



Addis Ababa University

College of Business and Economics

*“Effects of Electronic Banking on the Financial Performance of Commercial
Banks in Ethiopia”*

By

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**A Research project Submitted in Partial Fulfillment of the Requirements for the
Award of Masters of Business Administration in
Finance**

June, 2016

Addis Ababa, Ethiopia

DECLARATION

I, **undersigned** declare that this study entitled as “**Effects of Electronic Banking on the Financial Performance of Commercial Banks in Ethiopia**”, is my own work. I have carried out the research work independently with the guidance and support of the research advisor. This study had not been submitted to any degree/diploma in this or any other institution.

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CERTIFICATION

This is to certify that **Tilahun Damtew** has completed his thesis entitled” *Effects of Electronic Banking on the Financial Performance of Commercial Banks in Ethiopia*” In our opinion all the materials used for the thesis has been duly acknowledged and his thesis is appropriate to be submitted as a partial fulfillment requirement of Degree in Master of Business Administration in Finance (MBA in Finance)

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Abstract

Ethiopian commercial banks are at infancy stage to use technology based banking system and training of manpower to handle new technologies. Nonetheless, the adoption and usage of e-banking is at promising stage to enhance the performance and efficacy of banks. This research investigated the efficacy of Electronic banking in the area of automated teller machines, debit cards and point of sale terminals on 10 (1 government and 9 private owned) commercial banks found in Ethiopia using' financial performance indicators namely: profit before tax and return on assets. A quantitative survey method is used to gather data. Statistical analysis made with the aid of E-views 9 software. The findings envisaged that Electronic banking had statistically significant impact on return on assets and profitability of commercial banks of Ethiopia. Based on the findings of the study, it is safe to conclude that electronic banking influence financial performance of commercial banks in Ethiopia positively. Since the study do not include all electronic-banking so that it is strongly recommended further study on innovations like agency banking, mobile banking and internet banking impact on the financial performance of commercial banks.

Key Words: *E-banking, ATM, POS, ROA, PBT, Debit Card and E-views 9*

Acknowledgement

First and for most I would like to praise the Almighty God with St. Virgin Mary for their unspeakable gifts throughout my life to win untold and threatening challenges I had met. My next heartfelt gratitude goes to my advisor Asst.Prof Wollela Abehodie Yesegat for all her unreserved support, constructive comments and her cordiality approach in this thesis. I also do not forget to thank my brother Moke for his limitless support throughout this thesis. Father I do not forget you, you are the special one! Kiya I do not have word for your support say thank you. Omar I said thank you gave me E-views 9 software and stationary support. And all who have contributed directly and indirectly in making this thesis reality. Further I pass my grateful for Addis Ababa University, for its financial support and assigned an advisor that help me in my research undertakings.

ACRONYMS and ABBREVIATIONS

ATMs	Automated Teller Machines
AVR	Automated Voice Response
EFT	Electronic Fund Transfer
EFTPS	Electronic Funds Transfer at Point of Sale
EN	Enterprise Network
EPS	Earning Per Share
GDP	Gross Domestic Product
IBM	International Business Machines
IMF	International Monetary Fund
IT	Information Technology
LM	Linear Model
MIS	Management Information System
MVA	Market Value Added
NPM	Net Profit Margin
OLS	Ordinary Least Squared
PBC	Perceived Behavioral Control
PBT	Profit Before Tax
PEOU	Perceive Ease of Use
POS	Point of Sale
PU	Perceived Usefulness
ROA	Return on Assets
ROE	Return on Equity

SMS	Short Message Service
SN	Subjective Norms
STD	Standard Deviation
TPB	Theory of Planned Behavior
UK	United Kingdom
USA	United States of America
WAN	Wide Area Network
WEF	World Economic Forum
SCP	Structure Conduct Performance

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CHAPTER ONE: INTRODUCTION

The tremendous competition in the world commercial banks improved the number of banks in the world. The technological innovations improved customer demand of services offered by the banks. This revolution has set a motion in the banking sector for the provision of a payment system that is compatible with the demands of the electronic market (Arnaboldi and Claeys 2008). Further, technology has changed the preconditions for service delivery, dramatically in recent years (Acharya 2004).

Electronic banking (e-banking) facilities provided by most Ethiopian Banks are very basic. However e-banking facilities provided are at par with those in the regional states (Birritu 2011). In companies in particular this has invaluable significance to solve problems of cost and delay, arising from the counting bundling, transporting and depositing of large volumes of cash, as well as the risk and inconvenience of dealing with counterfeiting and the treatment of damaged notes. Gemechu (2014) stated that the appearance of e-banking in Ethiopia goes back to the late 2009, when the largest state owned, commercial bank of Ethiopia (CBE) introduced automated teller machine (ATM) to deliver service to the local users.

Previous studies on Ethiopian e-business focus on the assessment study and the correlation between e-banking and customer satisfaction (Assefa 2013). Likewise, Gemechu (2014); Gardachew (2010) evaluated the adoption of e-banking in the context of banks perception. However, this paper investigated the impact of e-banking on the financial performance of the Commercial Banks hitherto the adoption of e-banking.

High tech banking systems has been introduced and become adapted in the Ethiopian financial system very recently. Currently, the e-banking services delivered at every corner of the country are: ATM, Point of Sale (POS), and online book transfer. However, the online book transfer is not considered as transaction by the National Bank of Ethiopia (NBE). Since June 2011 NBE made mandatory to use electronic banking that enable banks to provide mobile, internet and card banking services. After the “National Payment System Proclamation No.718/2011” has been issued all commercial banks operating in the country are on the way to get the system from different companies (FDRE 2011).

The remaining section in this chapter present statement of problems, objectives and research hypotheses of the study, scope of the study, significance of the study, limitation of the study and organization of the thesis.

1.1. Statement of the problem

A number of studies on the impact of financial innovations regarding the performance of the banking system have been published although the outcomes of the research are contradicting each other. For instance, the study by Pooja & Balwinder (2009) and Nader (2011) concluded that electronic banking had insignificant impact on bank performance; in contrast, Batiz-Lazo & Woldesenbet (2006) and Mugenda & Mugenda (2003) stated that electronic banking had significant contribution to bank performance. It is at the center of such mixed conclusions that it becomes imperative to carry out a study in Ethiopian context whether e-banking has effect on financial performance of commercial banks. Despite the increasing use of e-banking was observed in Ethiopia, previous studies emphasize on the adoption, customer satisfaction to measure the efficiency of e-banking. The results of the research studies in

general agreed that e-banking in Ethiopia is sluggish and less adaptable (Gardachew 2010).

1.2. Objectives and research hypotheses

The broad objective of this study is to assess the effect of e-banking on financial performance of commercial banks in Ethiopia, focusing on its impact on profitability and return on total assets. Based on this broad research objective and the forthcoming theoretical underpinning such as innovation diffusion theory, theory of planned behavior, theory of task technology fit, and technology acceptance model; two hypotheses were developed:

***Hypothesis one:** E-banking has a significant positive relationship with profitability of commercial banks in Ethiopia.*

***Hypothesis two:** E-banking has significant positive relationship with return on total assets of commercial banks in Ethiopia.*

1.3. Significance of the study

The study findings may help banks in evaluating the importance of financial innovation on their performance in terms of bolstering profitability. Banks, especially commercial ones, are swiftly becoming more aware of the importance of financial innovation in this era and this study adds momentum to the link between e-banking and performance. Further, the results of the study will inform banks on which innovations there would have better link to financial performance and hence save on the costs of conducting cost benefit research in their institutions.

1.4. Scope of the study

The study covered Commercial Banks licensed by the National Bank of Ethiopia and employed e-banking. The commercial banks that formed the units of analysis of the study are those that were in operation by close of business on 31st of December 2015. The bank innovations used in the study are automated teller machines, debit cards and point of sale terminals. The financial performance of banks measured using profit before tax and return on assets. The study employed secondary data collected from 10 commercial banks in Ethiopia that applied ATM and POS since 2013. Accordingly data available for the period of 2013-2015 were used to assess the effects of e-banking on the financial performance of the Ethiopian commercial banks.

1.5. Limitation of the study

Due to time and availability of data the study reviewed those of commercial banks in Ethiopia that apply e-banking since, 2013. Further some research subjects' data was rejected because of the autocorrelation between the data; besides some of subjects have insufficient data on the variables of the study so that the study cannot encompass all commercial banks that are adopting innovative e-banking. Very further, the subjects were reduced with the aim to increase the observation data of the study.

1.6. Organization of the thesis

The study is organized in to five chapters. The first chapter deals with the body of proposals that include background of the study, statements of the problem, objective of the study, the research questions, scope of study, significant of study, limitations of the study, and organization of the research. The second chapter presents, i.e. literature review, gloss research results conducted previously. Researches that have been done on e-banking practice of commercial banks either internationally and domestically were reviewed (empirical study). Moreover, researches on theoretical underpinning of innovative technologies on the profitability and performance of commercial banks in international arena on e-banking were discussed. The third chapter will explain types and source of data employed in the study, method of statistical data analysis tools and collection. The fourth chapter presents the result and analysis along with discussion of the study. The last chapter will present conclusion and recommendation of the study.

CHAPTER TWO: LITERATURE REVIEW

This literature review has two sections; the first section contains the theoretical underpinning that comprises issues such as innovation diffusion theory, task technology fit theory, theory of planned behavior and technology acceptance model. These theoretical models are the basis for the hypothesis of this research study. The second section review enormous empirical research results and analysis that focus on the effect of e-banking on ROA and PBT. Similarly, studies that examine the financial performance of banking industry employing high tech devices and machines to make the service convenient and easily accessible even after the office bank hours were glossed.

2.1. Theoretical Literature

There are numerous theoretical underpinnings that serve as basis to formulate a model to practice a research. For instance, in determining the performance and profitability of the bank service employing high tech devices and machines there are four significant theories. These are innovation diffusion theory; task technology fit theory, theory of planned behavior, and technology acceptance model. According to (Ajzen 1991), a theoretical framework guides research, determining what variables to measure, and what statistical relationships to look for in the context of the problems under study. Thus, the theoretical literature helps the researcher to identify clearly the variables of the study; provides a general framework for data analysis; and helps in the selection of applicable research design.

2.1.1. Innovation diffusion theory

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. There is a wide gap in many fields, between what is known and what is actually put into use. Many innovations require a lengthy period, often of some years, from the time when they become available to the time when they are widely adopted. Therefore, a common problem for many individuals and organizations is how to speed up the rate of diffusion of an innovation (Rogers 2003).

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion, therefore, is a special type of communication in which the messages are concerned with a new idea. It is this newness of the idea in the message content of communication that gives diffusion its special character. In other words, diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of a social system. Hence, diffuse an innovation into a system is a challenge. The theory on the diffusion of new ideas and practices was investigated by various scholars and few of them are discussed below.

According to Dillon *et al.* (1996, P.282) there are five factors which influence the diffusion of an innovation. These are “*relative advantage (the extent to which a technology offers improvements over currently available tools), compatibility (its consistency with social practices and norms among its users), complexity (its ease of use or learning), trialability (the opportunity to try an innovation before committing to use it), and observability (the extent to which the technology's outputs and its gains are clear to see)*”. These elements are not mutually exclusive thus unable to predict either the extent or the rate of innovation diffusion.

