theory of Planned Behavior (TPB)
4. Technology Acceptance Model (TAM)

1. Theory of Reasoned Action (TRA)

The theory of reasoned action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975 quoted in (Belleau, Summers, Xu, & Pinel, 2007) is based on the assumption that individuals are rational and make systematic use of information available to them. According to theory of reasoned action, behavioral

intention (BI) of an individual is a measure of the strength of one's intention to perform a specified behavior.

BI is determined by two factors: Attitude towards the behavior (AB), which is a function of beliefs that performing the behavior possesses certain attributes and the evaluation of those beliefs. 2) Subjective Norm (SN), which is the perception of social groups i.e. what specific individuals or groups think that a person should or should not perform (Belleau, *et al;* 2007). An individual's Subjective Norm (SN) is determined by a multiplicative function of his or her normative beliefs (NBI), i.e., perceived expectations of specific referent individuals or groups, and his or her motivation to comply with these expectations. According to Fishbein and Ajzen (1975) quoted in Sheppard, Hartwick and Warshaw (1988), a behavioral intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity.

Kripanont (2007) established that TRA has two main determinants of behavior intention:

a. **Attitude toward Behavior (ATB)**

The attitude toward the behavior is the prior attitude of a person toward performing that behavior. It suggests that people think about their decisions and the possible outcomes of their actions before making any decision to be involved or not involved in a given behavior. This theory views the intention of an individual whether to perform a given behavior or not as the immediate determinant of action, and attitude is determined by the person's beliefs and evaluation of behavioral outcomes. So an individual, who strongly believes that positive outcomes will result from performing a particular behavior, will have positive attitudes towards that behavior. On the other hand, if a person strongly believes that a particular behavior will have a negative outcome, then there will be negative attitudes towards that behavior.

b. Subjective Norm (SN)

Subjective norm is the social pressure exerted on the person or the decision maker to perform the behavior. SN refers to an individual's perception about what other people think of his or her behavior in question (Leach, Hennessy & Fishbein, 1994). What other individuals or groups will think, agree or disagree about the decision of a person to perform a given behavior and how important these other individuals or groups are, to the decision maker play a vital role. So it is normal that sometimes people will consult others before making any decisions.

TRA is a well-researched model that has been applied extensively in predicting and explaining behavior across many domains and virtually any human behavior (Ajzen and Fishbein, 1980). Researchers often use this theory to study the determinants of Information Technology innovation usage behavior (Han, 2003).

TRA model predicts consumers' intention and behavior very well. (Belleau, *et al*; 2007); state that behavior that is comparatively Straight forward i.e. under volitional control can be predicted adequately by theory of reasoned action. As it is understood that an intention to buy a product is volitional and few constraints are associated with it, so the usage of theory of reasoned action can lead to valid prediction of purchase intention. However, there is a constraint associated with the TRA model regarding the distinction between a goal intention and a behavioral intention, which has also been acknowledged by Fishbein and Ajzen. The limitation is that they established their model to cope with behaviors.

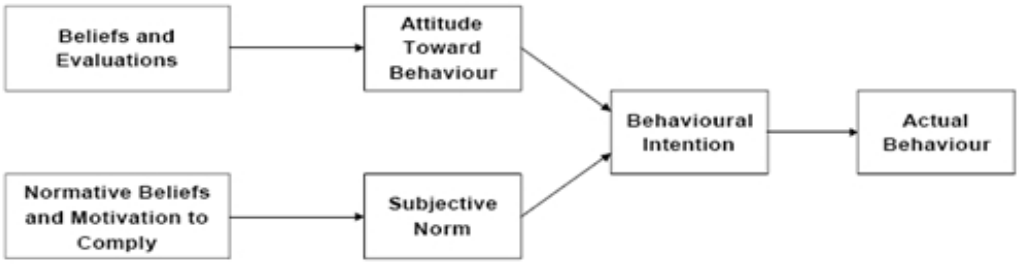


Figure 2: Theory of Reasoned Action. Source: (Fishbein & Ajzen, 1975).

2. **Diffusion of Innovation Theory**

Rogers (1995) Diffusion of Innovation (DOI) theory is a popular model used in information systems research to explain user adoption of new technologies. Rogers defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social society (Rogers, 1995). An innovation is an idea or object that is perceived to be new (Rogers, 1995).

According to DOI, the rate of diffusion is affected by an innovation's relative advantage, complexity, compatibility, trialability and observability. Rogers (1995) defines relative advantage as 'the degree to which an innovation is seen as being superior to its predecessor'. Complexity, which is comparable to TAM's perceived ease of use construct, is 'the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand'. Compatibility refers to 'the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters'. Trialability is the 'degree to which an idea can be experimented with on a limited basis'. Finally, observability is the 'degree to which the results of an innovation are visible' (Rogers, 1995).

The diffusion of theory is relevant because it explains the reason why banks adopt technological innovations. One of the reasons why banks adopt technological innovations is relevant advantage. This means that banks that adopt technological innovations have relatively better financial advantage than those who do not.

3. The Theory of Planned Behavior (TPB)

According to TRA, a person's behavioral intention guides his actual behavior of performing some certain action and where subjective norm and attitude toward the behavior determine the behavioral intention Liao, Shao, Wang, and Chen (2007).

According to Ajzen (1991) quoted in (Liao, *et al*; 2007: 2809): behavioral intention is a measure of the strength of one's willingness to try while performing certain behaviors. As in the original model of TRA, there are some limitations when dealing with behavior for which there is incomplete volitional control of people. Therefore, TPB is proposed to eliminate these limitations; and in fact, TPB differs from TRA because of the addition of perceived behavior control, which potentially effects behavioral intention. The TPB sought to account for conditions where individuals do not have a complete control over their behavior. When applied to the acceptance of information technology systems or services, the model contains five concepts. As in TRA, it includes behavioral attitudes, subjective norms, intention to use and actual use. However, this theory interprets behavioral control as a perceived construct. Perceived behavioral control covers both the intention to use and the actual usage.

Actual usage is in turn a weighted function of intention to use and perceived behavioral control. Under this arrangement control aspects of the observation is introduced into the model. This makes the TPB more functional in its application. Researchers have used the TPB widely to model the acceptance of a variety of new information technologies in businesses as well as to predict levels of usage.

4. The Technology Acceptance Model (TAM)

The TAM is a further adaptation of TRA specifically tailored for modeling user acceptance of information systems (Davis, 1989). TRA suggests that social behavior is motivated by an individual's attitude towards carrying out that behavior. However, it does not specify what specific beliefs would be important in a particular situation. TAM posits that the actual usage of technology can be predicted by user's behavioral intention and his/her attitude towards use, which in turn are influenced by the technology's perceived ease of use and perceived usefulness. Based on certain beliefs, a person forms an attitude about certain objects, on the basis of which one forms an intention as to how one should behave with respect to that object.

The intention to behave is the sole determinant of actual behavior. The TAM suggests that two specific

beliefs, Perceived ease of use and Perceived usefulness, determine one's behavioral intention to use a technology (Venkatesh, 2000; Venkatesh & Davis, 2000).

Perceived ease of use is the extent to which a person believes that using a technology will be free of effort. It is thus a construct tied to an individual's assessment of the effort involved in the process of using the system (Venkatesh, 2000).

Perceived usefulness is the degree to which a person believes that using a particular technology will enhance his performance (Sun & Zhang, 2006). Further, the TAM posits that Perceived usefulness will be influenced by Perceived ease of use because, other things being equal, the easier a technology is to use, the more useful it can be (Venkatesh, 2000).

Davis (1989) developed and validated better measures for predicting and explaining use, which focused on two theoretical constructs: perceived usefulness and perceived ease of use, which were theorized to be fundamental determinants of system use.

Kripanont (2007) made it clear that aside from their theoretical values, better measures for predicting and explaining system use would have great practical value, both for vendors who would like to assess user demand for new design ideas, and for information systems managers within user organizations who would like to evaluate these vendor offerings.

TAM postulates that computer usage is determined by Behavioral intention. However, the TAM differs from others in that Behavioral intention is viewed as being jointly determined by the person's attitude towards using a system and Perceived usefulness. The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified.

Ideally one would like a model that is helpful not only for prediction but also for explanation, so that researchers and practitioners can identify why a particular system may be unacceptable, and pursue appropriate corrective steps. As Figure 3 shows, TAM posits that two particular beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), are the primary relevance for computer acceptance behavior. PU is the degree to which a prospective user believes that using a particular system would enhance his or her job performance. This follows from the definition of the word "useful": "capable of being used advantageously". Within an organizational context, people are generally reinforced for good performance by raises, promotions, bonuses, and other rewards (Pfeffer, 1982). A system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship. In the past decade, TAM has become well established as a robust, powerful, and parsimonious model for predicting user acceptance.

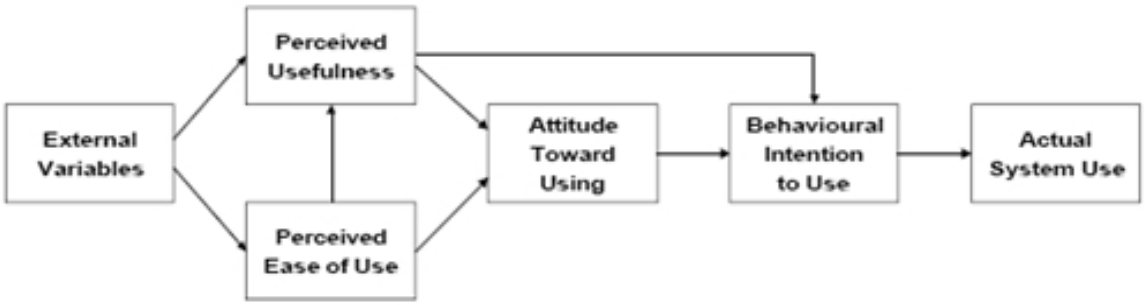


Figure 3: Technology Acceptance Model. Source: (Davis, Bagozzi & Warshaw, 1989:985).

According to Kripanont (2007), TAM theorized that the effects of external variables (e.g., system characteristics, development process, training) on intention to use are mediated by perceived usefulness and perceive ease of use.

Perceived usefulness is also influenced by perceived ease of use because if other things are equal, the easier the system (technology) is, the more useful it can be (Venkatesh and Davis, 2000). One assumption made by TAM is that usage of a particular technology is voluntary (Davis, 1989). Another assumption is that, given sufficient time and knowledge about a particular behavioral activity, an individual's stated preference to perform the activity (i.e. behavioral intention) will in fact closely resemble the way they do behave. This assumption only applies when the behavior is under a person's volitional control (Ajzen and Fishbein, 1980). Moreover, TAM has strong behavioral elements and it assumes that when there is an intention to act, there will be free will to act without limitation. In the real world, there will be many restrictions, such as limited ability, time constraints, environmental or organizational limits, or unconscious habits which will limit freedom to act (Bagozzi, 1992).

2.2. Empirical Review

Several studies have been conducted on factors influencing adoption of technology change and performance of banks. Some related studies are conducted by different researchers in different parts of the world. However, there are limited numbers of studies conducted in Ethiopia on employees' adoption of technological change. Specifically, Gardachew (2010) conducted research on the opportunities and challenges of E-banking in Ethiopia. The aim of his study was focused on analyzing the status of electronic banking in Ethiopia and investigates the main challenges and opportunities of implementing E-banking system. The author conducted a survey on the existing operating style of banks and identifies

some challenges of using E-banking system, such as, lack of suitable legal and regulatory frame works for E-commerce and E- payments, political instability in neighboring countries, high rates of illiteracy and absence of financial networks that links different banks.

Wondwossen and Tsegai (2005) also studied on the challenges and opportunities of E-payments in Ethiopia; their objective was studying of E-payment practices in developing countries, Africa and Ethiopia. The authors employs interview and on site observation to investigate challenges to E-payment in Ethiopia and found that, the main obstacles to the development of E-payments are, lack of customers trust in the initiatives, Unavailability of payment laws and regulations particularly for E-payment, Lack of skilled manpower and Frequent power disruption.

Similarly, according to Tchouassi (2012) sought to find out whether technology change really work to extend banking services to the unbanked using empirical Lessons from Selected Sub-Saharan Africa Countries. This study sought to discuss how mobile phones could be used to extend banking services to the unbanked, poor and vulnerable population. The study noted that poor, vulnerable and low-income households in Sub- Saharan Africa (SSA) countries often lacked access to bank accounts and faced high costs for conducting basic financial transactions. In addition to technological and economic innovation, policy and regulatory innovation was needed to make these services a reality. (Ching, *et al;* 2011) studied the factors affecting Malaysian mobile banking adoption from the point of an empirical analysis. This study aimed at extending the Technology Acceptance Model (TAM) to investigate mobile banking acceptance in Malaysia.

More specifically, the objective of this study was to examine the relationships between constructs of perceived usefulness, perceived ease of use, social norms, perceived risks, perceived innovativeness, and perceived relative advantages towards behavioral intention in adopting mobile banking. The findings of this study revealed that perceived usefulness, perceived ease of use, relative advantages, perceived risks and personal innovativeness were the factors affecting the behavioral intention of users to adopt mobile banking services in Malaysia.

Technology acceptance model is an information system theory that models how users come to accept and use a technology. According to Chuttur (2009), although many models have been proposed to explain and predict the use of a system, the technology acceptance model has been the only one which has captured the most attention of Information Systems Community.

Wang (2012) points to the significance of attitude towards the services and the brand offering the services. In addition, service security, privacy and convenience are identified as critical for adoption. Characteristics of the consumer are also covered because the ability and motivation of the consumer are included among the factors of importance for adoption of technology change.

Vatanparast and Asil (2007) look at four main criteria for adoption. These are related to the consumer (privacy, purpose, performance), the message (content, credibility, and customization), the device (interface, interactivity, and intelligence), and the media (price, process, and policy). With a focus on mobile banking advertising, Yaniv (2008) points to the advantage of multiple channels, careful targeting, and use of incentives to motivate users, interactive response capabilities, and real-time triggering as the most critical success factors.

Focusing downloadable apps, (Chiem , *et al;* 2010) list technology, governmental regulations, market characteristics, and socio-cultural factors as critical success factors.

The success criteria have an explicit eye on criteria for adoption. Sarker and Wells (2003) suggest five categories of success factors for adoption of handheld devices; individual characteristics (age, culture, technological self-efficacy and prior experience), communication/task characteristics (number of interacting participants, immediacy of response, volume of communication, communication objectives), modality of mobility (type -travelling, wandering, visiting – and extent), technology characteristics (interface characteristics, network capabilities), and context (economic factors, social factors, critical mass of subscribers and available services).

(Huang, *et al;* 2003) discuss the importance of learning from "failure" with electronic commerce. They discuss the efforts of First Atlantic Bank of Nigeria and find that it would have been more difficult for the bank to introduce a mobile banking service as promptly and readily without prior learning from the implementation of their Internet bank.

(Sripalawat, Thongmak & Ngramyarn, 2011) uncovered negative effects of services barriers, perceived risk, lack of information and perceived financial costs on the intention to adopt while positive influences were revealed for subjective norm, perceived usefulness, perceived ease of use, and self efficacy. However, as the many empirical research shows the two independent variables perceived ease of use and perceived usefulness are not enough to explain adoption of new technology by employees. As result many researcher include other factors on top of the basic perceived usefulness and perceived ease of use such as perceived risk, trust, relative advantage etc. In this research paper like other research works reviewed in the empirical literature review additional variable namely subjective norm in addition to perceived usefulness and perceived ease of use is added.

Addressing such gaps in the literature is the main aim of this study. Thus, the field of study falls broadly into the discipline of technology in general and more specifically, factors that affect employees' adoption in the context of commercial bank of Ethiopia using Subjective norm and TAM model.

2.3. Conceptual Framework and Hypotheses

Pikkarainen, Karjahoto & Pahnila (2004) in their work on Consumer acceptance of online banking find two fundamental reasons underlying online banking development and diffusion. First, banks get notable cost savings by offering online banking services. It has been proved that online banking channel is the cheapest delivery channel for banking products once established. Second, banks have reduced their branch networks and downsized the number of service staff, which has paved the way to self-service channels as quite many customers felt that branch banking took too much time and effort (Karjaluoto, 2002). Similarly, it has been noted that users' attitudes towards and acceptance of a new information system have a critical impact on successful information system adoption (Davis, 1989). The more accepting of a new information system the users are, the more willing they are to make changes in their practices and use their time and effort to actually start using the new information system (Pikkarainen, *et al*; 2004).

According to Venkatesh (1996) in which system use (actual behavior) is determined by perceived usefulness and perceived ease of use relating to the attitude towards use that relates to intention and finally to behavior. (Pikkarainen, *et al*; 2004) in their study of consumer acceptance of online banking in Finland in the light of the technology acceptance model (TAM) added with new variables derived from online banking acceptance literature on one hand and from a focus group interview with bank managers on the other. The model they developed proposed that online banking acceptance can be modeled with the variables derived from the TAM (PU and PEOU) and four other variables referring to perceived enjoyment, information on online banking, security and privacy, and the quality of the Internet connection. The dependent variable of the model is behavioral intention to adopt technology change. In addition, TAM is widely used popular technology adoption model with regard to information technology. It has proven to be a theoretical model in helping to explain and predict user behavior of information technology (Legris, 2003).

The TAM suggests that two beliefs – perceived usefulness and perceived ease of use are instrumental in explaining the variance in users' intentions. However, Davis (1989) noted, future technology acceptance research must address how other variables affect usefulness, ease of use and user acceptance. Therefore, perceived ease of use and perceived usefulness may not fully explain behavioral intentions towards the use of new technology, necessitating a search for additional factors that can better predict employees' adoption.

Based on the study problem and the literature review, this study aims to test the following hypotheses:

- Hypothesis 1: There is a relationship between perceived usefulness of the adoption of technology and behavioral intension of employees.
- Hypothesis 2: There is a relationship between perceived ease of use of the adoption of technology and behavioral intension of employees.
- Hypothesis 3: There is a relationship between subjective norm of the adoption of technology and behavioral intension of employees.
- Hypothesis 4: All independent variables have significant relationship with the adoption of technology.

Hypotheses 1 and 2 are proposed based on TAM as discussed before, Hypotheses 3 is the unique feature from TRA model, and Hypothesis 4 is based on TAM and Subjective norm respectively.

According to Venkatesh (1996) in which system use (actual behavior) is determined by perceived usefulness and perceived ease of use relating to the attitude towards use that relates to intention and finally to behavior. It has been noted that users' attitudes towards and acceptance of a new information system have a critical impact on successful information system adoption (Davis, 1989).

TRA and TAM models would be in more comprehensive manner to understand the acceptance behavior employees' adoption of technological change and hopefully, this would provide us with higher explanatory power to examine this problem and effectively improve the adoption or acceptance of technological change. Similarly, the diffusion of theory is relevant because it explains the reason why banks adopt technological innovations. According to Rogers (1995) one of the reasons why banks adopt technological innovations is relative advantage. Relative advantage as the degree to which an innovation is seen as being superior to its predecessor. Complexity, which is comparable to TAM's perceived ease of use construct, is the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand. Compatibility refers to the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters. Trialability is the 'degree to which an idea can be experimented with on a limited basis'. Finally, obserability is the degree to which the results of an innovation are visible.

2.4. Summary of Literature Review

In the Theory of Reasoned Action (TRA), Subjective Norm (SN) was defined as the social pressure exerted on a person or the decision maker to exude a behavior. SN was referred to as an individual's perception about what other people think of his or her behavior in question (Leach, Hennessy and Fishbein 1994). What other individuals or groups will think, agree or disagree about the decision of a person to perform a given behavior and how important these other individuals or groups are to the decision maker play a vital role. In the TRA model, it was stated that employee behavior to use new technology in the work place is affected by social pressures Employee perceived usefulness and perceived ease of use and adoption of new technology was one area that had not been well explained in the theories used for this study. Theories used in this study state that given sufficient time and knowledge about a particular behavioral activity, an individual's stated preference to perform the activity i.e. behavioral intention will in fact closely resemble the way they do behave. This assumption only applies when the behavior is under a person's volitional control (Ajzen & Fishbein 1980).

Researches done on employees' adoption of technological change and bank's performance have scarcely been conducted in the advanced world. Conducting this research in an entirely different context like Ethiopia in general and Commercial Bank of Ethiopia in particular will contribute immensely to the body of knowledge that exists on attitude of employees towards technological change and the finding will enhance performance of CBE in the study area. Most of the research has shown that employee attitude and behaviors need to be developed for successful adoption of technological change (Bernerth, 2004).

The TAM, TRA, TPB and DOI focus on different determinants to explain the employees' behavior in technology adoption, these theories share some similarities. Firstly, TRA, TPB, and TAM model assume an attitude-intention-behavior relationship, that is, cognitive and normative or affective beliefs form attitude, which, in turn, has influence on behavioral intention and actual usage of behavior. Secondly, the perceived usefulness in TAM is similar to relative advantage in DOI. These constructs are cognitive component of individual's attitude. The constructs of PU and relative advantage in various models further justify the rationale in TRA that the beliefs about the consequences of the behavior are keys to the formulation of attitude towards the behavior. Thirdly, the construct of perceived ease of use in TAM is obviously close to the complexity construct in DOI.

The TAM suggests that two specific beliefs, Perceived ease of use and Perceived usefulness, determine one's behavioral intention to use a technology (Venkatesh, 2000; Venkatesh and Davis, 2000). Perceived ease of use is thus a construct tied to an individual's assessment of the effort involved in the process of using the system (Venkatesh, 2000). Further, the TAM posits that Perceived usefulness will be influenced by Perceived ease of use because, other things being equal, the easier a technology is to use, the more

useful it can be (Venkatesh, 2000). Similar to the TRA, the TAM postulates that computer usage is determined by behavioral intention. However, the TAM differs from the TRA in that behavioral intention is viewed as being jointly determined by the person's attitude towards using a system and Perceived usefulness.