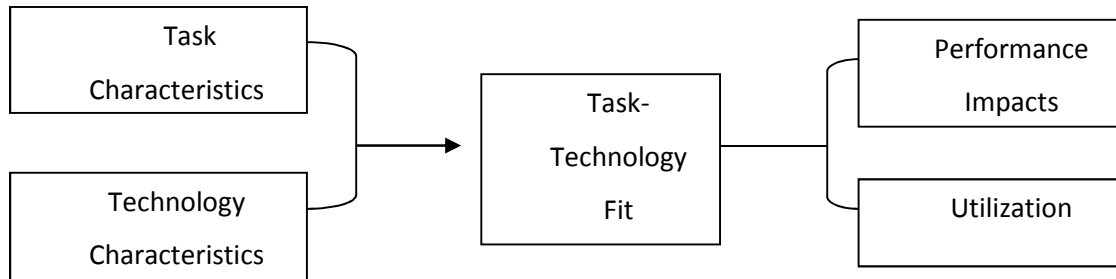
Further, Moore & Benbasat (1991) expanded the array of innovation characteristics to seven. In addition to the previously known four features they added relative advantage, compatibility, and trialability. The fourth characteristic, ease of use, is a close relative complexity. It is worth noting that both relative advantage and ease of use are subjective characteristics since they can be viewed differently depending on an individual's perceptions. Very further, Fishben and Ajzen (1975) concur, attitudes towards an object and attitudes regarding a particular behavior relating to that object can frequently differ. Explicitly, diffusion theory begins to describe the innovation-decision process within organizations, but not to the level of addressing whether and how the characteristics of an innovation interact to affect its adoption within organizations, or whether organizational type, size, or industry affect adoption. In addition, while there is an innovation-decision process described for individuals and within organizations, there is no description of how the variables interact when innovations are diffused across organizations (Lundblad & Jennife 2003).

2.1.2. Task Technology Fit (TTF) Theory

Task technology fit (TTF) theory contends that information technology (IT) is more likely to have a positive impact on individual performance and be used if the capabilities of the IT match the tasks that the user must perform (Goodhue & Thompson 1995). Further, Goodhue & Thompson (1995, P.141) mentioned the factors that measure task-technology fit as; *“quality, locatability, authorization, and compatibility, eases of use/training, production timeliness, systems reliability and relationship with users”*. Their model is useful in the analysis of various context of a diverse range of information systems including

electronic commerce systems and combined with or used as an extension of other models related to information systems outcomes.

Figure 1: Task-Technology Fit Diagram/Schematic of Theory



(Source: Goodhue & Thompson, 1995)

According to TTF theory the success of an information system have a strong correlation between task and technology, hence success has been related to individual performance (Goodhue and Thompson 1995) and to group performance (Zigurs & Buckland 1998). For group support systems, a specific theory of TTF was developed Zigurs & Buckland (1998) and later tested by Wilson *et al.* (1999) and detailed the requirements of group support systems to fit group tasks. For mobile information systems, TTF has been shown to be generally relevant, but more specific questions regarding the applicability of task-technology fit to mobile information systems remain unanswered (Gebauer and Shaw 2004).

The theory of task-technology fit maintains that a match between business tasks and information technology is important to explain and predict the success of information systems (Goodhue and Thompson 1995; Zigurs & Buckland 1998). For various scenarios of task and technology, statistical significance has been established of a positive association between task-technology fit and information system success measures, such as use Dishaw & Strong (1999), and impact on individual performance Goodhue and

Thompson (1995) and on group performance (Zigurs *et.al* 1999). The concept of task-technology fit promises to help identify aspects that are critical to support a given business task, and can, thus, contribute to the success of technology innovations (Junglas & Watson 2006). One such innovation is represented by mobile technology to support an increasingly mobile workforce (Barnes 2003).

2.1.3. Theory of planned behavior

The theory of planned behavior (TPB) started as the theory of reasoned actions in 1980 to predict an individual's intention to engage in a behavior at a specific time and place. The theory was intended to explain all behaviors over which people have the ability to exert self control. The key component to this model is behavioral intent; behavioral intentions are influenced by the attitude about the likelihood that the behavior will have the expected outcome and the subjective evaluation of the risks and benefits of that outcome.

However, the theory is ill-equipped to predict situations where people possess low volitional control. The common limitations of the theory are it assumed regardless of intention the person with opportunities and resources can easily acquired the desired behavior. This assumption set aside several variables such as fear, threat, mood or past experience. Further, the theory assumes that the behavior is the direct result of linear decision making process disregarding the change over time. Very further, it does not say anything about actual control over behavior nor the time frame between 'intent' and 'behavioral action' were not addressed.

In the theory of planned behavior (TPB), Ajzen (1991) incorporates perceived behavioral control (PBC) as an antecedent of behavioral intentions to overcome the limitations. Therefore, in the TPB, a person's performance of certain behavior depends on his or her

intention toward that behavior; intention in turn relies on attitudes, subjective norms (SN), and PBC. Ajzen (2006, P.54) defines PBC as “people’s perceptions of their ability to perform a given behavior”, and empirical evidence suggests that it improves predictions of intentions (Ajzen 1991). Subjective norms (SN) refer to perceived pressures to perform a behavior; according to what important others say or do (Fishben and Ajzen 1975).

E-commerce acceptance research suggests mixed results regarding this variable; some researchers find that SN has no significant influence on intentions (e.g., Shim *et al.* 2001; Shih and Fang, 2004), whereas others reveal a significant relationship (Taylor & Todd 1995). Nevertheless, Vijayasathy (2000) suggests that perceptions of relevant others may differ according to the type of behavior. Likewise, Barki & Hartwick (1994), show that SN has a significant effect on intentions for mandatory system usage but not when usage is voluntary. However, Davis *et al.* (1989) fail to find a significant relationship between SN and intentions. Scholars tackle the confusion from different angles: Venkatesh, *et.al* (2003) discuss compliance; Moore & Benbasat (1991) raise issues of image and social influence; Barki & Hartwick (1994); Taylor & Todd (1995) argue that system experience decreases the direct effect of SN on intentions; and Cournega (2000) propose substituting SN with social support. Despite these efforts, ambiguity still surrounds the SN construct.

2.1.4. Technology acceptance model

User acceptance remains a barrier to the success of new information technologies (IT). In an attempt to explain the idea, Davis (1989) introduced Technology Acceptance Model (TAM) based on the attitude-behavior paradigm from cognitive psychology. Davis (1989, P.35) argues that “*people adopt an application primarily because of the functions it performs and secondarily because of the ease or difficulty associated with making the system perform these*

functions”. The model provides a basis for tracking the impact of external factors on internal beliefs, attitude, and behavior (Davis *et al.* 1989).

TAM assumes that behavior “the manifest, observable response in a given situation” Ajzen (1991, P.60) is volitional. Behavioral intention indicates a person’s readiness to perform the given behavior Ajzen (2006), which makes it the main predictor of the actual behavior. In TAM, intention is a function of attitude and perceived usefulness (PU). Attitude is “the degree of evaluative affect that an individual associates with using the target system” (Davis, 1993, p.476). It represents what a person feels about a concept, which may be any entity about which persons can think and attach feeling (East 1997). Thus, attitude plays an important role in the decision to adopt a new computer technology (e.g., Davis *et al.* 1989; O’Cass and Fenech 2003). Fishben and Ajzen (1975) define attitude as (1) attitude toward objects, i.e. evaluation of a specified object, and (2) attitude toward action (behavior), or evaluation of a specified behavior. Little evidence supports the idea that attitude toward objects stimulates action (Bagozzi 1992). Previous IS research tends to treat attitude as a fragile and vague variable, although psychology research consistently recognizes its importance for individual behavior and social influence (e.g., Olson & Zanna 1993).

In the technology acceptance domain, some researchers emphasize the relationship between attitude and intentions (e.g., Hausman & Siekpe 2008), whereas others argue its little significance (e.g., Venkatesh, *et.al* 2003), suggesting that IS usage decisions might be dominated by cognitive beliefs, such as perceived usefulness, rather than affect, such as attitude. Yang and Yoo (2004) argue that researchers fail to distinguish between the two types of attitudes, where the potentially significant influence of cognition attitude gets offset by the insignificant influence of affect attitude.

The originality of the TAM derives from two related beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), which generalizes across different settings. TAM assumes that users engage in behaviors because they have evaluated the benefits and expect certain results (Dishaw & Strong 1999). Snoj et.al. (2004) find that users do not use a system for its own sake but instead use it because of its attributes that drive value, according to the utility provided by the combination of attributes, less the disutility represented by any sacrifices required to use the system.

As the ability of Internet users to find their way around a site and keep track of where they are (Richard & Chandra 2005), PEOU affects attitude either directly or indirectly through its effect on PU: *“even if potential users believe that a given application is useful, they may at the same time believe that the systems are too hard to use and that performance benefits of usage are outweighed by the effort of using the application”* (Davis 1989, p.320). Both PEOU and PU are influenced by external stimuli, such as information richness, web quality, and experience.

2.1.5. Electronic delivery channels in the banking industry

Technological innovations have been identified to contribute to the distribution channels of Banks. The electronic delivery channels are collectively referred to as Electronic Banking. Electronic Banking is really not a technology, but an attempt to merge several different technologies. In recent years different groups of technologies and industries made to work together. The Electronic banking is a systematic use of several technological products to facilitate the service of banking. In this section the electronic delivery channels used by banks to maximize their accessibility and profitability shall be discussed briefly.

2.1.5.1. Automated Teller Machines (ATMs)

Rose (1999) describes ATMs as follows: “an ATM combines a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the bank’s book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank’s computerized records, 24 hours a day”. Once access is gained, it offers several retail banking services to customers. They are mostly located outside of banks, and are also found at airports, malls, and places far away from the home bank of customers. At the outset they were function as cash dispensing machines. However, because of the advancement of technology, ATMs are able to provide a wide range of services, such as making deposits, funds transfer between two or more accounts and bill payments.

The primary advantages of ATMs are they save the customer’s time in service delivery and it is cost efficient way of yielding higher productivity per period of time than human tellers. Furthermore, as the ATMs continue when human tellers stop, therefore, there is continual productivity for the banks even after banking hours.

2.1.5.2. Branch Networking

Networking of branches is the computerization and inter-connecting of geographically scattered stand-alone bank branches, into one unified system in the form of a Wide Area Network (WAN) or Enterprise Network (EN); for the creating and sharing of consolidated customer information or records. It offers quicker rate of inter-branch transactions and as a consequence distance and time are eliminated. Hence, there is more productivity per time period. Moreover, as one system the networked branches serving the customer populace

would result in simulated division of labor among bank branches with its associated positive impact on productivity among branches. Similarly, since it saves the time of the customer to go to where he creates the bank account he will have time to produce so that the productivity of the individual increase as well.

2.1.5.3. Electronic Funds Transfer at Point of Sale (EFTPoS)

An Electronic Funds Transfer at the Point of Sale is an on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase points). A point of Sale uses a debit card to activate an Electronic Fund Transfer Process (Rose 1999).