One of the characteristics of the TAM often cited in the literature is the parsimony of the model. The parsimony of the TAM, coupled with its predictive power, makes it relatively easy to apply in different situations. However, it is also the model's key limitation in that it does not provide sufficient understanding from the perspective of providing system designers with the information necessary to create user acceptance for new systems (Venkatesh, 2000).

Based on the previous literature and better explanation of the model in relation to employees' adoption of technology acceptance both theoretically and empirically this study uses Subjective norm and TAM model. Therefore, perceived usefulness, perceived ease of use, subjective norm are included as independent variables in the model.

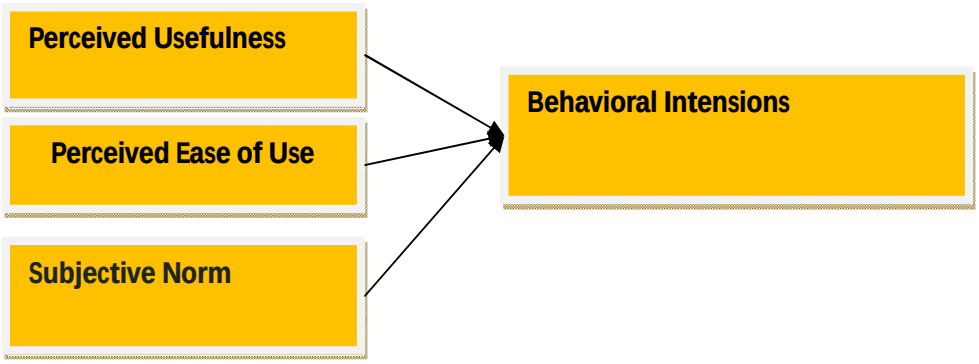


Figure 4: Theoretical Framework (source: researcher own, 2017).

Theoretical Framework Model Adopted:

The technology acceptance models tries to analyze for a given technology how will perceived usefulness and perceived ease of use affect user's behavioral intention to adopt new technology within the model. Technology Acceptance Model variables: Perceived usefulness and perceived ease of use may not fully explain the behavioral intension of employees in the adoption of technology, many researchers include additional variables as an independent variables in technology adoption among these subjective norm is included from theory of reasoned action in previous research works by Venkatesh and Davis (2000). Since subjective norm by potential users of a technology may influence the users' intention to use the technology. In this research

work like the previous research works subjective norm is believed to affect users' intention to adopt the technology in commercial bank of Ethiopia, since the technology is at early stage in Ethiopia.

Properly adopted technology enhance the quality of work; accomplish task quickly, make task easy and useful for banking activities are factors that make up the variable perceived usefulness.

Ease to learn, easy to become skilful, facilitates decision making and easy to do what user want with technology are factors that make up the variable perceived ease of use.

The use of bank's technology does not have any negative association with operations, values, relationship with management and creating team sprite in commercial bank of Ethiopia are factors that make up the variable subjective norm.

CHAPTER THREE
METHODOLOGY

3.0. Introduction

Methodology typically refers to the techniques that are used to conduct research. Any kind of research should be governed by a well-defined research methodology based on scientific principles and describes the research approach, research design, target population and sample design, data collection procedures, data analysis, reliability and validity and ethical considerations in the study.

3.1. Research Approach

There are two approaches to a research, either qualitative or quantitative approach. Qualitative research emphasis the process and meaning that are not rigorously examined or measured, in term of quantity, amount of intensity or frequency. In contrast, quantitative study emphasis measurement and analysis of causal relationships between variables, not processes (Zikmund, 2000).

In quantitative research variables and relationships are the central idea (Neuman, 2003). Quantitative research is useful in providing detailed planning prior to data collection and analysis, because it provided tools for measuring concepts, planning design stages and for dealing with population and sampling issues. In addition, a quantitative research approach utilizes a deductive model in testing the relationship between variables and to provide evidence for or against pre-specific hypothesis (Neuman, 2003). The objective of this study was examining determinants of technology adoption in the case of CBE. For achieving this, the researcher chosen a structured framework and develops research hypothesis. This study analyzed the data collected from sample employees and generalizes the data to population. So, the research approach for this study was predominantly quantitative in nature which involved the use of primary and secondary data in order to answer the research questions and achieves its research objective.

3.2. Research Design

Research design is considered as a "blueprint" for research which directs, which questions to study, which data are relevant, what data to collect, and how to analyze the results (Adèr, Mellenbergh & Hand, 2008). Among research design, descriptive research design is a systematic, empirical inquiry into which the researcher does not have direct control of independent variables as their manifestation has already

occurred or because they are reflecting the state of happenings and qualify the obtained findings through the use of quantitative analysis (Mugenda & Mugenda, 1999). It also involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection and often uses visual aids such as graphs, frequency, percentage, and charts to aid the reader in understanding the data distribution. When in-depth, narrative descriptions of small numbers of cases are involved, the research uses description as a tool to organize data into patterns that emerge during analysis. Those patterns aid the mind in comprehending a qualitative study and its implications. This design will be appropriate as the variables in this study vary in different properties and degrees.

On the other hand, explanatory research design is studying a problem or phenomena in order to establish causal relationship among variables (Saunders, Lewis & Hornhill, 2000). Explanatory research is sometimes referred to as causal research (Zikmund, 2000). Normally, descriptive research is conducted first and then explanatory research tries to establish and explain patterns related to phenomenon of interest (Saunders, *et al*; 2000). In the same fashion, while explanatory research is conducted when we encounter an issue that is already known and have a description of it, we might begin to wonder why things are the way they are. The desire to know "why", to explain, is the purpose of explanatory research. The researcher goes beyond merely describing the characteristics, to analyze and explain why and how something is happening.

The target population for this study was all employees except managerial level in Commercial Bank of Ethiopia, which helped to determine the sample frame and sample size. The procedure for data collection done with the aid of a research instrument, which designed from existing instruments. The questionnaire, with respect to this study, applied the use of a structured questionnaire as its research instrument. The structured questionnaire was chosen because it is a common instrument used for survey method and reduces the biasness of the interviewer and also enables the researcher to cover a relatively large number of respondents.

The purpose of the academic research can be exploratory (ambiguous problem), descriptive (aware of problem), or explanatory (clearly defined problem) (Zikmund, 2000).This study used descriptive and explanatory research design to aware and clearly defines problems related with determinants of technology adoption in the case of CBE.

3.3. Target Population and Sample Design

A population refers to an entire group of individuals, events or objects having a common observable characteristic (Mugenda & Mugenda, 2003). The target population of this study was employees of CBE in Addis Ababa. According to the e-payment report of CBE in December 15, 2016 the total employees in Addis Ababa (includes four districts East, west, North and South that have radius of 150 km from Addis Ababa as per the CBE Organizational Structure) is 9,698. The study population cut across all levels of employees except managerial level in Commercial Bank of Ethiopia. The reason for this was based on the study of Gagnon and Dragon (1998), who stated that lower employees rather than top employees are usually the ones using technology deployed in organizations.

The characteristic of the study population was mixed at every level of the bank irrespective of gender, age, marital status, educational qualification, job status and years worked in the bank.

The sample size for this study was determined using the Yamane's sample size formula.

Giving the population of N=9,698, CL=95% confidence level and e = 5% the level of precision and n is the sample size, the equation is thus presented as:

$$n = \frac{N}{1 + N(e)^2} = \frac{9698}{1 + 9698(.05)^2} = 385$$

Therefore, there are 385 employees included in the sample size using the Yamane's sample size formula.

Traditional sampling method can be divided into two categories (Saunders, *et al*; 2000): Probability and non-probability.

- Probability sampling is the most commonly associated with survey based research where researcher needs to make inferences from the sample about a population to answer the research questions or to meet research objectives (Saunders, *et al*; 2000). In probability sampling, sampling units are selected randomly. If done properly, probability sampling ensures that the sample is representative (Hair, *et al*; 2003).
- Non-probability sampling provides a range of alternative technique based on researcher subjective judgment (Saunders, *et al*; 2000). In non-probability sampling the selection of elements for the sample is not necessarily made with the aim of being statistically representative of the population. Rather the researcher uses the subjective methods such as personal experience, convenience, expert judgment and so on to select the elements in the sample. As a result the probability of any elements of the population being chosen is known.
- Convenience Sampling used to select branches and sample respondents based on accessibility, time and speed to complete a large number of participants. The reason behind such sampling design was to get higher number of employees within short period, since the type of employees across all branches

were assumed to be homogenous (no segmentation geographically or at branch level). Samples chosen to represent the relevant attributes of the target population. Accordingly: Gerji, Tefera Degefie, Megenagna, Meri, Jacros, Sefera, Yerer Goro, Hayat, Gurdshola, Gerji Giorgis, Koriya and Yerer Mebrat branches were selected.

Table 1: the proportion of Respondents

Branches	Proportion of Respondents
Tefera Degefie	65
Megenagna	61
Gerji	45
Gurdshola	45
Koriya	30
Meri	25
Hayat	24
Yerer Mebrat	20
Jacros	20
Yerer Goro	20
Sefera	15
Gerji Giorgis	15
Total	385

(Source: Survey data, 2017)

From total population using the formula stated, sample size required for the study is 385 employees in the above branches. Convenience sampling method used in the selection of 385 employees from the above twelve branches. Convenience sampling adopted because of the homogeneous characteristics of the study population, that was, non-managerial employees in Commercial Bank of Ethiopia.

3.4. Data Collection Procedures

The study used both primary and secondary data. Secondary data used mainly to obtain information about bank employees, branches and customers. As result secondary data were collected from Commercial Bank of Ethiopia and other published sources. Structured questioners used for collecting primary data. The collection of data using questionnaires consisting of Likert scales, distributed to the selected branches; through identified contact persons. Questions presented relating to the concepts on technology and to identify their intention on determinants of technology adoption in the case of CBE, in such a way to enable measurement of the respondent's perception. The respondents were asked to indicate their level of agreement on a five point likert scale with the following ratings. Strongly agree (SA; or 5), agree (A; or 4), neutral (N; or 3), disagree (DA; or 2), and strongly disagree (SD; or 1).

The use of structured questionnaire was to enhance uniformity of employees' response bearing in mind the degree of variations in perception of technological adoption. Questionnaires consisted of two parts; the first part consisted of background information about the respondents that comprised of age, gender, position, educational level etc.

Second part discussed with different factors based on subjective norm and TAM model. The questionnaire prepared in English. To determine the probable usefulness of the questionnaire and whether further revision needed prior to conducting the survey, the questionnaire was pilot tested. The subjects asked if they have any problems understanding the questionnaire or have specific comments regarding the questionnaire.

The subjects also encouraged to be very free with their responses, make suggestions for improvement and outline any difficulties they find. After each questionnaire accomplished, every question asked what he/she means in checking various answers. The questionnaire items selected from previous research study to represent the variables in the research model. Items measured on a scale for perceived usefulness, perceived ease of use and intention to use adapted from the TAM instrument (Davis, 1989) and item on scale subjective norm adopted from TRA (Fishbein & Ajzen, 1975).

3.5. Data Analysis

According to yin (1994), the ultimate goal of analyzing data is to treat the evidence fairly, to produce compelling analytical conclusions and to rule out alternative interpretations. The descriptive statistics used mainly to understand employees' profiles and the perception of employees toward the determinants of technology adoption in the case of CBE: perceive usefulness, perceive ease of use, subjective norm and behavioral intension with respect to technology which helped us to answer research questions.

Data from the structured questionnaire properly organized through data coding, cleaning and entering. Descriptive statistics by mean, median, mode, percentages, tables and charts were

generated from the software to establish relationship among variables. Analysis has been done by comparing these mean scores and deviations among respondents. The reason for using descriptive statistics was to compare the determinants of technology adoption in the case of CBE.

The data analysis used in this study was correlation to examine the relationship and the direction of the relationship between perceived usefulness in the adoption of technology and behavioral intension of employees, perceived ease of use in the adoption of technology and behavioral intension of employees and subjective norm in the adoption of technology and behavioral intension of employees which were part of the main objectives of the research.

For the explanatory statistical analysis, simple regression and multiple regression analysis applied for this research to address the objectives of the research, determinants of technology adoption in the case of CBE. Simple regression analysis applied for this research to address one independent variable relationship with the dependent variable. Multiple regression analysis also applied to assess the relationship between the independent variables and the dependent variable. In order to facilitate the interpretation and the finding of the study both descriptive and explanatory data analysis employed in this study and the coded data then processed using SPSS.

3.6. Reliability and Validity

The reliability of a measure indicates the extent to which the measure is without bias (error free) and hence offers consistent measurement across time and across various items in the instrument (Sekaran, 2006). Since the items making up conceptual model will be measured with a likert scale, the Cronbach's coefficient alpha is the reliability test of choice. The reliability of the data examined to check the consistency for all questions of this study through Cronbach's Alpha coefficient and also used to identify the validity of items. In addition, the internal reliability test with Cronbach's Alpha (α), which measured the correlation between the variables that attempt to determine a concept. This study replicated to achieve the same results within the prevailing time frame. Validity is judgment of whether data really provides evidence on what it is supposed to be about the research instrument (Anderson, 2004). It also refers to the extent to which a measure reflects the concept it intends to measure. If the measures use actually measure what they claim to, and if there are no logical errors when drawing conclusions from the data, the study is said to be valid (Trochim, 2000).

Reliability Test

To estimate the reliability of the questionnaire, test results collected from commercial bank of Ethiopia's employees shown in table 1 and Cronbach Alpha was computed by SPSS software.

Table 2: Cronbach Alpha Coefficient for each Variable

Item	Cronbach Alpha
Perceive Usefulness	0.906
Perceive Ease of Use	0.874
Subjective Norm	0.864
Behavioral Intension	0.900

(Source: Survey data, 2017)

All the items in total sample had Cronbach Alpha values of greater than 0.8 it showed that the high reliability of the construct.

3.7. Ethical Considerations

It made clear that the participants of the research remained unknown and explanation made of how the data collected and how the information used. The researcher undertook all necessary measures to ensure that all ethical aspects of the research process followed. In particular, the researcher made efforts to ensure the respondents understand that their participation in the research process was on a voluntary basis, and they could with draw at any time of their liking. Furthermore, the researcher also took all measures possible to ensure that respondents' identities kept anonymous.

3.8. Variables and Specification

The aim of this study is to examine determinates of technology adoption in the case of CBE employees. The researcher employed the regression model to determine the significance level of the variables for the behavioral intension of employees in the adoption of technology.

Behavioral Intension of employees=f (perceived usefulness, perceived ease of use and subjective norm)

Basically, $BI= \alpha + \beta 1X1+ \beta 2X2 + \beta 3X3+\varepsilon$

Where, BI=behavioral intension of employees

X1= perceived usefulness

X2= perceived ease of use

X3= Subjective norm

Here α is constant and β is coefficient of estimate and ε is the error term.

Behavioral intension of employees is dependent variable and X1 to X3 are independent variables.

The three variables: perceived usefulness and perceived ease of use from technology acceptance model and subjective norm from theory of reasoned action have been established based on literature review.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0. Introduction

This study sought to establish determinants of technology adoption in the case of CBE in twelve branches of Addis Ababa. Data was gathered by use of self administered questionnaires and findings of the study presented based on the objectives of the study. Data collected and presented were analyzed in this chapter. In the analysis, a total of three hundred eighty five (385) questionnaires were distributed to professional staff in commercial bank of Ethiopia. All the respondents completed the questionnaires. For the purpose of analysis, both descriptive and inferential statistics were used.

4.1. Profile of Respondents

The questionnaire included employee's profile, as an assortment of demographic and other factors were likely to influence the degree that determinants of technology adoption in the case of commercial bank of Ethiopia in selected branches in Addis Ababa.

4.1.1. Gender, Age and Educational Level of Respondents

Table 3: Gender, Age and Educational Level of Respondents

(Source: Survey data, 2017)

Item	Characteristic	Percentage (%)
Gender	Male	63.1
	Female	36.9
Age	Less than 25yrs	29.6
	25-35yrs	61.3
	36-45yrs	8.8
	Above 45yrs	0.3
Education	TVET/Diploma	3.4
	University Degree	88
	Master Degree	8.6
	Above Master Degree	-

As can be seen from Table 3**,** respondents' gender reveals that male respondents had 63.1% and females were 36.9%. Despite the 26.2% difference between the two genders, data obtained represent fair opinion

of both genders. This shows that there is a significant difference between men and women employees who are working in commercial bank of Ethiopia that are adopting bank technology.

Similarly, the sample employees were mostly in the age group of 25-35 that accounts 61.3% which was majority of the respondents' age. Whereas 29.6% less than 25years. On the other hand, there were 8.8% respondents whose age group was between 36-45 years and only one respondent above 45years. The fact that more than average of the respondents was young and adult implies it is an opportunity for the commercial bank of Ethiopia to adopt technology in the coming periods. Finally, with regards to educational background, majority of the respondents were first Degree holders which were 88% of the total respondents. Followed by Master Degree holders 8.6%. On the other hand, there were 3.4% with TVET/Diploma and no employees above Master Degree. That means most of CBE employees in Addis Ababa, in the branches where data were collected, have higher educational status which is an opportunity to CBE to provide advanced services using new technology adoption.

4.1.2. Position in CBE

Table 4: Position in Commercial Bank of Ethiopia

	Frequency	Percent	Valid Percent	Cumulative Percent
JCSO	74	19.2	19.2	19.2
CSO	227	59.0	59.0	78.2
CRO	22	5.7	5.7	83.9
KYC	24	6.2	6.2	90.1
ACCOUNTANT	13	3.4	3.4	93.5
AUDITOR	25	6.5	6.5	100.0
Total	385	100.0	100.0	

(Source: Survey data, 2017) (Note: JCSO- Junior Customer Service Officer, CSO- Customer Service Officer, CRO - Credit Relation Officer, KYC- Know Your Customer)

Regarding the distribution of respondents' position of employees in CBE as indicated by the table 4 above majority of the respondents were CSO which were 59% of the total respondents which were followed by JCSO 19.2%, Auditors 6.5%, KYC 6.2%, CRO 5.7% and Accountants 3.4% respectively. This shows majority of employees in CBE were at operational level.

4.1.3. Familiarity of Technology in CBE

Table 5: Familiarity of Technology

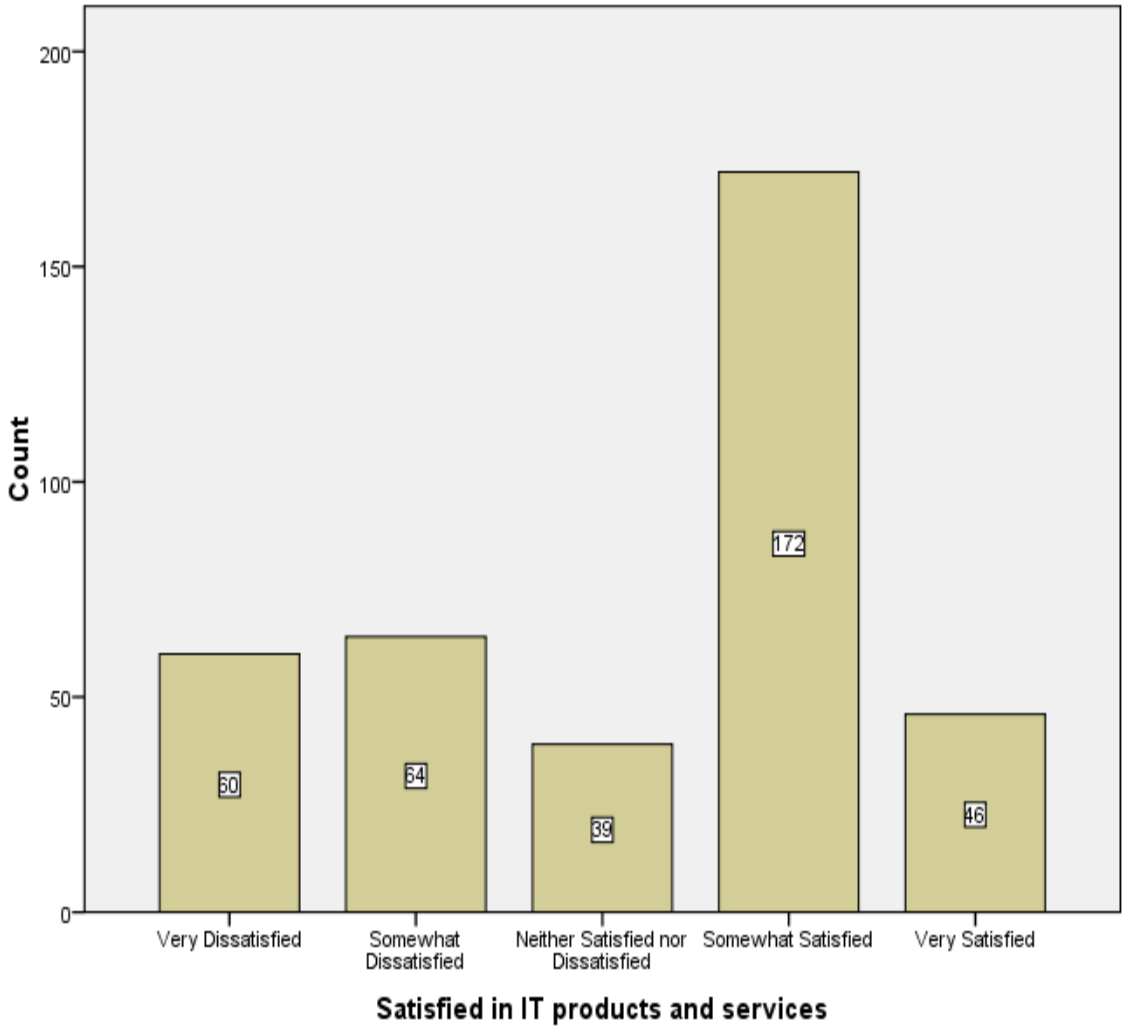
	Frequency	Percent
ATM	290	75.9
Mobile Banking	44	11.5
On line banking	28	7.3
POS	9	2.4
Gieom	10	2.6
Internet Banking	1	.3
Total	385	100.0

(Source: Survey data, 2017)

As can be observed from the above table 5, with respect to distribution of respondents' familiarity with technology in commercial bank of Ethiopia. It revealed that most of the respondents were more familiar with Automated Teller Machine (ATM), 75.3% followed by Mobile Banking with 11.4%, On-line banking with a frequency of 7.3%, Point of Sales System (POS), 2.3%, Gieom, 2.6%, Internet banking, 0.3% and 0.8% no response respectively. This indicates respondents' familiarity with technology in commercial bank of Ethiopia at work. This information implies that the technology frequently used in CBE was the ATM, Mobile banking, On-line banking, Gieom, POS and internet banking. Findings also show that the willingness of employees to adopt technology in a banking environment will tend to stem from the broad ideas of applicable technology, which people have in a banking environment.