Electronic Fund Transfer at Point Sale would provide service for customers to pay cheques and cash withdrawals for shopping without clerical duties. In addition, the system continues after banking hours and hence continual productivity for the bank even after bank working hours. In the same development it save the customer time without going to bank branches and ATMs point.

2.1.5.4. Telephone Banking (Tele-banking):

It is a virtual banking that provides financial services for bank customers to perform retail banking transactions by dialing a touch-tone telephone or mobile communication unit connected to automated system of the bank by utilizing Automated Voice Response (AVR) technology (Rose 1999). Tele-banking provides increased convenience, expanded access and significant time saving for bank customers. It has almost all the impact on productivity of ATMs, except that it lacks the productivity generated from cash dispensing by the ATMs. As

a delivery conduit it provides retail banking services even after banking hours so that it accrues continual productivity for the bank.

2.1.5.5. Personal Computer Banking (PC banking) and Internet Banking

PC banking is a service to bank customers to access information about their accounts via a proprietary network installed on their personal computer. Once access is gained the customer can perform a lot of retail banking functions. This service can also have all the benefits provided by telephone banking and ATMs.

Internet banking offer bank customers access to their bank accounts via a web site and to enable them to enact certain transactions on their account; by its nature internet banking put up more convenience and flexibility to customers coupled with a virtually absolute control over their banking. In other words, customers can have access to their accounts around the clock, from all over the world; access up to minute information on their accounts; perform their account transactions electronically with low cost. In the same relation banks profitability also developed by use of automated e-banking. Hence, banks will offer services at lower costs and with fewer staff that result in significant reduction in bank costs. Internet banking, however, has also down sides such as security concerns, insufficient knowledge of the technology and lack of personal computers by large customer populations.

2.1.6. Financial Performance of Commercial Banks

Financial performance has been studied under different yardsticks of performance i.e., size, profitability, financing pattern, economic efficiency, operational efficiency, asset quality, diversification and cost of operations (DeYoung 2001).

Nowadays banks contribute the lion share to the growth of the economy. Enormous studies have been conducted to find out the reason behind the alarming profitability of banks whether it is due to either internal or external factors. Various researches employed various characteristics and the external variables of bank level data across countries Williams (2003) employed key performance indicators (KPIs) and argued that it provide intelligence in the form of useful information about a public and private agency's performance. Scholar like Modell (2004) have maintained that the implementation of performance measurement systems possess important symbolic value.

Profitability offers clues about the ability of the bank to undertake risks and to expand its activity. The main indicators used in the appreciation of the bank profitability are: Return on equity, ROE ($\text{Net income} / \text{Average Equity}$), Return on Asset, ROA ($\text{Net income} / \text{Total assets}$) and the indicator of financial leverage or ($\text{Equity} / \text{Total Assets}$) (Rose 1999).

A commonly used measure of bank performance is the level of bank profits (Ceylan, *et.al* 2008). Bank profitability can be measured by the return on a bank's assets (ROA), a ratio of a bank's profits to its total assets. In other words, the income statements of commercial banks' profits report before and after taxes. Another good measure on bank performance is the ratio of pre-tax profits to equity (ROE) rather than total assets since banks with higher equity ratio should also have a higher return on assets (Ceylan, *et.al* 2008).

2.1.6.1. *Determinants of Bank profitability*

A number of models explain the determining factors of bank profitability. For instance, structure conduct performance (SCP) hypothesis states that the higher market concentration correlated with higher profitability of larger profits (Evan & Fortier, 1988). On the other hand, the relative efficiency hypothesis states that larger banks in UK are more efficient than smaller banks and hence they are more efficient (Clarke *et al.*, 1984).

The relationship between concentration and profitability in US banks suggested that total assets have a negative relationship with banks profitability while the market structure and the market concentration affect positively the profitability of US banks (Carlson *et al.*, 2001). On the contrary, De young (2001) showed that pure internet banks earned lower profits than traditional banks in US in terms of ROA and ROE. Similarly, Maholtra & Singh (2007) found that there is no significant relationship between adoption of internet and the performance of public sector banks in India in terms of returns on assets (ROA) and return on equity (ROE). They also explain that internet banking has a negative impact on the profitability of private sector in terms of ROA, a positive impact on the performance of foreign banks in terms of ROE. Delgado *et al.* (2007), however, find out that internet banks worldwide have underperformed traditional banks, mainly due to the higher operating costs.

Market size also play prominent role in the profitability of banks. Larger banks dominate a small market and achieve higher profits. Larger banks benefited from growth in the market and they were more profitable (Evan and Fortier 1988). Moreover, cost funds are also a factor of profitability in the banking sector. This is because profitability is affected by the type of deposits, as deposit accounts pay higher interest rates to customers than current accounts (Molyneux & Teppett 1993).

The other factor that has significant impact on bank profitability is capital. A low level financial capital risk would result in a high level of profits. However, well capitalized banks reduce their costs of funding, as they face lower costs of going bankrupt, or they face lower costs of going bankrupt, or they have lower needs for external funding, which results in higher profitability.

In addition portfolio composition is also important determinant factor for bank profitability. Because higher total deposits to total assets ratio means that banks have more funds to invest or lend to customers as a result they can increase their productivity in terms of return on assets (Molyneux & Teppett 1993).

There are little studies that examine the effect of ATMs and IT investment in bank profitability and efficiency. El-Bannany (2004) reported that investments in IT, and more specifically ATMs had a positive effect on the profitability of UK banks over the period 1976-1996. Recently, however, Kondo (2008) reported that the number of ATMs had no effect on the profitability of Japanese banks for the period 2000-2003.

2.2. Empirical Literature Review

E-banking enables firms from all sectors to raise money in larger amounts and at a cheaper cost than they could elsewhere (Lerner 2006). The life blood of a bank is determined by how well it can gather funds from the customers at the lowest cost; buy money, do something with the money, and then sell it to their profit (Dew 2007). Therefore, the more electronic transactions, the more fee-based income acquired, enforcing the bank to improve the features of e-banking transactions, such as mobile telephone top-ups, ticketing, paying telephone or electricity bills, house taxes, etc. Joining a certain ATM network

will also create customer awareness of that bank and influence the market share (Agboola 2006). The relationship between IT expenditures and bank's financial performance or market share is provisional upon the extent of network effect. If the network effect is too low, IT expenditures are likely to reduce payroll expenses, increase revenue and profit, and increase market share (Nadia, *et.al* 2011).

After developing some innovations and succeeding banks find new opportunities that could be exploited that provide more income for the bank (Nofie 2011). According to Nigel, *et.al* (2008) the impact of retail services on bank performance is dominated by fee income. This relationship is stronger in countries with more retail payment transaction equipment, like ATMs and POS terminals. Retail payment transaction technology itself can also improve bank performance and heterogeneity among retail payment instruments is associated with enhanced bank performance. Likewise, a higher usage of electronic retail payment instruments seems to stimulate banking business (Ngumi 2013). Besides the direct impact on bank performance, retail payment transaction technologies have an intensifying effect on the relationship between retail payment services and bank performance (Ngumi 2013). Advanced retail payment transaction technologies will foster innovation and growth in the retail banking sector. This will further create more value associated with retail payment services for banks. On the other hand, if more retail payment transactions have been done through ATMs or POS instead of retail payments offices, banks can be more cost efficient and obtain more income. Innovations of retail payment services have a larger impact on bank performance in countries with a relatively high adoption of retail payment transaction technologies (Iftekhhar, *et.al*. 2009).

According to Sana *et al.* (2011) banks are also earning from innovation led services in a way of commission and annual deductions by charge a certain amount or flat charges or a certain percentage on products and services like ATMs, funds transfer etc. If the eras of traditional banking are compared to the present e-banking eras, the results showed that e-banking has contributed positively and maximize the profits of banks (Ngumi 2013). Banks are gradually transitioning from manual means to the electronic means rather than jumping to electronic banking means. Efficiency has risen as the costs have been reduced; costs of labor, provision of services, time saved, accuracy, reliability and quality of services has improved (Sana *et al.* 2011).

Looking E-banking and profitability; profit is an important term in business decision makings. A large volume of accomplished researches and studies in the field of accounting are with regard to profit. Profit, as a guide of the dividend, can be applied by managers, investors and financial analysts as an index for evaluating management effectiveness and predict decision makings. As a matter of fact, all financial and manufacturing programs, activities and decisions are reflected in the firm's profitability (Ghafoorifard 2011).

According to Simpson (2002) suggests that e-banking is driven largely by the prospects of operating costs minimization and operating revenues maximization. A comparison of online banking in developed and emerging markets revealed that in developed markets lower costs and higher revenues are more noticeable. While Sullivan (2000) finds no systematic evidence of a benefit of internet banking in US click and mortar banks. Furst, *et.al.* (2002) explained that federally chartered US banks had higher Return on Equity (ROE) by using the click and mortar business model and also examined the determinants of internet banking adoption and observed that more profitable banks adopted internet banking after 1998 but yet

they were not the first movers. The work of Dehghan (2015) that analyzed the profit efficiency of the private banks in Mashhad results indicated that internet banking, mobile banking, telephone banking, point of sale (POS), ATM, and electronic money transfers profoundly develop the efficiency of the banks. Further the findings indicated a significant relationship between the application of internet banking and ATM and the variable of profitability while there is no significant relationship between the application of telephone banking, mobile banking, POS, and electronic money and profitability.

On the other hand we look E-banking and ROA, the study conducted in Turkey by Onay, *et.al.* (2008) proved that the strong impact of internet banking on bank profitability. Moreover, the research indicated the estimated the effect of online banking activities on the three common determinants of bank performance, namely the return on assets, return on equity and return on the financial intermediation margin. Further, she found out that besides investment in e-banking being a gradual process, internet banking variable has had a positive effect on the performance of the banking system in Turkey in terms of returns to equity only with a lag of two years.

In the same token study on the Jordanian banks Akram & Allam (2010) using test of hypothesis showed that there is an impact on the use of Management Information Systems [MIS] in Jordanian banks in the market value added (MVA), Earnings Per Share (EPS), ROA and Net Profit Margin (NMP). However, the test of hypothesis also showed that there was no impact of the use of MIS in Jordanian banks to improve the ROE. On the outcome of the study the researcher concluded that due to the increased costs of investment in information technology which might work to reduce the return on the property.

On the other hand the work on the performance of multi-channelled commercial banks in Italy by Hasan *et al.* (2009) indicated that Internet adoption seems to influence positively on bank performance, measured in terms of ROA and ROE. Similarly, Hernando & Nieto (2006) study on bank financial performance in the Spanish banking showed that the adoption of the internet as a delivery channel gradually reduces overhead expenses. This cost reduction boosts the performance of banks about one year and a half after the adoption in terms of ROA, and after three years in terms of ROE. Likewise DeYoung (2005) study proved that the internet had been used more as a complement than as a substitute for physical branches, suggesting the dominance of a multi-channel banking model.

Mobile phone service and performance; mobile phones enhance the ability of electronic banking solutions to offer customers an enhanced range of services at a low cost. Mobile banking is real time online banking, available anytime, anywhere throughout the country, it is convenient, affordable and secure and therefore it is much more effective in developing savings habits and hence leading to increase in bank deposits. Mobile phone also makes access to banking and advanced payment transactions at affordable cost. A positive aspect of mobile phones is that mobile networks can reach remote areas at low cost both to the consumer and the bank.

According to the report of International Telecommunication Union, ITU (2009) Sub-Saharan Africa countries has some of the lowest levels of infrastructure investment in the world. Merely 29 percent of roads are paved, barely a quarter of the population has access to electricity, and there are fewer than three landlines available per 100 people. Despite these facts access to and use of mobile telephone in sub-Saharan Africa has increased dramatically over the past decade. The report further informed that there are ten times as many mobile

phones as landlines in sub Saharan Africa and 60 percent of the population has mobile phone coverage. Mobile phone subscriptions increased by 49 percent annually between 2002 and 2007, as compared with 17 percent per year in Europe (ITU 2008).

The study by Aker & Mbiti (2010) demonstrated that there is a strong correlation between mobile phone coverage, the types of services offered, the price of such service, and firm performance. In markets with limited competition, profit-maximizing firms to offer more limited services at higher prices. In the same token, Rayhan, *et al.* (2012) in their study on mobile banking in Bangladesh concluded that mobile phone banking offers the potential to extend low cost virtual bank accounts to a large number of currently un-banked individuals.

The impact of internet service on bank performance; electronic banking system has become the main technology driven revolution in conducting financial transactions. However, banks have made huge investments in telecommunication and electronic systems, users have also been validated to accept electronic banking system as useful and easy to use (Adesina & Ayo 2010).

The study by Simpson (2002) revealed that electronic banking motivated largely by the prospects of operating costs minimization and operating revenues maximization. ICT revolution has distorted the conventional banking business model by making it possible for banks to break their comfort zones and value creation chain so as to allow customer service delivery to be separated into different businesses. For instance research by Delgado & Nieto (2007) pointed out primarily Internet banks distribute insurance and securities as well as banking products, but not all the products they distribute are produced by their group.

Similarly, Haq (2005) also states that banks exist because of their ability to achieve economies of scale in minimizing asymmetry of information between savers and borrowers. The unit costs of internet banking fall more rapidly than those of traditional banks as output increases as a result of balance sheet growth.

The study conducted by Daneshvar & Ramesh (2012) on panel data of two public banks to examine impact of IT investments on profitability and productivity of Indian public sector indicated that investments on IT contributed to increased amount of deposits and ROA as profitability. Further the results suggested that the increasing use of internet as an additional channel of marketing banking services has significantly improved the financial performance of community banks.

2.3. Research gaps

From the previous review of relevant literature, it is evident that research in the area of bank innovations has been done but not in a comprehensive approach. All the literature reviewed indicated that previous researchers only concentrated on customer satisfaction and behavior towards e-banking but, this research focused to assess the financial performance of banks. This makes the study more comprehensive. From survey of relevant literature, it has been found that there are a few studies specific to Ethiopia on the link of e-banking and IT adoption and its impact towards customer behavior of commercial banks. This study therefore intends to fill these pertinent gaps in literature by studying the effects of e-banking on selected key performance indicators of commercial banks in Ethiopia.

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter presents the research methodology for the study. The chapter is organized in three sections. The first section presents the research approach which is followed by a discussion of research methods adopted in the second section. The third section presents normality and heteroskedasticity test.

3.1. Research approaches

According to Creswell (2009) there are three types of research approach: the first one is qualitative research involves emerging questions and procedures, data typically collected in the participant's setting. The second one is quantitative research; it is a means for testing objective theories by examining the relationship among variables (Creswell 2009). The last one is mixed method research, it also an approach to inquiry that combines or associates both qualitative and quantitative forms (Creswell 2003). Studies that are products of the pragmatist paradigm and that combine the qualitative and quantitative approach within different phases of the research process (Grove 2003).

All the three research approaches have their own strategies of enquiry; for qualitative research ethnography is the strategies enquiry (Creswell 2009). For instance, Tony (2005) described that ethnography has come to be equated with virtually any qualitative research where the intent is to provide a detailed, in-depth description of everyday life and practice by primary data collection through fieldwork. For quantitative method experiments are strategies inquire (Creswell 2009). Experimental designs are research approach for obtaining information about causal relationship and also allowing research to assess the correlation between one variable and another (Kothari 2004). On the other hand mixed research method employed sequential

inquiry (Creswell 2009), according to Steven (2007 P.262) sequential explanatory strategy is “*the collection of quantitative data followed by the collection and analysis of qualitative data*”; in other words, equal priority is given to the two phases and data are integrated during interpretation.

3.2. Research methods

This research used quantitative panel data. According to Stephanie (2008, P.2) “*experimental (quantitative) designs are said to be the approach for obtaining information about causal relationships, allowing researchers to assess the correlation (relationship) between one variable and another*” A principal factor of such designs is that one element is manipulated by the researcher to see whether it has any impact upon another (Robson 1993).

The purpose of this secondary data and document survey study is to test the theory of planned behavior, task technology fit and innovation diffusion theory with respect to the independent variables (i.e. ATM, POS and Debit card) to dependent variables such as; PBT and ROA on financial performance of commercial banks. The subsequent discussions in this section describe the method used in investigating the impact of e-banking commercial banks performance. Specifically, sampling design followed by definition of variable & model specification and normality test at last heteroskedasticity test.

3.2.1. Sampling design

The sample units of the study were seventeen (17) commercial banks of which ten (10) commercial banks (Commercial Bank of Ethiopia, Dashin Bank, Zemen Bank, Wegagen Bank, Awash International Bank, Bank of Abyssinia, Cooperative Bank of Oromia, Oromia International Bank, United Bank and Nib International Bank) of which Commercial Bank of

Ethiopia is state owned the rests are private commercial banks used in this study. The sampled banks were selected because they have readily available information and have a higher level of information disclosure. These are also the banks that have invested heavily in various innovations based on information available from their annual reports and apply ATM and POS since 2013.

3.2.2. Definition of variables and Model specification

The dependent variables in this research are, Return on Asset and Profitability while the independent variables consisting of ATM, Debit Card and POS Terminal. The study used Ordinary least squared (OLS) model to test the statistical significance of variables.

3.2.2.1. Definition of Variables

The definition of dependent and independent variables is presented in the subsequent paragraphs.

Dependent Variables

The dependent variable is measured in terms of profit before tax and return on assets.

Profit before Tax is the net balance after deducting all expenses from revenue (Cicea & Hincu 2009). The first hypothesis of the study is whether there may have significant relationship between E-banking and profitability of commercial banks in Ethiopia. The following multiple linear regression equation used to determine the effect of e-banking on profitability of commercial banks:

Profit before tax will be obtained from the profit and loss statements of the banks by computing the difference between total revenue and total expenses.

Return on Assets is profit before tax divided by the total resources owned and controlled by

a Bank (Dew 2007). The second hypothesis of the study is whether there might have significant relationship between E-banking and return on total assets of commercial banks in Ethiopia. The following multiple linear regression equation that will be used to determine the effect of e-banking on the return on assets of commercial banks:

Return on assets is measured by dividing the profit before taxation of the banks by their total assets and then multiplied by 100% to get a percentage return on assets.

Hausman and Siekpe (2008) emphasize that regression methods have become an integral component of any data analysis concerned with describing the relationship between a response variable and one or more explanatory variables. It is often the case that the outcome variable is discrete, taking on two or more possible values. It is important to understand that the goal of an analysis using this method is the same as that of any model building technique used in statistics; to find the best fitting and most parsimonious, yet reasonable model to describe the relationship between an outcome (dependent or response) variable and a set of independent (predictor or explanatory) variables. These independent variables are often called covariates.

The data that was obtained from the survey of secondary quantitative data, and was analyzed using linear multiple regression to identify the E-banking is the most important and statistically significant on bank financial performance. According to IBM (2010), linear multiple regression is useful in situations where there are more than two independent variables and/or dependent variables. Tether (2001) uses a linear multiple regression procedure in a study to identify the population's idea of the definition of innovation across various sectors in the United Kingdom.

IBM Base (2010), states that a paired samples t-test compares the means of two variables for a single group. The study also used paired samples t-test of significance to test

whether the change in the independent variables was statistically significant. The t-test of significance was used to test whether the change in the independent variables was statistically significant. The above statistical tests and analysis were conducted through the use of econometric software E-views 9.

Independent Variables

The independent variables are ATM, debit Card and POS terminals.

- ATM: is an electronic telecommunication device that enables the customers a financial institution to perform financial transactions accessible 7/24 (Maleki and Akbari 2010). In this section ATM is proximate by total number of ATM terminals.
- Debit Card: is issued by banks to customers with checking accounts and they can be at cash machines ATMs to withdraw money from checking account and used to purchase items at stores and online (Nyanamba and Steve 2014). In this section Debit Card is proximate by total number of Debit Card users.
- POS: is the point at which a customer makes a payment to the merchant in exchange for goods (Habibzadeh and Mirmajidi 2011). In this section POS is proximate by total number of POS terminals.

They are represented by X_1 , X_2 and X_3 , respectively β_0 is the constant or intercept while β_1 , β_2 and β_3 , are the corresponding coefficients for the respective independent variables. ε , is the error term which represents residual or disturbance factors or values that are not captured within the regression model. The interpretation of X , β and ε is the same for the subsequent equations for testing the study objectives.

Ngumi (2013) research conducted in Kenya on effects of innovation on financial performance of commercial banks in Kenya; Mabrouk & Mamoghli (2010) employed in Tunisia so called financial innovation for banks profitability; Nofie (2011) study on the diffusion of electronic banking in Indonesia and Kemppainen (2003) Competition and regulation in European retail payment systems used number of ATM terminals, number of POS terminals and number of debit card used as independent variables.

3.2.2.2. *Model specification*

Besides using frequencies and descriptive analysis, the study used multiple linear regression analysis the so called ordinary least squared (OLS) model to test the statistical significance of the various independent variables (ATM, debit cards and POS) and dependent variables (profit before tax and return on assets).

$$PBT = \beta_{01} + \beta_{11}X_1 + \beta_{21}X_2 + \beta_{31}X_3 + \varepsilon$$

Where: - PBT profit before tax

β_{01} coefficient of constant

β_{11} , β_{21} and β_{31} are the coefficient of independent variables ATM, debit card and POS respectively.

X_1 , X_2 and X_3 are independent variables ATM, debit card and POS respectively.

ε is the error term which is assumed to be normally distributed with mean zero and constant variance.

Rationale why OLS model is selected: OLS methods involve data observations with minimum of 30 observations in order to regression the data. In Ethiopia the number of banks and hardly able to collect sufficient data as indicated in this research. Further, a number of

similar research topics with this research idea were conducted using OLS and the results were relevant and accepted by numerous scholars. For instance, the study conducted by Nader (2011) to assess financial performance of Saudi Arabia banks reported results that are both statistically significant but with mixed coefficient variables. Likewise Agboola (2006) results on the performance of Nigeria banks showed significant and positive coefficient variables it also holds true for Iftekhhar, *et.al.* (2009) study results across the European Union and Ngumi (2013) study conducted in Kenya that used OLS model to measure the financial performances of commercial banks used PBT as dependent variable.

In the following section it was attempted to explain about the significance of the OLS model by taking results of the study and explain what the model says about the variable results and the discussion on scholars that explain about the significance of OLS figures.