4.1.4. Satisfaction with the IT products/services provided by your bank

Figure 5: Satisfaction in IT products/services



(Source: Survey data, 2017)

As can be seen from the above figure 5, under the distribution of respondents' degree of satisfaction with respect to available technological products/services in commercial bank of Ethiopia, majority of the respondents were somewhat satisfied which were 172(44.7%) of the total respondents which were followed by somewhat dissatisfied 64(16.6%), very dissatisfied 60(15.7%), very satisfied 46(11.9%), neither satisfied nor dissatisfied 39(10.1%) and no response .9% respectively. This implies that there were a gap between employee's satisfaction level on new technology and the extent of technology introduced by the bank.

4.1.5. Technology delivers consistent output even in high work pressure.

Table 6: Technology delivers consistent output

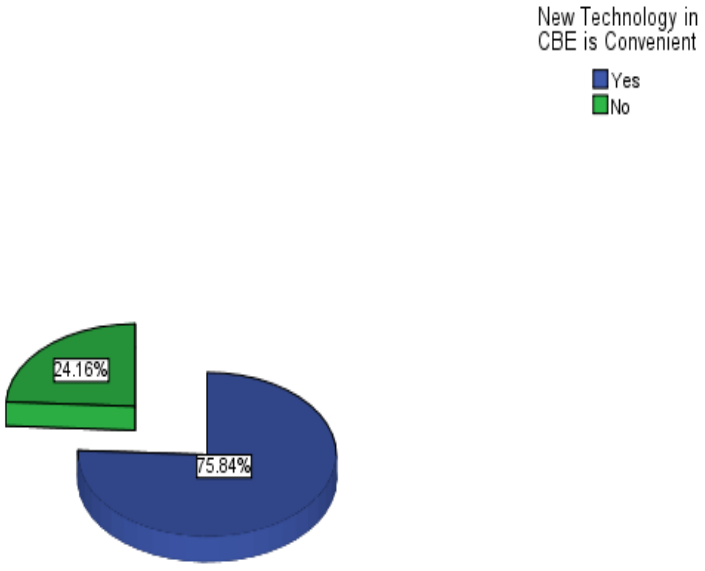
	Frequency	Percent
Yes	333	87.6
No	47	12.4
Total	385	100

(Source: Survey data, 2017)

In terms of consistent output delivered using technology in commercial bank of Ethiopia, the above table 6 indicated that among respondents 86.5% replied "Yes", followed by "No" 12.2% of the total respondents in CBE and no response to the question 1.3%. This implies that new technology in CBE delivered consistent output, useful, ease to use and obtain the desired output. Therefore properly adopted technology by employees enhances reliability and quality in the organization.

4.1.6. Use of new technology being convenient

Figure 6: Convenience of New Technology

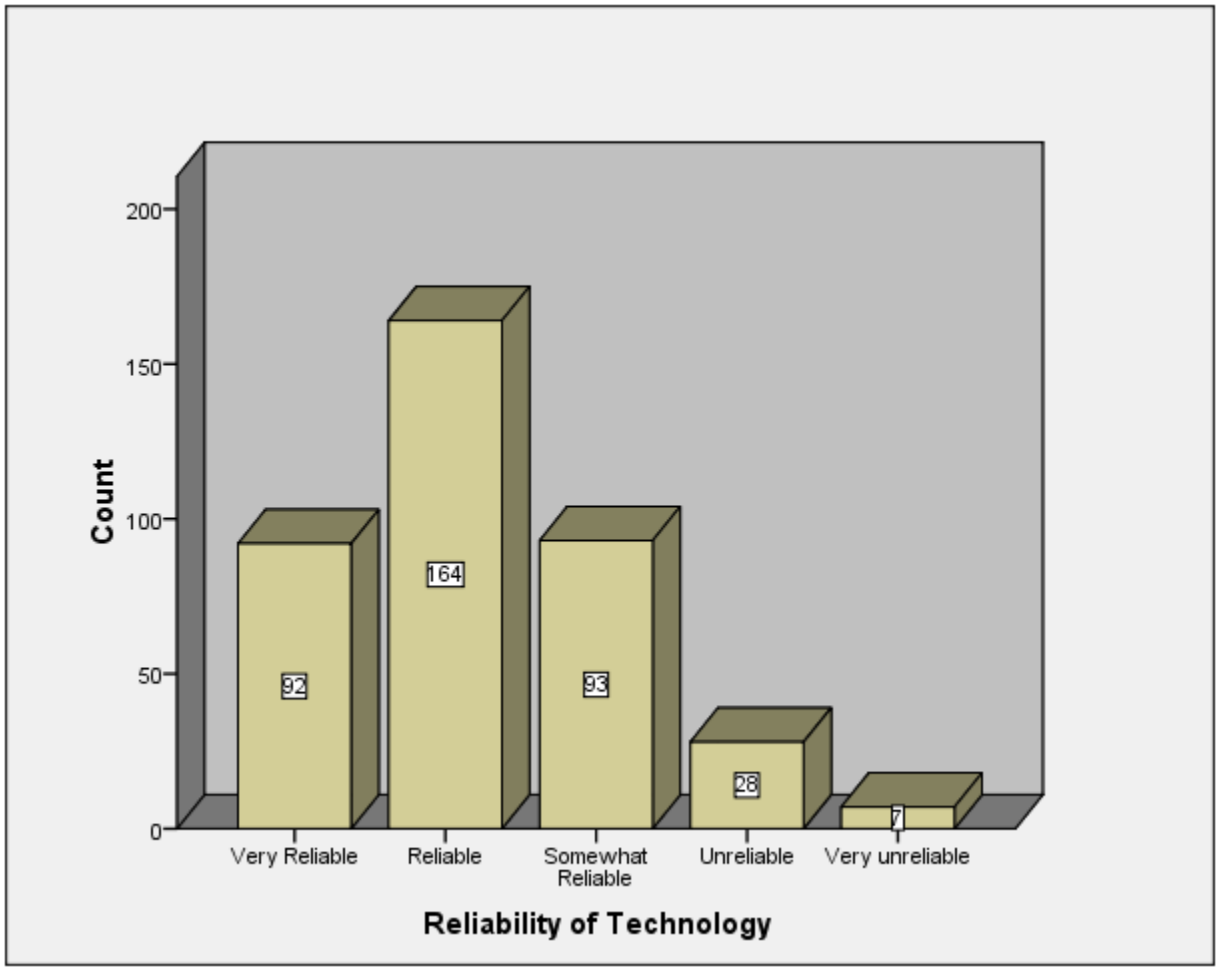


(Source: Survey data, 2017)

In terms of convenience of new technology in CBE, the above figure 6 indicated that among respondents, 75.84% replied “Yes” whereas 24.16% replied “No”. This implies that new technology in CBE with respect to convince to employees was good, meaning a lot expected from CBE to accommodate the required technology to cope up with stiff competition in the industry. Therefore, the technology adopted by employees in commercial bank of Ethiopia could be useful, ease to use, user friendly and obtain the desired output.

4.1.7. Reliability of technological products/services provided by CBE

Figure 7: Reliability of Technology



(Source: Survey data, 2017)

In terms of reliability of the adoption of new technology by employees in CBE as can be seen from the above figure 7, among sample respondents 164(42.6%) replied reliable, followed by 93(24.2%) replied very reliable, 92(23.9%) somewhat reliable, 28(7.3%) unreliable, 7(1.8%) very unreliable and .3 no

respond respectively. This implies reliability is very important to generate consistent output and the bank work on it more to sustain reliability and achieve organizational objectives.

4.2. Descriptive Analysis

The following section seeks to display and analyze the frequency distribution of the responses on the questionnaire items regarding the dependent and independent variables based on respondents' perception and subjective norm. The likert-type statements of the questionnaire were coded into Statistical Package for Social Science and analyzed with the use of frequency distribution, descriptive statistics and correlations. The purpose was to describe the characteristics of the data gathered from the sample used and to check the variables for any violation of the assumptions underlying the statistical techniques that used to address the stated research questions. The analysis divided into two parts: perceive usefulness, perceive ease of use and subjective norm which were the independent variables, and behavioral intension of employees in the adoption technology which was the dependent variable. Both variables were measured with likert-type statements with five scales ranging from Strongly Agree (5), Agree (4), Neutral (3), Disagree (2) and Strongly Disagree (1).

Dependent and independent we used only in regression.

1. **Perceived Usefulness**

Table 7: Perceived Usefulness of employee's technology adoption in CBE

	Technology enhances the quality of my work	Technology enables me to accomplish task quickly	Technology makes it easier for me to do my work	Technology is useful for my banking activities
Mean	4.05	4.14	4.10	4.16
Std. Deviation	.869	.861	.885	.871

(Source: Survey data, 2017)

Regarding perceive usefulness of the adoption of new technology by employee of commercial bank of Ethiopia, respondents were asked whether they `Strongly agreed, Agreed, Neutral, Disagreed or Strongly disagreed' based on the four questions shown in the table 7 above to confirm employee's technology adoption based on perceive usefulness. Accordingly, the sampled respondents agreed with the idea that "Using technology enhances the quality of my work in CBE" had a mean of 4.04 and standard deviation of 0.869; "Using technology enables me to accomplish tasks quickly in CBE." had a mean of 4.14 and standard deviation of 0.861;

"Using technology makes it easier for me to do my work in CBE" had a mean of 4.10 and standard deviation of 0.885 and " I find that technology in CBE is useful for my banking activities" had a mean of 4.16 and standard deviation of 0.871.

Despite mean constraint, the mean was four that means most of the respondents agreed that the adoption of technology by employees in CBE will help them to enhance the quality of work; accomplish their task quickly, make their task easy and useful for banking activities. However, the standard deviation tells there was deviation from the mean on both sides and data scores are close or clustered together meaning that they are not spread out or scattered.