Table 1: Model Fitness PBT and e-banking

R-squared	0.766135	Mean dependent var	3.47E+09
Adjusted R-squared	0.732725	S.D. dependent var	6.12E+09
S.E. of regression	3.16E+09	Akaike info criterion	-6.489520
Sum squared resid	2.10E+20	Schwarz criterion	-6.927740
Log likelihood	-580.1590	Hannan-Quinn criter.	-6.786810
F-statistic	22.93177	Durbin-Watson stat	2.263427
Prob(F-statistic)	0.000001		

Source: Authors' computation

The above table presents the coefficient of model fitness on how effective e-banking explain bank profitability. The profitability has an overall correlation with e-banking of 0.766 which is strong and positive. According to Gujarati (2004) described that the OLS adjusted R-squared greater than 0.60 will explain the data of the variables excellently. Some scholars also agreed that R-squared greater than 50% is explanatory of the variables in the study. In the give example bank innovations that are included in the model explain 73.3% of the changes or variations in profitability of commercial banks in Ethiopia. This shows that 26.7% of the variations in profitability are explained by other factors not captured in the model. The result

indicated that there is an opportunity for future studies to include additional variables that could explain banks' profitability.

Similarly (Table 1) showed the overall significance of the regression estimation model. It indicates that the model is significant in explaining the relationship between profitability and e-banking at a 1% level of significance. The analysis of variance of the predictors of the model have a significance is 0.000 and fails to accept the null hypothesis and conclude that bank innovations have a positive influence of profitability of commercial banks in Ethiopia.

$$ROA = \beta_{02} + \beta_{12}X_1 + \beta_{22}X_2 + \beta_{32}X_3 + \varepsilon$$

Where: - ROA Return on Assets

β_{01} coefficient of constant

β_{11} , β_{21} and β_{31} are the coefficient of independent variables ATM, debit card and POS respectively.

X_1 , X_2 and X_3 are independent variables ATM, debit card and POS respectively.

ε is the error term which is assumed to be normally distributed with mean zero and constant variance.

Return on assets is measured by dividing the profit before taxation of the banks by their total assets and then multiplied by 100% to get a percentage return on assets. The studies conducted by Mabrouk & Mamoghli (2010) in Tunisia so called financial innovation for banks profitability, Nofie (2011) the diffusion of electronic banking in Indonesia, Kempainen (2003) Competition and regulation in European retail payment systems and Ngumi (2013) on effect of bank innovations on financial performance of commercial banks in Kenya used OLS to measure the financial performance of banks. In the results of these studies it was observed that the OLS provides positive significant relations among the variables, it is to say that the results were statistically significant with positive coefficient.

Therefore, on the basis of the results of the above related researches this study also employed OLS model to analyse the data of the research. In the study ROA is a dependent variable to measure the financial performans of commercial banks in Ethiopia.

Table 2 : Model Fitness ROA and e-banking

R-squared	0.621790	Mean dependent var	0.040280
Adjusted R-squared	0.539189	S.D. dependent var	0.010787
S.E. of regression	0.008769	Akaike info criterion	-6.489520
Sum squared resid	0.001615	Schwarz criterion	-6.294500
Log likelihood	85.11901	Hannan-Quinn criter.	-6.435430
F-statistic	5.106329	Durbin-Watson stat	2.022169
Prob(F-statistic)	0.000251		

(Source: Authors' computation)

The above (table 2) shows the effectiveness of the model in measuring the influence of e-banking on return on assets of commercial banks in Ethiopia. The overall correlation coefficient (R-squared) between return on assets and e-banking indicated a strong positive correlation of 0.621. In the same token, the coefficient of determination (R-square) indicates that the e-banking in the regression model can explain 53.9% of the variations in return on assets of commercial banks in Ethiopia. This shows that 46.1% of the variations in profitability are explained by other factors not captured in the model. This result provides an opportunity for future studies to include additional variables that could explain banks' ROA.

Table 2 also shows the overall significance of the regression estimation model. It indicates that the model is significant in explaining the relationship between profitability and e-banking at a 1% level of significance. The analysis of variance of the predictors of the model have a significance is 0.000 and fails to accept the null hypothesis and conclude that bank innovations have a positive influence of profitability of commercial banks in Ethiopia.

3.2.3. Normality test

Normality is defined as the "shape of the data distribution or an individual metric variable and its correspondence to the normal distribution, which is the benchmark for statistical methods" (Hair *et al.*, 2006; p. 79). Violation of normality might affect the estimation process

or the interpretation of results especially in Ordinary Least squared analysis. For instance, it may increase the chi-square value and may possibly cause under estimation of fit indices and standard errors of parameter estimates (Hair *et al.*, 2006). One approach to diagnose normality is through visual check or by graphical analyses such as the histogram and normal probability plot that compare the observed data values with a distribution approximating the normal distribution. If the observed data distribution largely follows the diagonal lines then the distribution is considered as normal (Hair *et al.*, 2006). Beside the shape of distribution, normality can also be inspected by two multivariate indexes i.e. Skewness and kurtosis. The skewness portrays the symmetry of distribution whereas the kurtosis refers to the measure of the heaviness of the tails in a distribution (also known as peakedness or flatness of the distribution) compared with the normal distribution. In normal distribution, the scores of skewness and kurtosis are zero. Hair *et al* (2006) point out that skewness scores outside the -1 to +1 range demonstrate substantially skewed distribution. However, West *et al.* (1995) and Kline (2005) suggest that values of the skew index greater than three (3.0) are indicated as extremely skewed and score of the kurtosis index from about 8.0 to over 20.0 describe extreme kurtosis. In this study, the researcher set the maximum acceptable limit of observation values up to ± 1 for the skewness and up to ± 3 for the kurtosis. Thereafter, the researcher used ordinary least squared for data analysis.

The histogram graphs below used to show the normality test on PBT (figure 1) and on ROA (figure 2) respectively. Since the p-value is above 0.05 the data is normal.

Figure 2 Histogram normality test

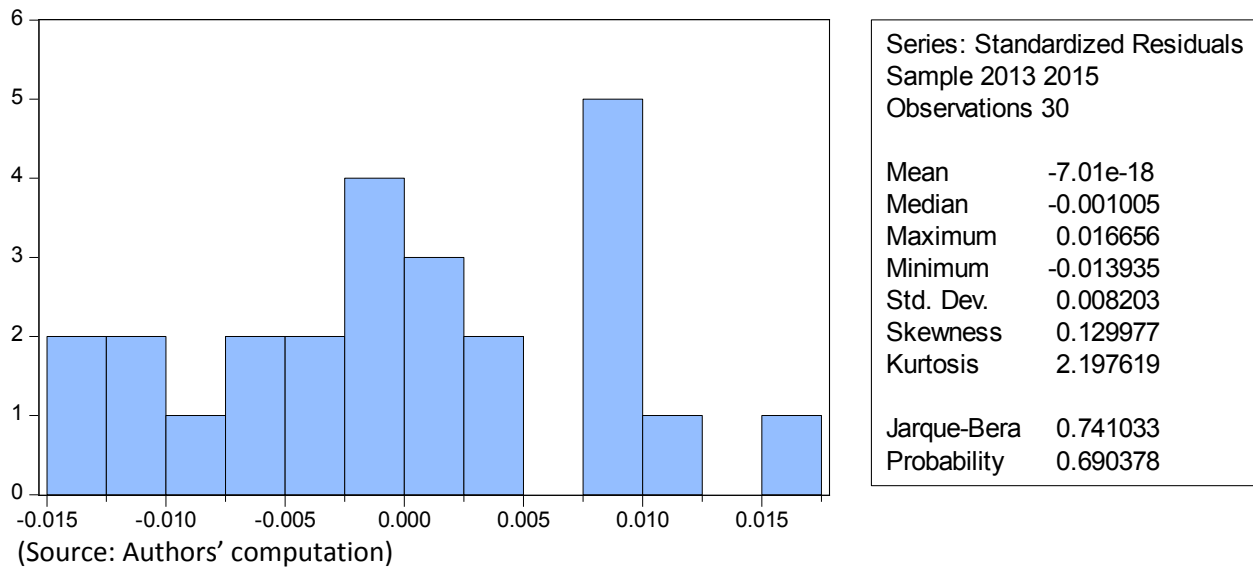
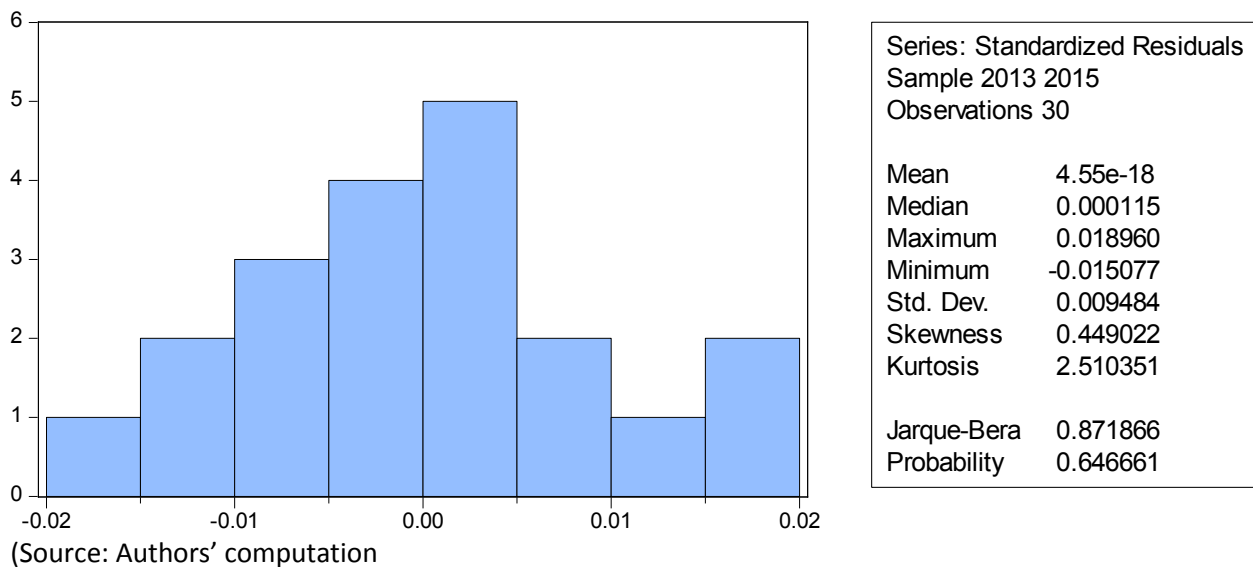


Figure 3 Histogram normality test



3.2.4. Heteroskedasticity Test

Heteroscedasticity test-consistent standard error estimates: Most standard econometrics software packages have an option (usually called something like 'robust') that allows the user to employ standard error estimates that have been modified to account for the

heteroscedasticity following (White 1980). The effect of using the correction is that, if the variance of the errors is positively related to the square of an explanatory variable, the standard errors for the slope coefficients are increased relative to the usual OLS standard errors, which would make hypothesis testing more 'conservative', so that more evidence would be required against the null hypothesis before it would be rejected (Brooks 2008). Both the F- and χ^2 ('LM') versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values are considerably in excess of 0.05 (Brooks 2008). These research variables were passed the violation table 3 & 4 shows below.

Table 3 Heteroskedasticity Test: White PBT

F-statistic	0.593820	Prob. F(9,15)	0.7833
Obs*R-squared	6.567390	Prob. Chi-Square(9)	0.6821
Scaled explained SS	11.34452	Prob. Chi-Square(9)	0.2528

(Source: Authors' computation)

Table 4 Heteroskedasticity Test: White ROA

F-statistic	0.761269	Prob. F(9,15)	0.6524
Obs*R-squared	7.838645	Prob. Chi-Square(9)	0.5505
Scaled explained SS	3.311985	Prob. Chi-Square(9)	0.9506

(Source: Authors' computation)

The figures in the above two tables showed that the variable value greater than 5 percent; the data have significant correlation with the given study variable. Therefore, the data are linear and normally distributed. Since the results of the study data have passed the normality test of the model; hence, the data concerned are used in the result analysis and discussion described in the following chapter of the paper.

CHAPTER FOUR: RESULTS AND DISCUSSION

The prime aim of the study is to investigate the influence of E-banking on financial performance of commercial banks in Ethiopia. Specifically, the study investigated the effect of automated teller machines, debit cards and point of sale terminals on financial performance as indicated by profit before tax and return on assets. This chapter contains detailed result data obtain from the research, analysis of each result and discussion of the results with other empirical studies. The chapter is organized in three sections, namely, the description of the overall Ethiopia's banking performance in 2015; second, descriptive statistics and correlation of the data; and the third section stated results and discussion on profitability and return on asset respectively.

4.1. Ethiopia's Banking Sector Performance in 2015

Performance of commercial banks in Ethiopia grew impressively between years 2013 to 2015 where total assets grew by 49% from 49,910.7 million to 74,547.5 million while net profit grow from 10.2 billion to 14.7billion (NBE 2015). According to National Bank Supervision Report (2015), the banking sector reflected solid performance in 2014. This performance can partly be attributed to improvement in the GDP growth which grew to 10.2%.

The Ethiopian economy continued to register a notable growth. In FY 2014/15, the real GDP grew by 10.2 percent relative to 11.2 percent growth target set in the first GTP for the fiscal year. The growth of the economy has also been remarkable compared to the 4.4 percent growth estimated for Sub - Saharan Africa in 2015 (IMF 2015). The Ethiopian economy is projected to grow by 11 percent in FY 2015/16 in contrast to 3.8 and 5.1 percent growth

by IMF for the world and SSA respectively (IMF 2015). The growth in reserve money was attributed to 16.9 percent rise in currency in circulation and 9.1 percent in deposits of banks at NBE Excess reserves of commercial banks reached Birr 9.3 billion at the end of June 2014/15 lower than Birr 10.0 billion a year ago (NBE 2015)

Banks opened 485 new branches in 2014/15 (of which 359 were private) raising the total branch network in the country to reach 2693 from 2208 last year. As a result, bank branch to population ratio declined from 1:39,833.8 people to 1:33,448.2 in 2014/15 (NBE 2015). The total capital of the banking industry increased by 19.0 percent and reached Birr 31.5 billion by the end of June 2015 as a number of banks injected more capital. As a result, the share of private banks in total capital marginally increased to 56.5 percent from 55.4 percent last year, while that of CBE remained at 34.0 percent (NBE 2015)

4.2. Descriptive statistics and Regression result

This section presents the factors that influence the financial performance of commercial banks in Ethiopia. The financial performance is measured using PBT and ROA against which number of POS terminals, number of debit card users and number of ATM terminals is regressed using the OLS model. The descriptive statistics of the variables used in the OLS model is presented in the subsection 4.2.1. The correlation analysis of the explanatory variables is given in the subsection 4.2.2. The result of the OLS model is presented and discussed in subsection 4.2.3.

4.2.1. Descriptive statistics of the variables used in OLS model

Tables 5 showed the summary data for the variables used in the analysis. The data are average values across years and reported showing the trend of the key variables over the period 2013 to 2015. The data showed that during 2013 to 2015 the average profit level; PBT and ROA of Ethiopian banks are 42.95 and 3.85 percent respectively. However, there is much difference in profitability among the banks as witnessed by the values of the standard deviations which is 0.17 and 0.01 as indicated in table 5 respectively.

Table 5 Descriptive statistics PBT and ROA

	PBT	ROA	POS	ATM	DCARD
Mean	0.423	0.039	433.85	162.60	248067.3
Median	0.380	0.040	247	105.00	119132.5
Maximum	0.760	0.060	1886	644.00	1604363.
Minimum	0.230	0.020	45	20.00	1500.000
Std. Dev.	0.170	0.010	438.10	158.74	387078.5
Skewness	0.156	0.591	0.947303	0.677	0.589960
Kurtosis	2.837	2.917	6.948463	5.394	9.088628
Jarque-Bera	4.477	1.170	25.63	14.15	53.25247
Probability	0.107	0.556	0.0000	0.0008	0.000000
Sum	8.590	0.770	8677.00	3252.00	4961346
Sum Sq.dev.	0.551	0.002	3646765	478786.8	2.85E+12
Observations	30	30	30	30	30

(Source: Author's computation)

4.2.2. Correlation analysis between the independent variables

Tables 6 and 7 showed the correlation between the explanatory variables used in the analysis. The matrix showed that in general the correlation between the explanatory variables is

not strong suggesting that multicollinearity problems are either not severe or non-existent. According to Kennedy (2008), multicollinearity will be a severe problem when the correlation is above 0.80.

Table 6 Correlation between PBT and independent variables

	PBT	POS	CARD	ATM
PBT	1.000	-0.0861 ^{***}	0.1150 ^{***}	0.0378
POS	-0.0861 ^{***}	1.000	0.7422	0.6780
CARD	0.1150 ^{***}	0.7422	1.000	0.7257
ATM	0.0378	0.67800	0.7257	1.000

(Source: Author's computation)

Table 7 Correlation between ROA and independent variables

	ROA	POS	CARD	ATM
ROA	1.000	-0.3438 ^{***}	-0.0112 ^{***}	-0.1435 ^{**}
POS	-0.3438 ^{***}	1.000	0.7422	0.6780
CARD	-0.0112 ^{***}	0.7422	1.000	0.7257
ATM	-0.1435 ^{**}	0.6780	0.7257	1.000

(Source: Author's computation)

N.B. ^{***} Significant at 1%, ^{**} Significant at 5%, PBT is the difference between total revenue and total expenses and also ROA is the ratio of total asset to profit before tax.

4.2.3. Regression result

The OLS model has been used to identify the factors that influence the financial performance of commercial banks. The preference of the OLS model is made following the result of the panel least squares methods which is indicated in Tables 8, 9, 10 and 11.

Tables 8 and 9 showed the results of omitted variables while, tables 8 and 9 showed the result of variables that used in analysis and discussion of the research.

Among the 17 Commercial Banks only 5 Commercial Banks have consecutive five years data on e-banking although the data are incomplete. When the five consecutive year's data collected from five Commercial Banks it will give 25 observational data. However, panel data on OLS model required minimum 30 observations to analyze the data, so that to comply with the software the researcher decrease the independent variables from five to three (i.e. number of ATMs, number of POS terminals and number of debit card) and totally damp moderating variables and increase the cross sections. As a result, the observation data using three independent variables cross sectioned on 10 banks provide 30 observations that satisfy the requirement to analyze the data using OLS model.

Tables 8 and 9 showed the result included omitted variables; five independent variables (i.e. number of ATMs, number of POS terminals, number of debit card, number of mobile banking transaction and number of internet transaction) and two moderating variables (i.e. mobile subscription and internet subscription fee). The following result is before moderating and independent variables were abridged.

Table 8: - Regression result PBT

Dependent Variable: PBT
 Method: Panel Least Squares
 Date: 04/15/16 Time: 21:00
 Sample (adjusted): 2011 2015
 Periods included: 5
 Cross-sections included: 5
 Total panel (balanced) observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NO_OF_POS	-6830484.	2755764.	-2.478617	0.0240
NO_OF_MOBILE_BANKING_TR	13798.91	20145.54	0.684961	0.5026
NO_OF_INTERNET_BANKING_	148898.0	391445.0	0.380380	0.7084
NO_OF_DEBIT_CARDS	13726.44	10068.66	1.363284	0.1906
NO_OF_ATM	8388961.	16652520	0.503765	0.6209
MOBILE	293.8419	916.1563	0.320733	0.7523
INTERNET	-1112.883	2743.252	-0.405680	0.6900
C	-3.83E+08	9.01E+09	-0.042543	0.9666

R-squared	0.791703	Mean dependent var	3.47E+09
Adjusted R-squared	0.705933	S.D. dependent var	6.12E+09
S.E. of regression	3.32E+09	Akaike info criterion	46.93694
Sum squared resid	1.87E+20	Schwarz criterion	47.32698
Log likelihood	-578.7117	Hannan-Quinn criter.	47.04512
F-statistic	9.230598	Durbin-Watson stat	0.657919
Prob(F-statistic)	0.000097		

(Source: Author's computation)

Table 9: - Regression result ROA

Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/15/16 Time: 21:03
Sample (adjusted): 2011 2015
Periods included: 5
Cross-sections included: 5
Total panel (balanced) observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.039305	0.022269	1.765008	0.0955
NO_OF_POS	-1.72E-05	6.81E-06	-2.525252	0.0218
NO_OF_MOBILE_BANKING_TR	8.02E-08	4.98E-08	1.611329	0.1255
NO_OF_INTERNET_BANKING_	1.11E-06	9.67E-07	1.149240	0.2664
NO_OF_DEBIT_CARDS	-2.45E-10	2.49E-08	-0.009854	0.9923
NO_OF_ATM	-8.11E-06	4.12E-05	-0.197144	0.8461
INTERNET	-5.38E-09	6.78E-09	-0.793806	0.4382
MOBILE	1.26E-09	2.26E-09	0.555000	0.5861

R-squared	0.590977	Mean dependent var	0.040280
Adjusted R-squared	0.422556	S.D. dependent var	0.010787
S.E. of regression	0.008197	Akaike info criterion	-6.515687
Sum squared resid	0.001142	Schwarz criterion	-6.125647
Log likelihood	89.44609	Hannan-Quinn criter.	-6.407506
F-statistic	3.508927	Durbin-Watson stat	2.226222
Prob(F-statistic)	0.016262		

(Source: Author's computation)

The results showed in the above tables were not statistically significant; at the same time there is multicollinearity problem in their data. It is to say the data were not linear; in other words, there is conflict or contradiction among the variables. Therefore, the data did not satisfy the required test result, as a result, the variables were omitted because of the reason for autocorrelation. Consequently, the independent variables such as mobile transaction and internet banking transaction along with the moderating variables internet subscription and

mobile subscription were omitted. The following results obtained by omitted the mentioned variables and optimizing the observation by taking only three independent cross reacting with 10 Commercial Banks. Shortly below the table 10 showed the regression result of PBT and the analysis and discussion regarding the results showed in the table.