2. **Perceived Ease Of Use**

Table 8: Perceive Ease of use of employee's technology adoption in CBE

	Learning to use Technology in CBE is easy	Ease to become skillful using Technology	Technology in CBE facilitates decision making	I find easy what I want with Technology
Mean	3.91	3.92	3.98	3.91
Std. Deviation	.930	.926	.885	.912

(Source: Survey data, 2017)

Regarding perceive ease of use of the adoption of new technology by employees in commercial bank of Ethiopia, respondents were asked whether they `Strongly agreed, Agreed, Neutral, Disagreed or Strongly disagreed' based on the four questions shown in the table 8 above to confirm employee's technology adoption based on perceive ease of use. The descriptive statistics of items to perceive ease of use shown in table 8. "Learning to use technology in CBE is easy for me" had a mean of 3.91 and standard deviation of 0.930; "I find it easy to become skilful in using technology in CBE" had a mean of 3.92 and standard deviation of 0.926; "The ease of using technology in CBE facilitates my decision making" had a mean of 3.98 and standard deviation of 0.885 and "I find it easy to do what I want to do with technology in CBE" had a mean of 3.91 and standard deviation of 0.912. Despite mean constraint, the mean was approximately four that means most of the respondents agreed that the adoption of technology in CBE is ease to learn, easy to become skilful, facilitates my decision making and easy to do what I want. This result indicates that the data scores were close or clustered together meaning that they are not spread out or scattered. This is a positive indication.

3. Subjective Norms

Table 9: Subjective norm of the adoption of technology by employees in CBE

	Ease operation of Technology is important to me	Technology in CBE agree with my value	Technology improves relationship	Technology creates team sprite
Mean	3.96	3.90	3.78	3.77
Std. Deviation	.942	.896	.941	.984

(Source: Survey data, 2017)

Regarding subjective norm of the adoption of new technology by employees in commercial bank of Ethiopia, respondents were asked whether they `Strongly agreed, Agreed, Neutral, Disagreed or Strongly disagreed' based on the four questions shown in the table 9 above to confirm employee's technology adoption based on subjective norm. In table 9 above the descriptive statistics of items to subjective norm is shown. "The easy operation of technology is important to me as an employee of CBE" had a mean of 3.96 and standard deviation of 0.942; "My use of technology in CBE agrees with my values" had a mean of 3.90 and standard deviation of 0.896; "My use of technology in CBE will improve the quality of my relationship with management" had a mean of 3.78 and standard deviation of 0.941 and "My use of technology in CBE helps to create team sprite in CBE" had a mean of 3.77 and standard deviation of 0.984.

This implies that the use of bank's technology does not have any negative association with their operations, their values, relationship with management and creating team sprite in commercial bank of Ethiopia. This result also indicates that the data scores are close or clustered together meaning that they are not spread out or scattered. This is a positive indication.

The dependent variable of the study was employee's behavior towards the determinants of technology adoption: the case of CBE employees.

4. **Employee Behavior**

Table 10: Employee's behavior on technology adoption in CBE

	IT facilitates provision of services	IT enhance my capacity	IT strengthens my willingness to try	IT to offer solutions to customer problems
Mean	3.91	3.97	3.96	4.03
Std. Deviation	.885	.860	.862	.905

(Source: Survey data, 2017)

Regarding behavioral intension of employees in the adoption of new technology in commercial bank of Ethiopia, respondents were asked whether they `Strongly agreed, Agreed, Neutral, Disagreed or Strongly disagreed' based on the four questions shown in the table 10 above to confirm employee's technology adoption based on behavioral intension. The descriptive statistics of items to behavioral intension is shown in table 10. "I intend to use my bank's new IT to facilitate provision of services" had a mean of 3.91 and standard deviation of 0.885; "I intend to use my bank's new IT to enhance my capacity" had a mean of 3.97 and standard deviation of 0.860; "I intend to use new IT products and services to strengthen my willingness to try" had a mean of 3.96 and standard deviation of 0.862 and "I intend to use new IT to offer solutions to customer problems in CBE" had a mean of 4.03 and standard deviation of 0.905.

This implies that employees, given any opportunity, will tend to use bank's technology to facilitate provision of services, enhance my capacity, strengthen willingness and offer solutions to customer problems in CBE and indicate the data scores are close or clustered together meaning that they are not spread out or scattered. This is a positive indication.

4.3. Correlation Analysis

To determine the relationship between perceive usefulness, perceive ease of use and subjective norm with behavioral intension of employees in commercial bank of Ethiopia, Pearson correlation was computed. Table 11 shown below presents the results of Pearson correlation on the relationship among perceive usefulness, perceive ease of use, subjective norm and behavioral intension.

Table 11: The correlation between perceive usefulness, perceive ease of use, subjective norm and behavioral intension of employees

		Perceive Usefulness	Perceive Ease of Use	Subjective Norm	Behavioral Intension
Perceive Usefulness	Pearson Correlation	1	.654**	.599**	.621**
	Sig. (2-tailed)		.000	.000	.000
Perceive Ease of Use	Pearson Correlation	.654**	1	.758**	.668**
	Sig. (2-tailed)	.000		.000	.000
Subjective Norm	Pearson Correlation	.599**	.758**	1	.702**
	Sig. (2-tailed)	.000	.000		.000
Behavioral Intension	Pearson Correlation	.621**	.668**	.702**	1
	Sig. (2-tailed)	.000	.000	.000	

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

(Source: Survey data, 2017)

The researcher explored the extent to which perceive usefulness of the adoption of technology has impacted behavioral intension of employees in commercial bank of Ethiopia. In performing the analysis, Pearson Correlation was computed to establish the relationship between perceive usefulness with behavioral intension of employees in CBE. From the correlation analysis, the result revealed a significant positive relationship between behavioral intension of employees and perceive usefulness [$r=0.621$, $p<0.05$]. This means that behavioral intension has improved significantly as usage of perceive usefulness of the adoption of technology increase.

Similarly, the researcher explored the extent to which perceive ease of use in the adoption of technology has impacted behavioral intension of employees in commercial bank of Ethiopia. In performing the analysis, Pearson Correlation was computed to establish the relationship between perceive ease of use in the adoption of technology and behavioral intension of employees in CBE. From the correlation analysis, the result revealed a significant positive relationship between behavioral intension of employees and perceive ease of use the adoption of technology[$r=0.668$, $p<0.05$]. This means that behavioral intension has improved significantly as usage of perceive ease of use increase.

Finally, the researcher explored that the extent to which subjective norm of the adoption of technology has impacted behavioral intension of employees in commercial bank of Ethiopia. In performing the analysis, Pearson Correlation was computed to establish the relationship between uses of subjective norm with behavioral intension of employees in CBE. From the correlation analysis, the result revealed a significant positive relationship between behavioral intension of employees and subjective norm in the

adoption of technology [r=0.702, p<0.05]. This means that behavioral intension has improved significantly as usage of subjective norm increase. Similarly perceive usefulness, perceive ease and subjective norm of the adoption of technology positively related with behavioral intension of employees in commercial bank of Ethiopia.

4.4. Regression Analysis

In this section regression analysis for dimensions of the adoption of technology by employees in commercial bank of Ethiopia and explanatory variables. R- Squared is measured the goodness of fit of the explanatory variables in explaining the variations in behavioral intension of employees measures of explanatory variable (perceive usefulness, perceive ease of use and subjective norm).

Regression model was applied to test how far the perceive usefulness; perceive ease of use and subjective norm had impact on behavioral intension of employees.

Coefficient of determination (R^2) is the measure of proportion of the variance of dependent variable about its mean that is explained by the independent or predictor variables (Hair et.al, 1998). Higher value of R^2 represents greater explanatory power of the regression equation.

4.4.1. Impact of perceive usefulness on behavioral intension

Table 12: Impact of perceive usefulness on behavioral intension

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.621[a]	.386	.384	.60800

a. Predictors: (Constant), Perceive Usefulness

b. Dependent Variable: Behavioral Intension

(Source: Survey data, 2017)

The above table 12 shows the adjusted R^2 value of 0.384. This result shows that the independent variable (perceive usefulness) accounted for 38.4 percent of the variance in behavioral intension. Thus 38.4 percent of the variation in behavioral intension can be explained by perceive usefulness and the other unexplored variables may explain the variation in behavioral intension which accounts for 61.6 percent.

4.4.2. Impact of perceive ease of use of the adoption of technology on behavioral intension

Table 13: Impact of perceive ease of use on behavioral intension

(Source: Survey data, 2017)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.668[a]	.446	.445	.57738

a. Predictors: (Constant), Perceive Ease of Use

b. Dependent Variable: Behavioral Intension

The above table 13 shows the adjusted R^2 value of 0.445. This result shows that the independent variable (perceive ease of use) accounted for 44.5 percent of the variance in behavioral intension. Thus, 44.5 percent of the variation in behavioral intension can be explained by perceive ease of use and the other unexplored variables may explain the variation in behavioral intension which accounts for 55.5percent.

4.4.3. Impact of subjective norm on the adoption of technology on behavioral intension of employees

Table 14: Impact of subjective norm on the adoption of technology on behavioral intension of employees

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.702[a]	.492	.491	.55263

a. Predictors: (Constant), Subjective Norm

b. Dependent Variable: Behavioral Intension

(Source: Survey data, 2017)

The above table 14 shows the adjusted R^2 value of 0.491. This result shows that the independent variable (subjective norm) accounted for 49.1 percent of the variance in behavioral intension. Thus, 49.1 percent of the variation in behavioral intension can be explained by subjective norm and the other unexplored variables may explain the variation in behavioral intension which accounts for 50.9percent.

4.4.4. Multiple regression Analysis

In this section regression analysis for determinants of behavioral intention of employees on technology adoption have been undertaken to understand the relationship between behavioral intension and explanatory variables.

4.4.5. Diagnosis Test

Before applying regression analysis, some tests were conducted in order to ensure the appropriateness of data to assumptions regression analysis as follows:

Multicollinearity Test for Multiple Linear Regressions

Figure 15: Multicollinearity Test

Model	Collinearity Statistics	
	Tolerance	VIF
Perceive Usefulness	.547	1.828
Perceive Ease of Use	.364	2.749
Subjective Norm	.407	2.455

a. Dependent Variable: Behavioral Intension

(Source: Survey data, 2017)

To test multicollinearity, according to Menard (1995) the tolerance should be more than 0.2 while variance integration factor (VIF) should be less than 10 (Myers, 1990). As can be seen from table 15 the variables: perceive usefulness, perceive ease of use and subjective norm their tolerance more than 0.2 and their VIF less than 10. Therefore, this study had no multicollinearity problem since tolerance is greater than 0.2 and VIF less than 10.

Normality Test

Skewness and Kurtosis analysis for data Normality Test of study variables: Perceive Usefulness (PU), Perceive Ease of Use (PEU) and Subjective Norm (SN) of the adoption of Technology and Behavioral Intension (BIE) of Employees.