Table 10: - Regression Result PBT

Dependent Variable: PBT
 Method: Panel Least Squares
 Date: 04/23/16 Time: 10:55
 Sample: 2013 2015
 Periods included: 3
 Cross-sections included: 10
 Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.97E+09	1.08E+09	1.822060	0.0820
POS	-6817836.	2282468.	-2.987045	0.0070
CARD	20996.04	5289.976	3.969025	0.0007
ATM	-2193047.	11385283	-0.192621	0.8491
R-squared	0.766135	Mean dependent var		3.47E+09
Adjusted R-squared	0.732725	S.D. dependent var		6.12E+09
S.E. of regression	3.16E+09	Akaike info criterion		6.489520
Sum squared resid	2.10E+20	Schwarz criterion		-2.774002
Log likelihood	-580.1590	Hannan-Quinn criter.		-8.681023
F-statistic	22.93177	Durbin-Watson stat		2.263427
Prob(F-statistic)	0.000001			

(Source: Author's computation)

4.3. Effect of E-banking on the Bank Profitability

The first hypothesis of the study was whether E-banking has a significant positive relationship with profitability of commercial banks in Ethiopia; the hypothesis was assessed by use of secondary data that has been collected from selected commercial banks.

Data on E-banking and profit before tax for the banking industry for the period 2013 to 2015 was analysed using regression tests; Results on Table 10 showed that E-banking explains 76.6% variations of profit before tax of commercial banks in Ethiopia. This figure

reveals that E-banking are statistically significant in explaining profit before tax of commercial banks in Ethiopia and hence supports the alternate hypothesis of the study. That is to say E-banking has significant positive relationship with Commercial Bank profitability.

4.3.1. POS Terminals and Bank Profitability

The figures of table 10 showed the influence of POS terminals on banks' profits, the result envisages that when other explanatory variables remain constant an installment of one POS terminal decrease profitability and statistically significant at 1%. Although POS is statistically significant but have negative influence on banks' profitability. The negative influence refers to the relation between the independent variable POS with the dependent variable, i.e. profitability. It means as POS number increases the profitability of the bank will be compromised with respect to the existing number of customers. However, if the number of customers increase it is advisable to increase the POS for it has significance to boost the profit. For instance, in the present Ethiopia most POS terminals found at the door side of banks since customers can get the service from the bank the use of POS will be insignificant but it is recommended the POS will be installed far from banks where there is no bank services and where the shopping or marketing are highly concentrated areas it would increase the transaction. For instance, if POS terminals installed in supermarkets, customers can easily transact the finance into the account of the supermarket at this hence, the supermarket easily deposit its finance on its account and the bank charge fee also increased since it can work off office hours and distance. In short, the POS terminals have direct relationship with the number of customers.

The findings of this research contradict with the study result of Hasan *et al.* (2009) conducted in Italy concluded that availability of POS terminals made banks to improve their profits and cost efficiency consistently as the number of POS increase disregarding the number of customers. In other words, their result indicated POS have positive coefficient ratio whereas in this research it has negative coefficient ratio. Similarly, Kempainen (2003 & 2008) results in his study on European Union Banks, retail payments would support bank profitability if there was existence of retail payment transactions like the POS terminals. Although the above study of scholars in Europe have positive coefficient ratio of POS; like the result of this research POS is statistically significant in their studies.

However, the findings of the study by Nader (2011) in Saudi Arabia commercial banks which concluded that the availability of POS terminals did not improve the profit efficiency of the banks for the period 1998 to 2007 is similar with the results of this research regarding the coefficient ratio of POS but Nader (2011) results showed that POS is not statistically significant and have negative coefficient ratio.

4.3.2. Debit Cards and Bank Profitability

The result presented on table 10 showed the effect of debit cards on banks' profitability. The result envisaged that other explanatory variables remains constant Debit cards would have a positive influence on banks' profitability and also statistically significant at 1%.

The positive influence of debit card indicated that it has a positive impact on bank profitability. In other words, one unit of debit card rise the profitability of the bank also rises. Moreover, the rise of debit card would have strong impact on customer satisfaction.

POS and Debit Card enhance transaction by accessing the account of the customer anytime including out of office hours. Therefore, these innovative technologies pave the way to access the customers wherever they are at supermarkets, shops to transfer money from their account to the seller. These kinds of finance transaction will increase the profit of bank from service charge and make the transaction convenient for the customer. In addition, the customers were secured from theft and not carry bulk of money papers wherever they undergo shopping and market of any sort. Further, it is beneficial for the government by decreasing the printing of paper money that cost it sorely. In general, POS and Debit Card transactions have industrial, commercial and social significance in addition to the profitability of the bank.

Most commercial banks collect advisable profit from debit card users as commission income, since the cards are portable enough customers used aggressively to pay their bills on POS terminals and transfer and withdrawing money from ATM terminals; cost of POS terminals is relatively cheap, with such limited investment the banks collect a profit. That was why banks appreciate customers hold cards and promote to use. The regression result itself supports the action of banks.

For example in Ethiopia banks and card issuers have been using several methods to encourage customers to use their cards. These include discounts at selected service points for females. All these strategies are meant to contribute to the banks' bottom line. Cards are also affordable to both the banks and the customers and they do not require a lot of maintenance costs both at acquisition and when in operation. This makes cards quite attractive as an instrument for conducting transactions for customers and the banks. This high usage of cards attracts commission income for the bank which adds to the banks' profits.

The findings this research agree with those of Agboola (2006) that conduct a study in Nigeria and concluded that smart cards or debit and credit cards improved banks' income generation and had low capital needs and boosted banks' profits. Likewise Nofie (2011) also asserted that retail payment instruments like debit and credit cards are capable of enhancing bank performance. Further the study of Ngumi (2013) conducted in Kenya indicated that debit and credit cards boost banks profit by collecting commission income from users.

4.3.3. ATMs and Bank Profitability

The results of the effects of ATMs on the profitability of commercial banks also indicated in table 10. The result showed that other explanatory variables remains constant ATMs terminals have a negative influence on banks' profitability and also statistically not significant.

The number of ATM terminals has a negative impact on profitability mean; it is to mean as the number of ATM terminals increase the impact on profitability not attractive, or profitability would decrease. In other words, it does not bring profit since the customers solely withdraw the money. Whereas it increases customer satisfaction by accessing their account 7/24; the major reason was the cost of installation and price of ATM terminals compared to profit (i.e. the banks collect as a commission fee) was too expensive.

Ethiopian commercial banks installing ATM terminals to maintain customer's satisfaction, not gathering profit directly from the investment but it helps banks to collect profit from other sources; this mean if "there were happy customers there will be happy bank concept". Therefore, the banks installing more number of terminals proximity to key business areas such as: commercial malls, petrol stations, hospitals, open-space markets, supermarkets and

universities and colleges to attract more number of customers. Although ATM has little impact on the profitability of banks it increase the fluidity of market that fattens the economy of the nation.

In Ethiopia ATMs are not capable of generating profit for commercial banks irrespective of their cost but, due to the convenience they offer to bank customer's banks work aggressively to expand. Banks in Ethiopia have been marketing themselves by showcasing their ATM network across the country with an objective to attract more customers and eventually in the long run contribute to bank profits. Some banks in Ethiopia have further invested in intelligent ATMs which have face and finger print detection capabilities all in the need to attract more customers.

The result findings of this research agree with the result of Valahzaghrd and Bilandi (2014) study conducted in Iran banks during the period 2007-2012. Based on the results of their study they concluded that ATM and POS may not have any meaningful impact on profitability.

In contrast to the results of this research study the results of the following research findings on the impact of ATMs in the profitability of banking in different countries. For instance, Nader (2011) in a study conducted among Saudi Arabia banks during the period 1998-2007 where the results of the study confirmed that availability of ATMs and branches had a positive effect of profit efficiency of Saudi banks. Similar with Nader (2011) the study result by Agboola (2006) conducted in Nigeria showed that the increase in the adoption of ATMs had a positive impact on a bank's image and its profitability. In the same token, the study of Hasan *et.al.*(2009) conducted across the European Union which showed that ATMs increased bank profitability in terms of accounting ratios and cost efficiency. Likewise

the study of Gakure & Ngumi (2013) stated that ATMs contributed positively to the profits of commercial banks in Kenya.

Table 11: -Regression result ROA

Dependent Variable: ROA
 Method: Panel Least Squares
 Date: 04/23/16 Time: 10:31
 Sample: 2013 2015
 Periods included: 3
 Cross-sections included: 10
 Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047861	0.002926	16.35957	0.0000
POS	2.02E-05	6.18E-06	-3.270666	0.0037
CARD	4.48E-08	1.45E-08	3.092402	0.0055
ATM	6.86E-05	3.14E-05	-2.188512	0.0401
R-squared	0.621790	Mean dependent var		0.040280
Adjusted R-squared	0.539189	S.D. dependent var		0.010787
S.E. of regression	0.008769	Akaike info criterion		-6.489520
Sum squared resid	0.001615	Schwarz criterion		-6.294500
Log likelihood	85.11901	Hannan-Quinn criter.		-6.435430
F-statistic	5.106329	Durbin-Watson stat		2.022169
Prob(F-statistic)	0.000251			

(Source: Author's Computation)

4.4. Effect of E-banking on the Rate of Return on Assets

The second hypothesis of the study was whether E-banking has significant positive relationship with return on assets of commercial banks in Ethiopia. The hypothesis was verified from the secondary data that collected from the banks.

Data on E-banking and return on asset for the banking industry over the period 2013 to 2015 was analysed using regression tests; Results on Table 11 showed that E-banking explains 62.2% variations of ROA of commercial banks in Ethiopia. This figure reveals that E-banking is statistically significant in explaining ROA of commercial banks in Ethiopia and hence supports the alternate hypothesis of the study. That is to say E-banking has

significant positive relationship with ROA.

4.4.1. POS Terminals and Return on Assets

The figures of table 11 showed the influence of POS terminals on ROA, the result envisages that when other explanatory variables remain constant an installment of one POS terminal increase profitability and statistically significant at 1%. Therefore POS is statistically significant and has positive influence on ROA. The positive influence refers to the relation between the independent variable POS with the dependent variable, i.e. ROA. It means as POS number increases the ROA of the bank will be boost with respect to the existing number of customers; again it also brought shareholders collect return.

Point of Sale terminals network is being expanded by the Ethiopian Commercial banks because it provides an opportunity to serve more bank customers in the urban and remote areas. POS terminals have provided an opportunity for Ethiopian commercial banks to establish agent banking in non-traditional bank locations and thus providing more income for banks. Again it does not require huge initial capital outlay but has a high income generating potential because it allows customers to purchase, pay bills and access statements; thus it enables banks to earn more and improving their return on assets. These have led to reduction and control of banks' operational costs and hence maximize profits leading to improved return to assets.

The result findings of this research agree with the result of Kemppainen (2003 & 2008) the study done among the EU countries found that POS terminals were capable of improving banks' profitability and hence return on assets. The findings are further supported by Nofie (2011) and Iftekhar *et.al.* (2009), which was in line with findings of this study, as observed

from the study that POS terminals contributed to banks' income and return on assets where there is more retail payments transaction equipment like the POS terminals.

4.4.2. Debit Cards and Return on Assets

The result presented on table 11 showed the effect of debit cards on ROA. The result envisaged that when other explanatory variables remains constant Debit cards would have a positive influence on ROA and also statistically significant at 1%.