Table 16: Normality test of PU, PEU, SN and BIE

	Skewness	Kurtosis
Perceive Usefulness	-1.280	1.801
Perceive Ease of Use	-1.071	1.388
Subjective Norm	-.966	1.146
Behavioral Intension	-.963	.978

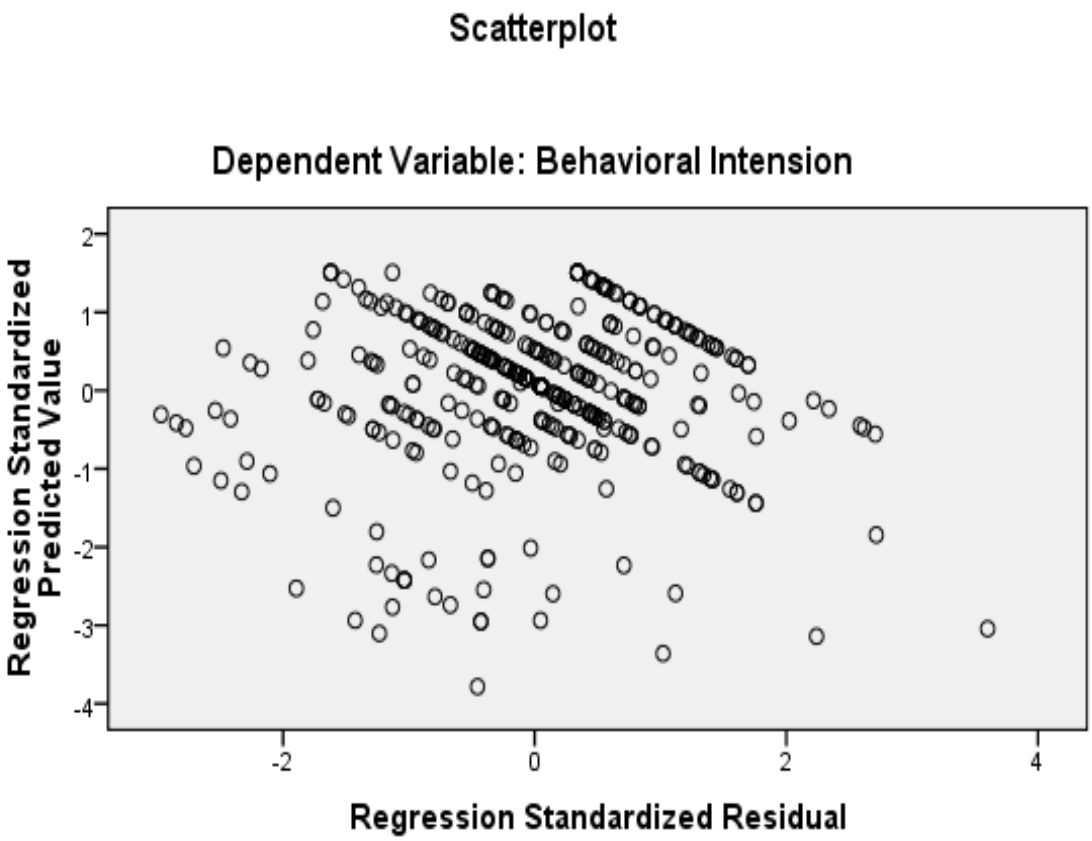
(Source: Survey data, 2017)

To test normality of distribution there are different ranges according to different researchers based on the value closer to zero. For instance, skewness and kurtosis between -2 and +2 are considered acceptable (Torchim & Donnelly, 2006). Therefore, based on this range the skewness and kurtosis for variables: perceive usefulness, perceive ease of use, subjective norm and behavioral intension in table 16 considered acceptable, and meaning the distribution moderately normally.

Heteroscedasticity

Heroscedasticity is more than simply a barrier to the correct estimate of coefficients. Attention to differences in variance can provide both an important supplement to present exploratory analysis techniques and suggest ways to evaluate theory. Quantitative models require precisely estimated coefficients, but a single minded emphasis on curing heteroscedasticity can lead one to ignore valuable information. The suspicion that a variable may function as a necessary but not sufficient condition is no less important than knowing that it is “related” to dependent variable.

Figure 8: Heteroscedasticity



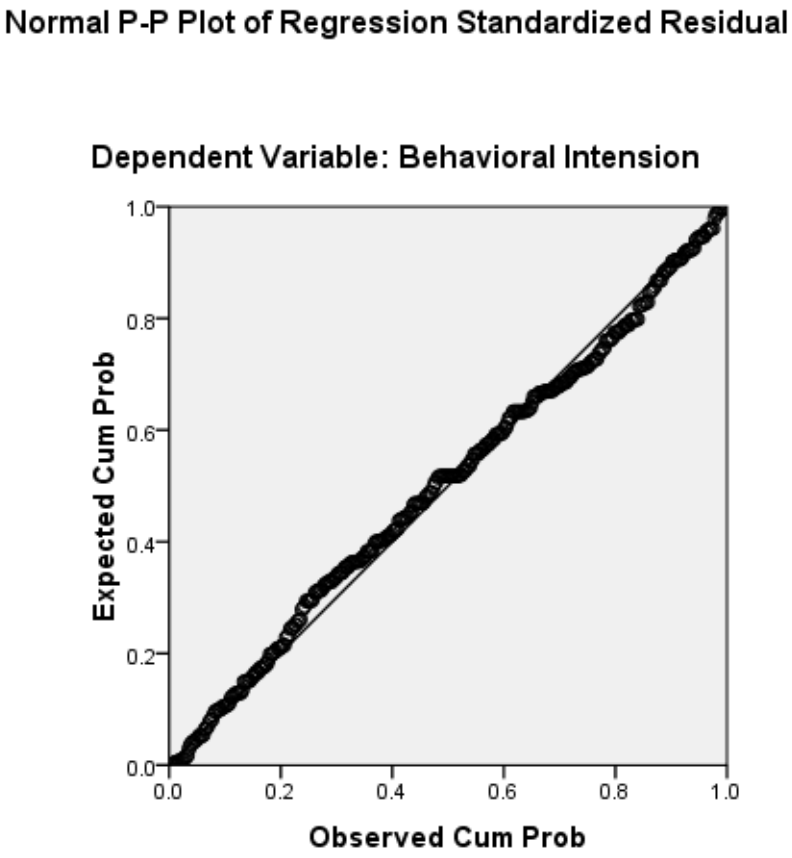
(Source: Survey data, 2017)

The finding of heteroscedasticity can provide a rational for suspecting interaction with variables not included in the data set. Thus, the scatter plot of residuals shows there is no hetrocscidesiticity problem.

Linearity Test

Linearity refers to the degree to which the change in the dependent variable is related to the change in the independent variables. To determine whether the relationship between the dependent variable, behavioral intension of employees and the independent variables perceived usefulness, perceived ease of use and subjective norm is linear; plots of the regression residuals through SPSS software had been used.

Figure 8: Normal Point Plot of Standardized Residual



(Source: Survey data, 2017)

The plot of residuals shows no large difference in the spread of the residuals as you look from left to right on figure 8. This result suggests the relationship we are trying to predict is linear.

The overall regression model and its ANOVA are summarized as follows:

Figure 17: regression model and ANOVA

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.755[a]	.570	.567	.50995

c. Dependent Variable: Behavioral Intension

Adjusted R- squared is measured the goodness of fit of the explanatory variables in explaining the variations in behavioral intension measures of explanatory variables: perceived usefulness,

perceived ease of use and subjective norm. As clearly described in Table 17 adjusted R- square value for the regression model was 0.567. This indicates the explanatory variables; perceived usefulness, perceived ease of use and subjective norm in this study explained about 56.7 percent of the variation in behavioral intension. The remaining 43.3 percent explained by other variables which are not included in the model. Therefore, determinants of technology adoption: perceived usefulness, perceived ease of use and subjective norm are good explanatory variables of behavioral intension of employees in commercial bank of Ethiopia.

Figure 18: ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	131.382	3	43.794	168.405	.000[a]
	Residual	99.079	381	.260		
	Total	230.461	384			

a. Predictors: (Constant), Subjective Norm, Perceived Usefulness, Perceived Ease of Use

b. Dependent Variable: Behavioral Intension

From the ANOVA test in table 18: it shows Sig. value 0.01 is greater than the calculated Sig. value 0.000. It reflects there was a statistically significant correlation between dependent variable and independent variables at 1% significant level. Which means the explanatory variables; perceived usefulness, perceived ease of use and subjective norm have great contribution to improve behavioral intension of employees in Commercial Banks of Ethiopia.

The results of the multiple linear regression analysis signal that there is variation in the effect of determinants of technology adoption on behavioral intension of employees in commercial bank of Ethiopia.

Beside the F statistics (168.405) which used to measure the overall test of significance of the model was presented, and null hypothesis can be clearly rejected since the p-value is 0.000 which is sufficiently low, the model is well fitted at 1 percent level of significance.

Thus, from an examination of the information presented in all tests the researcher concludes that there are no significant data problems that would lead to say the assumptions of multiple regressions have been seriously violated.

Table 19: Multiple Regression model for Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	.583	.155		3.769	.000
Perceive Usefulness	.248	.045	.250	5.495	.000
Perceive Ease of Use	.206	.057	.203	3.637	.000
Subjective Norm	.395	.052	.399	7.576	.000

Dependent Variable: Behavioral Intension

(Source: Survey data, 2017)

Basically, BI= α + β1X1+ β2X2 + β3X3+ε

Where, BI=behavioral intension of employees

X1= perceived usefulness

X2= perceived ease of use

X3= Subjective norm

Here α is constant and β is coefficient of estimate and ε is the error term.

Behavioral intension of employees is dependent variable and X1 to X3 are independent variables.

Similarly, BI= 0.583 + 0.250X1+ 0.203X2 + 0.399X3+ε

Std. Err (0.155) (0.045) (0.057) (0.052)

T values (3.769)* (5.495)* (3.637)* (7.576)*

*Sig= Significant at 99% level

Coefficient analysis shows the relationship between dependent variable: behavioral intension of employees and independent variables: perceived usefulness, perceived ease of use and subjective norm. In the final model, table 19 perceives usefulness, perceive ease of use and subjective norm had more statistical significance in predicting employee behavior. Subjective norm scale recorded a higher beta value (beta=.399, p<.001, sig.000) than perceived usefulness scale (*beta* = .250, $p < .001$, *Sig*.000) and perceived ease of use scale recorded (*beta* = .203, $p < .001$, *Sig*.000). This implied that the variable, subjective norm is making a significant unique contribution to the prediction of the dependent variable, behavioral intension of employees than the variables, perceived usefulness and perceived ease of use. In conclusion, the results of the standard multiple regression analysis showed that the three measures perceives usefulness, perceive ease of use and subjective norm are statistically significant in contributing

to and predicting behavioral intension of employees to the adoption of new technology in commercial bank of Ethiopia. Therefore, the null hypotheses (H_0) were rejected and the alternative hypotheses accepted that the three variables, perceives usefulness, perceive ease of use and subjective norm do contribute significantly to behavioral intension of employees to the adoption of new technology in commercial bank of Ethiopia.