The positive influence of debit card indicated that it has a positive impact on ROA, this seems that if the number of debit card increase by one unit the ROA also increase proportionally. The major reason for increment of ROA was that the customers can easily access their account at any time; besides, using debit card either withdrawing or transferring money from ATM and paying their bill at POS terminals is possible and manageable. As a result the banks get more return as a fee charge increase during the non-stopping transaction not hindered by geography or off hours of work time.

For example, in Ethiopia CBE have created partnerships with several retail outlets like supermarkets, hospitals, petrol stations and hotels and managed to have joint income sharing agreements when bank customers use their cards at such outlets. Cards also present a convenient opportunity for customers to transact without the need to carry cash and hence leading to high growth in use of cards and hence more returns for the banks.

The findings of this study on ROA is consistent with those of Ngumi (2013) results of a study conducted in Kenya where the target study units for this research were 20 conveniently selected commercial banks for the year 2002-2011 was observed and

concluded that both debit and credit cards improved profitability of a bank and hence the return on assets. Debit and credit cards do not involve a heavy initial capital outlay and hence have a shorter payback period. Likewise Nofie (2011) and Kemppainen (2008) found that use of cards enabled banks to make more income and hence bring better return on bank assets if the banks encouraged their customers to use them at retail outlets.

4.4.3. ATMs and Return on Assets

The results of table 11 indicated that ATMs influenced operational costs of a bank and also return on assets as well. As indicated in the result where other explanatory variables remain constant ATMs terminals have a positive influence on ROA and statistically significant at 5%.

ATM has a positive impact on ROA, this seems that if the number of ATM terminals increase by one unit the ROA also increase by the specified number of result. The major reason was the customers easily access their account at any time, by using debit card either withdrawing or transferring money. These led banks get more return in the form of charge fee.

The findings indicate that ATMs have potential to generate income for banks and hence the aggressive ATM network expansion by commercial banks in Ethiopia. Moreover, ATM machines are now located at non-traditional locations like at the petrol stations, supermarkets, universities and colleges and in the rural areas, indicating the importance that banks attach to ATM machines in reaching and maintaining customers and strategically earning fees for their use.

Akram & Allam (2010) conducted a study in Jordan and found that use of information technology which is embodied in ATMs improved the matrix of financial and

operational performance. The study concluded that information technology had a strong impact on return on assets which is consistent to the findings of this study. Likewise Ngumi (2013) the study conducted in Kenya “impact of e-banking on financial performance” conclude that ATMs have a positive significant impact on ROA. Furthermore, in the study done in the US by Nadia *et.al.*(2003) it was observed that use of ATMs led to responses on internal cost cutting leading to better return on assets; this result has similar outcome with the findings of this research.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

Conclusion

Based on the findings of the study, it can be concluded that E-banking influence financial performance of commercial banks in Ethiopia positively. The adoption of E-banking by commercial banks has a high potential of improving financial performance and hence better returns to the shareholders. The versatility of E-banking has made their adoption rate to be high among both the banks and their customers. It could have been challenging if the adoption was only with either the banks or the customers. Banks in Ethiopia have continued to perform well even when other sectors of the economy show lagged performance. This can be explained by the use of e-banking which have enabled banks to start making income away from traditional sources like interest, trade and asset financing. Banks have been able to make more commission income from transactions done on e-banking channels like; debit cards and point of sale terminals.

In general, the research thoroughly examined the impact of e-banking particularly selecting transaction machines such as ATMs, POS, and Debit Cards on the profitability and ROA of 10 Ethiopian Commercial Banks. Entirely the results collectively applaud the hypotheses. It is vividly witnessed by the analysis of the results of the study that POS and ATMs have negative impact on the profitability of banks but have positive impact on ROA of banks. In contrast, Debit Cards have positive influence on the profitability as well as on ROA of commercial banks. Although ATMs have no significant impact in the profitability of banks, it jointly contributes to increasing ROA in commercial banks along with POS and Debit Cards.

E-banking were found to have a high prediction power in terms of grouping banks using predictive discriminant analysis. It should also be noted that the performance on the Ethiopia banking sector is not purely and wholly derived from e-banking because there are other drivers of financial performance in the sector like; regulations, human resource, quality of management and corporate governance. Nonetheless, the contribution of e-banking cannot be belittled since the results indicated that in short period of adoption the Ethiopian Commercial Banks are delight in amassing profits using e-banking.

To sum up the e-banking fuelled the Commercial Banks of Ethiopia a great deal of cash capital flow that increase the profitability as well as ROA of the banks. Although the result indicated some negative influences by the selected variables, it is very clear that e-banking is promising activity to increase the performance of Ethiopian Commercial Banks. Further, although evidences from previous studies on whether E-banking influence bank performance showed that there was mixed results based on the operating environment and the level of adoption. In Ethiopia where there is a low level of adoption of E-banking in the banking sector the results on performance of banking is not controversial and confusing.

Recommendations

Based on the findings of this research the following recommendation was made:

- To increase the profitability impact of POS and ATMs, Ethiopian Commercial Banks are strongly suggested to installing POS and ATMs machines more comprehensively.
- Still the e-banking have potential to address problems of banking services positively for remote areas. Hence, it is strongly suggested to ICT professionals to explore innovative solutions such as deposit cashes using ATM.
- Additionally, the government should have a policy to change all cash marketing into electronic marketing to fatten its revenue and curb tax evasions as well as reducing cost printing and minting money.
- Finally, researchers specializing in financial sector strongly recommended to exploit the e-banking contribution as the economy and finance of the nation astronomically rises in the near future.

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Appendix I: - List of Commercial Banks in Ethiopia 2015G.C

	Bank Name	Profit in ETB
1	Abay Bank S.C	75,000,000.00
2	Addis International Bank	90,000,000.00
3	Awash International Bank	1,856,300,000.00
4	Bank of Abyssinia	351,300,000.00
5	Berhan International Bank	131,000,000.00
6	Bunna International Bank	109,000,000.00
7	Commercial Bank of Ethiopia	4,545,540,000.00
8	Cooperative Bank of Oromia	485,000,000.00
9	Dashen Bank	28,000,000.00
10	Dehub Global Bank	19,000,000.00
11	Enat Bank	39,000,000.00
12	Lion International Bank	128,000,000.00
13	Nib International Bank	420,000,000.80
14	Oromia International Bank	205,000,000.40
15	United Bank	350,000,000.00
16	Wegagaen Bank	394, 000,000.30
17	Zemen Bank	131,000,000.00

(Source: National Bank of Ethiopia, 2015)

Appendix II: Data Collection Sheet

	Bank	Year	ATM	Dcard	POS	ROA	PBT
1	CBE	2013	258	300470	206	0.05	8424000000
1	CBE	2014	433	973762	244	0.04	9686000000
1	CBE	2015	644	1604363	1886	0.05	12664000000
2	WB	2013	150	135716	166	0.03	4500000000
2	WB	2014	242	172270	323	0.03	4140000000
2	WB	2015	339	234533	479	0.03	4530000000
3	NIB	2013	40	16500	200	0.04	378573939
3	NIB	2014	60	41500	300	0.04	414616144
3	NIB	2015	130	101500	700	0.04	440800710
4	DB	2013	105	254933	780	0.03	8130000000
4	DB	2014	170	303040	827	0.02	9890000000
4	DB	2015	220	367567	873	0.03	9640000000
5	ZB	2013	40	20615	150	0.03	123810853
5	ZB	2014	50	24236	200	0.04	165017423
5	ZB	2015	60	29001	250	0.04	200512713
6	AIB	2013	120	33476	75	0.02	583018655
6	AIB	2014	120	39083	100	0.03	828806605
6	AIB	2015	120	67121	280	0.03	861222528
7	UB	2013	20	20888	10	0.03	374162288
7	UB	2014	67	53487	60	0.02	361022700
7	UB	2015	68	70162	93	0.02	358238411
8	AB	2013	25	4428	30	0.03	351467529
8	AB	2014	25	6236	40	0.02	351488741
8	AB	2015	50	15000	60	0.02	373964686
9	OIB	2013	10	10450	10	0.03	206335151
9	OIB	2014	93	102549	45	0.06	258383225
9	OIB	2015	105	203598	105	0.04	682521760
10	CBO	2013	15	3200	20	0.02	266959221
10	CBO	2014	20	6500	40	0.03	475851926
10	CBO	2015	50	12653	50	0.04	602000000

Appendix III: - Variables Operationalization Framework

No	Variable Name	Nature of Variable	Variable Indicators & Measurement	Data Collection Method	Type of Analysis	Level of Analysis
1	Automated Teller Machine	Independent	Number of Automated Teller Machines in use by the end of each year	data collection sheet	Quantitative	Descriptive & Regression Analysis
2	Debit Card	Independent	Number of total debit cards on issue by the end of each year	data collection sheet	Quantitative	Descriptive & Regression Analysis
3	POS Terminals	Independent	Number of total point of sale terminals on issue by the end of each year	data collection sheet	Quantitative	Descriptive & Regression Analysis
4	Profit before Tax	Dependent	Ethiopian Birr value of profit before tax by the end of each year	data collection sheet	Quantitative	Descriptive & Regression Analysis
5	Return on Assets	Dependent	Ethiopian Birr Value of total assets divided by profit before tax by the end of each year	data collection sheet	Quantitative	Descriptive & Regression Analysis

Appendix IV: - Regression Result

Dependent Variable: PBT
 Method: Panel Least Squares
 Date: 04/23/16 Time: 10:55
 Sample: 2013 2015
 Periods included: 3
 Cross-sections included: 10
 Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.97E+09	1.08E+09	1.822060	0.0820
POS	-6817836.	2282468.	-2.987045	0.0070
CARD	20996.04	5289.976	3.969025	0.0007
ATM	-2193047.	11385283	-0.192621	0.8491
R-squared	0.766135	Mean dependent var		3.47E+09
Adjusted R-squared	0.732725	S.D. dependent var		6.12E+09
S.E. of regression	3.16E+09	Akaike info criterion		6.489520
Sum squared resid	2.10E+20	Schwarz criterion		-2.774002
Log likelihood	-580.1590	Hannan-Quinn criter.		-0.681023
F-statistic	22.93177	Durbin-Watson stat		2.263427
Prob(F-statistic)	0.000001			

(Source: Author's computation)

Dependent Variable: ROA
 Method: Panel Least Squares
 Date: 04/23/16 Time: 10:31
 Sample: 2013 2015
 Periods included: 3
 Cross-sections included: 10
 Total panel (balanced) observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047861	0.002926	16.35957	0.0000
POS	2.02E-05	6.18E-06	-3.270666	0.0037
CARD	4.48E-08	1.45E-08	3.092402	0.0055
ATM	6.86E-05	3.14E-05	-2.188512	0.0401
R-squared	0.621790	Mean dependent var		0.040280
Adjusted R-squared	0.539189	S.D. dependent var		0.010787
S.E. of regression	0.008769	Akaike info criterion		-6.489520
Sum squared resid	0.001615	Schwarz criterion		-6.294500
Log likelihood	85.11901	Hannan-Quinn criter.		-6.435430
F-statistic	5.106329	Durbin-Watson stat		2.022169
Prob(F-statistic)	0.000251			

(Source: Author's Computation)