Figure 20: Summery of Hypotheses results

Hypothesis	Analysis Used	Result
H_1: There is relationship between perceive usefulness and behavioral intension of employees.	Multiple Regression	Support H_1
H_2: There is relationship between perceive ease of use and behavioral intension of employees	Multiple Regression	Support H_2
H_3: There is relationship between subjective norm and behavioral intension of employees	Multiple Regression	Support H_3

(Source: Survey data, 2017)

Hypothesis one revealed that there is relationship between the measure of perceive usefulness and behavioral intension surrounding employee use of new IT in Commercial bank of Ethiopia. The study shown that perceive usefulness is statistically significant in contributing employee use of new IT in CBE.

Hypothesis two revealed that there is relationship between perceive ease of use of the adoption of technology and behavioral intension surrounding employee in Commercial bank of Ethiopia. The study shown that perceive ease of use statistically significant in contributing employee use of new IT in CBE.

Hypothesis three revealed that there is relationship between subjective norm and behavioral intension surrounding employee use of new IT in Commercial bank of Ethiopia. The study shown that subjective norm is statistically significant in contributing to employee use of new IT in CBE. The implication of this result is that, employees are influenced socially with respect to the attributes of technological change used in Commercial Bank of Ethiopia. This finding is similar with the work of Venkatesh and Davis (2000) stating in their theory of Technology Acceptance Model that “social influence processes (subjective norm, voluntariness, and image) significantly influenced user acceptance of technology”.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5. Introduction

In this chapter, the summary, conclusion and recommendation of the research study presented. The research paper used technology acceptance model and subjective norm from theory of reasoned action to understand employee's perception and subjective norm on determinates of technology adoption: the case of CBE employees in Addis Ababa city branches followed by summary and conclusion of the findings of the research and its implication. Finally, recommendations for further study stemming from the research findings presented.

5.1. Summary

This research study was able to establish the relevance and usefulness of the theories proposed in this study to the findings generated. Four theories were proposed and they were not far in the results found from the data analyzed during the research study. This research was conducted to explore the link between employee perceive usefulness, perceive ease of use and subjective norm in the adoption of technology and behavioral intension of employees in commercial bank of Ethiopia.

Hypothesis one and two revealed that there is positive and significant relationship between the independent variables: perceive usefulness and perceive ease of use in the adoption of technology with behavioral intension of employees. The study also revealed that perceive usefulness of the adoption of technology is statistically significant in contributing employee use of new technology in CBE. Similarly, the study also revealed that perceive ease of use in the adoption of technology is statistically significant in contributing employee use of new technology in CBE.

The implication of this finding is that there are high levels of perceive usefulness and perceive ease of use associated with high levels of employee behavior in Commercial Bank of Ethiopia. This result also conforms with what Kripanont (2007) said in his work that people think about their decisions and the possible outcomes of their actions before making any decision to be involved or not involved in a given behavior. He went further to explain that the Theory of Reasoned Action (TRA) views the intention of an individual whether to perform a given behavior or not, as the immediate determinant of action, and that perceive usefulness and perceive ease of use are determined by the person's beliefs and evaluation of behavioral outcomes. According to Chau and Hu (2002), the Theory of Planned Behavior (TPB) is a theory that predicts deliberate behavior, because behavior can be deliberative and planned, and TPB is considered to be more general than TRA because of perceived behavioral control. Once again, Kripanont

(2007), posited that as a general rule, the more favorable the perceive usefulness, perceive ease of use and subjective norm, and the greater the perceived behavioral control, the stronger should be the individual intention to display the behavior in question.

Hypothesis three also revealed that there are positive and significant relationship between subjective norm of the adoption of technology and behavioral intension of employees. The study revealed that subjective norm is statistically significant in contributing employee use of new technology in CBE. The implication of this result is that, employees are influenced socially with respect to the attributes of technological Change posed by the technology used in Commercial Bank of Ethiopia. This finding is similar with the work of Venkatesh and Davis (2000) stating in their theory of Technology Acceptance Model that "social influence processes (subjective norm, voluntariness, and image) significantly influenced user acceptance of technology".

5.2. Conclusion

The empirical finding from this study shown that there was a positive and significant relationship between perceived usefulness and employee behavior to use new technology. Similarly, the finding shown that there was a positive and significant relationship between perceived ease of use and employee behavior to use new technology in CBE. On the other hand, perceive usefulness and perceive ease of use in adoption of technology were statistical significance in contributing to and predicting employee behavior to use new technology in CBE. Based on this study, it was concluded that the behavior of employees to use new technology in commercial bank of Ethiopia is from the initial attitude formed by employees with respect to the perceived usefulness and perceived ease of use of the new technology adopted at work place.

This study also revealed that there is a relationship between subjective norm on the adoption of technology and behavioral intension of employees. Findings from this study shown that there was a positive and significant relationship between subjective norm and employee behavior to use new technology. The findings of this study also shown that subjective norm was statistically significant in contributing and predicting employee behavior in the use of new technology in CBE. The findings implied that subjective norm is associated with employee behavior to use technology in CBE. That is, employee behavior to use new technology in CBE is influenced by social pressures from colleagues, friends and family. The implication of this result is that, employees influenced socially in commercial bank of Ethiopia. This finding is similar with the work of Venkatesh and Davis (2000) stating in their theory TAM that social influence processes: subjective norm, voluntariness, and image significantly influenced user acceptance of technology.

The main objectives of this research are to understand the relationship of perceived usefulness, perceived ease of use and subjective norm in the adoption of technology independently and together with behavioral intension of employees.

The first objective of this research work is to assess CBE employee's perception on technology usefulness. The finding of the research shows that perceived usefulness of the adoption of technology has positive relationship with the behavioral intension of employees in commercial bank of Ethiopia and employees also perceive the technology adoption as useful.

The second objective of this research is to assess the extent to which employees in CBE perceive ease of use of technology. The finding of the research shows that perceived ease of use of the adoption of technology has positive relationship with behavioral intension of employees and employees perceive the adoption of technology is easy to use. And if behavioral intension of employees is perceived as easy to use then based on empirical evidences about the research model used in this paper, employees are ready to adopt the technology.

The third objective of this research work is to examine employee's subjective norm towards technology. The finding of the research shows that subjective norm of the adoption of technology has positive relationship with behavioral intension of employees and employees' subjective norm in the adoption of technology is socially acceptable. Finally, regression analysis conducted in the research shows as perceived usefulness, perceived ease of use and subjective norm of the adoption of technology have positive relationship with behavioral intension of employees.

5.3. Recommendations

Commercial bank of Ethiopia should broaden the attitude of employees about the adopted technology to make the service more useful and as well to be perceived useful in the minds of its employees.

Commercial bank of Ethiopia should produce user guide for the adopted technology using various means such as booklets, flyers, and in electronic means such as website based electronic documents to make use of new technology become easier for existing and potential employees.

The employee in CBE should not be required to expend a lot of effort or time, or undergo too great change in behavior, to adopt new technology.

Commercial Bank of Ethiopia should create awareness to employees concerning the adopted technology products they offer and the benefits associated with using new technology through advertising their products and services.

5.4. Limitations and Future Research Directions

The limitations of this study are: first, this study only focused on employee perceives usefulness, perceive ease of use and subjective norm in the adoption of technology toward behavioral intention of employees. Other studies could be conducted to look at managerial attitude towards the adoption of technology in Ethiopia banking sector as a way of expanding and validating the research model introduced in this thesis. Secondly, this study was based on survey results only. Future efforts should concentrate on the acquisition of longitudinal data in order to provide a reliable confirmation of the relationships identified in this thesis.

The country specific factors affecting the use of different types of new technology into organizations should demand future investigation, as such these factors also influence the way employees develop attitudes towards the attributes of new technology, which in turn affects the performance of the organization.

Additional survey research is also needed to explore whether the findings of this thesis are applicable to other sectors of the Ethiopian economy.

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APPENDIX:
QUESTIONNAIRE

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF MARKETING MANAGEMENT MA PROGRAM.

Dear respondent, the information in this questionnaire is related to **Determinants of Technology Adoption: The case of CBE Employees**. This is an academic research and the information will be used for academic purposes only. Kindly provide as much information as requested, be sincere and don't write your name. Your response is highly appreciated.

Part I: Background Information

Instruction: *Kindly provide the following information. Please, tick* (√) *as appropriate.*

1. Indicate your gender?
   □ Male □ Female
2. Select your age?
   □ Less than 25 yrs □ 25-35 yrs □ 36-45 yrs □ Above 45 yrs
3. Current educational level:
   □ TVET/ Diploma □ University Degree □ Master Degree □ Above Master Degree
4. Select your position in CBE?
   □ JCSO □ CSO □CRO □ KYC □ Accountant □ Auditor
5. Which of the following technologies are you familiar with in CBE?(select all that apply)
   □ Automated Teller Machines □ Mobile Banking □ On-Line Banking
   □ Point of Sales System □ Gieom □ Internet Banking
6. How satisfied are you with the IT products and services provided by your bank?
   □Very Dissatisfied □ Somewhat Dissatisfied □ Neither Satisfied nor Dissatisfied
   □ Somewhat Satisfied □Very Satisfied
7. Bank Technology helps employees to deliver consistent output even in high work pressure?
   □ Yes □ No
8. I use new technology in CBE because it is convenient?
   □ Yes □ No
9. How reliable is the technology products and services provided by CBE?
   □ Very Reliable □ Reliable □ Somewhat Reliable □ Unreliable □ Very unreliable

Part II. Five Point Likert Scale

Instruction: Please kindly indicate by marking (√) whether you "Strongly disagree", "Disagree", "Neutral", "Agree" or "Strongly agree", with the statements below.

I. Perceived Usefulness;

No	*Construct*	*Strongly disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
10.	Using technology enhances the quality of my work in CBE.					
11.	Using technology enables me to accomplish tasks quickly in CBE.					
12.	Using technology makes it easier for me to do my work in CBE.					
13.	I find that technology in CBE is useful for my banking activities.					

II. Perceived Ease of Use;

14.	Learning to use technology in CBE is easy for me.					
15.	I find it easy to become skillful in using technology in CBE.					
16.	The ease of using technology in CBE facilitates my decision making.					
17.	I find it easy to do what I want to do with technology in CBE.					

III. Subjective Norm;

18.	The easy operation of bank technology is important to me as an employee of CBE.					
19.	My use of technology in CBE agrees with my values.					
20.	My use of technology in CBE will improve the quality of my relationship with management.					
21.	My use of technology in CBE helps to create team sprite in CBE.					

IV. Behavioral Intension;

22.	I intend to use my bank's new IT to facilitate provision of services in CBE.					
23.	I intend to use my bank's new IT to enhance my capacity.					
24.	I intend to use my bank's new IT products and services to strengthen my willingness to try.					
25.	I intend to use my bank's new IT to offer solutions to customer problems in CBE.					

Thank you very much for participation in this study! Your time and opinions are greatly and deeply appreciated.